ESIE05-07

Service Manual

EWAP110~540MBYNN	R407C
EWAD120~340MBYNN	R134a
EWWD120~540MBYNN	R134a
EWLD120~540MBYNN	R134a
ERAP110~170MBYNN	R407C
EWTP110~540MBYNN	R407C

Air-cooled chillers, heat pump chillers and heat recovery chillers

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Table of Contents

1 Introduction

Part 1 System Outline

1 General Outline

2 Piping Layout

3 Wiring Layout

Part 2
Functional Description

1 Operation Range

2 Functional Control for a Standalone Unit

3 The Functional Controller for DICN

4 The Digital Controller For Large chillers

Part 3 Troubleshooting

1 Overview of Fault Indications and Safeties

2 Checking the Digital Inputs and Outputs

3 Troubleshooting of Inverter with the Status Display Panel

4 Procedure for software upload/download

5 Procedure to Protect Compressor in Case of Frozen Evaporator

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

7 Manual Upload or Download Control Motor Test Procedure

8 EEV Driver Error List

Part 4
Commissioning and Test Run

1 Pre-Test Run Checks

2 Test Run and Operation Data

Part 5
Maintenance

1 Maintenance

Part 6
Appendix

1 Appendix

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 EWAP110~540MBYNN, EWAD120~340MBYNN, EWWD120~540MBYNN, EWLD120~540MBYNN, ERAP110~170MBYNN and EWTP110~540MBYNN.

EWAP110~540MBYNN

The Daikin EWAP110~540MBYNN air-cooled water chillers:

- Are designed for outdoor installation.
- Are used for cooling applications.
- Used refrigerant R407C.
- Are available in 9 standard sizes with nominal cooling capacities ranging from 111 kW to 541 kW.

EWAD120~340MBYNN

The Daikin EWAD120~340MBYNN air-cooled water chillers:

- Are designed for outdoor installation.
- Are used for cooling applications.
- Used refrigerant R134a.
- Are available in 6 standard sizes with nominal cooling capacities ranging from 121 kW to 330 kW.

EWWD120~540MBYNN

The Daikin EWWD120~540MBYNN heat pump water chillers:

- Are designed for indoor installation.
- Are used for cooling and heating applications.
- Used refrigerant R134a.
- Are available in 9 standard sizes with nominal cooling capacities ranging from 123 kW to 546 kW and with nominal heating capacities ranging from 147 KW to 655 KW.

EWLD120~540MBYNN

The Daikin EWLD120~540MBYNN heat pump water chillers:

- Are designed for indoor installation.
- Are used for cooling and heating applications.
- Used refrigerant R134a.
- Are available in 9 standard sizes with nominal cooling capacities ranging from 123 kW to 546 kW and with nominal heating capacities ranging from 147 KW to 655 KW.

ERAP110~170MBYNN

The Daikin ERAP110~170MBYNN Air-cooled chillers:

- Are designed for outdoor installation.
- Are used for cooling applications.
- Used refrigerant R407C.
- Are available in 3 sizes with nominal cooling capacities ranging from 114 kW to 171kW.

EWTP110~540MBYNN

The Daikin EWTP110~540MBYNN head recovery chillers:

- Are designed for outdoor installation.
- Are used for cooling and heat recovery applications.
- Used refrigerant R407C.
- Are available in 9 sizes with nominal cooling capacities ranging from 107 kW to 520 kW.
- Cooling capacity during heat recovery from 97,7 Kw to 465 Kw.
- Heat recovery capacity from 116kw to 441KW.

Before starting up the unit

Before starting up the unit for the first time, make sure it has been properly installed. See "Pre-Test Run Checks" on page 4–3.

Part 1
System Outline

Introduction

This part contains an outline of all the relevant elements in the EWAP110~540MBYNN, EWAD110~340MBYNN, EWWD120~540MBYNN, EWLD120~540MBYNN, ERAP110~170MBYNN and EWTP110~540MBYNN 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
- Installation outline of a typical installation
- Outlook drawings: Outlook, dimensions, installation and service space.

Overview

This chapter contains the following topics:

1.2 Technical Specifications: EWAP110~540MBYNN

Technical specifications

The table below contains the technical specifications.

Model	EWAP 110MBYNN	EWAP 140MBYNN	EWAP 160MBYNN	EWAP 200MBYNN	EWAP 280MBYNN	EWAP 340MBYNN	EWAP 400MBYNN	EWAP 460MBYNN	EWAP 540MBYNN
Nominal cooling capacity (1)	111 kW	144 kW	164 kW	199 kW	285 kW	349 kW	395 kW	468 kW	541 kW
Nominal input (2)	41.9 kW	51.8 kW	64.3 kW	78.1 kW	108 kW	140 kW	156 kW	189 kW	222 kW
Capacity steps	30-100% Stepless						15-100% Stepless		
Compressor									
Type	Semi-hermetic single screw compressor								
Speed	2880 rpm								
Crankcase heater	1x150 W								
No. x model (Y1)	1 x ZHC3LTGUYE	1 x ZHC3WLGUYE	1 x ZHC5LMGUYE	1 x ZHC5WLGUYE	1 x ZHC7LSGUYE	1 x ZHC7WSGUYE	2 x ZHC5WLGUYE	1 x ZHC5WLGUYE + 1 x ZHC7LSGUYE	2 x ZHC7LSGUYE
Evaporator									
Type	Brased plate heat exchanger, one per circuit								
No. x model	1 x AC120EQ-NP80	1 x AC120EQ-NP120	1 x AC120EQ-NP156	1 x AC250EQ-NP96	1 x AC250EQ-NP128	1 x AC250EQ-NP162	2x AC250EQ-NP96	1x AC250EQ-NP96 + 1x AC250EQ-NP128	2 x AC250EQ-NP128
Min.water volume in the system (3)	540 l	700 l	800 l	970 l	1390 l	1710 l	970 l	1140 l	1320 l
Water flow rate (min/max)	160/640 l/min	205/825 l/min	235/940 l/min	285/1140 l/min	410/1640 l/min	500/2000 l/min	565/2265 l/min	670/2680 l/min	775/3100 l/min
Nominal water flow	318 l/min	413 l/min	470 l/min	570 l/min	817 l/min	1000 l/min	1132 l/min	1342 l/min	1551 l/min
Nom. water pressure drop	50 kPa	48 kPa	41 kPa	31 kPa	42 kPa	52 kPa	35 kPa	39 kPa	44 kPa
Insulation material	PVC nitril foam								
Condenser									
Type	Cross fin coil / Hi-X tubes and PE coated waffle louvre fins								
Rows x stages x fin pitch	2 x (48+2) x 2 mm	3 x (48+2) x 2 mm		2 x (48+2) x 2 mm	3 x (48+2) x 2 mm				
Face area	8.4 m²			16.8 m²			25.2 m²		
Nominal air flow	960 m³/min			1920 m³/min			2880 m³/min		
Discharge	Vertical								
Fan type	Direct drive								
No. of fans	4			8			12		
No. of motors x output	4 x 550 kW	4 x 1020 kW		8 x 550 kW	8 x 1020 kW		12 x 1020 kW		
Piping connections (4)									
Evap. water in/outlet	Flexible coupling + counterpipe for welding 3"OD			Flexible coupling + counterpipe for welding 3"			Flexible coupling + counterpipe for welding 5"		

Model	EWAP 110MBYNN	EWAP 140MBYNN	EWAP 160MBYNN	EWAP 200MBYNN	EWAP 280MBYNN	EWAP 340MBYNN	EWAP 400MBYNN	EWAP 460MBYNN	EWAP 540MBYNN
Refrigerant circuit									
Refrigerant type	R407C								
Refrigerant charge	27 kg	39 kg	42 kg	58 kg	84 kg	84 kg	128 kg	129 kg	130 kg
Refrigerant control	Thermostatic expansion valve								
Oil type	Idemitsu FVC 68D								
Oil charge volume	5.5 l		7.5 l		10 l		2 x 7.5 l	7.5+10 l	2x10 l
No. of circuits	1						2		
Dimensions (h x w (5) x d (5))	2250 x 2346 (2700) x 2238 mm			2250 x 4280 (4495) x 2238 mm			2250 x 5901 x 2238 (2653) mm		
Weight									
Machine weight	1417 kg	1571 kg	1660 kg	2203 kg	2583 kg	2633 kg	4865 kg	4988 kg	5111 kg
Operation weight	1425 kg	1584 kg	1676 kg	2223 kg	2610 kg	2667 kg	4939 kg	5069 kg	5199 kg
Casing									
Colour	Ivory white / Munsell code 5Y7.5/1 / ± RAL 7044								
Material	Polyester coated galvanised steel plate								
Sound power leve	91 dBA	96 dBA		97 dBA	99 dBA	100 dBA	101 dBA		
Safety devices	■ Double PED approved high pressure switches ■ Low pressure protection ■ Pressure relief valve on condenser ■ Compressor motor thermal protector ■ Compressor motor overcurrent relay ■ Discharge temperature controller ■ Freeze up protection ■ Recycling and quard timer ■ Reverse phase protector/flow switch								

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C
2. Nominal cooling power input at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C
3. Minimum required watervolume for standard thermostat setting and at nominal conditions.
4. Piping connections are delivered with victaulic joint and counterpipe for welding.
5. Dimension values between brackets include installation space of delivered filter.

1

1.3 Technical Specifications: EWAD120~340MBYNN

Technical specifications

The table below contains the technical specifications.

Model	EWAD 120MBYNN	EWAD 150MBYNN	EWAD 170MBYNN	EWAD 240MBYNN	EWAD 300MBYNN	EWAD 340MBYNN
Nominal cooling capacity (1)	121 kW	149 kW	171 kW	226 kW	286 kW	330 kW
Nominal input (2)	41.1 kW	54.1 kW	64.9 kW	83.7 kW	105 kW	136 kW
Capacity steps	30-100% Stepless					
Compressor						
Type	Semi-hermetic single screw compressor					
Speed	2880 rpm					
Crankcase heater	1x150 W					
No. x model (Y1)	1 x ZHA5LMGUYE	1 x ZHA5WLGUYE	1 x ZHA7MSGUYE	2 x ZHA5LMGUYE	2 x ZHA5WLGUYE	2 x ZHA7MSGUYE
Evaporator						
Type	Shell & Tube heat exchanger					
No. x model	DES135	DES175	DES175	DED240	DED315	DED315
Min.water volume in the system (3)	590 l	730 l	840 l	550 l	700 l	810 l
Water flow rate (min/max)	150/490 l/min	200/725 l/min	200/725 l/min	300/930 l/min	395/1165 l/min	395/1165 l/min
Nominal water flow	345 l/min	427 l/min	492 l/min	649 l/min	820 l/min	946 l/min
Nom. water pressure drop	31.7 kPa	18.6 kPa	24.8 kPa	41 kPa	36.6 kPa	49.1 kPa
Insulation material	PVC nitril foam					
Condenser						
Type	Cross fin coil / Hi-X tubes and PE coated waffle louvre fins					
Rows x stages x fin pitch	2 x (48+2) x 2 mm	3 x (48+2) x 2 mm		2 x (48+2) x 2 mm	3 x (48+2) x 2 mm	
Face area	8.4 m²			16.8 m²		
Nominal air flow	960 m³/min			1920 m³/min		
Discharge	Vertical					
Fan type	Direct drive					
No. of fans	4			8		
No. of motors x output	4 x 550 kW	4 x 1020 kW		8 x 550 kW	8 x 1020 kW	
Piping connections (4)						
Evap. water in/outlet	3'' victaulic coupling	4'' victaulic coupling			5'' victaulic coupling	

Model	EWAD 120MBYNN	EWAD 150MBYNN	EWAD 170MBYNN	EWAD 240MBYNN	EWAD 300MBYNN	EWAD 340MBYNN
Refrigerant circuit						
Refrigerant type	R134a					
Refrigerant charge	26 kg	37 kg	42 kg	60 kg	82 kg	88 kg
Refrigerant control	Thermostatic expansion valve					
Oil type	Idemitsu FVC 68D					
Oil charge volume	7.5 l		10 l	2x7.5 l	2x10 l	2x10 l
No. of circuits	1			2		
Dimensions (h x w x d)	2221 x 3973 x 1109 mm			2250 x 4280 x 2238 mm		
Weight						
Machine weight	1391 kg	1600 kg	1705 kg	2710 kg	3210 kg	3260 kg
Operation weight	1441 kg	1663 kg	1768 kg	2790 kg	3340 kg	3390 kg
Casing						
Colour	Ivory white / Munsell code 5Y7.5/1 / ± RAL 7044					
Material	Polyester coated galvanised steel plate					
Sound power level	87 dBA	94 dBA	92 dBA	90 dBA	97 dBA	95 dBA
Safety devices	■ Double PED approved high pressure switches ■ Low pressure protection ■ Pressure relief valve ■ Compressor motor thermal protector ■ Compressor motor overcurrent relay ■ Discharge temperature controller ■ Freeze up protection ■ Recycling and quard timer ■ Reverse phase protector/flow switch					

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C.
2. Nominal cooling power input at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C.
3. Minimum required watervolume for an thermostat difference between compressor ON and OFF of 2.2°C and at nominal operating conditions.
4. Piping connections are delivered with victaulic joint and counterpipe for welding.

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1.4 Technical Specifications: EWWD120~540MBYNN

Technical specifications

The table below contains the technical specifications.

Model		EWWD 120MBYNN	EWWD 180MBYNN	EWWD 240MBYNN	EWWD 280MBYNN	EWWD 360MBYNN	EWWD 440MBYNN	EWWD 500MBYNN	EWWD 520MBYNN	EWWD 540MBYNN
Nominal cooling capacity	Cooling (1)	123 kW	183 kW	249 kW	273 kW	366 kW	432 kW	498 kW	522 kW	546 kW
	Heating (2)	147 kW	216 kW	290 kW	327 kW	431 kW	505 kW	580 kW	617 kW	655 kW
Nominal input	Cooling (3)	28.7 kW	45.2 kW	61.6 kW	69.2 kW	90.5 kW	107 kW	123 kW	131 kW	138 kW
	Heating (4)	34.5 kW	54.0 kW	72.8 kW	83.4 kW	108 kW	127 kW	146 kW	156 kW	167 kW
Capacity steps		30-100% Stepless						15-100% Stepless		
Compressor										
Type		Semi-hermetic single screw compressor								
Speed		2880 rpm								
Crankcase heater		1x150 W								
No. x model (Y1)		1 x ZHA5LMGUYE	1 x ZHA7MSGUYE	1 x ZHA7WSGUYE	1 x ZHA9LSGUYE	2 x ZHA7MSGUYE	1 x ZHA7MSGUYE + 1 x ZHA7WSGUYE	2 x ZHA7WSGUYE	1 x ZHA7WSGUYE + 1 x ZHA9LSGUYE	2 x ZHA9LSGUYE
Evaporator										
Type		Brased plate heat exchanger, one per circuit								
No. x model		1 x AC120EQ-NP156	1 x AC250Q-NP96	1 x AC250Q-NP128	1 x AC250Q-NP162	2 x AC250Q-NP96	1x AC250EQ-NP96 + 1x AC250Q-NP128	2x AC250Q-NP128	1x AC250EQ-NP128 + 1x AC250EQ-NP162	2 x AC250EQ-NP162
Min.water volume in the system (5)		600 l	890 l	1220 l	1330 l	895 l	1055 l	1215 l	1275 l	1335 l
Water flow rate (min/max)		175/700 l/min	265/1070 l/min	350/1400 l/min	400/1600 l/min	525/2100 l/min	625/2500 l/min	700/2800 l/min	750/3000 l/min	800/3200 l/min
Nominal water flow		353 l/min	525 l/min	714 l/min	783 l/min	1049 l/min	1238 l/min	1428 l/min	1496 l/min	1565 l/min
Nom. water pressure drop		23 kPa	28 kPa	33 kPa	31 kPa	28/28 kPa	28/33 kPa	33/33 kPa	33/31 kPa	31/31 kPa
Insulation material		Polyethyleen foam								
Condenser										
Type		Shell & tube								
Qty x model		1 x CDEW215	1 x CDEW260	1 x CDEW400	1 x CDEW450	2 x CDEW260	CDEW400 + 260	2 x CDEW400	CDEW400 + 450	2 x CDEW450
Nominal water flow		435	654	890	981	1309	1545	1781	1871	1962
Water flow rate (min/max)		217/800 l/min	336/1050 l/min	450/1230 l/min	520/1370 l/min	670/2100 l/min	790/2290 l/min	900/2470 l/min	970/260 l/min	1040/2730 l/min
Nom. water pressure drop		20 kPa	30 kPa	30 kPa	38 kPa	38 kPa	30/30 kPa	30/30 kPa	30/38 kPa	38/38 kPa
Piping connections (6)										
Evap. water in/outlet		3” OD victaulic	3” OD victaulic							
Refrigerant circuit										
Refrigerant type		R134a								
Refrigerant charge		18 kg	35 kg	37 kg	38 kg	70 kg	72 kg	74 kg	75 kg	76 kg
Refrigerant control		Thermostatic expansion valve		Electr. Exp valve		2 x Therm. Exp. valve	1 x Therm. Exp. valve + 1 x Electr. Exp valve	2 x Electr. Exp. valve		
Oil type		Idemitsu FVC 68D								

Model	EWWD 120MBYNN	EWWD 180MBYNN	EWWD 240MBYNN	EWWD 280MBYNN	EWWD 360MBYNN	EWWD 440MBYNN	EWWD 500MBYNN	EWWD 520MBYNN	EWWD 540MBYNN
Oil charge volume	7.5 l	10 l		14 l	10 l	2 x 10 l		10 + 14 l	2x14 l
No. of circuits	1				2				
Dimensions (h x w (7) x d (7))	1018 x 2681 (3051) x 930 mm	1018 x 2681 (3254) x 930 mm			2000 x 2681 (3254) x 930 mm				
Weight									
Machine weight	1000 kg	1273 kg	1527 kg	1623 kg	2546 kg	2800 kg	3034 kg	3150 kg	3346 kg
Operation weight	1032 kg	1318 kg	1588 kg	1693 kg	2636 kg	2906 kg	3156 kg	3281 kg	3485 kg
Casing									
Colour	Ivory white / Munsell code 5Y7.5/1 / ± RAL 7044								
Material	Polyester coated galvanised steel plate								
Sound power level	91 dBA	95 dBA	96 dBA		98 dBA	99 dBA			
Safety devices	■ Double PED approved high pressure switches ■ Low pressure protection ■ Pressure relief valve ■ Compressor motor thermal protector ■ Compressor motor overcurrent relay ■ Discharge temperature protector ■ Freeze up protection ■ Recycling and quard timer ■ Reverse phase protector/flow switch								

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator 12°C/7°C; Condenser 30°C/35°C.
2. Heating capacity for conditions: Evaporator 12°C/7°C; Condenser 40°C/45°C.
3. Nominal cooling power input at Eurovent conditions: Evaporator 12°C/7°C; Condenser 30°C/35°C.
4. Heating power input for conditions: Evaporator 12°C/7°C; Condenser 40°C/45°C.
5. Min. required water volume for standard thermostat setting and at nominal conditions.
6. Piping connections are delivered with victaulic joint and counterpipe for welding.
7. Dimension values between brackets include installation space of delivered filter.

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1.5 Technical Specifications: EWLD120~540MBYNN

Technical specifications

The table below contains the technical specifications.

Model	**EWLD 120MBYNN**	**EWLD 170MBYNN**	**EWLD 240MBYNN**	**EWLD 260MBYNN**	**EWLD 340MBYNN**	**EWLD 400MBYNN**	**EWLD 480MBYNN**	**EWLD 500MBYNN**	**EWLD 540MBYNN**
Nominal cooling capacity (1)	116 kW	170 kW	235 kW	265 kW	340 kW	405 kW	470 kW	500 kW	530 kW
Nominal input (2)	32 kW	49.8 kW	66.5 kW	77.9 kW	99.6 kW	116 kW	133 kW	144 kW	156 kW
Capacity steps	30-100% Stepless						15-100% Stepless		
Compressor									
Type	Semi-hermetic single screw compressor								
Speed	2880 rpm								
Crankcase heater	1x150 W								
No. x model (Y1)	1 x ZHA5LMGUYE	1 x ZHA7MSGUYE	1 x ZHA7WSGUYE	1 x ZHA9LSGUYE	2 x ZHA7MSGUYE	1 x ZHA7MSGUYE + 1x ZHA7WSGUYE	2 x ZHA7WSGUYE	1 x ZHA7WSGUYE + 1 x ZHA9LSGUYE	2 x ZHA9LSGUYE
Evaporator									
Type	Brased plate heat exchanger, one per circuit								
No. x model	1 x AC120EQ-NP156	1 x AC250Q-NP96	1 x AC250Q-NP128	1 x AC250Q-NP162	2 x AC250Q-NP96	1 x AC250Q-NP96 + 1x AC250Q-NP128	2x AC250Q-NP128	1x AC250EQ-NP128 + 1x AC250EQ-NP162	2 x AC250EQ-NP162
Min.water volume in the system (3)	570 l	830 l	1150 l	1300 l	830 l	990 l	1150 l	1220 l	1295 l
Water flow rate (min/max)	175/700 l/min	265/1070 l/min	350/1400 l/min	400/1600 l/min	525/2100 l/min	625/2500 l/min	700/2800 l/min	750/3000 l/min	800/3200 l/min
Nominal water flow	333 l/min	487 l/min	674 l/min	760 l/min	975 l/min	1161 l/min	1347 l/min	1434 l/min	1520 l/min
Nom. water pressure drop	23 kPa	28 kPa	32 kPa	30 kPa	28/28 kPa	28/33 kPa	33/33 kPa	33/31 kPa	31/31 kPa
Insulation material	Polyethyleen foam								
Piping connections (4)									
Evap. water in/outlet	3" OD victaulic	3" victaulic							
Refrigerant circuit									
Refrigerant type	R134a								
Refrigerant charge	No pre charge								
Refrigerant control	Therm. Exp. valve		Electr. Exp. valve		2 x Therm. Exp. valve	1 x Therm. Exp. valve + 1 x Electr. Exp. valve	2 x Electr. Exp. valve		
Oil type	Idemitsu FVC 68D								
Oil charge volume	7.5 l	10 l		14 l	10 l	2 x 10 l		10+14 l	2x14 l
No. of circuits	1				2				
Dimensions (h x w (5) x d (5))	1018 x 2681 (3051) x 930 mm	1018 x 2681 (3254) x 930 mm			2000 x 2681 (3254) x 930 mm				

Model	EWLD 120MBYNN	EWLD 170MBYNN	EWLD 240MBYNN	EWLD 260MBYNN	EWLD 340MBYNN	EWLD 400MBYNN	EWLD 480MBYNN	EWLD 500MBYNN	EWLD 540MBYNN
Weight									
Machine weight	891 kg	1110 kg	1342 kg	1428 kg	2220 kg	2452 kg	2684 kg	2770 kg	2858 kg
Operation weight	907 kg	1130 kg	1369 kg	1462 kg	2260 kg	2497 kg	2738 kg	2831 kg	2924 kg
Casing									
Colour	Ivory white / Munsell code 5Y7.5/1 / ± RAL 7044								
Material	Polyester coated galvanised steel plate								
Sound power level	91 dBA	95 dBA	96 dBA		98 dBA	99 dBA			
Safety devices	■ Double PED approved high pressure switches ■ Low pressure protection ■ Pressure relief valve ■ Compressor motor thermal protector ■ Compressor motor overcurrent relay ■ Discharge temperature protector ■ Freeze up protection ■ Recycling and guard timer ■ Reverse phase protector/flow switch								

Notes

1. Nominal cooling capacity at Eurovent conditions: Entering/Leaving water evaporator = 12°C/7°C; Condensing temperature = 45°C.
2. Nominal power input at Eurovent conditions: See Eurovent 6/C/003 Entering/Leaving water temperature = 12°C/7°C; Condensing temperature = 45°C.
3. Min. required water volume for standard thermostat settings and at nominal conditions.
4. Piping connections are delivered with victaulic joint and counterpipe for welding.
5. Dimension values between brackets include installation space of delivered filter.

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1.6 Technical Specifications: ERAP110~170MBYNN

Technical specifications

The table below contains the technical specifications.

Model	ERAP110MBYNN	ERAP150MBYNN	EWAD170MBYNN
Nominal cooling capacity (1)	114 kW	150 kW	171 kW
Nominal input	42.1 kW	52.1 kW	65.2 kW
Capacity steps	30-100% Stepless		
Compressor			
Type	Semi-hermetic single screw compressor		
Speed	2880 rpm		
Crankcase heater	1x150 W		
No. x model (Y1)	1 x ZHC3LTGUYE	1 x ZHC3WLGUYE	1 x ZHC5LMGUYE
Condenser			
Type	Cross fin coil / Hi-X tubes and PE coated waffle louvre fins		
Rows x stages x fin pitch	2 x (48+2) x 2 mm	3 x (48+2) x 2 mm	
Face area	8.4 m²		
Piping connections			
Condenser outlet	7/8”		
Compressor suction inlet	2”1/8”		
Relief device outlet	Compressor: 1”NPT		
Refrigerant circuit			
Refrigerant type	R407C		
Refrigerant charge	No pre-charge provided		
Refrigerant control	Thermostatic expansion valve		
Oil type	Idemitsu FVC 68D		
Oil charge volume	5.5 l		7.5 l
No. of circuits	1		
Dimensions (h x w x d)	2250 x 2346 x 2238 mm		
Weight			
Machine weight	1326 kg	1440 kg	1556 kg
Operation weight	–		
Casing			
Colour	Ivory white / Munsell code 5Y7.5/1 / ± RAL 7044		
Material	Polyester coated galvanised steel plate		
Sound power level	91 dBA	96 dBA	
Safety devices	■ Double PED approved high pressure switches ■ Low pressure protection ■ Pressure relief valve on compressor ■ Compressor motor thermal protector ■ Compressor motor overcurrent relay ■ Discharge temperature controller ■ Recycling and quard timer ■ Reverse phase protector		

Note

1. Cooling capacity/Power input conditions:

- Ambient = 35°C
- Suction dewpoint = 5°C
- Superheat = 10°C

1.7 Technical Specifications: EWTP110~540MBYNN

Technical specifications

The table below contains the technical specifications.

Model		**EWTP 110MBYNN**	**EWTP 140MBYNN**	**EWTP 160MBYNN**	**EWTP 200MBYNN**	**EWTP 280MBYNN**	**EWTP 340MBYNN**	**EWTP 400MBYNN**	**EWTP 460MBYNN**	**EWTP 540MBYNN**
Nominal cooling capacity	Cooling (1)	107 kW	138 kW	158 kW	191 kW	274 kW	335 kW	397 kW	449 kW	520 kW
	Cooling during Heat recovery (4)	97.7 kW	126 kW	144 kW	171 kW	251 kW	311 kW	337 kW	401 kW	465 kW
	Heat recovery capacity (4)	116 kW	148 kW	176 kW	208 kW	301 kW	377 kW	407 kW	434 kW	441 kW
Nominal input	Cooling (2)	43.7 kW	54 kW	67 kW	81.3 kW	113 kW	146 kW	163 kW	197 kW	232 kW
	Heat recovery mode (4)	39.4 kW	47.8 kW	62.4 kW	73.2 kW	103 kW	132 kW	142 kW	177 kW	214 kW
Head recovered		85%							75	65
Capacity steps		30-100% Stepless						15-100% Stepless		
Compressor										
Type		Semi-hermetic single screw compressor								
Qty x model (Y1)		1 x ZHC3LTGUYE	1 x ZHC3WLGUYE	1 x ZHC5LMGUYE	1 x ZHC5WLGUYE	1 x ZHC7LSGUYE	1 x ZHC7LSGUYE	2 x ZHC5WLGUYE	1 x ZHC5WLGUYE + 1 x ZHC7LSGUYE	2 x ZHC7LSGUYE
No. of compressors		1						2		
Speed		2880 rpm								
Refrigerant oil type		FVC68D								
Refrigerant oil charge		5.5 l		7.5 l		10 l		2x7.5 l	7.5+10 l	2x10 l
Crankcase heater		1x150 W						2x150 W		
Evaporator										
Type	Brased plate heat exchanger, one per circuit									
Qty. x model		1 x AC120EQ-NP80	1 x AC120EQ-NP120	1 x AC120EQ-NP156	1 x AC250EQ-NP96	1 x AC250EQ-NP128	1 x AC250EQ-NP162	2 x AC250EQ-NP96	1 x AC250EQ-NP96 1 x AC250EQ-NP128	2 x AC250EQ-NP128
Filter		WYE type strainer. Diameter perforation = 1mm								
Minimum water volume in the system (3)		520 l	680 l	770 l	930 l	1340 l	1640 l	930 l	1100 l	1270 l
Water flow rate (min/max)		160/640 l/min	205/825 l/min	235/940 l/min	285/1140 l/min	410/1640 l/min	500/2000 l/min	565/2265 l/min	670/2680 l/min	775/3100
Nom. water pressure drop:	- Heatex-changer	44	41	33	25	29	32	29	32	36
	- Filter	2	3	5	4	9	15	2	3	5
	- Total	46	44	38	28	39	48	32	36	41
Insulation material		PVC nitril foam								
Heat recovery Condenser										
Type		Brased plate heat exchanger, one per circuit								
Qty x model		1 x CB76-76H	1 x CB76-98H	1 x CB76-108H		1 x CB76-148H	1 x CB76-180H	2 x CB76-180H		
Filter		Field supply								
Water flow rate (min/max)		-/500 l	-/600 l	-/700 l		-/900 l	-/1100 l	2 x (-/700) l		
Nom. water pressure drop (4)		47 Kpa	49 Kpa	64 Kpa	88 Kpa	108 Kpa	175 Kpa	85 & 85 Kpa	85 & 100 Kpa	100 & 100 Kpa

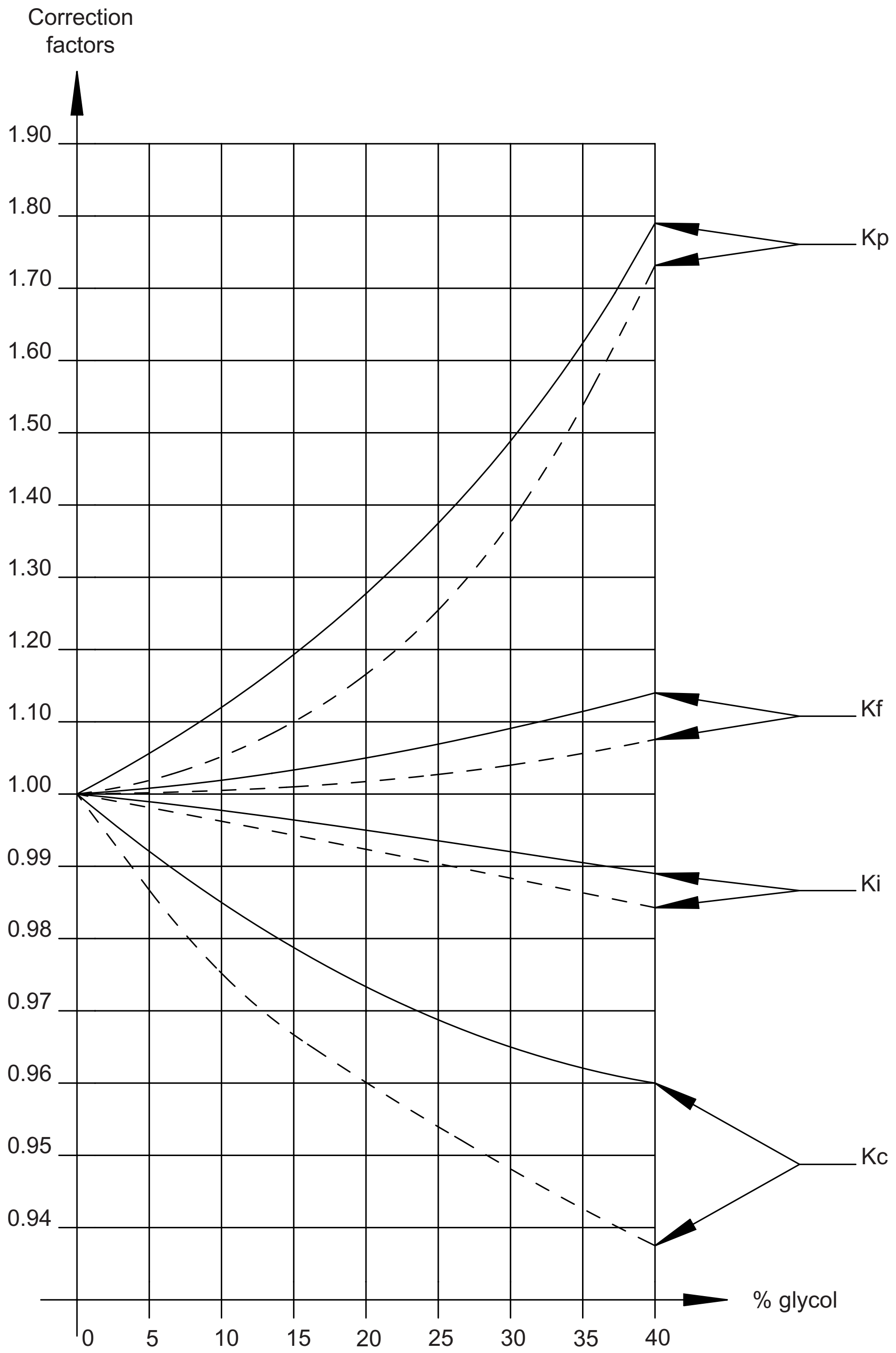
Model	EWTP 110MBYNN	EWTP 140MBYNN	EWTP 160MBYNN	EWTP 200MBYNN	EWTP 280MBYNN	EWTP 340MBYNN	EWTP 400MBYNN	EWTP 460MBYNN	EWTP 540MBYNN
Insulation material	PVC nitril foam								
Air heat exchanger									
Type	Cross fin coil / Hi-X tubes and chromate waffle louvre fins								
Rows x stages x fin pitch	2 x (48+2) x 2 mm	3 x (48+2) x 2 mm		2 x (48+2) x 2 mm	3 x (48+2) x 2 mm				
Face area	8.4 m²			16.8 m²			25.2 m²		
Refrigerant circuit									
Type	R407C								
Refrigerant charge	32 Kg	46 Kg	49 Kg	76 Kg	110 Kg		80+80 Kg		
No. of circuits	1						2		
Refrigerant control	Thermostatic expansion valve								
Piping connections									
Evap. water in/outlet	Flexible coupling + counterpipe for welding 3”OD			Flexible coupling + counterpipe for welding 3”			Flexible coupling 5”		
Heat recovery condenser in/outlet	2”G								
Heat recovery condenser in/outlet	Field installation			1/4”G					
Dimensions (h x w x d)	2250 x 2346 (2700) x 2238 mm			2250 x 4280 (4495) x 2238 mm			2250 x 5901 x 2238 (2653) mm		
Weight									
Machine weight	1465 kg	1629 kg	1723 kg	2266 kg	2646 kg	2727 kg	4990 kg	5113 kg	5236 kg
Operation weight	1483 kg	1654 kg	1752 kg	2299 kg	2692 kg	2784 kg	5090 kg	5220 kg	5350 kg
Casing									
Colour	Ivory white / Munsell code 5Y7.5/1 / ± RAL 7044								
Material	Polyester painted galvanised steel plate								
Sound power level	89 dBA	94 dBA		95 dBA	96 dBA	98 dBA	99 dBA		
Fan									
Air flow rate	960 m^3			1920 m^3			2880 m^3		
Speed	730 rpm	900 rpm		730 rpm	900 rpm				
Type	Direct drive								
Qty	4			8			12		
No. of motorsxoutput	4X550 w	4X1020 w		8x550 w	8x1020 w		12x1020 w		
Vertical									
Safety devices	■ Double PED approved high pressure switches ■ Low pressure protection ■ Pressure relief valve ■ Compressor motor thermal protector ■ Compressor motor overcurrent relay ■ Discharge temperature protector ■ Freeze up protection ■ Recycling and quard timer ■ Reverse phase protector/flow switch								

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator = 12°C/7°C; ambient = 35°C.
2. Nominal cooling power input at Eurovent conditions: Evaporator = 12°C/7°C; ambient = 35°C.
3. Min. required water volume for standard thermostat settings and at nominal conditions.
4. Nominal cooling capacity and heat recovery capacity during heat recovery mode according to EN14511.
5. Dimension values between brackets include installation space of delivered filter.

1.8 Correction Factors for Glycol

Correction factors The illustration below shows the correction factors for glycol.



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Legend

The table below describes the patterns and symbols used for the correction factors illustration above.

Pattern	Description
______	Ethylene glycol
- — — -	Propylene glycol
Kc	Correction on cooling capacity
Ki	Correction on power input
Kf	Correction on flow rate
Kp	Correction on pressure drop

Glycol freezing point

The table below contains glycol freezing points for different glycol concentrations.

Type	Concentration (wt%)	0	10	20	30	40
Ethylene glycol	Freezing point °C	0	-4	-9	-16	-23
	Minimum LWE °C	5	2	0	-5	-11
Propylene glycol	Freezing point °C	0	-3	-7	-13	-22
	Minimum LWE °C	5	3	-2	-4	-10

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1.9 Electrical Specifications: EWAP110~540MBYNN

Electrical specifications

The table below contains the electrical specifications.

Model	EWAP 110MBYNN	EWAP 140MBYNN	EWAP 160MBYNN	EWAP 200MBYNN	EWAP 280MBYNN	EWAP 340MBYNN	EWAP 400MBYNN	EWAP 460MBYNN	EWAP 540MBYNN
Power supply									
Phase	3 N~								
Frequency	50 Hz								
Voltage	400 V								
Voltage tolerance	±10 %								
Unit									
Starting current	158 A	193 A	248 A		316 A	440 A	248 A	248/316 A	316 A
Nominal running current	70 A	84 A	104 A	128 A	180 A	226 A	258 A	316 A	373 A
Max. running current	95 A	120 A	135 A	168 A	232 A	288 A	342 A	396 A	452 A
Recommended fuses[1]	3 x 125gL A	3 x 160gL A		3 x 200gL A	3 x 250gL A	3 x 355gL A	std: 6 x 250 gL) op52 : 3 x 400gL	std: 6 x 250 gL) + (3 x 300) gl op52 : 3 x 425gL	std: 6x 300gL) op52 : 3 x 500gL
Fans									
Phase	1~								
Voltage	230 V								
Max. running current	4 x1.9 A	4 x3.1 A		8 x 1.9 A	8 x 3.1 A		12 x 3.1		
Compressor									
Phase	3~								
Voltage	400+/-10% V								
Starting current	= Starting current of the unit								
Nom. running current	62 A	70 A	90 A	112 A	155 A	201 A	2 x 111 A	111 + 168 A	2 x 168 A
Max. running current	87 A	106 A	121 A	152 A	206 A	262 A	2 x 152 A	152 + 206 A	2 x 206 A
Starting method	Star-Delta								
Control circuit									
Phase	1~								
Voltage	230/24 V AC (supplied by factory installed transformers)								
Recommanded fuses	Factory installed								
Crankcase heater (E1/2HC)	1 x (150 W -0.65 A)						2 x (150 W - 0.65 A)		
Liquid line solenoid valves (Y15..16S/ Y25..26S)	2 x (16.1 VA -70 mA) inrush current = 130 mA						4 x (16.1 VA -70 mA) inrush current = 130 mA		

Model	EWAP 110MBYNN	EWAP 140MBYNN	EWAP 160MBYNN	EWAP 200MBYNN	EWAP 280MBYNN	EWAP 340MBYNN	EWAP 400MBYNN	EWAP 460MBYNN	EWAP 540MBYNN
Capacity solenoid valves (Y11/Y21)	1 x (16.1 VA -70 mA) inrush current = 130 mA						2 x (1 x (16.1 VA -70 mA) inrush current = 130 mA		
Evaporator heater tape									
Supply voltage	230+/-10% V								
Recommended fuses	2 x 2 A						2 x 4 A		

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C.
2. Nominal cooling power input at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C.

1.10 Electrical Specifications: EWAD120~340MBYNN

Electrical specifications

The table below contains the electrical specifications.

Model	EWAD 120MBYNN	EWAD 150MBYNN	EWAD 170MBYNN	EWAD 240MBYNN	EWAD 300MBYNN	EWAD 340MBYNN
Power supply						
Phase	3N~					
Frequency	50 Hz					
Voltage	400 V					
Voltage tolerance	±10 %					
Unit						
Starting current	172 A	193 A	250 A	172 A	193 A	250 A
Nominal running current	67.6 A	87.4 A	109 A	135 A	175 A	219 A
Max. running current	83.6 A	101 A	140 A	167 A	203 A	281 A
Recommended fuses	3 x 100gL A	3 x 125gL A	3 x 160gL A	3 x 200gL A	3 x 250gL A	3 x 300gL A
Fans						
Phase	1~					
Voltage	230 V					
Max. running current	4 x1.9 A	4 x3.1 A		8 x 1.9 A	8 x 3.1 A	
Compressor						
Phase	3~					
Voltage	400+/-10% V					
Starting current	= Starting current of the unit					
Nom. running current	60 A	75 A	97 A	2 x 60 A	2 x75 A	2 x 97 A
Max. running current	76 A	89 A	128 A	2 x 76 A	2 x 89 A	2 x128 A
Starting method	Star-Delta					
Control circuit						
Phase	1~					
Voltage	230/24 AC (supplied by factory installed tranformers)					
Recommended fuses	Factory installed					
Crankcase heater (E1/2HC)	1 x (150 W -0.65 A)			2 x (150 W -0.65 A)		
Liquid line solenoid valves (Y15..16S/ Y25..26S)	2 x (16.1 VA -70 mA) inrush current = 130 mA					
Capacity sole-noid valves (Y11/Y21)	1 x (16.1 VA -70 mA) inrush current = 130 mA			2 x (16.1 VA -70 mA) inrush current = 130 mA		

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C.
2. Nominal cooling power input at Eurovent conditions: Evaporator 12°C/7°C; ambient 35°C.

1.11 Electrical Specifications: EWWD120~540MBYNN

Electrical specifications

The table below contains the electrical specifications.

Model	**EWWD 120MBYNN**	**EWWD 180MBYNN**	**EWWD 240MBYNN**	**EWWD 280MBYNN**	**EWWD 360MBYNN**	**EWWD 440MBYNN**	**EWWD 500MBYNN**	**EWWD 520MBYNN**	**EWWD 540MBYNN**
Power supply									
Phase	3 N~								
Frequency	50 Hz								
Voltage	400 V								
Voltage tolerance	±10 %								
Unit									
Starting current	172 A	250 A	304 A	390 A	250 A	304 A		390 A	
Nominal running current	48 A	78 A	108 A	118 A	156 A	186 A	216 A	226 A	236 A
Max. running current	76 A	120 A	191 A	199 A	240 A	311 A	382 A	390 A	398 A
Recommended fuses (1)	3 x 100gL A	3 x 160gL A		3 x 224gL A	5 x 200gL A	3 x 200gL A + 3 x 250gL A	5 x 250 gL A		
Fans									
Phase	1~								
Voltage	230 V								
Compressor									
Phase	3~								
Voltage	400+/-10% V								
Starting current	= Starting current of the unit								
Nom. running current	48 A	78 A	108 A	118 A	78 + 78 A	78 + 108 A	108 x 108 A	108 + 118 A	118 + 118 A
Max. running current	76 A	120 A	191 A	199 A	120 + 120 A	120 + 191 A	191 + 191 A	191 + 199 A	199 x 199 A
Starting method	Star-Delta								
Control circuit									
Phase	1~								
Voltage	230/24 V AC (supplied by factory installed transformers)								
Recommanded fuses	Factory installed								
Crankcase heater (E1/2HC)	1 x (150 W -0.65 A)						2 x (150 W - 0.65 A)		
Liquid line solenoid valves (Y15..16S/ Y25..26S)	2 x (16.1 VA -70 mA) inrush current = 130 mA						4 x (16.1 VA -70 mA) inrush current = 130 mA		
Capacity sole-noid valves (Y11S/Y21S)	1 x (16.1 VA -70 mA) inrush current = 130 mA						2 x (1 x (16.1 VA -70 mA) inrush current = 130 mA		

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Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator 12°C/7°C; Condenser 30°C/35°C.
2. Heating capacity for conditions: Evaporator 12°C/7°C; Condenser 40°C/45°C.
3. Nominal cooling power input at Eurovent conditions: Evaporator 12°C/7°C; Condenser 30°C/35°C.
4. Heating power input for conditions: Evaporator 12°C/7°C; Condenser 40°C/45°C.

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1.12 Electrical Specifications: EWLD120~540MBYNN

Electrical specifications

The table below contains the electrical specifications.

Model	EWLD 120MBYNN	EWLD 170MBYNN	EWLD 240MBYNN	EWLD 260MBYNN	EWLD 340MBYNN	EWLD 400MBYNN	EWLD 480MBYNN	EWLD 500MBYNN	EWLD 540MBYNN
Power supply									
Phase	3 N~								
Frequency	50 Hz								
Voltage	400 V								
Voltage tolerance	±10 %								
Unit									
Starting current	172 A	250 A	304 A	390 A	250 A	304 A		390 A	
Nominal running current	48 A	78 A	108 A	118 A	156 A	186 A	216 A	226 A	236 A
Max. running current	76 A	120 A	191 A	199 A	240 A	311 A	382 A	390 A	398 A
Recommended fuses (1)	3 x 100gL A	3 x 160gL A	3 x 224gL A		5 x 200gL A	3 x 200gL A + 3 x 250gL A	5 x 250 gL A		
Fans									
Phase	1~								
Voltage	230 V								
Compressor									
Phase	3~								
Voltage	400+/-10% V								
Starting current	= Starting current of the unit								
Nom. running current	48 A	78 A	108 A	118 A	78 + 78 A	78 + 108 A	108 x 108 A	108 + 118 A	118 + 118 A
Max. running current	76 A	120 A	191 A	199 A	120 + 120 A	120 + 191 A	191 + 191 A	191 + 199 A	199 x 199 A
Starting method	Star-Delta								
Control circuit									
Phase	1~								
Voltage	230/24 V AC (supplied by factory installed transformers)								
Recommanded fuses	Factory installed								
Crankcase heater (E1/2HC)	1 x (150 W -0.65 A)						2 x (150 W - 0.65 A)		
Liquid line solenoid valves (Y15..16S/ Y25..26S)	2 x (16.1 VA -70 mA) inrush current = 130 mA						4 x (16.1 VA -70 mA) inrush current = 130 mA		
Capacity sole-noid valves (Y11..14S/Y21.. 24S)	3 x (16.1 VA -70 mA) inrush current = 130 mA						5 x (16.1 VA -70 mA) inrush current = 130 mA		

Notes

1. Nominal cooling capacity at Eurovent conditions: Entering/Leaving water evaporator = 12°C/7°C; Condensing temperature = 45°C.
2. Nominal power input at Eurovent conditions: See Eurovent 6/C/003 Entering/Leaving water temperature = 12°C/7°C; Condensing temperature = 45°C.

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1.13 Electrical Specifications: ERAP110~170MBYNN

Electrical specifications

The table below contains the electrical specifications

Model	ERAP110MBYNN	ERAP150MBYNN	ERAP170MBYNN
Power supply			
Phase	3N~		
Frequency	50 Hz		
Voltage	400 V		
Voltage tolerance	±10 %		
Unit			
Starting current	158 A	193 A	248 A
Nominal running current	70 A	84 A	104 A
Max. running current	95 A	120 A	135 A
Recommended fuses	3 x 125gL A	3 x 160gL A	
Fans			
Phase	1~		
Voltage	230 V		
Max. running current	4 x1.9 A	4 x3.1 A	
Compressor			
Phase	3~		
Voltage	400+/-10% V		
Starting current	= Starting current of the unit		
Nom. running current	62 A	70 A	90 A
Max. running current	87 A	106 A	121 A
Starting method	Star-Delta		
Control circuit			
Phase	1~		
Voltage	230/24 AC (supplied by factory installed tranformers)		
Recommended fuses	Factory installed		
Liquid line solenoid valves (Y15..16S/ Y25..26S)	2 x (16.1 VA -70 mA) inrush current = 130 mA		
Capacity sole-noid valves (Y11S)	1 x (16.1 VA -70 mA) inrush current = 130 mA		

Note

1. Cooling capacity/Power input conditions:
   - Ambient = 35°C
   - Suction dewpoint = 5°C
2. Superheat = 10°C

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1.14 Electrical Specifications: EWTP110~540MBYNN

Electrical specifications

The table below contains the electrical specifications.

Model	EWTP 110MBYNN	EWTP 140MBYNN	EWTP 160MBYNN	EWTP 200MBYNN	EWTP 280MBYNN	EWTP 340MBYNN	EWTP 400MBYNN	EWTP 460MBYNN	EWTP 540MBYNN
Power supply									
Phase	3 N~								
Frequency	50 Hz								
Voltage	400 V								
Voltage tolerance	±10 %								
Unit									
Starting current	158 A	193 A	248 A		316 A	440 A	248 A	248/316 A	316 A
Nominal running current cooling	70 A	84 A	104 A	128 A	180 A	226 A	258 A	316 A	373 A
Max. running current	95 A	120 A	135 A	168 A	232 A	288 A	342 A	396 A	452 A
Recommended fuses	3 x 125gL A	3 x 160gL A		3 x 200gL A	3 x 250gL A	3 x 355gL A	std: 2 x (3x250gl) op52: 3x400gL	std: (3x250) x (3x300) gl op52: 3x425gL	std: 2 x (3x300gl) op52: 3x500gL
Fans									
Nominal running current	4x1.9 A	4x3.1 A		8x1.9 A	8x3.1 A		12x3.1 A		
Maximum running current	4x1.9 A	4x3.1 A		8x1.9 A	8x3.1 A		12x3.1 A		
Starting current - DOL	9.5 A per fan - 6 sec								
Compressor									
Phase	3~								
Voltage	400+/-10% V								
Starting current	= Starting current of the unit								
Nom. running current	62 A	70 A	90 A	112 A	155 A	201 A	2 x 111 A	111 + 168 A	2 x 168 A
Max. running current	87 A	106 A	121 A	152 A	206 A	262 A	2x152 A	152 + 206 A	2 x 206 A
Starting method	Star-Delta								
Recommended fuses							Factory installed		
Control circuit									
Phase	1~								
Voltage	230/24 V AC (supplied by factory installed transformers)								
Recommanded fuses	Factory installed								
Crankcase heater (E1/2HC)	1 x (150 W -0.65 A)						2 x (150 W - 0.65 A)		

Model	EWTP 110MBYNN	EWTP 140MBYNN	EWTP 160MBYNN	EWTP 200MBYNN	EWTP 280MBYNN	EWTP 340MBYNN	EWTP 400MBYNN	EWTP 460MBYNN	EWTP 540MBYNN
Liquid line solenoid valves	2 x (16.1 VA -70 mA) inrush current = 130 mA						2 x (3 x (16.1 VA -70 mA)) inrush current = 130 mA		
Capacity solenoid valves	1 x (16.1 VA -70 mA) inrush current = 130 mA						2 x (16.1 VA -70 mA) inrush current = 130 mA		
Evaporator heater tape									
Supply Voltage	230V+/-10% V								
Recommended fuses	2x2A						2x4A		
Condenser heater tape									
Supply Voltage	230V+/-10% V								
Recommended fuses	2x2A						2x4A		

Notes

1. Nominal cooling capacity at Eurovent conditions: Evaporator = 12°C/7°C; ambient = 35°C.
2. Nominal cooling power input at Eurovent conditions: Evaporator = 12°C/7°C; ambient = 35°C.
3. Min. required water volume for standard thermostat settings and at nominal conditions.
4. Nominal cooling capacity and heat recovery capacity during heat recovery mode according to EN14511.
5. Dimension values between brackets include installation space of delivered filter.

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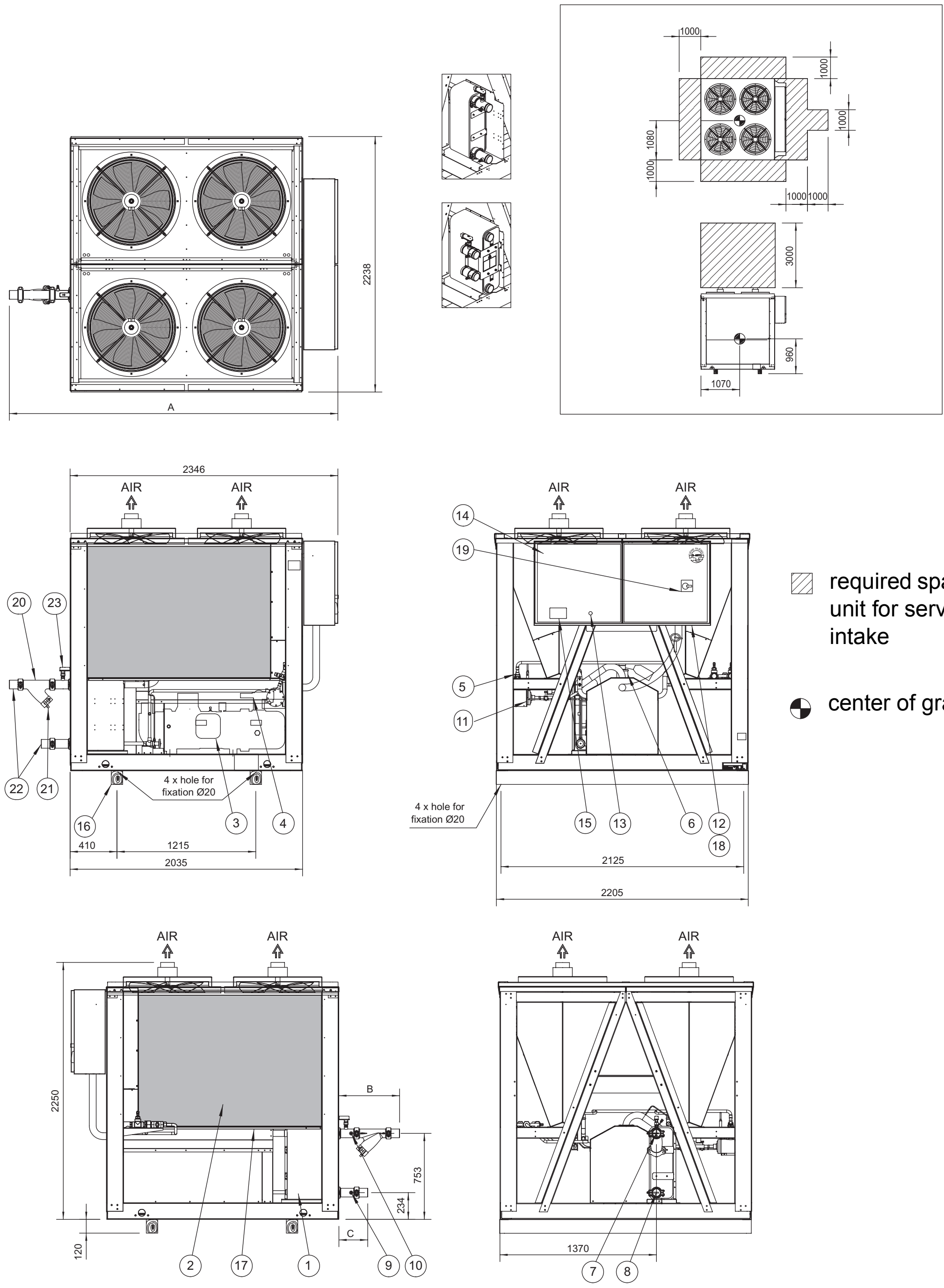
1.15 Outlook Drawing: EWAP110~160MBYNN

EWAP110~ 160MBYNN

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



required space: around the unit for service and air intake

center of gravity

				CHILLED WATER	
MODEL	A	B	C	IN (O.D.)	OUT (O.D.)
EWAP110MBYNN*	2700	354	75	Ø 76.1	Ø 76.1
EWAP140MBYNN*	2794	448	169	Ø 76.1	Ø 76.1
EWAP160MBYNN*	2879	533	254	Ø 76.1	Ø 76.1

Components

The table below lists the components.

No.	Component
1	Evaporator
2	Condenser
3	Compressor
4	Discharge stop valve
5	Liquid stop valve
6	Suction, stop valve (optional)
7	Chilled water in
8	Chilled water out
9	Leaving water temperature sensor
10	Entering water temperature sensor
11	Drier
12	Power supply intake

No.	Component
13	Emergency stop
14	Switchbox
15	Digital display controller
16	Transportbeam
17	Ambient temperature sensor
18	Field wiring intake
19	Main isolator switch (optional)
20	Filter (supplied as kit)
21	Flush plug (Ø13 mm NPT)
22	Counterpipes for welding (supplied as kit)
23	Flowswitch

Note: EWAP110MBYNN:

- The inlet counterpipe with flowswitch and temperature sensor is premounted.
- The outlet counterpipe with temperature sensor is premounted.

Note: EWAP140~160MBYNN:

- The inlet counterpipe with flowswitch and temperature sensor is temporary mounted on side of evaporator for transport.
- The outlet counterpipe with temperature sensor is temporary mounted on side of evaporator for transport.

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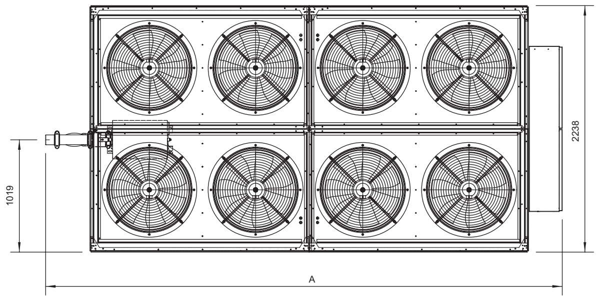
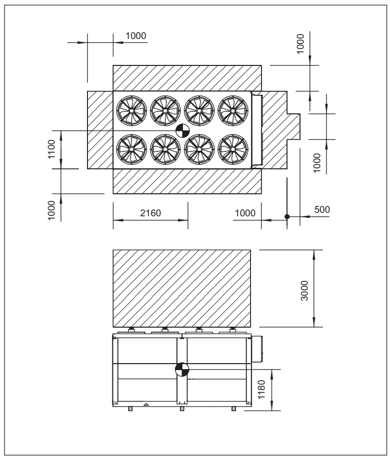
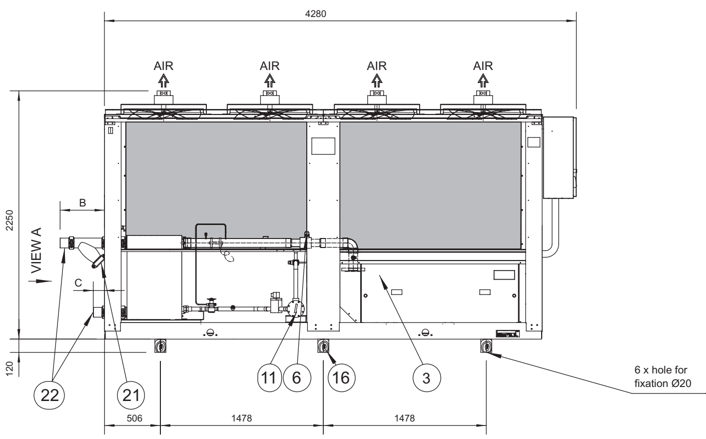
1.16 Outlook Drawing: EWAP200~340MBYNN

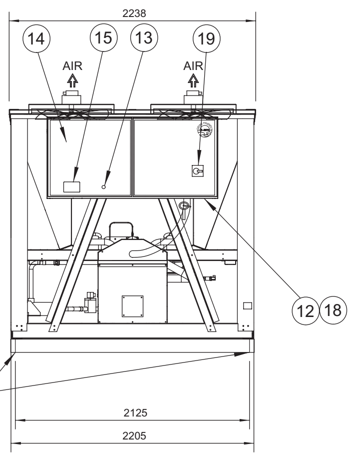
EWAP200~ 340MBYNN

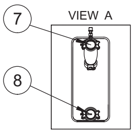
The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



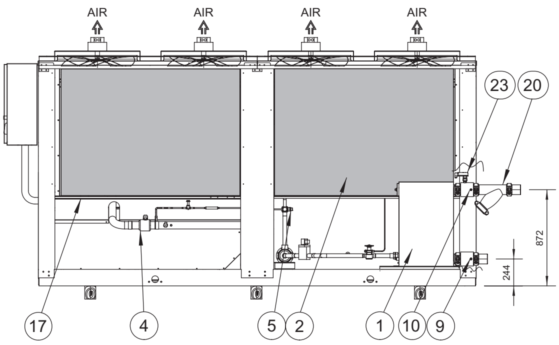








MODEL	A	B	C	CHILLED WATER IN (O.D.)	CHILLED WATER OUT (O.D.)
EWAP400MBYNN*	4495	215	-85	Ø 88.9	Ø 88.9
EWAP460MBYNN*	4585	305	5	Ø 88.9	Ø 88.9
EWAP540MBYNN*	4680	400	100	Ø 88.9	Ø 88.9



required space: around the unit for service and air intake

center of gravity

Components

The table below lists the components.

No.	Component
1	Evaporator
2	Condenser
3	Compressor
4	Discharge stop valve
5	Liquid stop valve
6	Suction, stop valve (optional)
7	Chilled water in
8	Chilled water out
9	Leaving water temperature sensor
10	Entering water temperature sensor
11	Drier
12	Power supply intake

No.	Component
13	Emergency stop
14	Switchbox
15	Digital display controller
16	Transportbeam
17	Ambient temperature sensor
18	Field wiring intake
19	Main isolator switch (optional)
20	Filter (supplied as kit)
21	Flush plug (Ø19 mm NPT)
22	Counterpipes for welding (supplied as kit)
23	Flowswitch

Note:

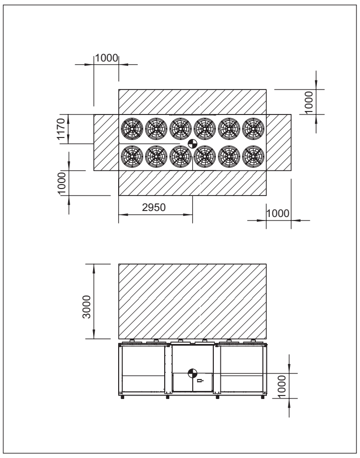
- The inlet counterpipe with flowswitch and temperature sensor is premounted.
- The outlet counterpipe with temperature sensor is premounted.

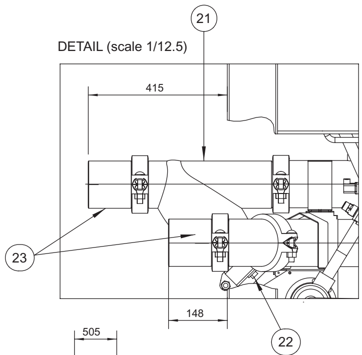
1

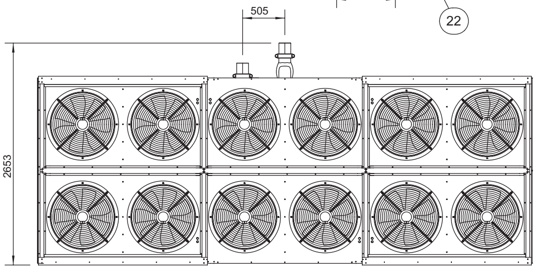
1.17 Outlook Drawing: EWAP400~540MBYNN

EWAP400~ 540MBYNN

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

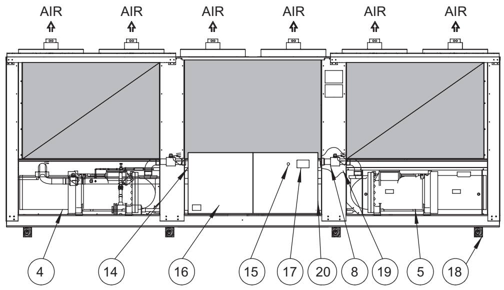




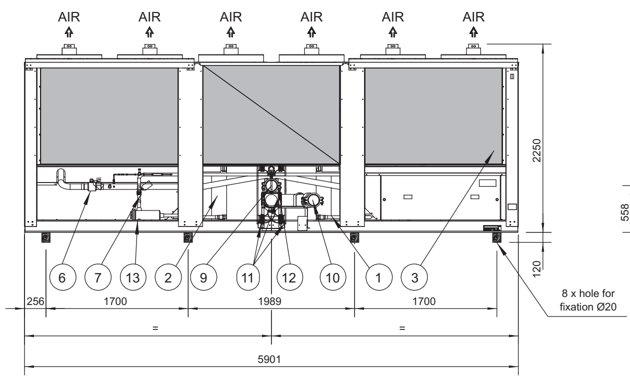


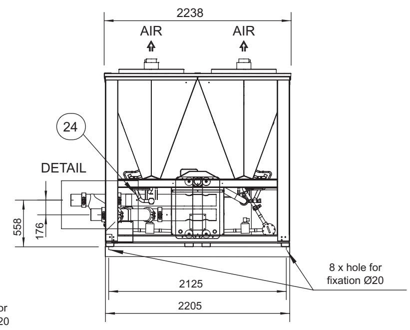
required space: around the unit for service and air intake

center of gravity



UNIT	CHILLED WATER	
	IN (O.D.)	OUT (O.D.)
EWAP400-540*	Ø 141.3	Ø 141.3





Components

The table below lists the components.

No.	Component
1	Evaporator 1
2	Evaporator 2
3	Condenser
4	Compressor 1
5	Compressor 2
6	Discharge stop valve
7	Liquid stop valve
8	Suction, stop valve (optional)
9	Chilled water in
10	Chilled water out
11	Leaving water temperature sensor
12	Entering water temperature sensor
13	Drier

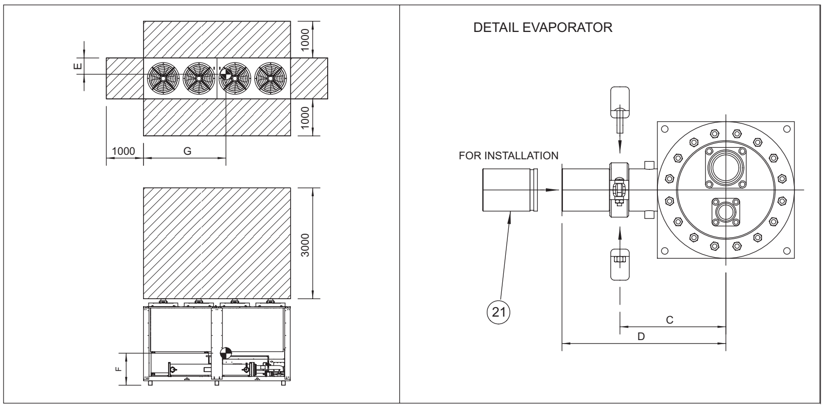
No.	Component
14	Power supply intake
15	Emergency stop
16	Switchbox
17	Digital display controller
18	Transportbeam
19	Ambient temperature sensor
20	Field wiring intake
21	Filter (supplied as kit)
22	Flush plug (Ø25 mm NPT)
23	Counterpipes for welding (supplied as kit)
24	Flowswitch

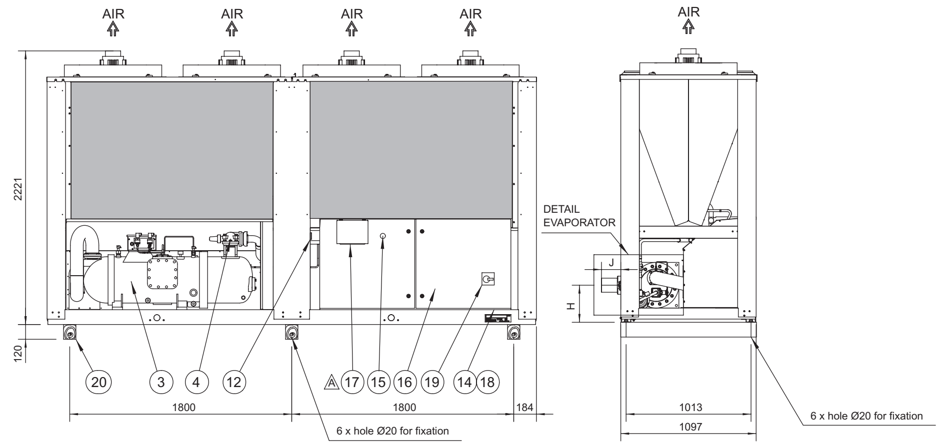
1

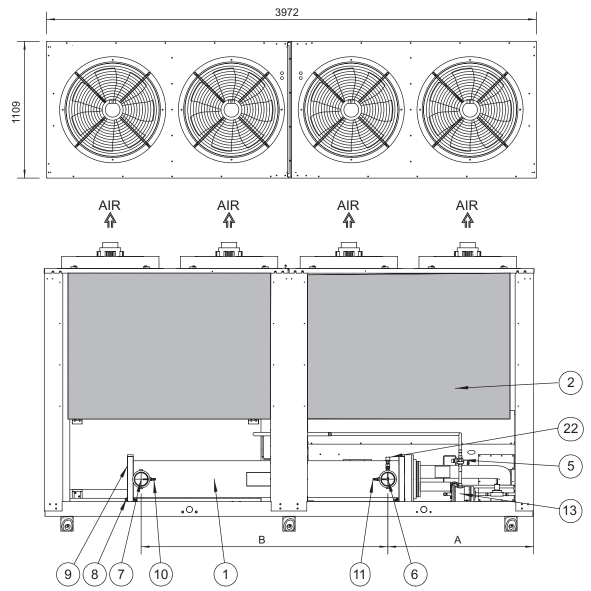
1.18 Outlook Drawing: EWAD120~170MBYNN

EWAD120~ 170MBYNN

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







required space: around the unit for service and air intake

center of gravity

UNIT	A	B	C	D	E	F	G	H	J	CHILLED WATER IN (O.D.)	CHILLED WATER OUT (O.D.)
EWAD120	1170	2000	260	365	591	755	2026	271	78	Ø 88.9	Ø 88.9
EWAD150	1174	2000	290	442	595	740	2061	300	156	Ø 114.3	Ø 114.3
EWAD170	1174	2000	290	442	577	730	2033	300	156	Ø 114.3	Ø 114.3

Components

The table below lists the components:

No.	Component
1	Evaporator
2	Condenser
3	Compressor
4	Discharge stop valve (Suction, stop valve optional)
5	Liquid stop valve
6	Chilled water in (flexible joint)
7	Chilled water out (flexible joint)
8	Water drain evaporator
9	Air purge evaporator
10	Leaving water temperature sensor
11	Entering water temperature sensor

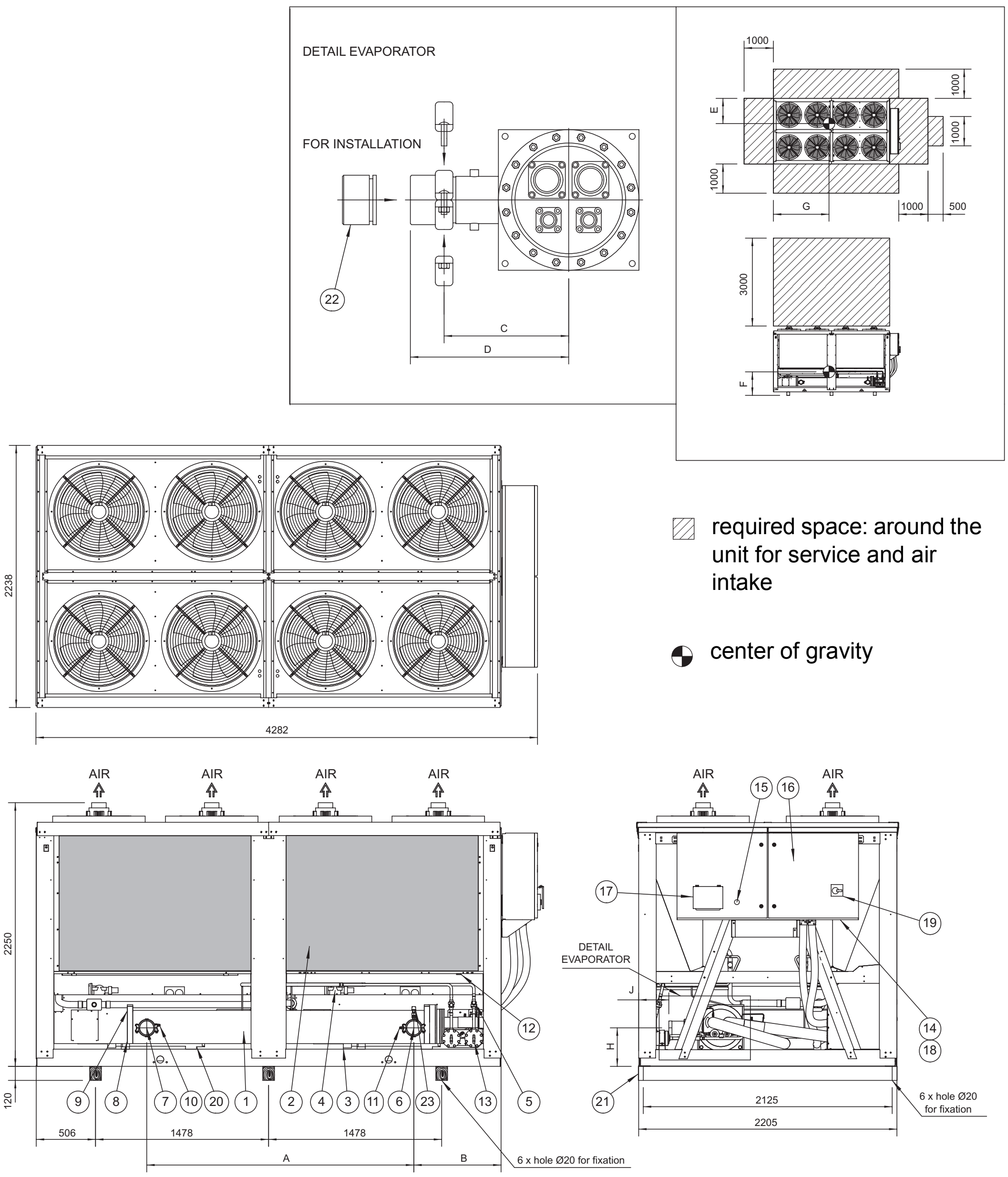
No.	Component
12	Ambient temperature sensor
13	Drier + charge valve
14	Power supply intake
15	Emergency stop
16	Switchbox
17	Digital display controller
18	Field wiring intake
19	Main isolator switch (optional)
20	Transportbeam
21	Counterpipe for welding (supplied as kit)
22	Flowswitch

1

1.19 Outlook Drawing: EWAD240~340MBYNN

EWAD240~ 340MBYNN

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



UNIT	A	B	C	D	E	F	G	H	J	CHILLED WATER IN (O.D.)	CHILLED WATER OUT (O.D.)
EWAD240	2280	745	307	442	850	810	1896	330	180	Ø 114.3	Ø 114.3
EWAD300	2250	800	364	518	864	825	1909	355	257	Ø 141.3	Ø 141.3
EWAD340	2250	800	364	518	871	830	1913	355	257	Ø 141.3	Ø 141.3

Components

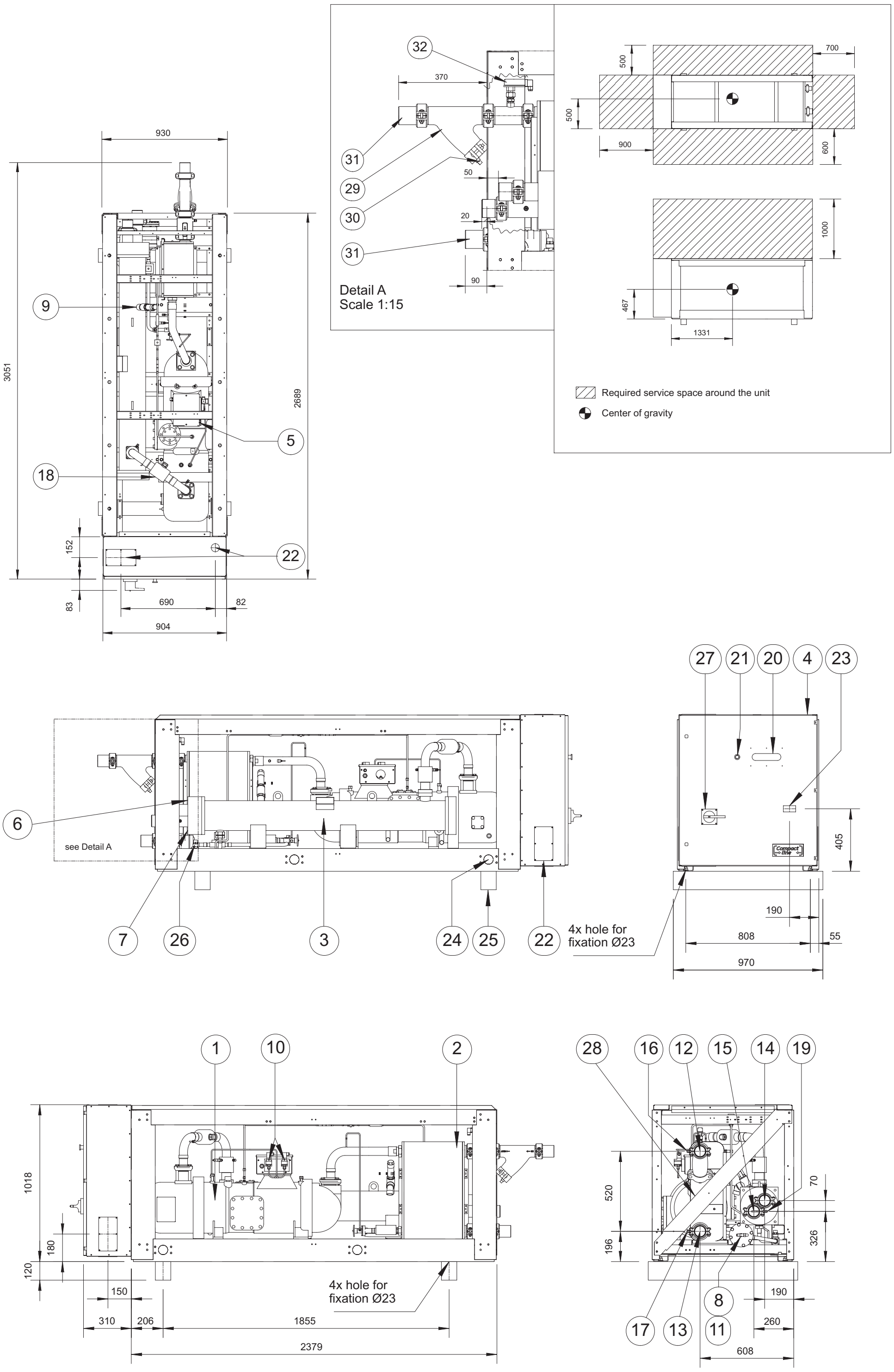
The table below lists the components.

No.	Component
1	Evaporator
2	Condenser
3	Compressor 1
4	Discharge stop valve (Suction, stop valve optional)
5	Liquid stop valve
6	Chilled water in
7	Chilled water out
8	Water drain evaporator
9	Air purge evaporator
10	Leaving water temperature sensor
11	Entering water temperature sensor
12	Ambient temperature sensor

No.	Component
13	Drier + charge valve
14	Power supply intake
15	Emergency stop
16	Switchbox
17	Digital display controller
18	Field wiring intake
19	Main isolator switch (optional)
20	Compressor 2
21	Transportbeam
22	Counterpipe for welding (supplied as kit)
23	Flowswitch

1.20 Outlook Drawing: EWWD120MBYNN

EWWD120 MBYNN The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Components

The table below lists the components.

No.	Component
1	Compressor
2	Evaporator
3	Condenser
4	Switchbox
5	Compressor Switchbox
6	Air purge condenser
7	Water drain condenser
8	Charge valve
9	Safety valve
10	High pressure switches
11	Drier
12	Chilled water in
13	Chilled water out
14	Condenser water out
15	Condenser water in
16	Evaporator entering water temperature sensor
17	Evaporator leaving water temperature sensor

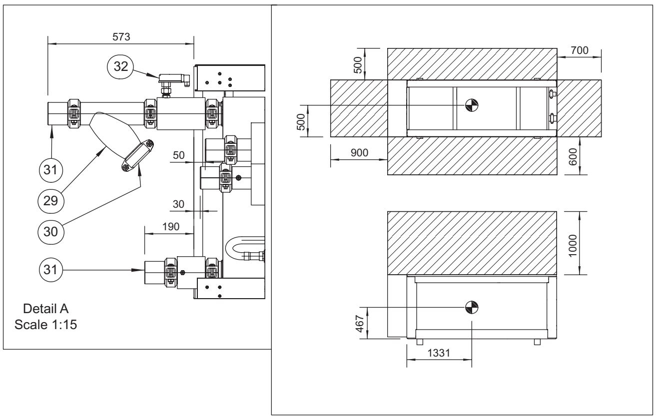
No.	Component
18	Discharge stop valve
19	Condenser entering water temperature sensor
20	Digital display controller
21	Emergency stop
22	Power supply intake
23	Field wiring intake
24	Holes for lifting
25	Transportbeam
26	Ballvalve liquid pipe
27	Main isolator switch (optional)
28	Frame support
29	Filter (supplied as kit)
30	Flush plug (Ø13 mm NPT)
31	Counterpipes for welding (supplied as kit)
32	Flowswitch

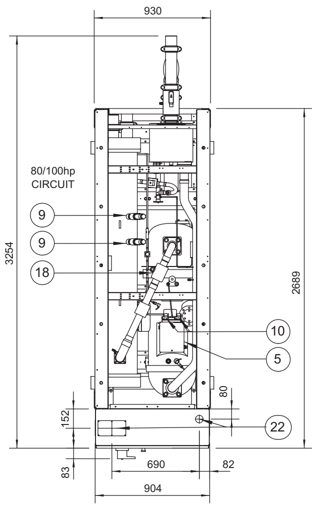
1

1.21 Outlook Drawing: EWWD180~280MBYNN

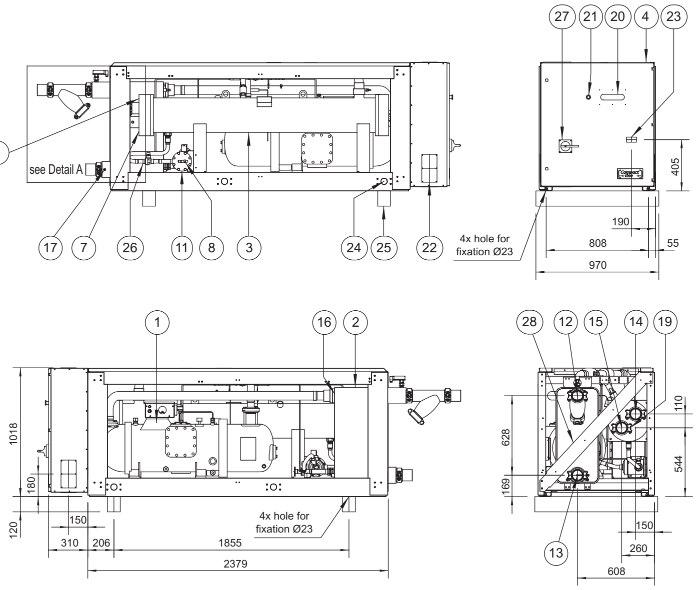
EWWD180~ 280MBYNN

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





	EVAPORATOR		CONDENSER	
MODEL	IN (O.D.)	OUT (O.D.)	IN (O.D.)	OUT (O.D.)
EWWD180~280MBYNN*	Ø 88.9	Ø 88.9	Ø 88.9	Ø 88.9



required space: around the unit for service and air intake

center of gravity

Components

The table below lists the components.

No.	Component
1	Compressor
2	Evaporator
3	Condenser
4	Switchbox
5	Compressor Switchbox
6	Air purge condenser
7	Water drain condenser
8	Charge valve
9	Safety valve
10	High pressure switches
11	Drier
12	Chilled water in
13	Chilled water out
14	Condenser water out
15	Condenser water in
16	Evaporator entering water temperature sensor
17	Evaporator leaving water temperature sensor

No.	Component
18	Discharge stop valve
19	Condenser entering water temperature sensor
20	Digital display controller
21	Emergency stop
22	Power supply intake
23	Field wiring intake
24	Holes for lifting
25	Transportbeam
26	Ballvalve liquid pipe
27	Main isolator switch (optional)
28	Frame support
29	Filter (supplied as kit)
30	Flush plug (Ø19 mm NPT)
31	Counterpipes for welding (supplied as kit)
32	Flowswitch

Note:

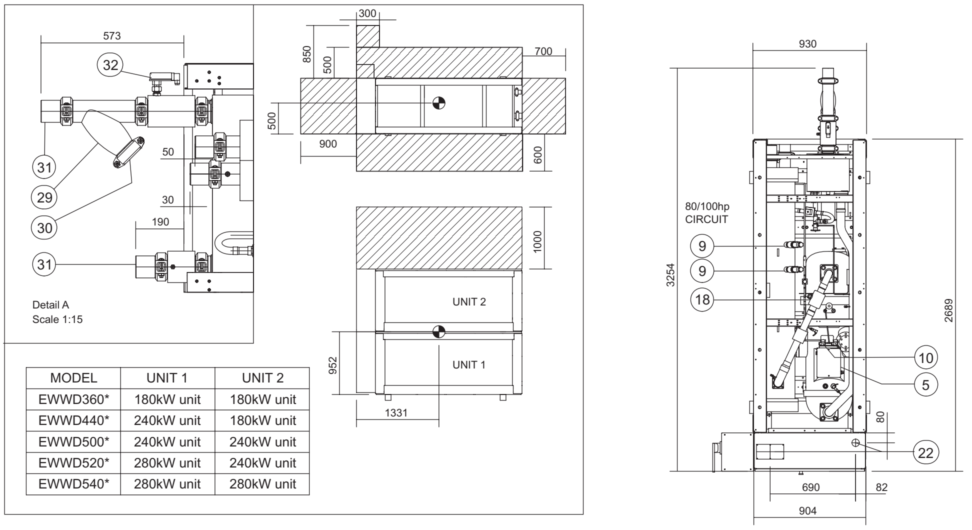
- The inlet counterpipe with flowswitch is temporary mounted on side of evaporator for transport.
- The outlet counterpipe with temperature sensor is temporary mounted on side of evaporator for transport.

1

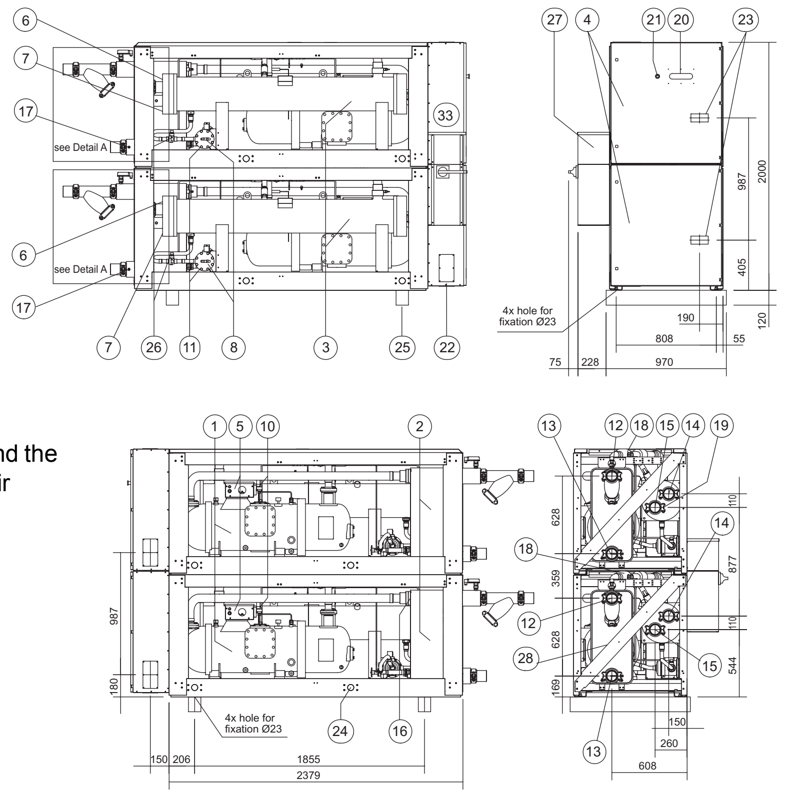
1.22 Outlook Drawing: EWWD360~540MBYNN

EWWD360~ 540MBYNN

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



MODEL	UNIT 1	UNIT 2
EWWD360*	180kW unit	180kW unit
EWWD440*	240kW unit	180kW unit
EWWD500*	240kW unit	240kW unit
EWWD520*	280kW unit	240kW unit
EWWD540*	280kW unit	280kW unit



▨ required space: around the unit for service and air intake

◐ center of gravity

	EVAPORATOR		CONDENSER	
MODEL	IN (O.D.)	OUT (O.D.)	IN (O.D.)	OUT (O.D.)
EWWD360~540MBYNN*	Ø 88.9	Ø 88.9	Ø 88.9	Ø 88.9

Components

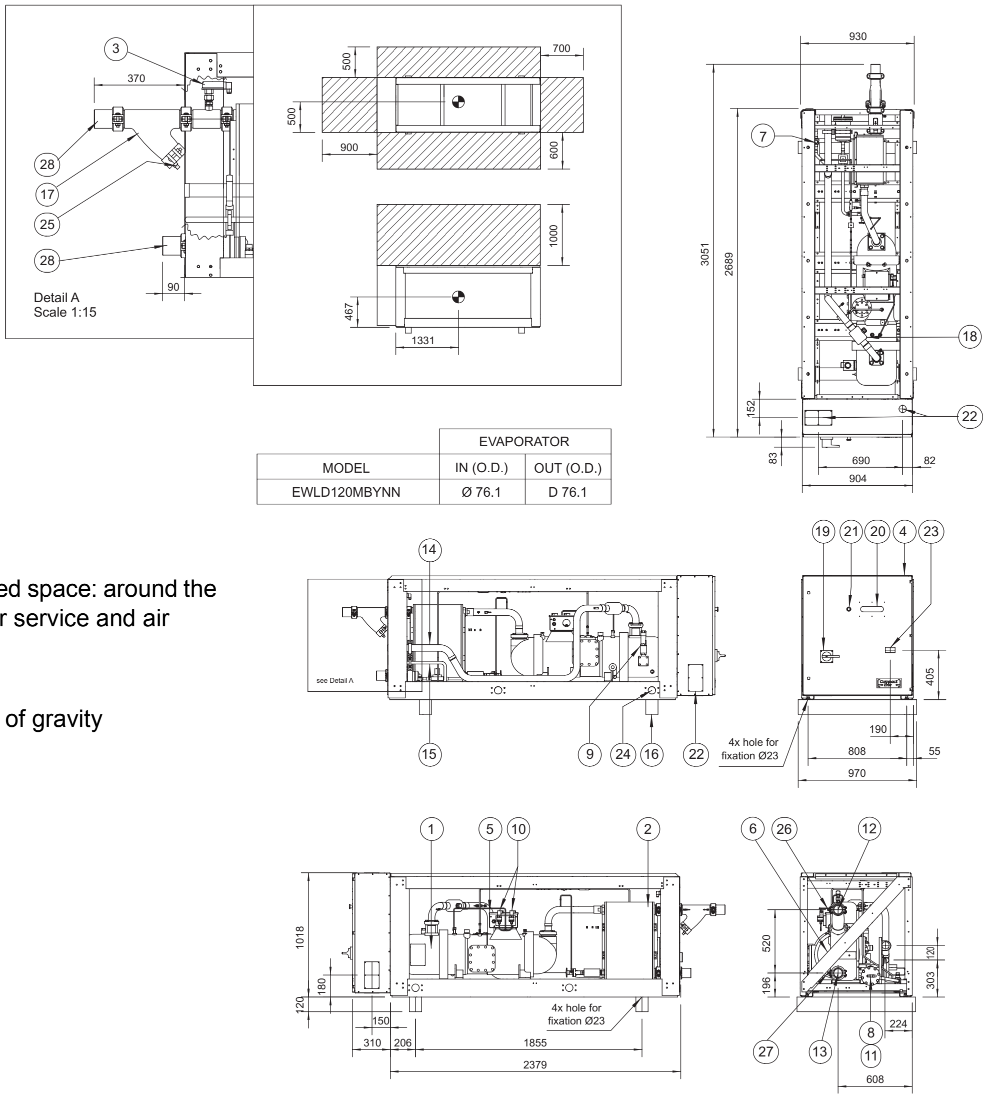
The table below lists the components.

No.	Component
1	Compressor
2	Evaporator
3	Condenser
4	Switchbox
5	Compressor Switchbox
6	Air purge condenser
7	Water drain condenser
8	Charge valve
9	Safety valve
10	High pressure switches
11	Drier
12	Chilled water in
13	Chilled water out
14	Condenser water out
15	Condenser water in
16	Evaporator entering water temperature sensor
17	Evaporator leaving water temperature sensor
18	Discharge stop valve

No.	Component
19	Condenser entering water temperature sensor
20	Digital display controller
21	Emergency stop
22	Power supply intake
23	Field wiring intake
24	Holes for lifting
25	Transportbeam
26	Ballvalve liquid pipe
27	Main isolator switch (optional)
28	Frame support
29	Filter (supplied as kit)
30	Flush plug (Ø19 mm NPT)
31	Counterpipes for welding (supplied as kit)
32	Flowswitch
33	Mixed outled water temperature sensor (rolled up in switchbox)

1.23 Outlook Drawing: EWLD120MBYNN

EWLD120MBYNN The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



	EVAPORATOR	
MODEL	IN (O.D.)	OUT (O.D.)
EWLD120MBYNN	Ø 76.1	D 76.1

required space: around the unit for service and air intake

center of gravity

Components

The table below lists the components:

No.	Component
1	Compressor
2	Evaporator
3	Flowswitch
4	Switchbox
5	Compressor Switchbox
6	Frame support
7	Ballvalve liquid pipe
8	Charge valve
9	Safety valve
10	High pressure switches
11	Drier
12	Chilled water in
13	Chilled water out
14	Discharge pipe Ø53.98 x 2.00 (spinning end)
15	Liquid pipe Ø22.20 x 1.10 (spinning end)

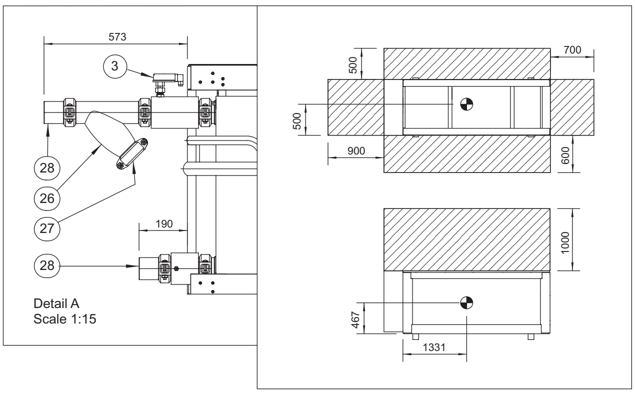
No.	Component
16	Transportbeam
17	Filter (supplied as kit)
18	Discharge stop valve
19	Main isolator switch (optional)
20	Digital display controller
21	Emergency stop
22	Power supply intake
23	Field wiring intake
24	Holes for lifting
25	Flush plug (Ø13 mm NPT)
26	Evaporator entering water temperature sensor
27	Evaporator leaving water temperature sensor
28	Counterpipes for welding (supplied as kit)

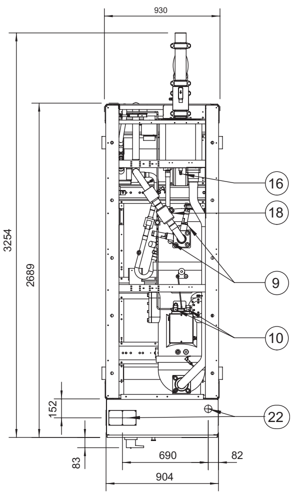
1

1.24 Outlook Drawing: EWLD170~260MBYNN

EWLD170~ 260MBYNN

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

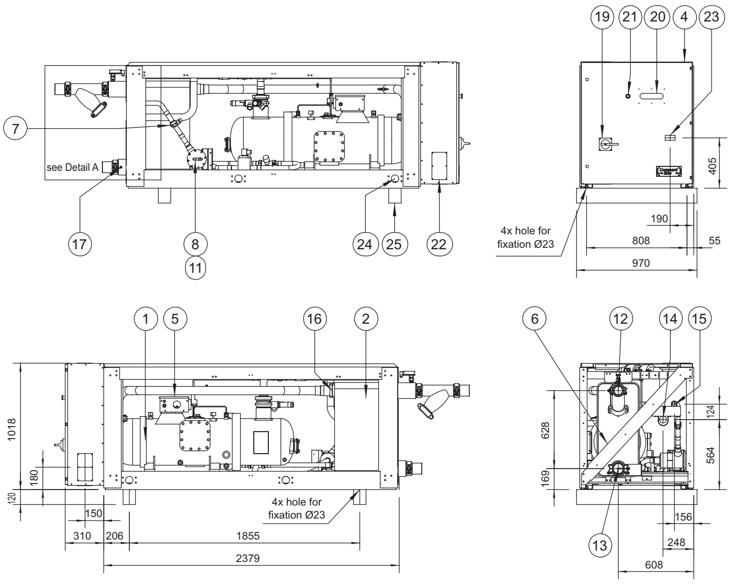




	EVAPORATOR	
MODEL	IN (O.D.)	OUT (O.D.)
EWLD170/240/260MBYNN	Ø 88.9	Ø 88.9

required space: around the unit for service and air intake

center of gravity



Components

The table below lists the components:

No.	Component
1	Compressor
2	Evaporator
3	Flowswitch
4	Switchbox
5	Compressor Switchbox
6	Frame support
7	Ballvalve liquid pipe
8	Charge valve
9	Safety valve
10	High pressure switches
11	Drier
12	Chilled water in
13	Chilled water out
14	Discharge pipe Ø53.98 x 2.00 (spinning end)
15	Liquid pipe Ø34.90 x 1.25 (spinning end)

No.	Component
16	Evaporator entering water temperature sensor
17	Evaporator leaving water temperature sensor
18	Discharge stop valve
19	Main isolator switch (optional)
20	Digital display controller
21	Emergency stop
22	Power supply intake
23	Field wiring intake
24	Holes for lifting
25	Transportbeam
26	Filter (supplied as kit)
27	Flush plug (Ø19 mm NPT)
28	Counterpipes for welding (supplied as kit)

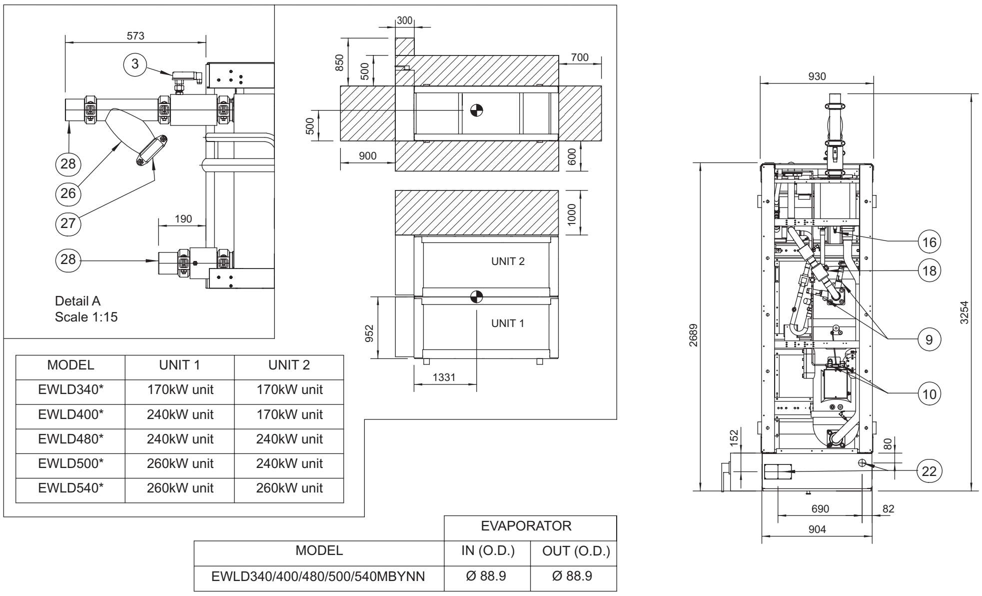
Note:

- The inlet counterpipe with flowswitch is temporary mounted on side of evaporator for transport.
- The outlet counterpipe with temperature sensor is temporary mounted on side of evaporator for transport.

1.25 Outlook Drawing: EWLD340~540MBYNN

EWLD340~540MBYNN

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

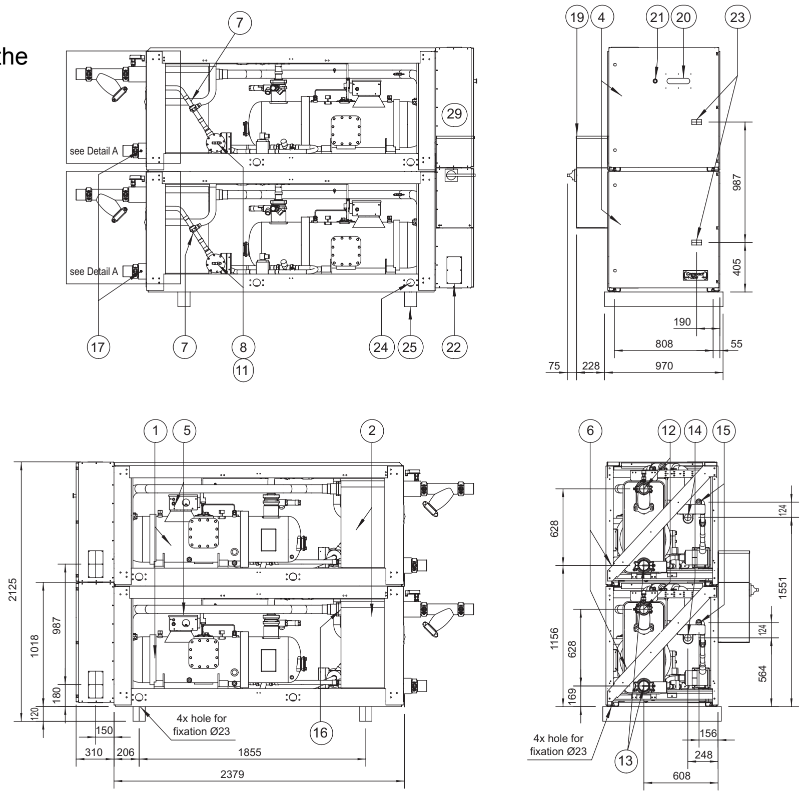


MODEL	UNIT 1	UNIT 2
EWLD340*	170kW unit	170kW unit
EWLD400*	240kW unit	170kW unit
EWLD480*	240kW unit	240kW unit
EWLD500*	260kW unit	240kW unit
EWLD540*	260kW unit	260kW unit

MODEL	EVAPORATOR IN (O.D.)	EVAPORATOR OUT (O.D.)
EWLD340/400/480/500/540MBYNN	Ø 88.9	Ø 88.9

required space: around the unit for service and air intake

center of gravity



Components

The table below lists the components:

No.	Component
1	Compressor
2	Evaporator
3	Flowswitch
4	Switchbox
5	Compressor Switchbox
6	Frame support
7	Ballvalve liquid pipe
8	Charge valve
9	Safety valve
10	High pressure switches
11	Drier
12	Chilled water in
13	Chilled water out
14	Discharge pipe Ø53.98 x 2.00 (spinning end)
15	Liquid pipe Ø34.90 x 1.25 (spinning end)

No.	Component
16	Evaporator entering water temperature sensor
17	Evaporator leaving water temperature sensor
18	Discharge stop valve
19	Main isolator switch (optional)
20	Digital display controller
21	Emergency stop
22	Power supply intake
23	Field wiring intake
24	Holes for lifting
25	Transportbeam
26	Filter (supplied as kit)
27	Flush plug (Ø19 mm NPT)
28	Counterpipes for welding (supplied as kit)
29	Mixed outled water temperature sensor (rolled up in switchbox)

Note:

- The inlet counterpipe with flowswitch is temporary mounted on side of evaporator for transport.
- The outlet counterpipe with temperature sensor is temporary mounted on side of evaporator for transport.

1

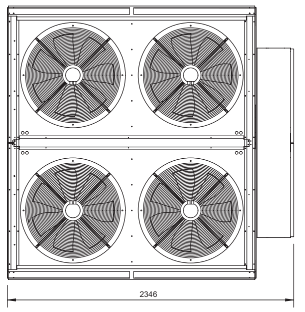
1.26 Outlook Drawing: ERAP110~170MBYNN

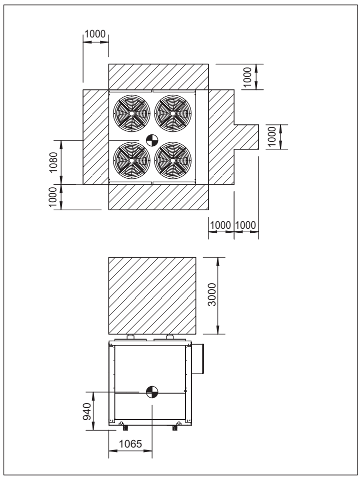
ERAP110~ 170MBYNN

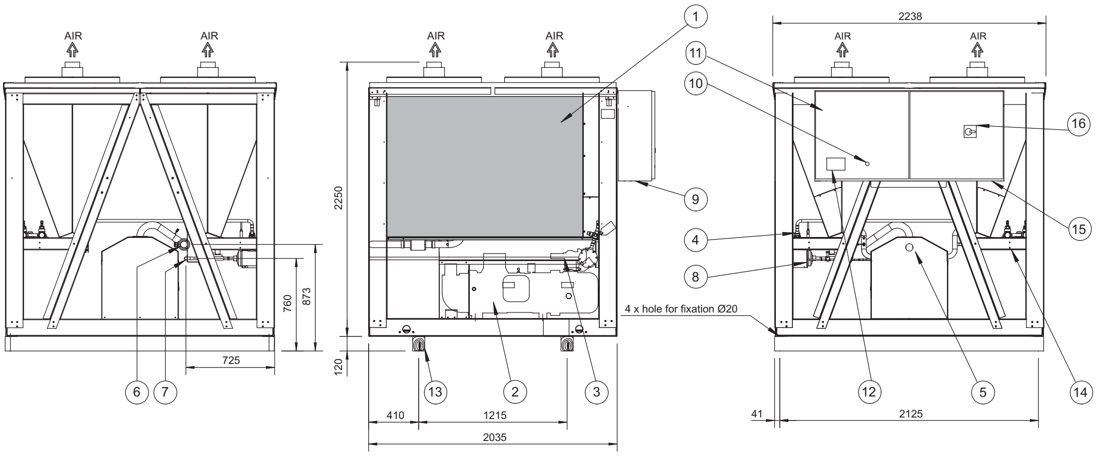
The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).

▨ required space: around the unit for service and air intake

◐ center of gravity







Components

The table below lists the components:

No.	Component
1	Condenser
2	Compressor
3	Discharge stop valve
4	Liquid stop valve
5	Suction stop valve (optional)
6	Suction line
7	Liquid line
8	Drier + charge valve

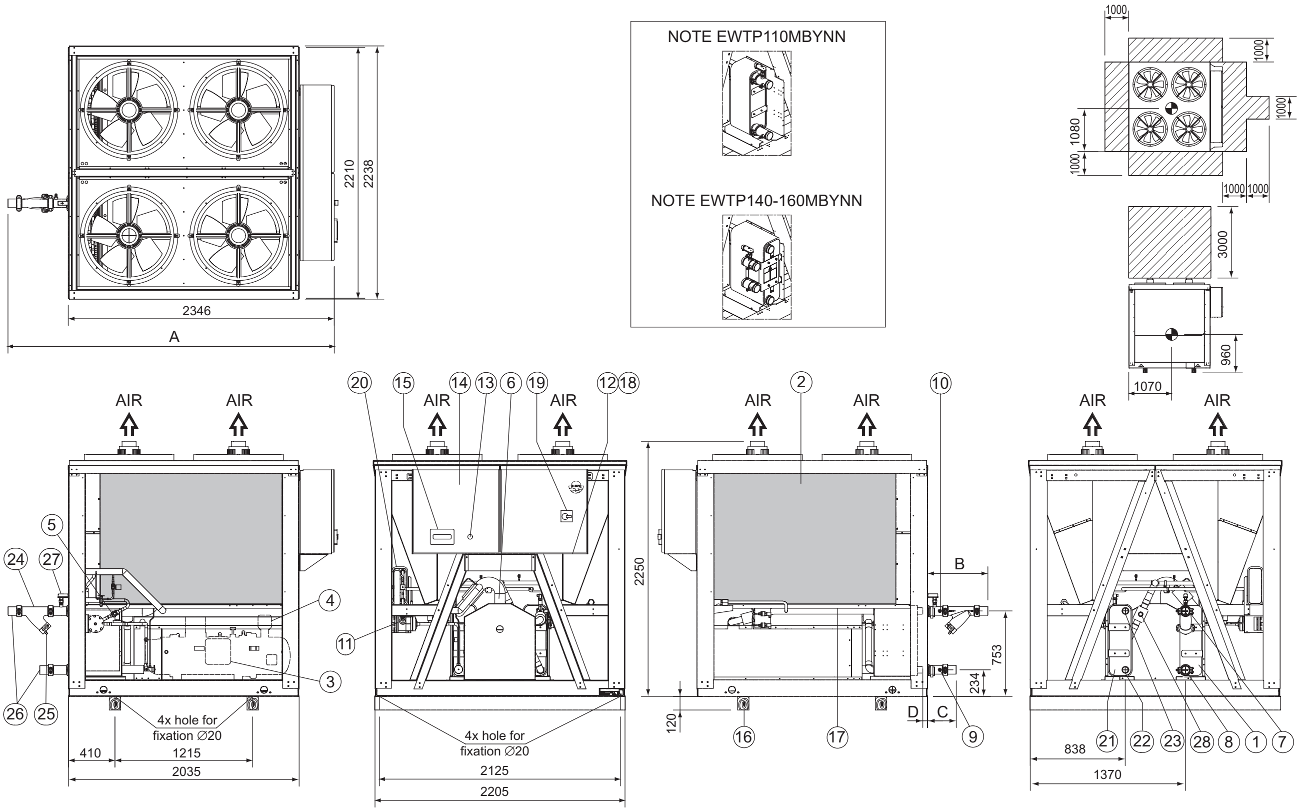
No.	Component
9	Power supply intake
10	Emergency stop
11	Switchbox
12	Digital display controller
13	Transportbeam
14	Ambient temperature sensor
15	Field wiring intake
16	Main isolator switch (optional)

1

1.27 Outlook Drawing: EWTP110~160MBYNN

EWTP110~ 160MBYNN

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



					CHILLED WATER		HOT WATER	
MODEL	A	B	C	D	IN (O.D.)	OUT (O.D.)	IN (GAS M)	OUT (GAS M)
EWTP110MBYNN*	2700	354	75	98	∅ 76.1	∅ 76.1	2"	2"
EWTP140MBYNN*	2794	448	169	41	∅ 76.1	∅ 76.1	2"	2"
EWTP160MBYNN*	2879	533	254	10	∅ 76.1	∅ 76.1	2"	2"

required space: around the unit for service and air intake

center of gravity

Components

The table below lists the components:

No.	Component
1	Evaporator
2	Condenser
3	Compressor
4	Discharge stop valve
5	Liquid stop valve
6	Suction stop valve (optional)
7	Chilled water in (Victaulic 3”0D)
8	Chilled water out (Victaulic 3”0D)
9	Leaving water temperature sensor
10	Entering water temperature sensor
11	Drier + charge valve
12	Power supply intake
13	Emergency stop
14	Switchbox
15	Digital display controller

No.	Component
16	Transportbeam
17	Ambient temperature sensor
18	Field wiring intake
19	Main isolator switch (optional)
20	Economizer
21	Heatrecovery condenser
22	Heatrecovery water inlet (2”GAS M)
23	Heatrecovery water outlet (2”GAS M)
24	Filter (supplied as kit)
25	Flush plug (Ø13 mm NPT)
26	Counterpipes for welding (supplied as kit)
27	Flowswitch
28	Stopvalve heatrecovery condenser

Note EWTP110MBYNN:

- The inlet counterpipe with flowswitch and temperature sensor is premounted.
- The outlet counterpipe with flowswitch and temperature sensor is premounted.

Note EWTP140~160MBYNN:

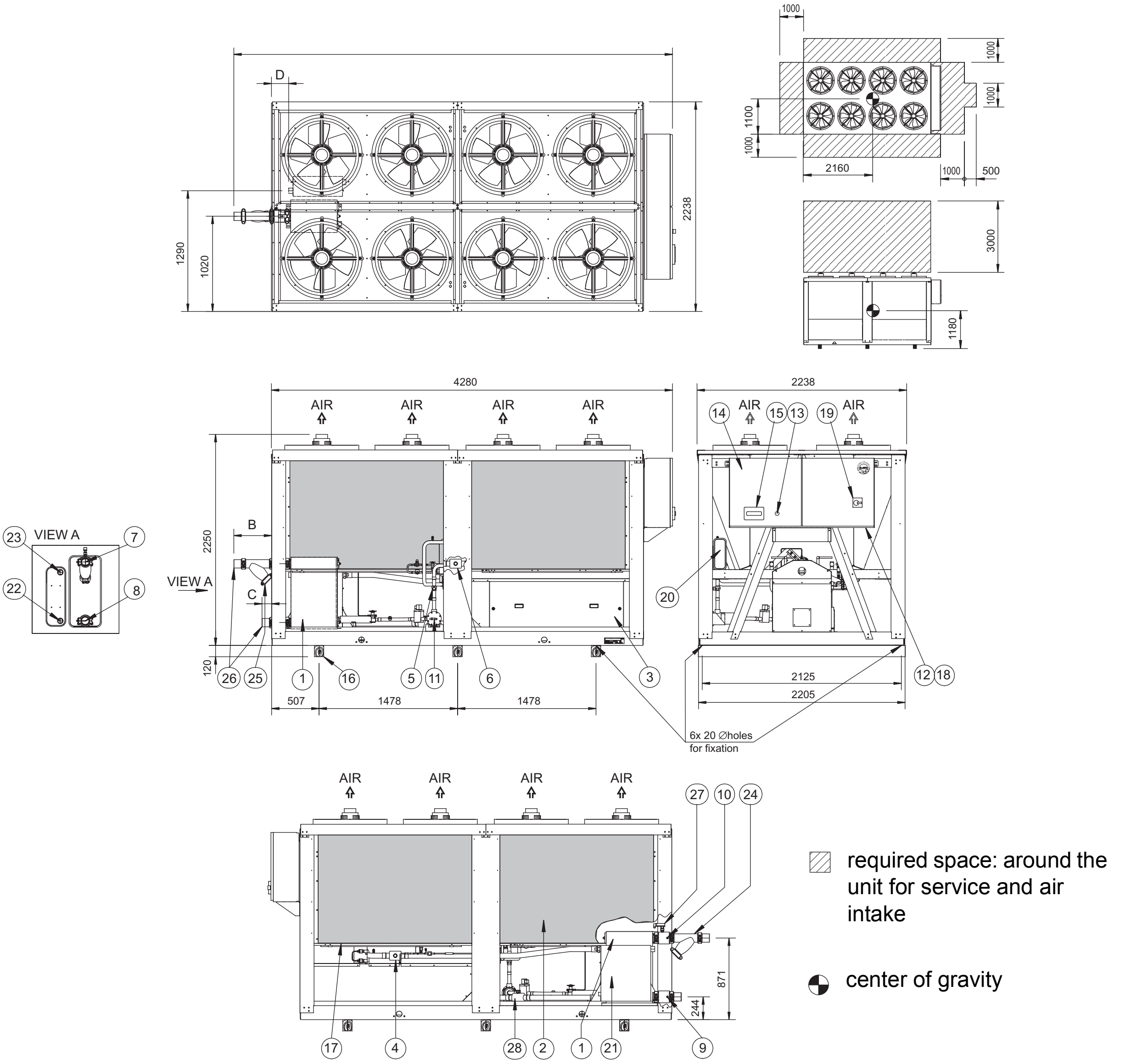
- The inlet counterpipe with flowswitch and temperature sensor is temporary mounted on side of evaporator for transport.
- The outlet counterpipe with flowswitch and temperature sensor is temporary mounted on side of evaporator for transport.

1

1.28 Outlook Drawing: EWTP200~340MBYNN

EWTP200~ 340MBYNN

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



					CHILLED WATER		HOT WATER	
MODEL	A	B	C	D	IN (O.D.)	OUT (O.D.)	IN (GAS M)	OUT (GAS M)
EWTP200MBYNN*	4495	215	-85	387	∅ 88.9	∅ 88.9	2"	2"
EWTP280MBYNN*	4585	305	5	275	∅ 88.9	∅ 88.9	2"	2"
EWTP340MBYNN*	4680	400	100	182	∅ 88.9	∅ 88.9	2"	2"

Components

The table below lists the components:

No.	Component
1	Evaporator
2	condenser
3	Compressor
4	Discharge stop valve
5	Liquid stop valve
6	Suction stop valve (optional)
7	Chilled water in (Victaulic 3”)
8	Chilled water out (Victaulic 3”)
9	Leaving water temperature sensor
10	Entering water temperature sensor
11	Drier + charge valve
12	Power supply intake
13	Emergency stop
14	Switchbox
15	Digital display controller

No.	Component
16	Transportbeam
17	Ambient temperature sensor
18	Field wiring intake
19	Main isolator switch (optional)
20	Economizer
21	Heatrecovery condenser
22	Heatrecovery water inlet (2”GAS M)
23	Heatrecovery water outlet (2”GAS M)
24	Filter (supplied as kit)
25	Flush plug (Ø19 mm NPT)
26	Counterpipes for welding (supplied as kit)
27	Flowswitch
28	Stopvalve heatrecovery condenser

Note:

- The inlet counterpipe with flowswitch and temperature sensor is premounted.
- The outlet counterpipe with flowswitch and temperature sensor is premounted.

1

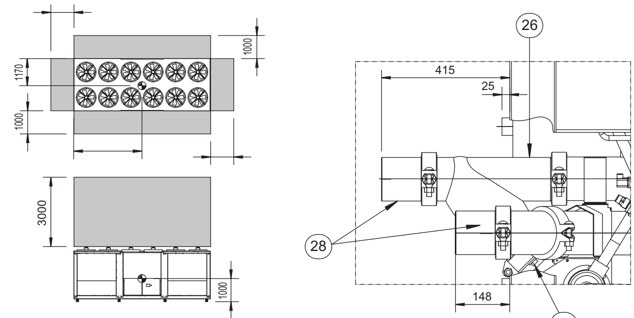
1.29 Outlook Drawing: EWTP400~540MBYNN

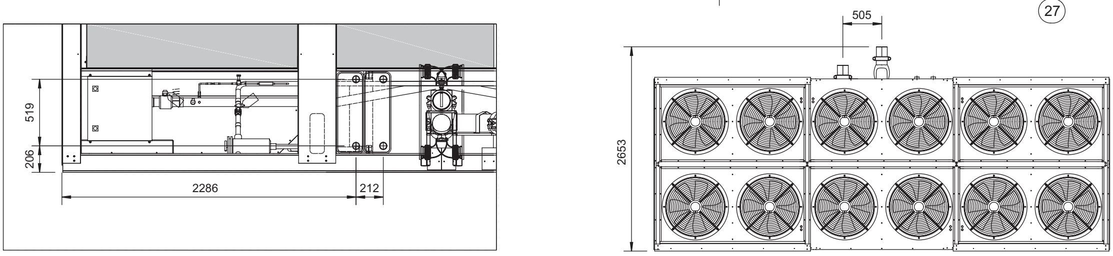
EWTP400~ 540MBYNN

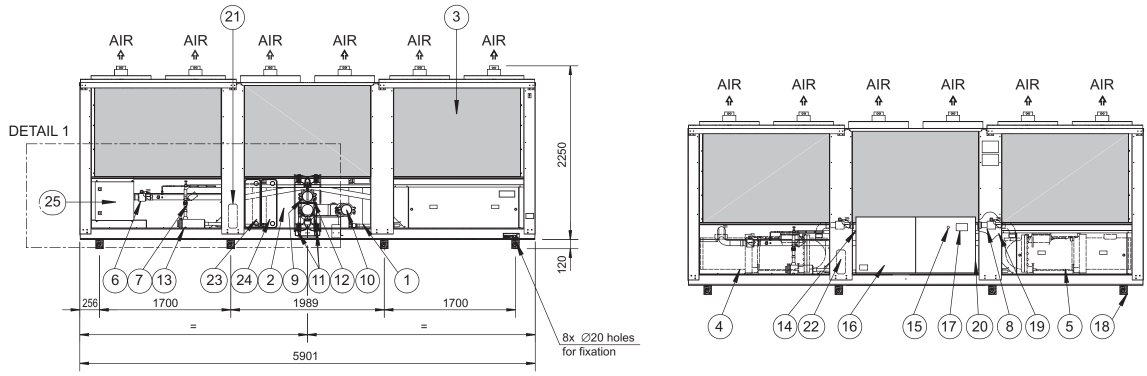
The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).

required space: around the unit for service and air intake

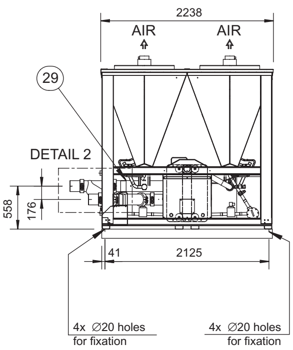
center of gravity







	CHILLED WATER		HOT WATER	
MODEL	IN (O.D.)	OUT (O.D.)	IN (GAS M)	OUT (GAS M)
EWTP400MBYNN	Flexible joint 5"	Flexible joint 5"	2"	2"
EWTP460MBYNN	Flexible joint 5"	Flexible joint 5"	2"	2"
EWTP540MBYNN	Flexible joint 5"	Flexible joint 5"	2"	2"



Components

The table below lists the components:

No.	Component
1	Evaporator 1
2	Evaporator 2
3	Condenser
4	Compressor 1
5	Compressor 2
6	Discharge stop valve
7	Liquid stop valve
8	Suction stop valve (optional)
9	Chilled water in
10	Chilled water out
11	Leaving water temperature sensor
12	Entering water temperature sensor
13	Drier + charge valve
14	Power supply intake
15	Emergency stop
16	Switchbox
17	Digital display controller
18	Transportbeam
19	Ambient temperature sensor
20	Field wiring intake
21	Economizer 1
22	Economizer 2
23	Heatrecovery condenser 1
24	Heatrecovery condenser 2
25	Inverterbox
26	Filter (supplied as kit)
27	Flush plug (Ø13 mm NPT)
28	Counterpipes for welding (supplied as kit)
29	Flowswitch

1

2 Piping Layout

2.1 What Is in This Chapter?

Introduction

This chapter describes the internal refrigeration circuit. The water piping is considered to be a common practice and is, therefore, not described.

Overview

This chapter contains the following topics:

1

2.2 Installation Outline

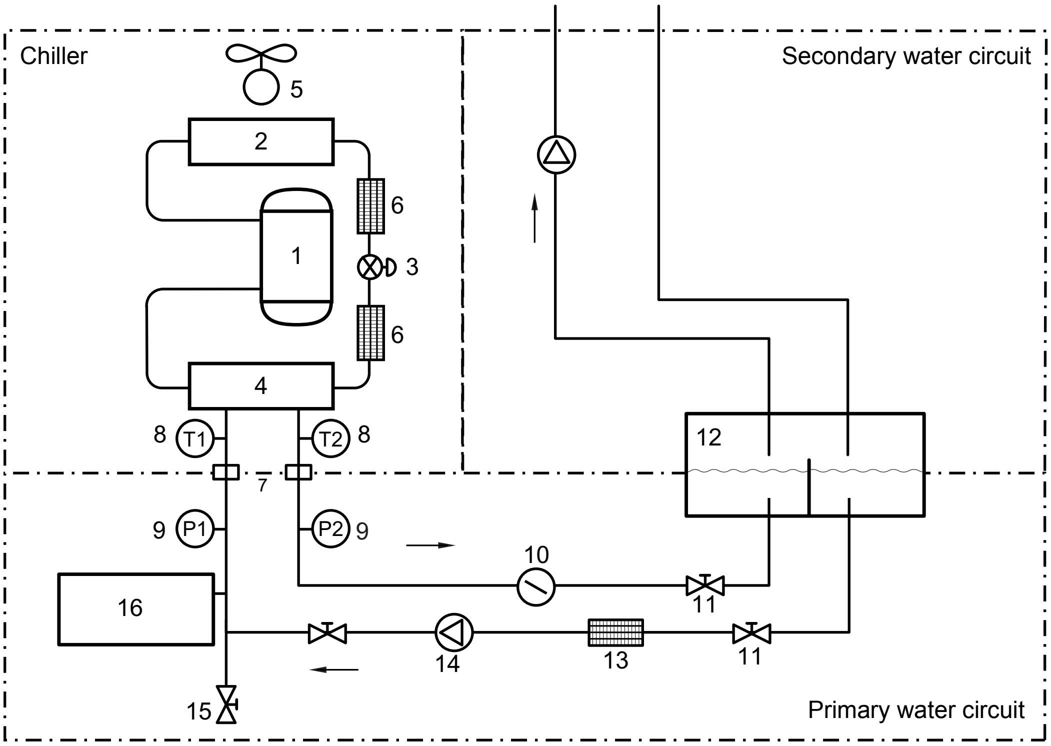
Introduction

The installation outline contains the main parts of a typical installation:

- ➤ Chiller
- ➤ Primary water circuit
- ➤ Secondary water circuit.

Typical installation

The illustration below shows a typical installation. Some of these components may not be present in all the chillers described in this manual.



Components

The table below lists the components.

No.	Chiller
1	Compressor
2	Air-heat exchanger
3	Expansion valve
4	Water-heat exchanger
5	Fan motor
6	Refrigerant filter strainer
7	Water connections
8	Temperature measuring points

No.	Primary water circuit
9	Pressure measuring points
10	Flow switch
11	Shut-off valves
12	Buffer tank
13	Water filter
14	Water pump
15	Drain valve
16	Expansion tank

Water filter

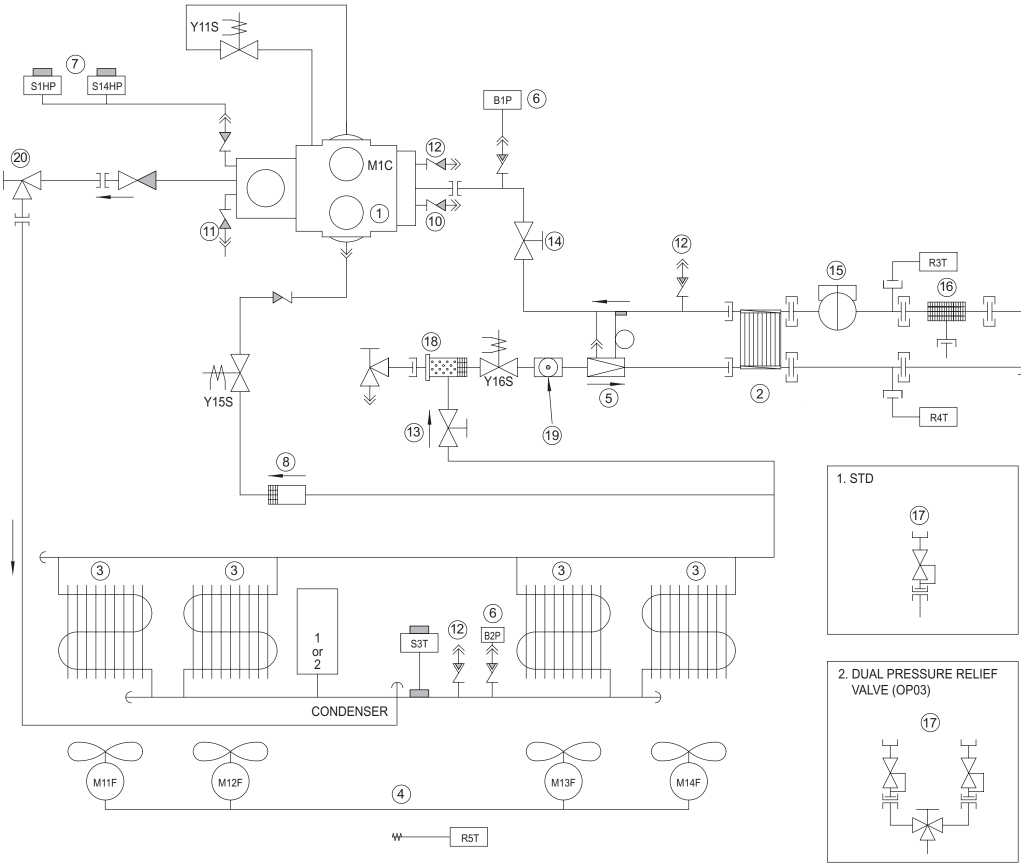
Make sure a filter is installed in front of the water inlet of the plate-heat exchanger. The plate-heat exchangers are sensitive to dirt and small particles.
The mesh opening of the filter is max. 1 mm.

1

2.3 Functional Diagram Refrigeration Circuit: EWAP110~160MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWAP110-160MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

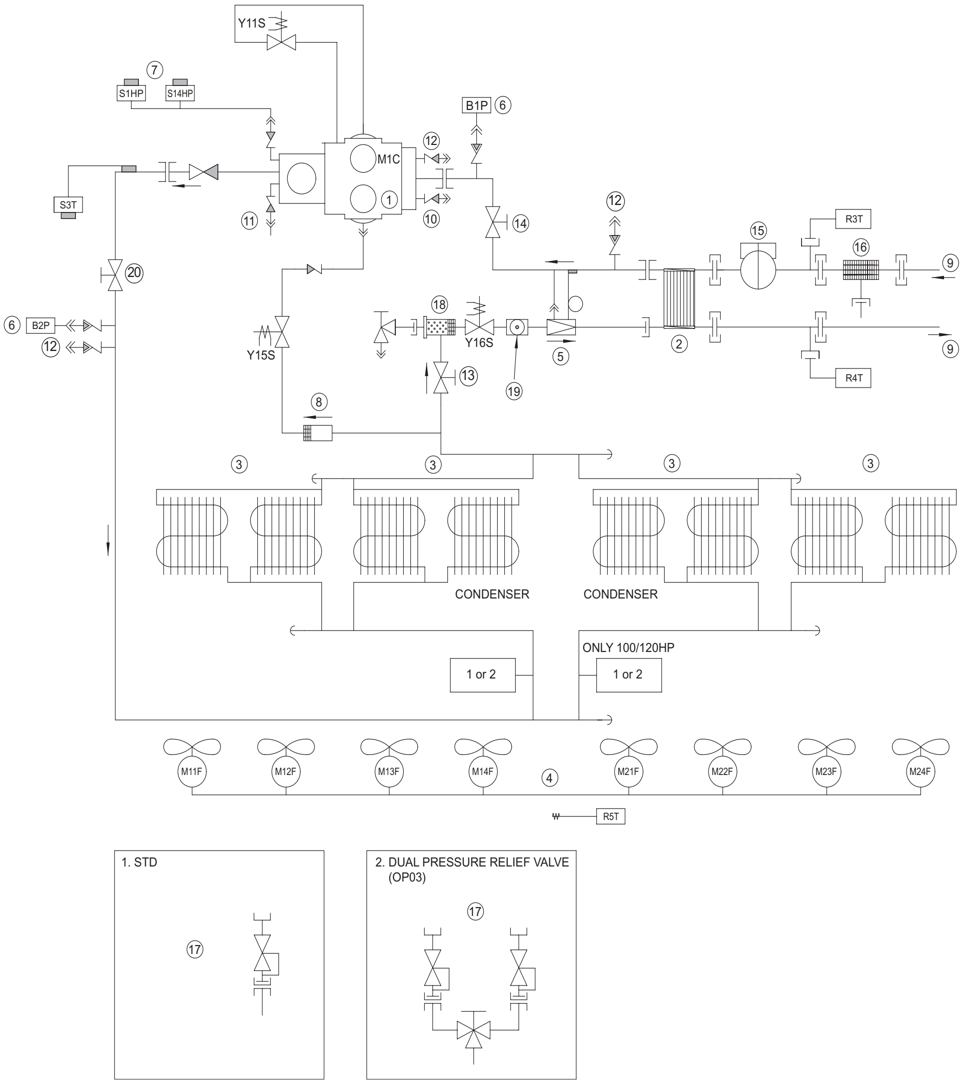
Symbol	Description
M11F	Condenser fan motor
M12F	Condenser fan motor
M13F	Condenser fan motor
M14F	Condenser fan motor
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Discharge temperature controller
R3T	Inlet water evap. temp. sensor
R4T	Outlet water evap. temp. sensor
R5T	Ambient temperature sensor

Symbol	Description
B1P	Low pressure transmitter
B2P	High pressure transmitter
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid linesolenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

1

2.4 Functional Diagram Refrigeration Circuit: EWAP200~340MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWAP200-340MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

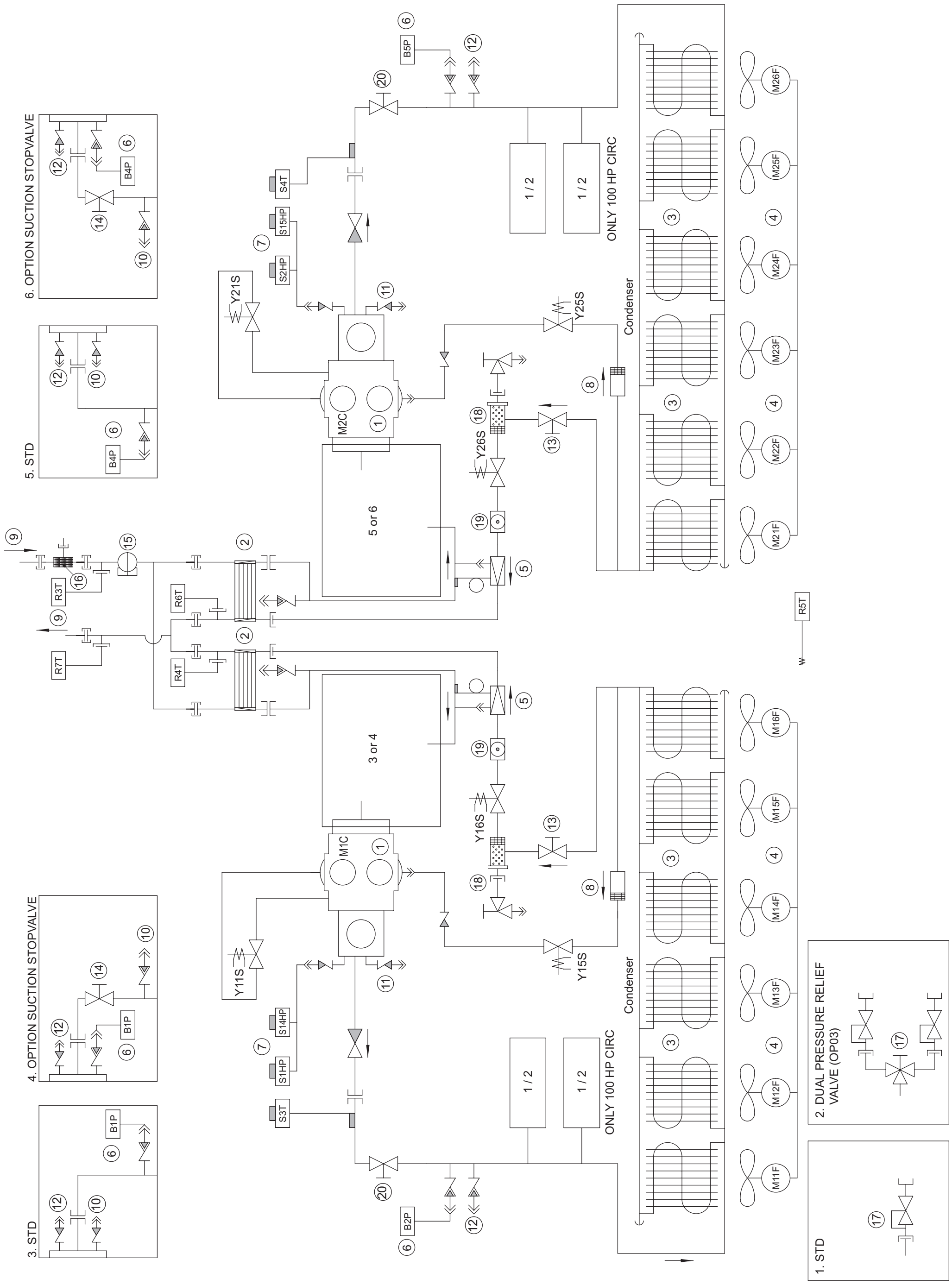
Symbol	Description
M11, -18F	Condenser fan motor
M1C	Compressor motor
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Discharge temperature controller
R3T	Inlet water evap. temp. sensor
R4T	Outlet water evap. temp. sensor
R5T	Ambient temperature sensor
B1P	Low pressure transmitter
B2P	High pressure transmitter

Symbol	Description
Y11	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid linesolenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

2.5 Functional Diagram Refrigeration Circuit: EWAP400~540MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWAP400-540MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M11, -16F	Condenser fan motor
M21, -26F	Condenser fan motor
M1C, M2C	Compressor motor
S1, 2HP	High pressure switch
S14, 15HP	High pressure switch
S3, 4T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R6T	Outlet water evap. temp sensor
R7T	Mixed outlet water temp sensor
R5T	Ambient temperature sensor
B1, 4P	Low pressure transmitter

Symbol	Description
B2, 5P	High pressure transmitter
Y11	Unloader solenoid valve
Y21	Unloader solenoid valve
Y15, 25S	Liquid injection solenoid valve
Y15, 26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

Components refrigeration side EWAP110~540MBYNN

The table below describes the main components of the refrigeration circuit on the refrigeration side.

No.	Component	Function / remark
1	Compressor	All compressors are semi-hermetic screw compressors with step less capacity control.
2	Water-heat exchanger (evaporator)	The water-heat exchanger is of the brazed plate-heat exchanger type.
3	Air-heat exchanger (condenser)	The air-heat exchanger is of the cross fin coil type. Hi-X-tubes and PE coated waffle louvre fins are used. The air is discharged upwards.
4	Fan	Direct driven single speed motor.
5	Expansion valve	The thermostatic expansion valve is set up to control the superheat between 5°C and 7°C.
6	Low-pressure transmitter and High pressure transmitter	The Low and high pressure transmitter are used to gain information in order to perform some controls and also act as safety.
7	High-pressure switch	This switch acts as a circuit safety. ➤ Activation at 25 bar ➤ Manual reset at HP-Switch
8	Strainer	This strainer prevents dirt particles from entering the solenoid valve of the liquid injection.
9	Water in- and outlet connections	The water in- and outlet piping connections are delivered with victolic joint and countrtpipe for welding.
10	Low-pressure service port	The low-pressure service port is used to connect a low-pressure gauge.
11	High-pressure service port	The high-pressure service port is used to connect a high-pressure gauge.
12	Serviceport	Serviceport.
13	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
14	Suction stop valve (optional)	This suction stop valve can be used in combination with the discharge stop valve to seperate the compressor from the system (for examble: maintenance).
15	Flowswitch	The flowswitch is used to check if there is water flow.
16	Filter + drain plug	Water filter and drain. This drain is used to drain the filter before opening the filter.
17	Safety valve	The safety valves prevent pressure above 28 bar.
18	Drier + charge valve	The replaceable filter drier will keep the refrigerant system dry. It is equipped with a 3/8” charge valve.
19	Sightglass with moisture indicator	The sightglass with moisture indicator is used to check the refrigerant shortage and/or moisture level in the system.

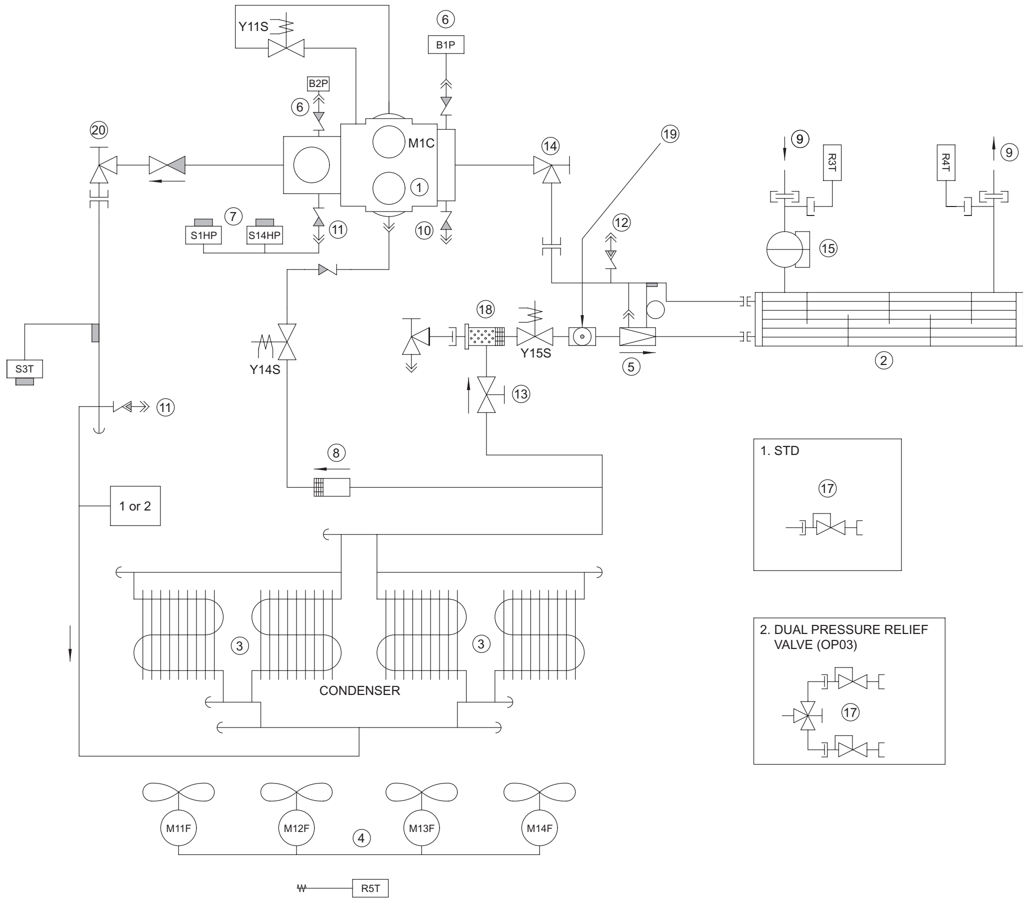
No.	Component	Function / remark
20	Discharge stop valve	This stop valve is used during pump down and service work in combination with liquid stop valve or suction stop valve if present (optional).

1

2.6 Functional Diagram Refrigeration Circuit: EWAD120~170MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWAD120~170MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M11F	Condenser fan motor
M12F	Condenser fan motor
M13F	Condenser fan motor
M14F	Condenser fan motor
M1C	Compressor motor1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Discharge temperature controller
R3T	Inlet water evap. temp. sensor
R4T	Outlet water evap. temp. sensor
R5T	Ambient temperature sensor

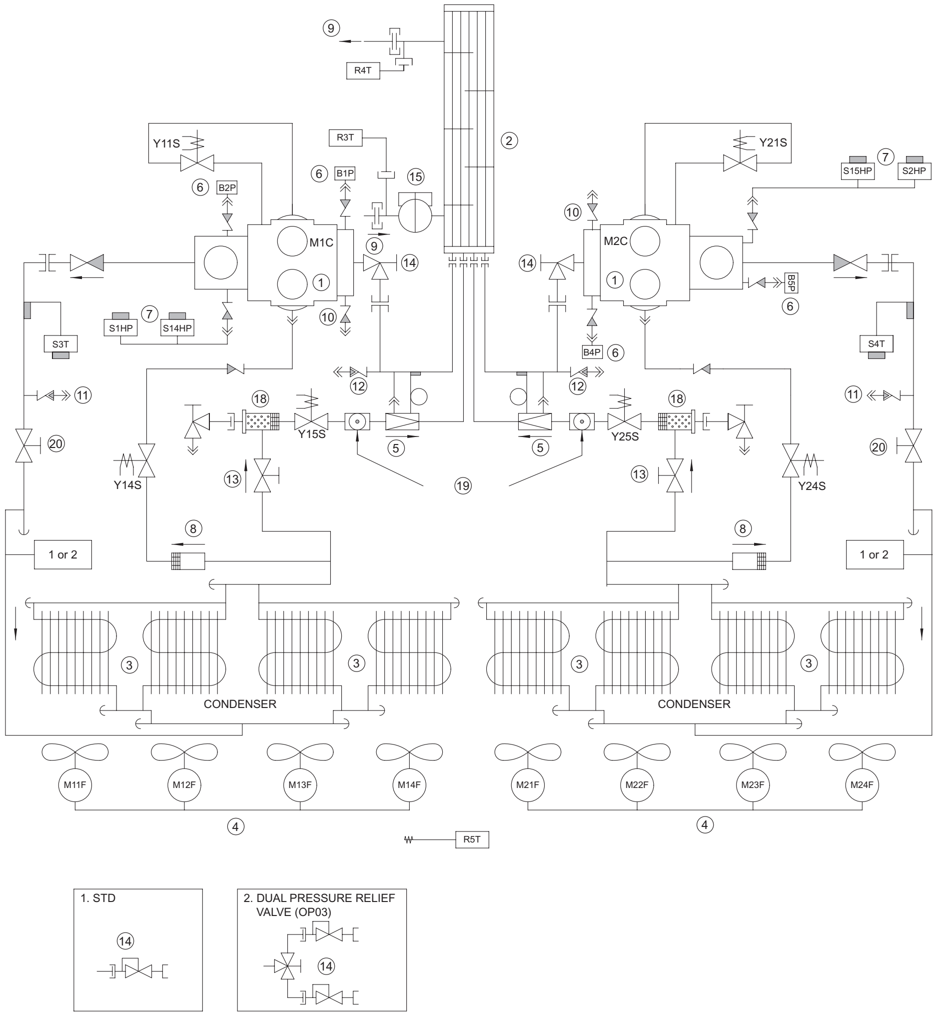
Symbol	Description
B1P	Low pressure transmitter
B2P	High pressure transmitter
Y11S	Unloader solenoid valve
Y14S	Liquid injection solenoid valve
Y15S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

2.7 Functional Diagram Refrigeration Circuit: EWAD240~340MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWAD240~340MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M11, -14F	Condenser fan motor
M21, -24F	Condenser fan motor
M1C, M2C	Compressor motor
S1, 2HP	High pressure switch
S14, 15HP	High pressure switch
S3, 4T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R5T	Ambient temperature sensor
B1, 4P	Low pressure transmitter
B2, 5P	High pressure transmitter

Symbol	Description
Y11S	Unloader solenoid valve
Y21S	Unloader solenoid valve
Y14, 24S	Liquid injection solenoid valve
Y15, 25S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
→	Spinned pipe

Components refrigeration side EWAD120~ 340MBYNN

The table below describes the main components of the refrigeration circuit on the refrigeration side.

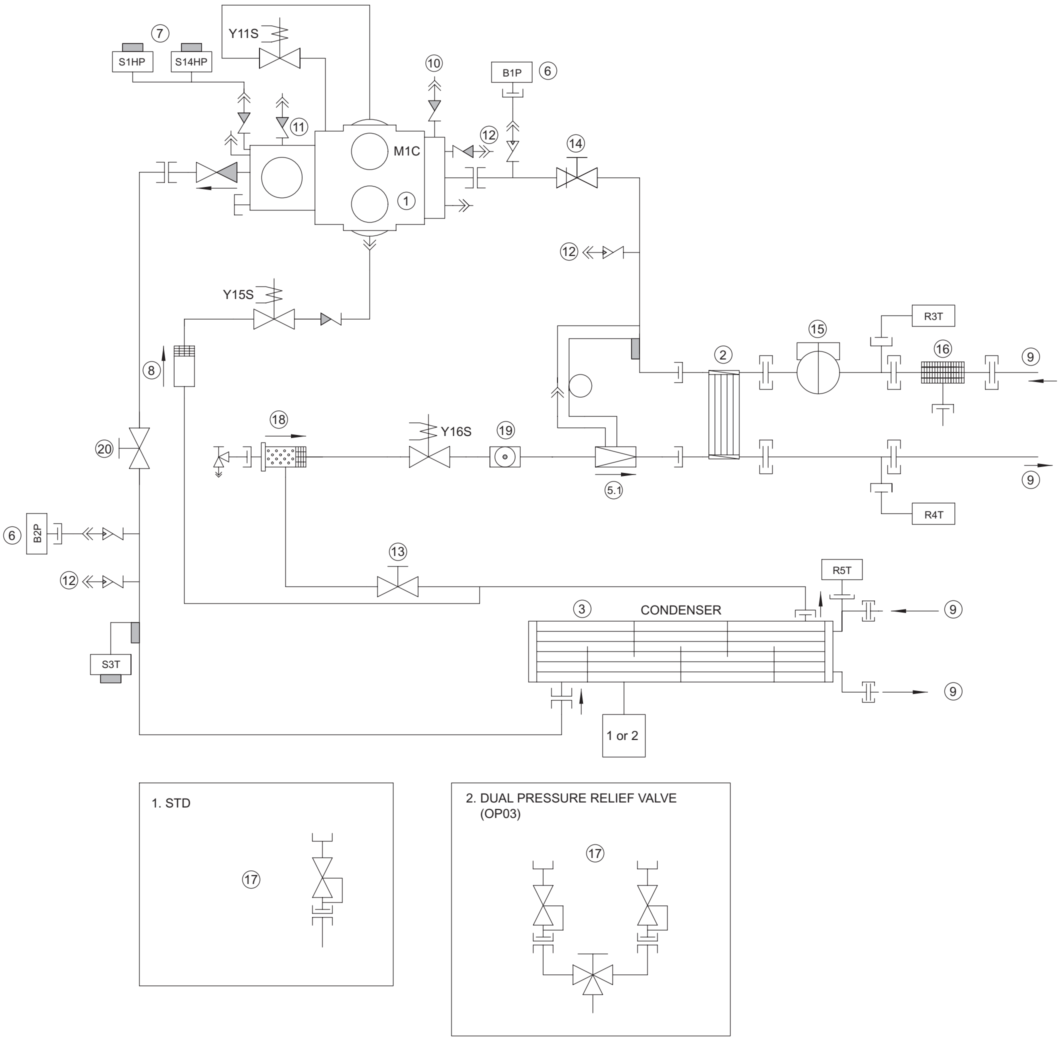
No.	Component	Function / remark
1	Compressor	All compressors are semi-hermetic screw compressors with step less capacity control.
2	Water-heat exchanger (evaporator)	The water-heat exchanger is of the brazed plate-heat exchanger type.
3	Water-heat exchanger (condenser)	The condenser is a shell and tube type with water flowing through the tubes and refrigerant flowing through the shell. The external finned tubes provide an extended surface, creating a better contact between the refrigerant and the water.
4	Fan	Direct driven single speed motor.
5	Expansion valve	The thermostatic expansion valve is set up to control the superheat between 5°C and 7°C.
6	Low-pressure transmitter and High pressure transmitter	The Low and high pressure transmitter are used to gain information in order to perform some controls and also act as safety.
7	High-pressure switch	This switch acts as a circuit safety. ➤ Activation at 17 bar ➤ Manual reset at HP-Switch
8	Strainer	This strainer prevents dirt particles from entering the solenoid valve of the liquid injection.
9	Water in- and outlet connections	The water in- and outlet piping connections are delivered with victolic joint and countrtpipe for welding.
10	Low-pressure service port	The low-pressure service port is used to connect a low-pressure gauge.
11	High-pressure service port	The high-pressure service port is used to connect a high-pressure gauge.
12	Serviceport	Serviceport.
13	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
14	Suction stop valve (optional)	This suction stop valve can be used in combination with the discharge stop valve to seperate the compressor from the system (for examble: maintenance).
15	Flowswitch	The flowswitch is used to check if there is water flow.
17	Safety valve	The safety valves prevent pressure above 28 bar.
18	Drier + charge valve	The replaceable filter drier will keep the refrigerant system dry. It is equipped with a 3/8” charge valve.
19	Sightglass with moisture indicator	The sightglass with moisture indicator is used to check the refrigerant shortage and/or moisture level in the system.

No.	Component	Function / remark
20	Discharge stop valve	This stop valve is used during pump down and service work in combination with liquid stop valve or suction stop valve if present (optional).

1

2.8 Functional Diagram Refrigeration Circuit: EWWD120~180MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWWD120-180MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R5T	Inlet water cond. temp. sensor
B1P	Low pressure transmitter
B2P	High pressure transmitter

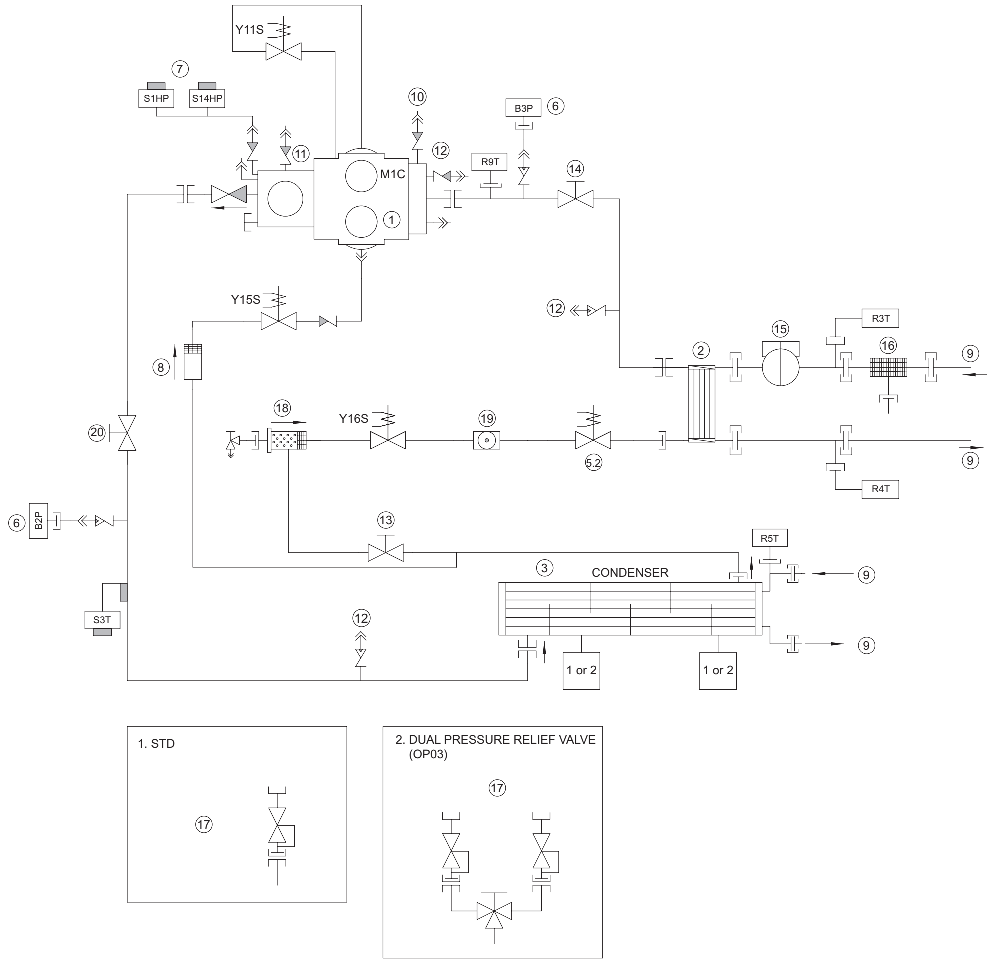
Symbol	Description
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

2.9 Functional Diagram Refrigeration Circuit: EWWD240~280MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWWD240-280MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R5T	Inlet water cond. temp. sensor
R9T	EEV temperature sensor
B2P	High pressure transmitter
B3P	EEV low pressure sensor

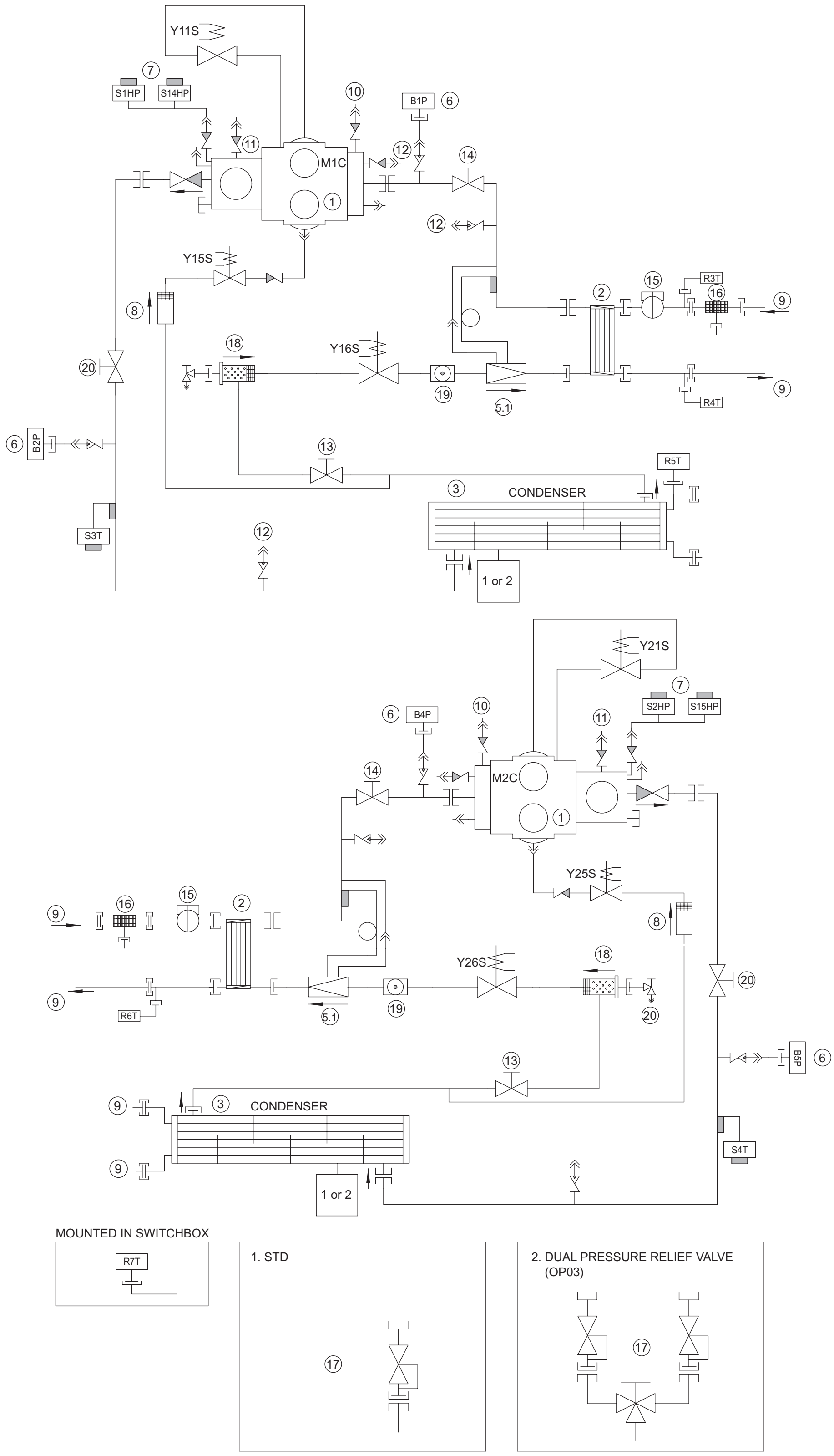
Symbol	Description
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

1

2.10 Functional Diagram Refrigeration Circuit: EWWD360 MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWWD360 MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R5T	Inlet water cond. temp. sensor
B1P	Low pressure transmitter
B2P	High pressure transmitter
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
M2C	Compressor motor 2
S2HP	High pressure switch
S15HP	High pressure switch

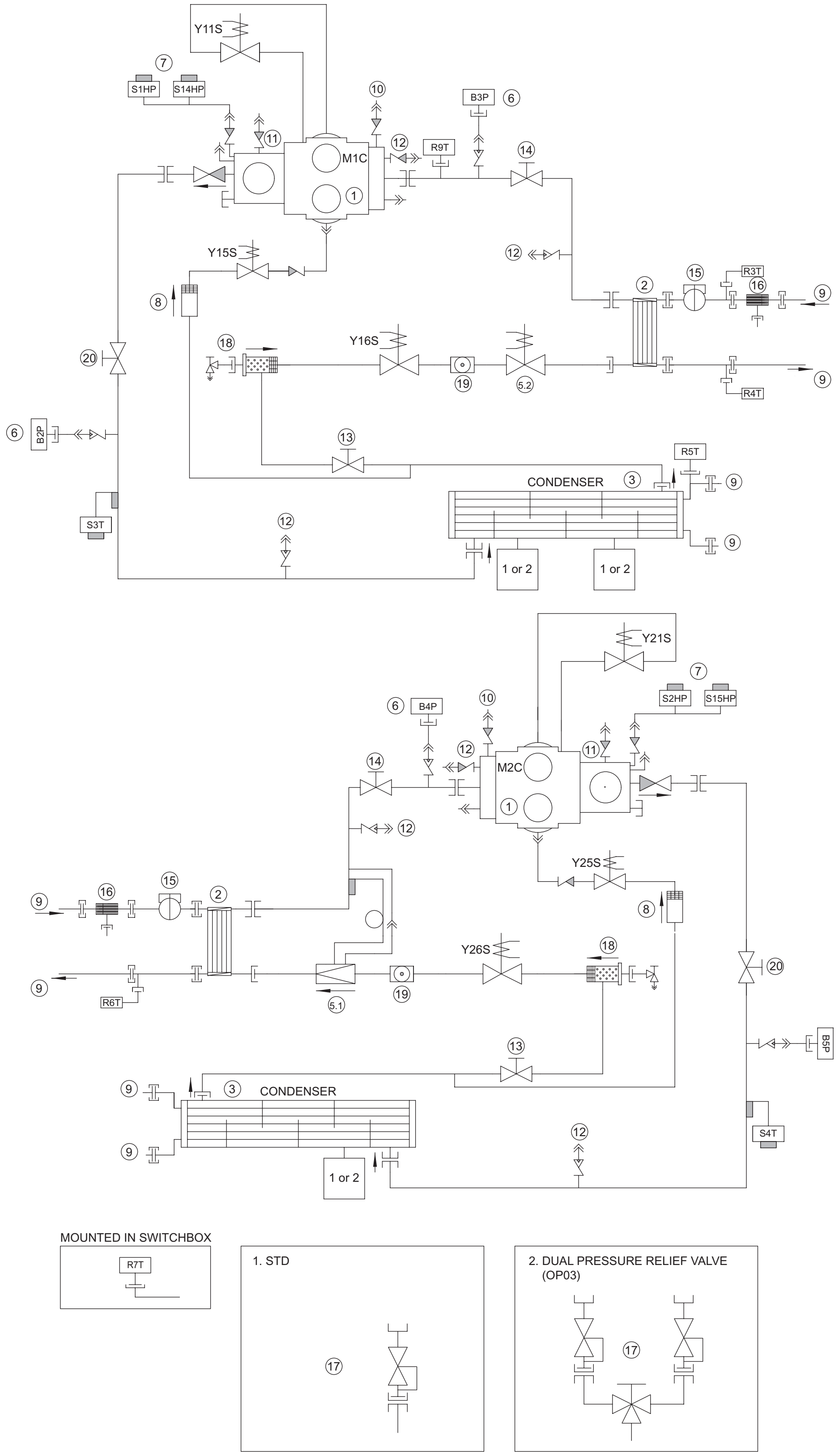
Symbol	Description
S4T	Dicharge temperature controller
R6T	Outlet water evap. temp sensor
R7T	Mixed outlet water temp sensor
B4P	Low pressure transmitter
B5P	High pressure transmitter
Y21S	Unloader solenoid valve
Y25S	Liquid injection solenoid valve
Y26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

1

2.11 Functional Diagram Refrigeration Circuit: EWWD440 MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWWD440 MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

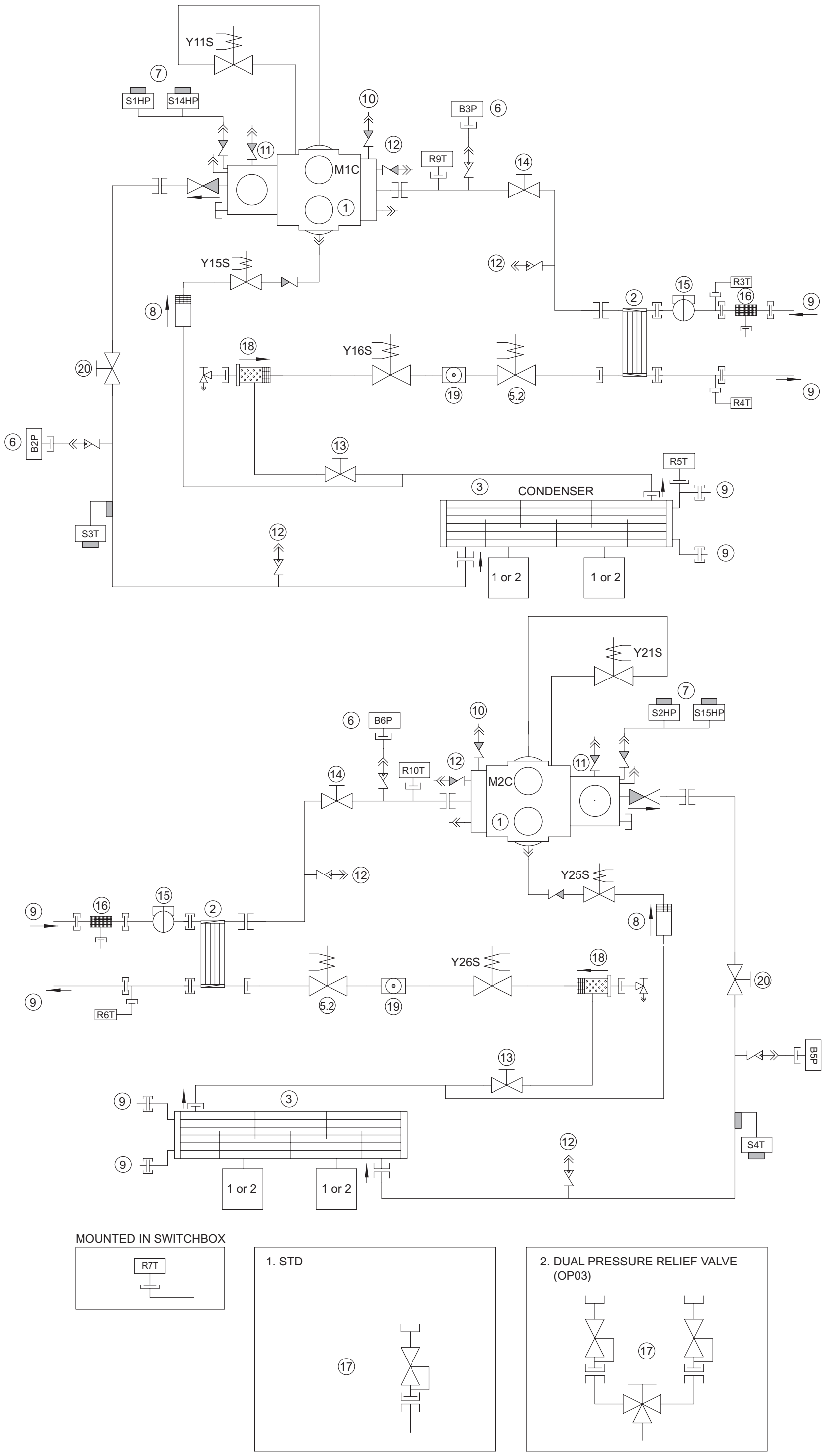
Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R5T	Inlet water cond. temp. sensor
R9T	EEV temperature sensor
B2P	High pressure transmitter
B3P	EEV low pressure sensor
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
M2C	Compressor motor 2
S2HP	High pressure switch

Symbol	Description
S15HP	High pressure switch
S4T	Dicharge temperature controller
R6T	Outlet water evap. temp sensor
R7T	Mixed outlet water temp sensor
B4P	Low pressure transmitter
B5P	High pressure transmitter
Y21S	Unloader solenoid valve
Y25S	Liquid injection solenoid valve
Y26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
→	Spinned pipe

1

2.12 Functional Diagram Refrigeration Circuit: EWWD500~540MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWWD500-540 MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R5T	Inlet water cond. temp. sensor
R9T	EEV temperature sensor
B2P	High pressure transmitter
B3P	EEV low pressure sensor
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
M2C	Compressor motor 2
S2HP	High pressure switch
S15HP	High pressure switch

Symbol	Description
S4T	Dicharge temperature controller
R6T	Outlet water evap. temp sensor
R7T	Mixed water evap. temp sensor
R10T	EEV temperature sensor
B5P	High pressure transmitter
B6P	EEV low pressure sensor
Y21S	Unloader solenoid valve
Y25S	Liquid injection solenoid valve
Y26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

Components refrigeration side EWWD120~540MBYNN

The table below describes the main components of the refrigeration circuit on the refrigeration side.

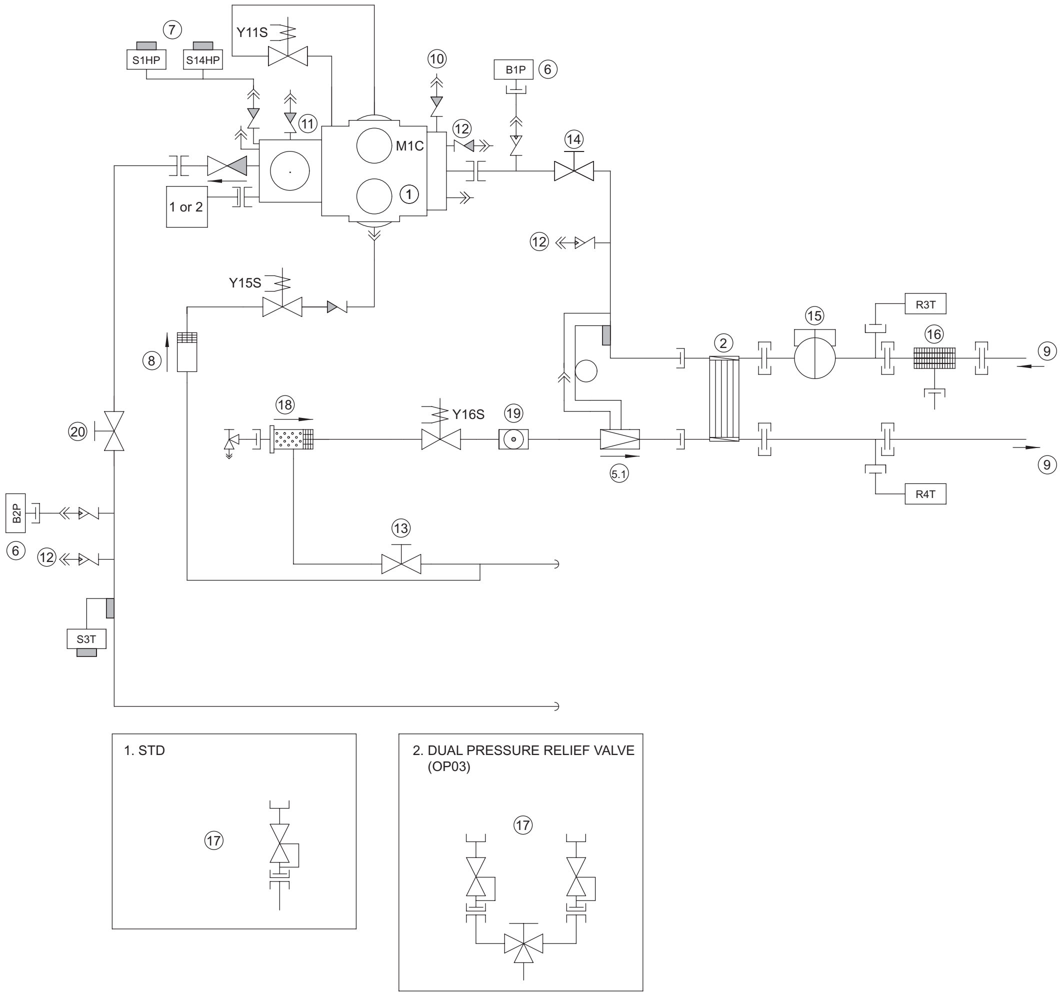
No.	Component	Function / remark
1	Compressor	All compressors are semi-hermetic screw compressors with step less capacity control.
2	Water-heat exchanger (evaporator)	The water-heat exchanger is of the brazed plate-heat exchanger type.
3	Water-heat exchanger (condenser)	The condenser is a shell and tube type with water flowing through the tubes and refrigerant flowing through the shell. The external finned tubes provide an extended surface, creating a better contact between the refrigerant and the water.
5.1	The thermostatic expansion valve	The thermostatic expansion valve is set up to control the superheat between 5°C and 7°C.
5.2	Electronic expansion valve	Electronic expansion valve with EEV driver to control the superheat at 5°C (setpoint)
6	Low-pressure transmitter and High pressure transmitter	The Low and high pressure transmitter are used to gain information in order to perform some controls and also act as safety.
7	High-pressure switch	This switch acts as a circuit safety. ➤ Activation at 17 bar ➤ Manual reset at HP-Switch
8	Strainer	This strainer prevents dirt particles from entering the solenoid valve of the liquid injection.
9	Water in- and outlet connections	The water in- and outlet piping connections are delivered with victolic joint and countrtpipe for welding.
10	Low-pressure service port	The low-pressure service port is used to connect a low-pressure gauge.
11	High-pressure service port	The high-pressure service port is used to connect a high-pressure gauge.
12	Serviceport	Serviceport.
13	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
14	Suction stop valve (optional)	This suction stop valve can be used in combination with the discharge stop valve to seperate the compressor from the system (for examble: maintenance).
15	Flowswitch	The flowswitch is used to check if there is water flow.
16	Filter + drain plug	Water filter and drain. This drain is used to drain the filter element before opening the filter.
17	Safety valve	The safety valves prevent pressure above 28 bar.
18	Drier + charge valve	The replaceable filter drier will keep the refrigerant system dry. It is equipped with a 3/8” charge valve.

No.	Component	Function / remark
19	Sightglass with moisture indicator	The sightglass with moisture indicator is used to check the refrigerant shortage and/or moisture level in the system.
20	Discharge stop valve	This stop valve is used during pump down and service work in combination with liquid stop valve or suction stop valve if present (optional).

1

2.13 Functional Diagram Refrigeration Circuit: EWLD120~170MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWLD120-170MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

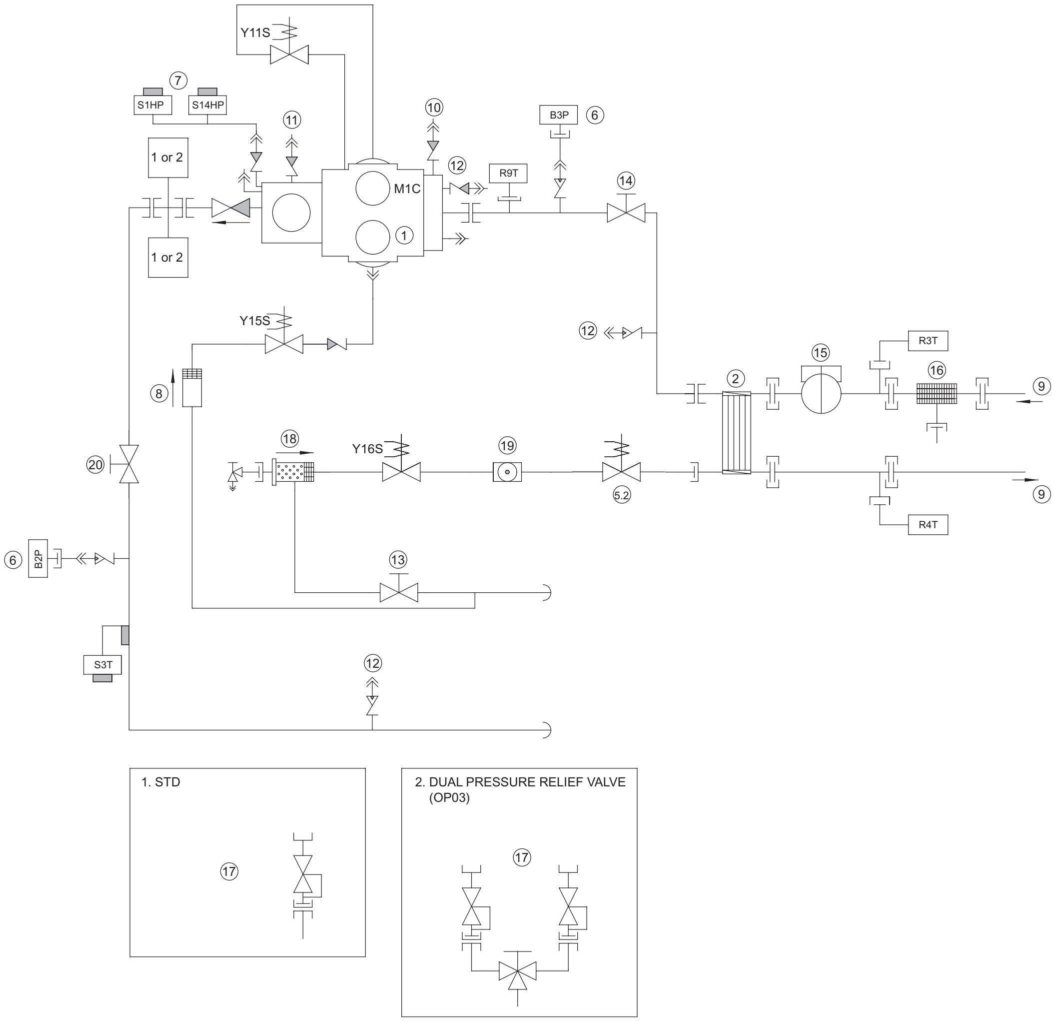
Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
B1P	Low pressure transmitter
B2P	High pressure transmitter
Y11S	Unloader solenoid valve

Symbol	Description
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

1

2.14 Functional Diagram Refrigeration Circuit: EWLD240~260MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWLD240-260MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R9T	EEV temperature sensor
B2P	High pressure transmitter
B3P	EEV low pressure sensor

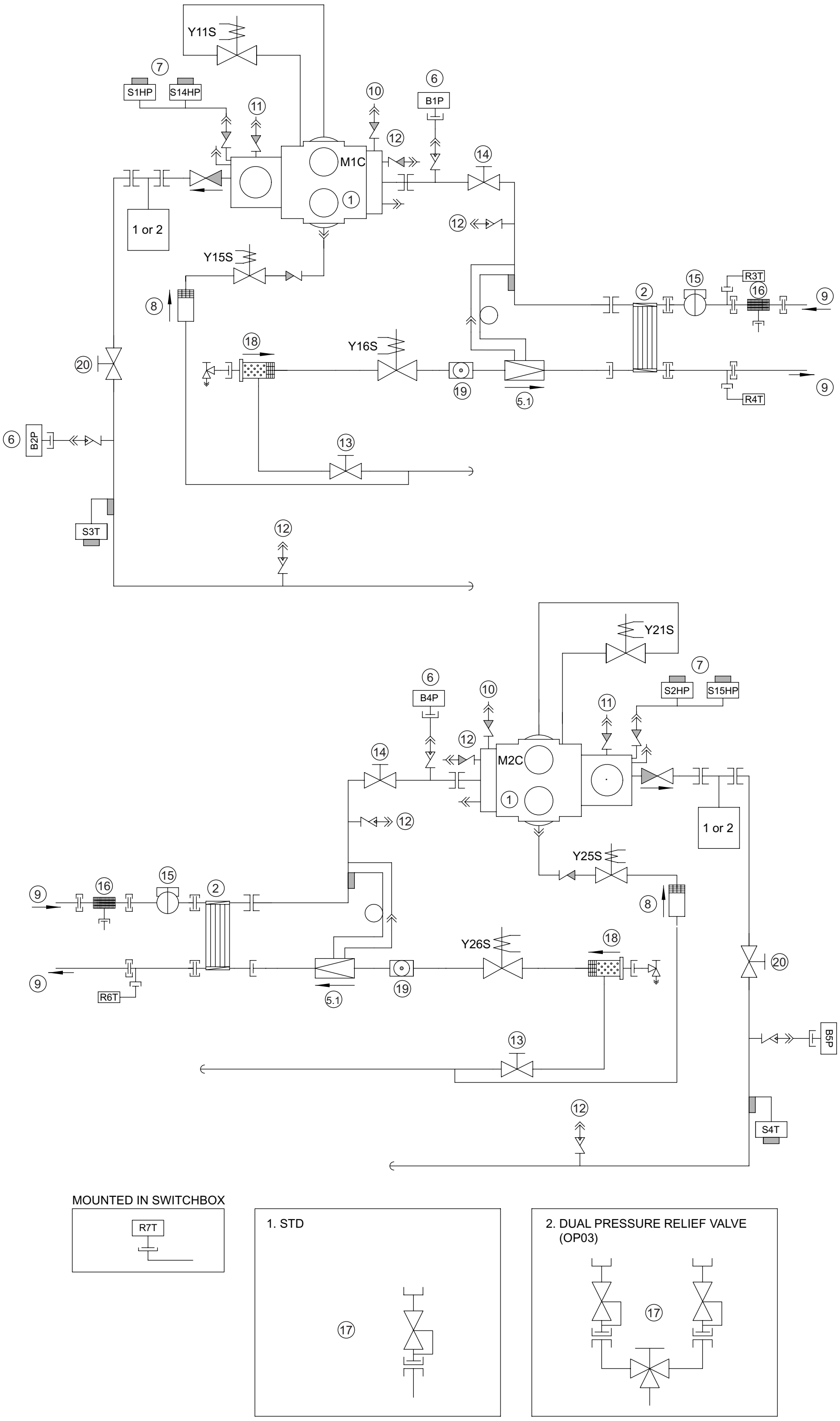
Symbol	Description
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

2.15 Functional Diagram Refrigeration Circuit: EWLD340 MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWLD340 MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
B1P	Low pressure transmitter
B2P	High pressure transmitter
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
M2C	Compressor motor 2
S2HP	High pressure switch
S15HP	High pressure switch

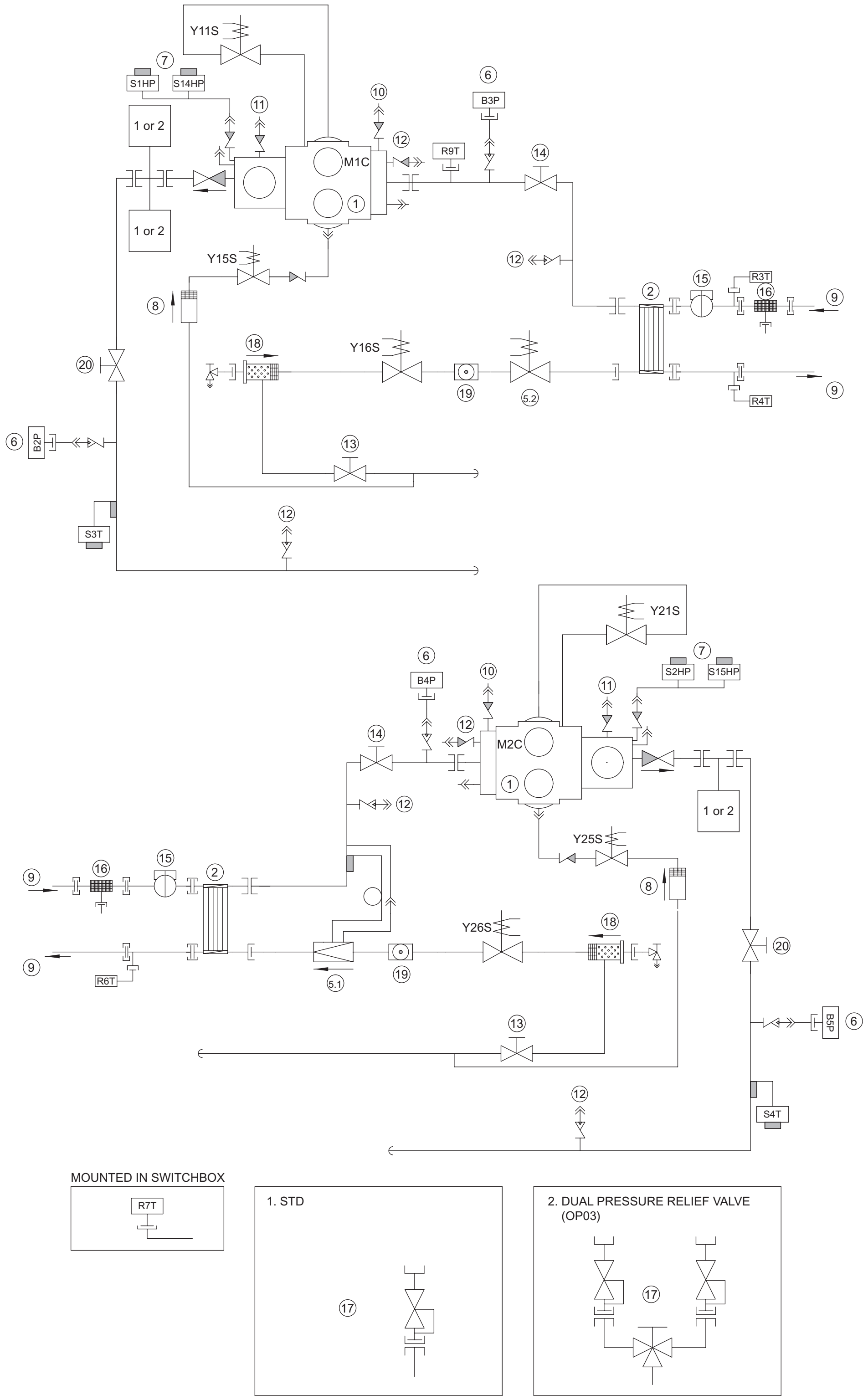
Symbol	Description
S4T	Dicharge temperature controller
R6T	Outlet water evap. temp sensor
R7T	Mixed water evap. temp sensor
B4P	Low pressure transmitter
B5P	High pressure transmitter
Y21S	Unloader solenoid valve
Y25S	Liquid injection solenoid valve
Y26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

2.16 Functional Diagram Refrigeration Circuit: EWLD400 MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWLD400 MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

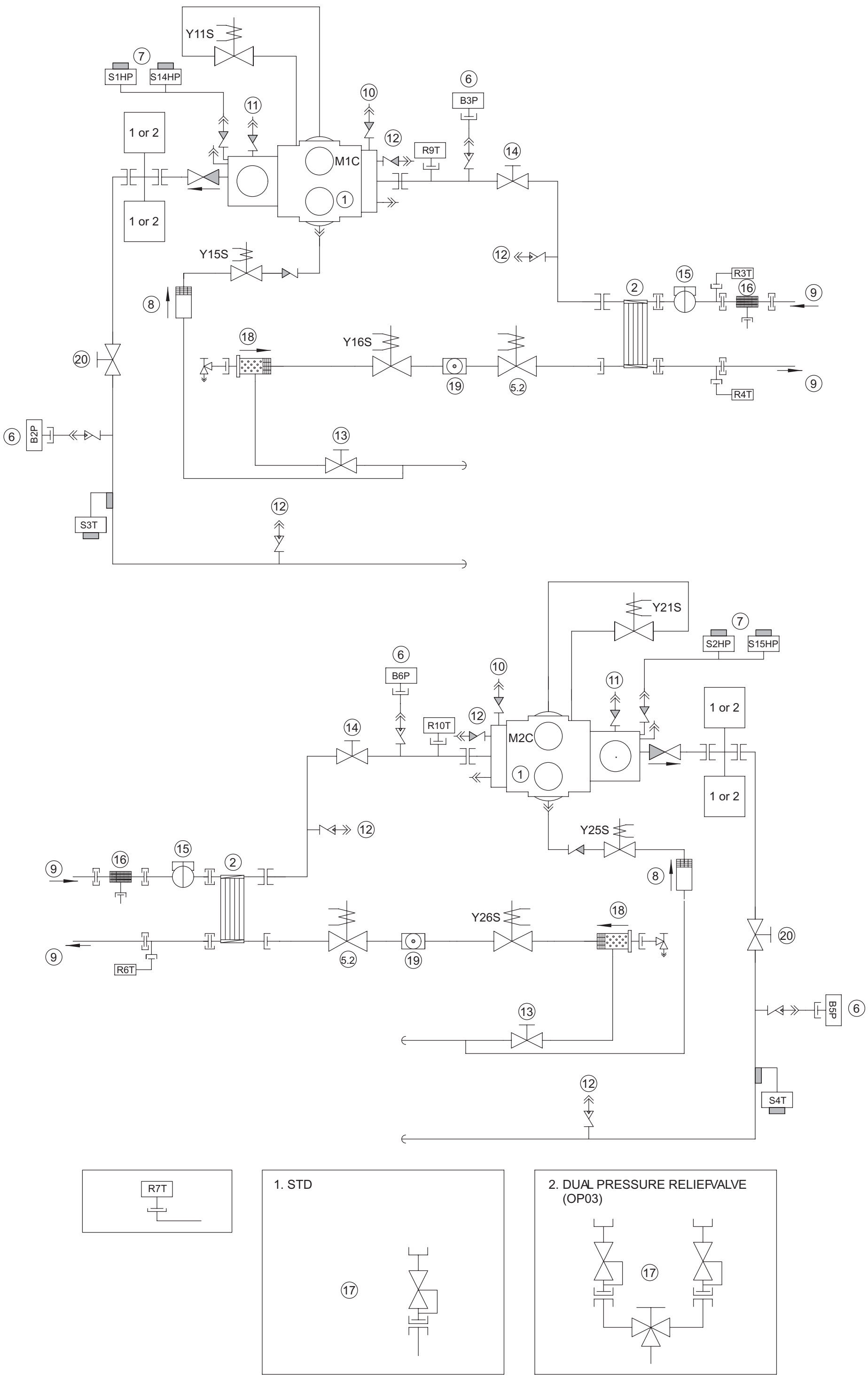
Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R9T	EEV temperature sensor
B2P	High pressure transmitter
B3P	EEV low pressure sensor
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
M2C	Compressor motor 2
S2HP	High pressure switch
S15HP	High pressure switch

Symbol	Description
S4T	Dicharge temperature controller
R6T	Outlet water evap. temp sensor
R7T	Mixed water evap. temp sensor
B4P	Low pressure transmitter
B5P	High pressure transmitter
Y21S	Unloader solenoid valve
Y25S	Liquid injection solenoid valve
Y26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

1

2.17 Functional Diagram Refrigeration Circuit: EWLD480~540MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWLD480~540MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M1C	Compressor motor 1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Dicharge temperature controller
R3T	Inlet water evap. temp sensor
R4T	Outlet water evap. temp sensor
R9T	EEV temperature sensor
B2P	High pressure transmitter
B3P	EEV low pressure sensor
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
M2C	Compressor motor 2
S2HP	High pressure switch
S15HP	High pressure switch

Symbol	Description
S4T	Dicharge temperature controller
R6T	Outlet water evap. temp sensor
R7T	Mixed water evap. temp sensor
R10T	EEV temperature sensor
B5P	High pressure transmitter
B6P	EEV low pressure sensor
Y21S	Unloader solenoid valve
Y25S	Liquid injection solenoid valve
Y26S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

Components refrigeration side EWLD120~540MBYNN

The table below describes the main components of the refrigeration circuit on the refrigeration side.

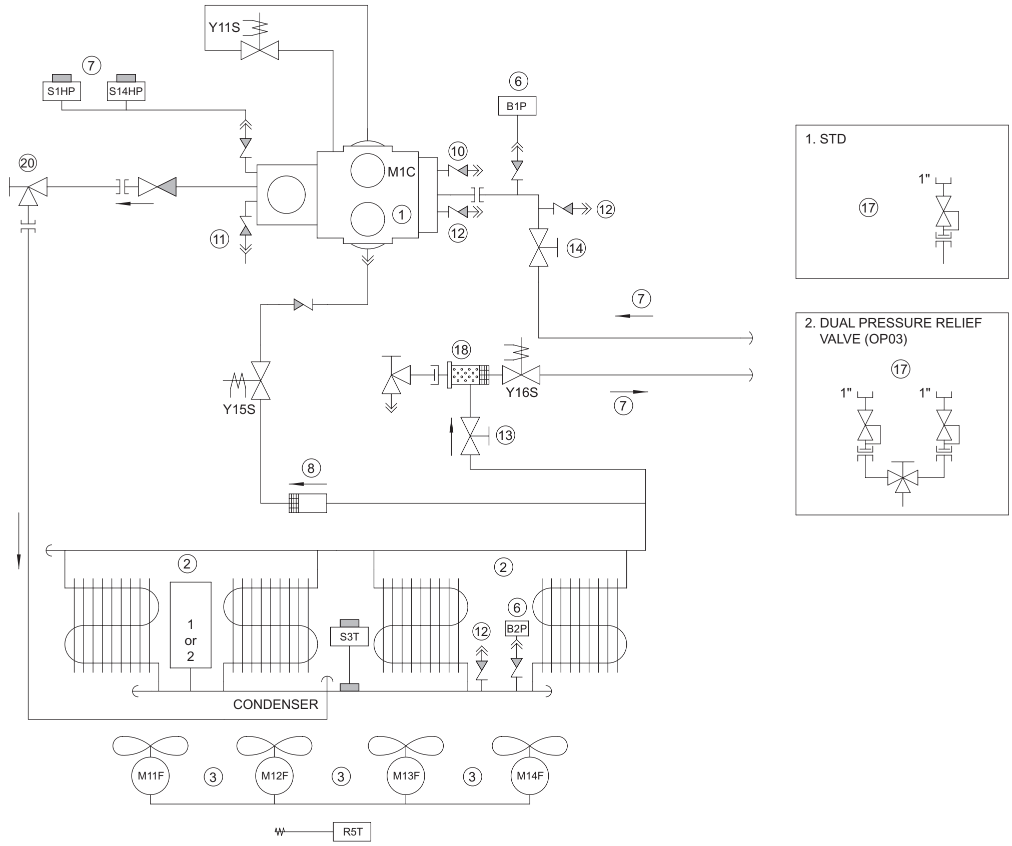
No.	Component	Function / remark
1	Compressor	All compressors are semi-hermetic screw compressors with step less capacity control.
2	Water-heat exchanger (evaporator)	The water-heat exchanger is of the brazed plate-heat exchanger type.
5.1	The thermostatic expansion valve	The thermostatic expansion valve is set up to control the superheat between 5°C and 7°C.
5.2	Electronic expansion valve	Electronic expansion valve with eev driver to control the superheat at 5°C (setpoint)
6	Low-pressure transmitter and High pressure transmitter	The Low and high pressure transmitter are used to gain information in order to perform some controls and also act as safety.
7	High-pressure switch	This switch acts as a circuit safety. ➤ Activation at 17 bar ➤ Manual reset at HP-Switch
8	Strainer	This strainer prevents dirt particles from entering the solenoid valve of the liquid injection.
9	Water in- and outlet connections	The water in- and outlet piping connections are delivered with victolic joint and countrtpipe for welding.
10	Low-pressure service port	The low-pressure service port is used to connect a low-pressure gauge.
11	High-pressure service port	The high-pressure service port is used to connect a high-pressure gauge.
12	Serviceport	Serviceport.
13	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
14	Suction stop valve (optional)	This suction stop valve can be used in combination with the discharge stop valve to seperate the compressor from the system (for examble: maintenance).
15	Flowswitch	The flowswitch is used to check if there is water flow.
16	Filter + drain plug	Water filter and drain. This drain is used to drain the filter element before opening the filter.
17	Safety valve	The safety valves prevent pressure above 28 bar.
18	Drier + charge valve	The replaceable filter drier will keep the refrigerant system dry. It is equipped with a 3/8” charge valve.
19	Sightglass with moisture indicator	The sightglass with moisture indicator is used to check the refrigerant shortage and/or moisture level in the system.

No.	Component	Function / remark
20	Discharge stop valve	This stop valve is used during pump down and service work in combination with liquid stop valve or suction stop valve if present (optional).

2.18 Functional Diagram Refrigeration Circuit: ERAP110~170MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of ERAP110~170MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M11F	Condenser fan motor
M12F	Condenser fan motor
M13F	Condenser fan motor
M14F	Condenser fan motor
M1C	Compressor motor1
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Discharge temperature controller
R5T	Ambient temperature sensor
B1P	Low pressure transmitter

Symbol	Description
B2P	High pressure transmitter
Y11S	Unloader solenoid valve
Y15S	Liquid injection solenoid valve
Y16S	Liquid line solenoid valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

Components refrigeration side

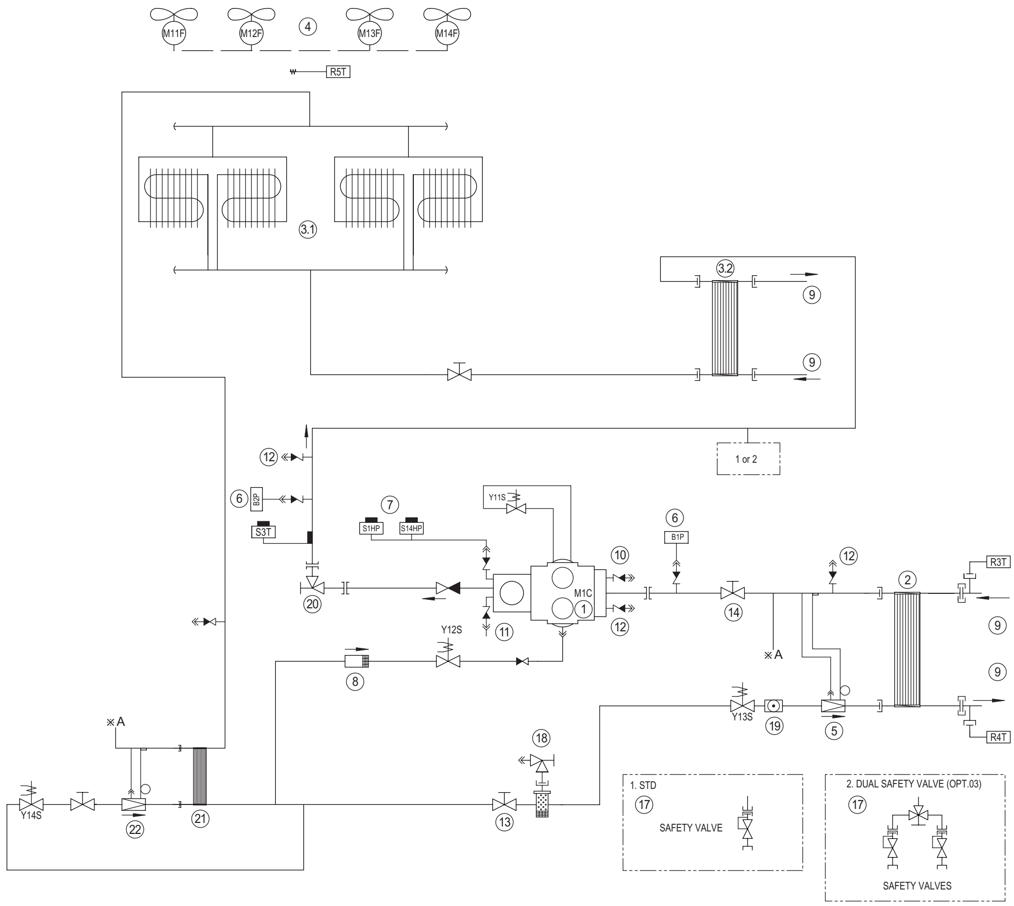
The table below describes the main components of the refrigeration circuit on the refrigeration side.

No.	Component	Function / remark
1	Compressor	All compressors are semi-hermetic screw compressors with step less capacity control.
3	Air-heat exchanger (condenser)	The air-heat exchanger is of the cross fin coil type. Hi-X-tubes and PE coated waffle louvre fins are used. The air is discharged upwards.
4	Fan	Direct driven single speed motor.
6	Low-pressure transmitter and High pressure transmitter	The Low and high pressure transmitter are used to gain information in order to perform some controls and also act as safety.
7	High-pressure switch	This switch acts as a circuit safety. ➤ Activation at 25 bar ➤ Manual reset at HP-Switch
8	Strainer	This strainer prevents dirt particles from entering the solenoid valve of the liquid injection.
10	Low-pressure service port	The low-pressure service port is used to connect a low-pressure gauge.
11	High-pressure service port	The high-pressure service port is used to connect a high-pressure gauge.
12	Serviceport	Serviceport.
13	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
14	Suction stop valve (optional)	This suction stop valve can be used in combination with the discharge stop valve to seperate the compressor from the system (for examble: maintenance).
17	Safety valve	The safety valves prevent pressure above 28 bar.
18	Drier + charge valve	The replaceable filter drier will keep the refrigerant system dry. It is equipped with a 3/8”charge valve.
20	Discharge stop valve	This stop valve is used during pump down and service work in combination with liquid stop valve or suction stop valve if present (optional).

1

2.19 Functional Diagram Refrigeration Circuit: EWTP110~160MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWTP110~160MBYNN. It is also applicable for glycol applications.



Symbols

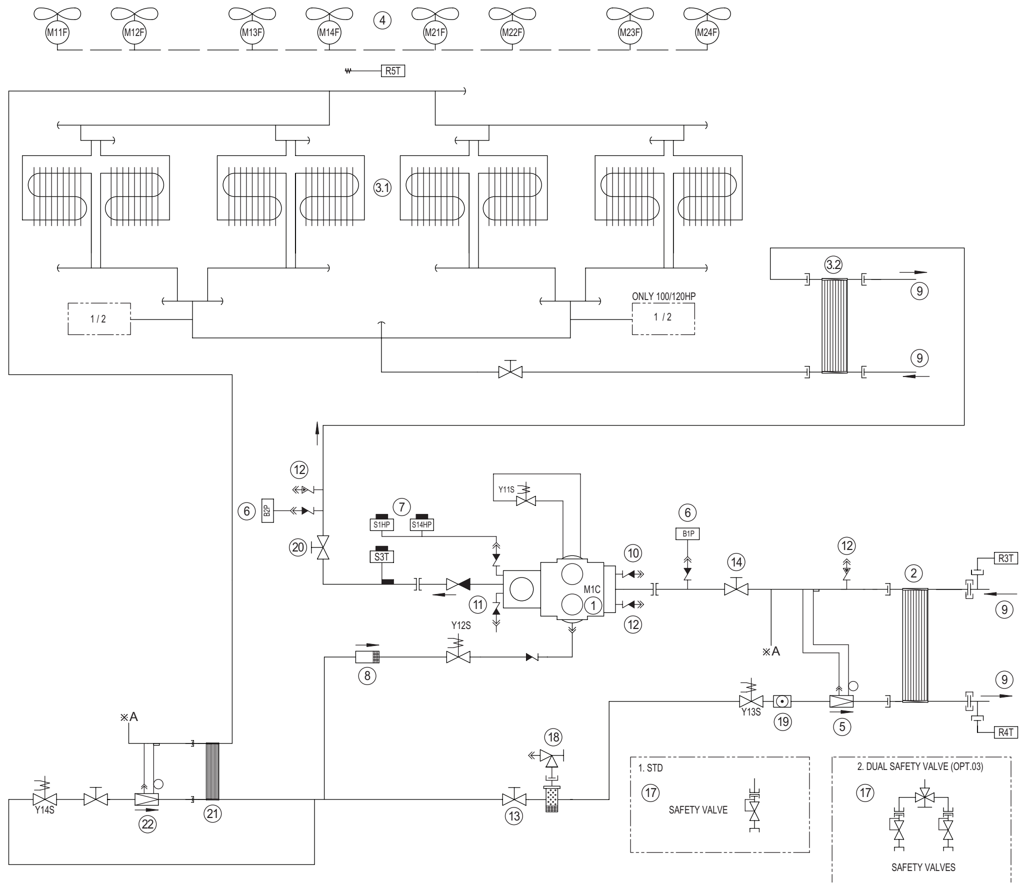
The table below describes the symbols.

Symbol	Description	Symbol	Description
M11F, -24F	Condenser Fan motor	Y11S	Unloader solenoid valve
M1C	Compressor motor	Y12S	Liquid injection solenoid valve
S1HP	High pressure switch	Y13S	Liquid line solenoid valve
S14HP	High pressure switch	Y14S	Economizer valve
S3T	Discharge temperature controller		Check valve
R3T	Inlet water evap. temp.sensor		Flare connection
R4T	Outlet water evap. temp.sensor		Screw connection
R5T	Ambient temperature sensor		Flange connection
B1P	Low pressure transmitter	×	Pinched pipe
B2P	High pressure transmitter		Spinned pipe

1

2.20 Functional Diagram Refrigeration Circuit: EWTP200~340MBYNN

Functional diagram The illustration below shows the functional diagram of the refrigeration circuit of EWTP200~340MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M11F, -24F	Condenser Fan motor
M1C	Compressor motor
S1HP	High pressure switch
S14HP	High pressure switch
S3T	Discharge temperature controller
R3T	Inlet water evap. temp.sensor
R4T	Outlet water evap. temp.sensor
R5T	Ambient temperature sensor
B1P	Low pressure transmitter
B2P	High pressure transmitter

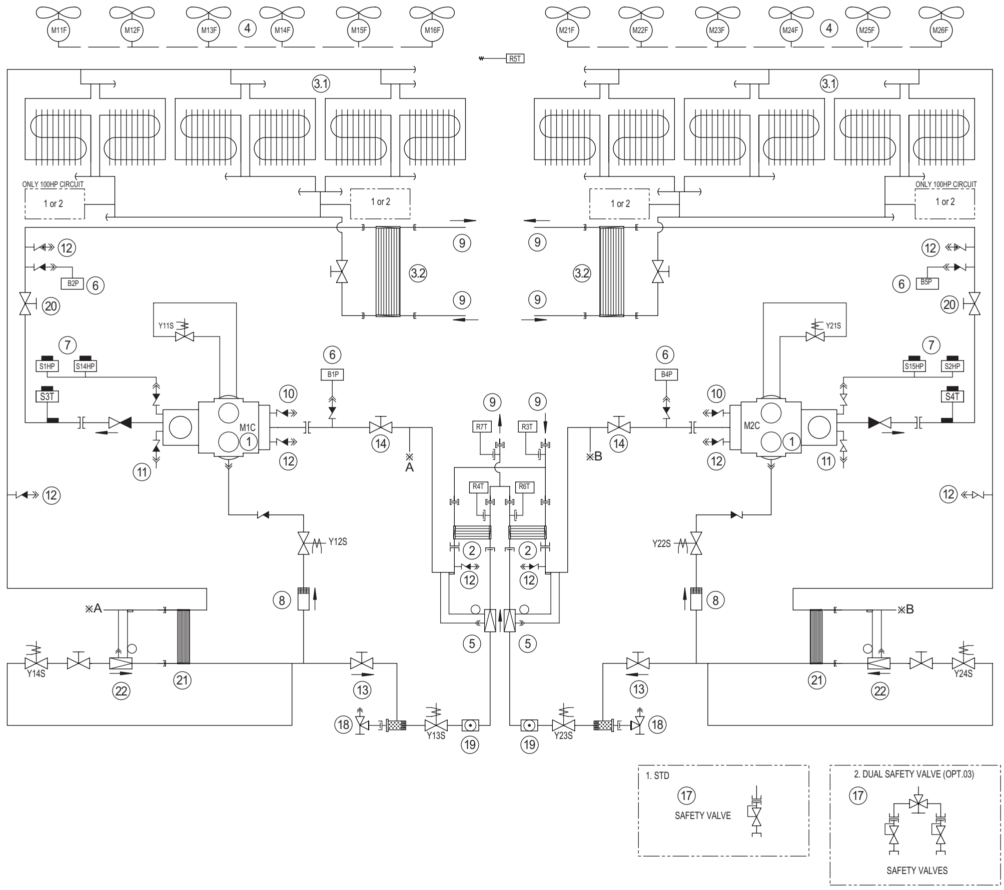
Symbol	Description
Y11S	Unloader solenoid valve
Y12S	Liquid injection solenoid valve
Y13S	Liquid line solenoid valve
Y14S	Economizer valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
×	Pinched pipe
	Spinned pipe

1

2.21 Functional Diagram Refrigeration Circuit: EWTP400~540MBYNN

Functional diagram

The illustration below shows the functional diagram of the refrigeration circuit of EWTP400~540MBYNN. It is also applicable for glycol applications.



Symbols

The table below describes the symbols.

Symbol	Description
M11F, -16F	Condenser Fan motor
M21F, -26F	Condenser Fan motor
M1C, M2C	Compressor motor
S1P, S2P	High pressure switch
S14P, S15P	High pressure switch
S3T, S4T	Discharge temperature controller
R3T	Inlet water evap. temp.sensor
R4T	Outlet water evap. temp.sensor
R5T	Ambient temperature sensor
R6T	Outlet water evap. temp. sensor
R7T	Mixed outlet water temp. sensor
B1P, B4P	Low pressure transmitter

Symbol	Description
B2P, B5P	High pressure transmitter
Y11S	Unloader solenoid valve
Y21S	Unloader solenoid valve
Y12S, Y22S	Liquid injection solenoid valve
Y13S, Y23S	Liquid line solenoid valve
Y14S, Y24S	Economizer valve
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

Components refrigeration side EWTP110~540MBYNN

The table below describes the main components of the refrigeration circuit on the refrigeration side.

No.	Component	Function / remark
1	Compressor	All compressors are semi-hermetic screw compressors with step less capacity control.
2	Water-heat exchanger (evaporator)	The water-heat exchanger is of the brazed plate-heat exchanger type.
3.1	Air-heat exchanger heat recovery condenser	The air-heat exchanger is of the cross fin coil type. Hi-X-tubes and PE coated waffle louvre fins are used. The air is discharged upwards.
3.2	Water-heat exchanger (condenser)	The heat recovery water-heat exchanger is of the brazed plate-heat exchanger type. In the refrigerant circuit it is placed before the air-heat exchanger.
4	Fan	2 types of fans are used: ➤ On / off fans: direct driven single speed motor ➤ Inverter fans: Variable speed motor Both fans work together to ensure a proper fan regulation.
5	Expansion valve	The thermostatic expansion valve is set up to control the superheat between 5°C and 7°C.
6	Low-pressure transmitter and High pressure transmitter	The Low and high pressure transmitter are used to gain information in order to perform some controls and also act as safety.
7	High-pressure switch	This switch acts as a circuit safety. ➤ Activation at 25 bar ➤ Manual reset at HP-Switch
8	Strainer	This strainer prevents dirt particles from entering the solenoid valve of the liquid injection.
9	Water in- and outlet connections	The water in- and outlet piping connections are delivered with victolic joint and countrtpipe for welding.
10	Low-pressure service port	The low-pressure service port is used to connect a low-pressure gauge.
11	High-pressure service port	The high-pressure service port is used to connect a high-pressure gauge.
12	Serviceport	Serviceport.
13	Liquid stop valve	The liquid stop valve is used as shut-off valve in case of a pump-down.
14	Suction stop valve (optional)	This suction stop valve can be used in combination with the discharge stop valve to seperate the compressor from the system (for examble: maintenance).
17	Safety valve	The safety valves prevent pressure above 28 bar.
18	Drier + charge valve	The replaceable filter drier will keep the refrigerant system dry. It is equipped with 3/8” a charge valve.

No.	Component	Function / remark
19	Sightglass with moisture indicator	The sightglass with moisture indicator is used to check the refrigerant shortage and/or moisture level in the system.
20	Discharge stop valve	This stop valve is used during pump down and service work in combination with liquid stop valve or suction stop valve if present (optional).
21	Economizer refrigerant - Refrigerant heat exchanger	The economizer heat exchanger is of the brazed Plate-heat exchanger type. Both sides are refrigerant.
22	Economizer expansion valve	The TX6 - N03 expansion valves to ensure a subcool during heat recovery mode

1

3 Wiring Layout

3.1 What Is in This Chapter?

Introduction

This part gives a general overview of technical specifications and applicable units for the pCO² controller with the V4.3M6 software version.

Overview

This chapter contains the following topics:

1

3.2 Main Functions of the EWAP110~540MBYNN, EWAD110~340MBYNN, EWWD120~540MBYNN, EWLD120~540MBYNN, ERAP110~170MBYNN and EWTP110~540MBYNN

Main functions

EEV: Electronic Expansion Valve: (For stepless units: Batterypack for EEV is NOT USED)

<table>
<tr><th colspan="6">AIR-COOLED</th></tr>
<tr><th colspan="3">Unit name</th><th>HP compressor combination</th><th>Nr of EEV</th><th>Controller</th></tr>
<tr><td rowspan="9">EWAP</td><td rowspan="9">Air-Cooled: R407C</td><td>EWAP110MBYNN</td><td>40HP</td><td>0</td><td rowspan="6">pCO² medium controller</td></tr>
<tr><td>EWAP140MBYNN</td><td>50HP</td><td>0</td></tr>
<tr><td>EWAP160MBYNN</td><td>60HP</td><td>0</td></tr>
<tr><td>EWAP200MBYNN</td><td>80HP</td><td>0</td></tr>
<tr><td>EWAP280MBYNN</td><td>100HP</td><td>0</td></tr>
<tr><td>EWAP340MBYNN</td><td>120HP</td><td>0</td></tr>
<tr><td>EWAP400MBYNN</td><td>80HP&80HP</td><td>0</td><td rowspan="3">pCO² large controller</td></tr>
<tr><td>EWAP460MBYNN</td><td>100HP&80HP</td><td>0</td></tr>
<tr><td>EWAP540MBYNN</td><td>100HP&100HP</td><td>0</td></tr>
<tr><td rowspan="6">EWAD</td><td rowspan="6">Air-Cooled: R134a</td><td>EWAD120MBYNN</td><td>40HP</td><td>0</td><td rowspan="6">pCO² medium controller</td></tr>
<tr><td>EWAD150MBYNN</td><td>50HP</td><td>0</td></tr>
<tr><td>EWAD170MBYNN</td><td>60HP</td><td>0</td></tr>
<tr><td>EWAD240MBYNN</td><td>80HP</td><td>0</td></tr>
<tr><td>EWAD300MBYNN</td><td>100HP</td><td>0</td></tr>
<tr><td>EWAD340MBYNN</td><td>120HP</td><td>0</td></tr>
<tr><td rowspan="9">EWWD</td><td rowspan="9">Water-Cooled: R134a</td><td>EWWD120MBYNN</td><td>40HP</td><td>0</td><td rowspan="4">pCO² medium controller</td></tr>
<tr><td>EWWD180MBYNN</td><td>60HP</td><td>0</td></tr>
<tr><td>EWWD240MBYNN</td><td>80HP</td><td>1</td></tr>
<tr><td>EWWD280MBYNN</td><td>100HP</td><td>1</td></tr>
<tr><td>EWWD360MBYNN</td><td>60HP&60HP</td><td>0</td><td rowspan="5">pCO² large controller</td></tr>
<tr><td>EWWD440MBYNN</td><td>80HP&60HP</td><td>1</td></tr>
<tr><td>EWWD500MBYNN</td><td>80HP&80HP</td><td>2</td></tr>
<tr><td>EWWD520MBYNN</td><td>100HP&80HP</td><td>2</td></tr>
<tr><td>EWWD540MBYNN</td><td>100HP&100HP</td><td>2</td></tr>
</table>

1

WATER-COOLED					
Unit name			**HP compressor combination**	**Nr of EEV**	**Controller**
EWLD	**Remote Condenser: R134a**	EWLD120MBYNN	40HP	0	**pCO^2 medium controller**
		EWLD170MBYNN	60HP	0	
		EWLD240MBYNN	80HP	1	
		EWLD260MBYNN	100HP	1	
		EWLD340MBYNN	60HP&60HP	0	**pCO^2 large con-troller**
		EWLD400MBYNN	80HP&60HP	1	
		EWLD480MBYNN	80HP&80HP	2	
		EWLD500MBYNN	100HP&80HP	2	
		EWLD540MBYNN	100HP&100HP	2	
ERAP	**Condensing units: R407C**	ERAP110MBYNN	40HP	0	**pCO^2 medium controller**
		ERAP150MBYNN	50HP	0	
		ERAP170MBYNN	60HP	0	
EWTP	**Heat recovery: R407C**	EWTP110MBYNN	40HP	0	**pCO^2 medium controller**
		EWTP140MBYNN	50HP	0	
		EWTP160MBYNN	60HP	0	
		EWTP200MBYNN	80HP	0	
		EWTP280MBYNN	100HP	0	
		EWTP340MBYNN	120HP	0	
		EWTP400MBYNN	80HP&80HP	0	**pCO^2 large controller**
		EWTP460MBYNN	100HP&80HP	0	
		EWTP540MBYNN	100HP&100HP	0	

DICN option

DICN = Daikin Integrated Chiller Network

Also referred to as master-slave system

Basic principles:

- ➤ No ER-units in a DICN-system
- ➤ Possible to combine all air-cooled (including heat-recovery) in one DICN-system
- ➤ Possible to combine all water-cooled in one DICN-system.
- ➤ Possible to combine all condensers-less in one DICN-system.
- ➤ It is possible to combine up to max 4 units in one DICN-system.
- ➤ It is not possible to combine water-cooled, air-cooled or condenser-less in one DICN.

1

Nr of Languages

1. English
2. German
3. French
4. Spanish
5. Italian

Possible options

List of options which can be combined with the pCO² controller.

Number	Description
EKCLWS	Leaving water control sensor for DICN
EKAC200A	BMS card
EKBMSMBA	BMS gateway mod-bus / j-bus protocol
EKBMSBNA	BMS gateway bac-net protocol

To be able to use the BMS gateway it is necessary to install the BMS card on the controller.

(BMS = Building Management System)

3.3 Technical Specification

Version of software.

Software version:	X x.xM6 (date)	X: “V“: Final software “A” = Alfa software “B” = Beta software
Software code:	FLDKNMCHLA	“FL” = software for pCO² “DKN” = Daikin Europe NV “M” = Multilanguage “CHL” = Large Chiller applications “A” = Setup code for pCO²
Boot version:	V x.xx (date)	x.xx: progressive number
Bios version:	V x.xx (date)	x.xx: progressive number

Note: In a DICN system (Master-slave), all the pCO²-controllers must have the same software code, bios and boot version!

This manual is based on the software version V4.3M6.
Other software versions can have different displays and functions.

Applicable parts

This chapter gives an overview of the references and codes as well as the revision number, of the pCO² controller, the pCO and the EEV driver.

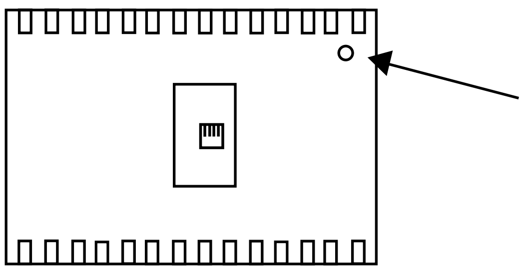
Adjusting the contrast of the display

Built in controller (pCO²)

Press the "enter" key and hold, then press "on/off" key and hold.
Keep the two buttons pressed and use the "up" and "down" keys to adjust the contrast.

Remote terminal (pCO)

When you use a remote controller it is possible to adjust the contrast.
At the back of the upper left corner of the remote controller you will find a hole where you can adjust the brightness of the remote controller with a small screw driver.



Note: The remote terminal is the same as the pCO controller.

1

General features of the medium and large controller

Features common to medium and large:

- ➤ 16-bit microprocessor, 14 MHz, internal registers and 32 bit operation, 512 Byte internal RAM;
- ➤ MByte FLASH MEMORY or 2 + 2 MByte FLASH MEMORY;
- ➤ 256 kByte static RAM;
- ➤ 1 RS485 serial port for pLAN;
- ➤ ready for connection to RS485 supervisory network;
- ➤ clock with replaceable lithium battery;
- ➤ 56 Byte of battery backed-up RAM;
- ➤ selection of address and LEDs for pLAN and LED power signal.;
- ➤ DIN plastic case for installation on omega rail;
- ➤ 24Vac/Vdc power supply;
- ➤ telephone connector for pCO terminals;
- ➤ up to 5 possible languages: English, German, French, Spanish, Italian.

pCO² LARGE (18 DIN modules):

- ➤ 14 optically-isolated digital inputs, 24Vac 50/60Hz or 24Vdc;
- ➤ 4 optically-isolated digital inputs, 24Vac/Vdc or 230Vac (50/60Hz);
- ➤ 18 relay digital outputs (3 of which with changeover contacts);
- ➤ 4 analogue inputs, selectable between NTC, PT1000, ON/OFF;
- ➤ 6 analogue inputs, selectable between NTC, 0÷1V, 0÷10V, 0÷20 mA, 4÷20mA;
- ➤ 6 analogue outputs, 0÷10 V;
- ➤ 1 serial port for I/O expansion.

pCO² MEDIUM (18 DIN modules):

- ➤ 12 optically-isolated digital inputs, 24Vac 50/60Hz or 24Vdc;
- ➤ 2 optically-isolated digital inputs, 24Vac/Vdc or 230Vac (50/60Hz);
- ➤ 13 relay digital outputs (3 of which with changeover contacts);
- ➤ 2 analogue inputs, selectable between NTC, PT1000, ON/OFF;
- ➤ 6 analogue inputs, selectable between NTC, 0÷1V, 0÷10V, 0÷20 mA, 4÷20mA;
- ➤ 4 analogue outputs, 0÷10 V.

Simulation boards

It is possible to order Daikin simulation boards for practice and teaching.
In a simulation board the sensors and signals are, of course different than those on a real unit. Therefore there is a special mode on the controller, to be able to use it on a simulation board.

This simulation setting has to be set in the service menu.

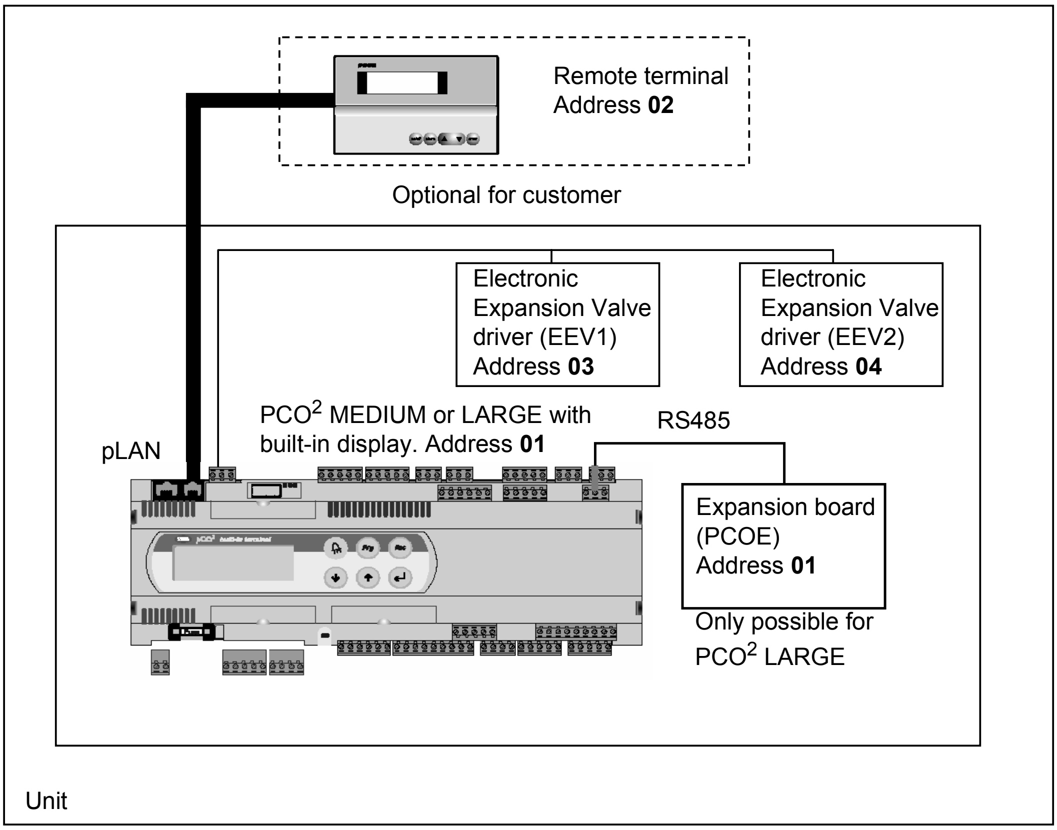
For details refer to the function description in the according chapter in this manual.

1

3.4 Unit Setup

Basic unit setup

This setup is for a standalone unit.
An optional remote terminal can be added.
The dipswitch settings, for the addresses, are listed below.



Overview of addresses		PCB (pCO² medium or large)	Remote terminal (optional)	EEV1 (if present)	EEV2 (if present)	PCOE Expansion board
Unit 1	Master	1	2	3	4	1

Example of dipswitch settings:

Address 1 = 100000 Address 2 = 010000 Address 3 = 110000 Address 4 = 001000

You can find the dipswitch of the EEV driver on the inner side of the driver. Take off the cap of the EEV driver (cap with the led's). If you have removed it, you will find on the inner side of the cap the address dipswitch. Set the dipswitch address and close the EEV driver again.

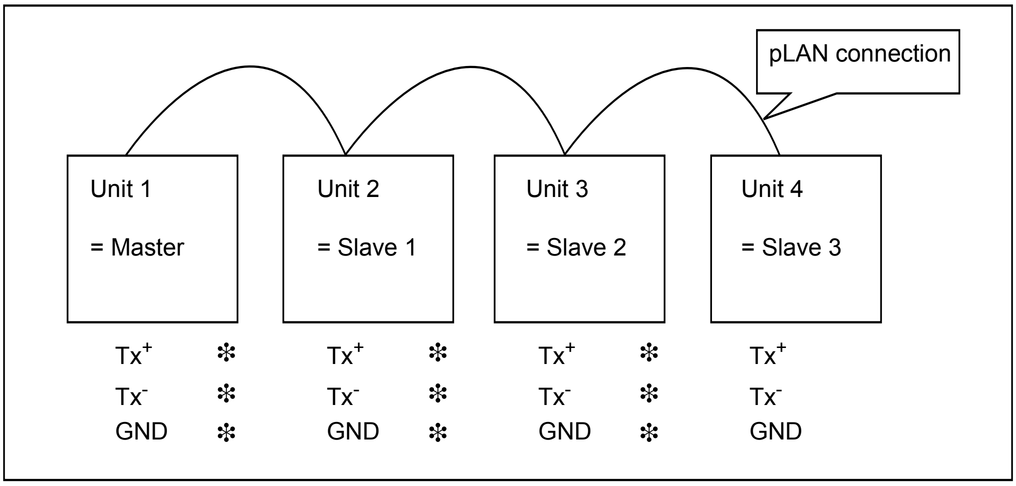
DICN setup (= Master/Slave system)

In the service menu, the installer must select if the units are used in a DICN system or not.

The D.I.C.N. option allows simultaneous operation of up to 4 chillers as if they were a single unit, in order to deliver the required cooling capacity. This results in precise and efficient capacity control.

It is also possible to define units as standby units, which is useful for back up purposes guaranteeing reliable operation of the chiller plant.

With this option, up to a 2 Megawatt chiller plant can be operated as if they were a single unit.



Overview of addresses of DICN setup:

		PCB (pCO^2)	User-terminal (optional)	EEV1 (if present)	EEV2 (if present)	PCOE (if present)
Unit 1	Master	1	2	3	4	1
Unit 2	Slave 1	5	6	7	8	1
Unit 3	Slave 2	9	10	11	12	1
Unit 4	Slave 3	13	14	15	16	1

Note: See chapter 3 the functional controller for DTCN for more explanation.

Network hardware overview

The Daikin BMS option makes it possible to connect the Daikin chillers to a larger control system. Two different protocols can be used: Modbus and BACnet. The necessary tools for this communication are the Gateway and the address cards.
For information about the BMS functions refer to the corresponding chapters. For detailed information refer to the Service Manual "BMS option for Daikin water chillers".

External connections setup

Two different setups can be used to connect units to a BMS-system through a BMS gateway.

➤ 1) Multidrop: The gateway can be connected to the BMS making use of the RS485 connection

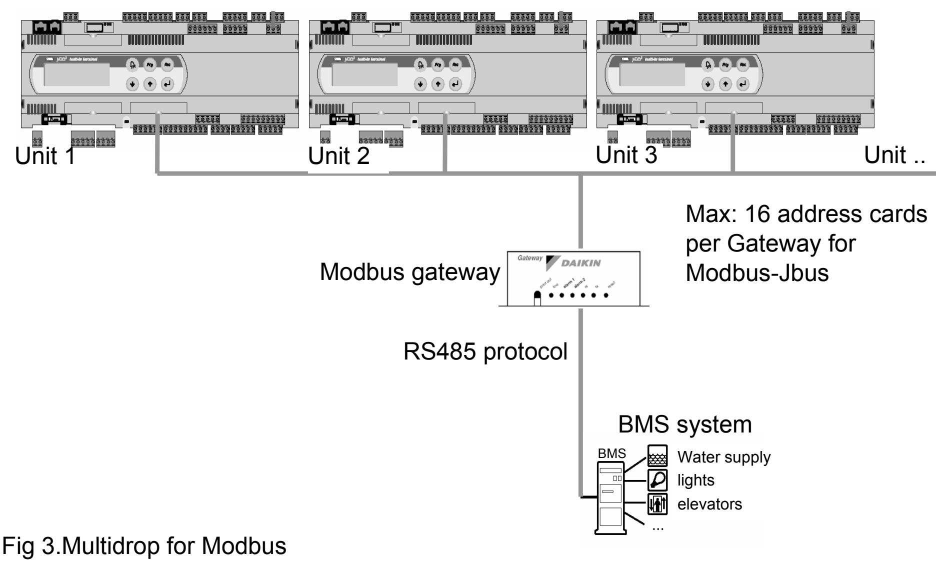


Fig 3.Multidrop for Modbus

➤ Gateway used for modbus gateway: EKBMSMBA

➤ Address card EKAC200A should be used in each unit.

➤ When A DICN (master / slave) is connected to a BMS system, you only require an address card in the master unit. When you require a full read-out of all parameters from the slave units, then all slaves should have an address card connected to the gateway.

- 2) Point to point: A gateway can be connected to the BMS making use of the RS232 connection

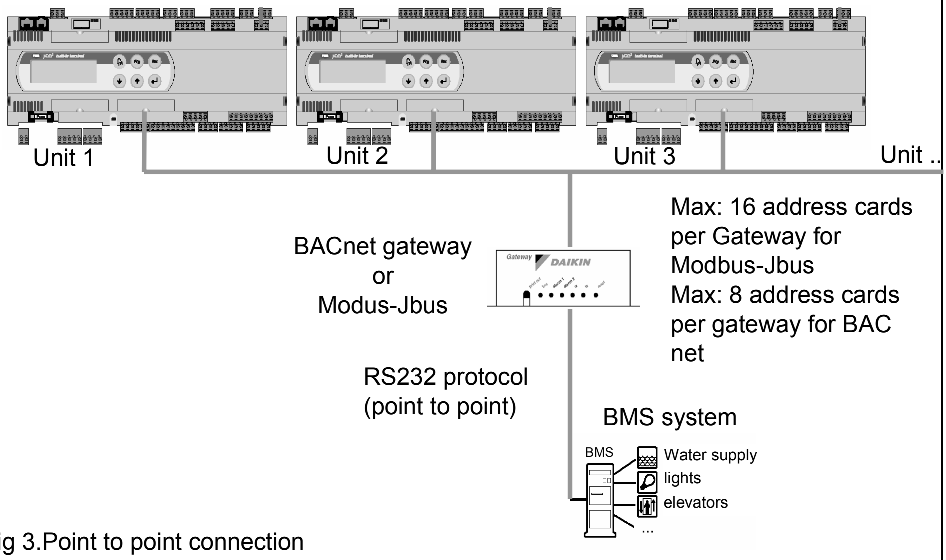


Fig 3.Point to point connection

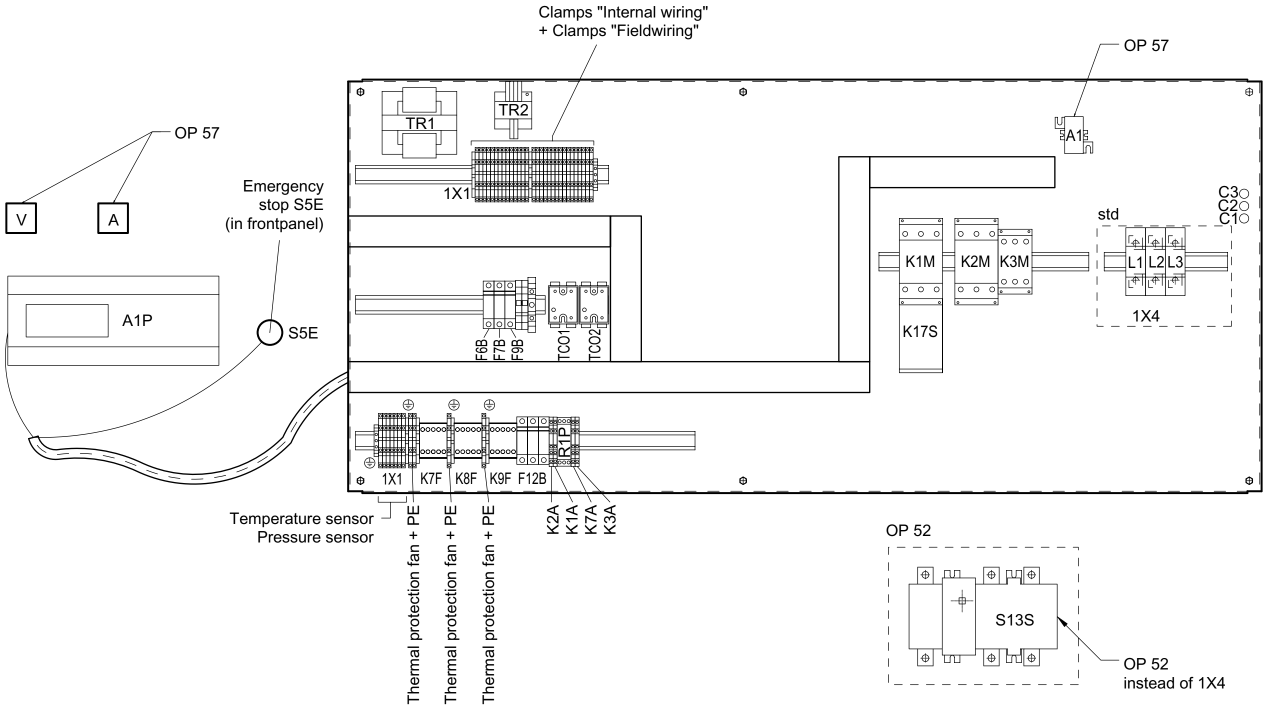
Note: BACnet is only possible in point to point setup and with a maximum of 8 address cards per gateway.

- Gateway used for modbus gateway: EKBMSBNA / EKBMSMBA
- Address card EKAC200A should be used in each unit.
- When A DICN (master / slave) is connected to a BMS system, you only require an address card in the master unit. When you require a full read-out of all parameters from the slave units, then all slaves should have an address card connected to the gateway.

3.5 Switch Box Layout EWAP/ERAP

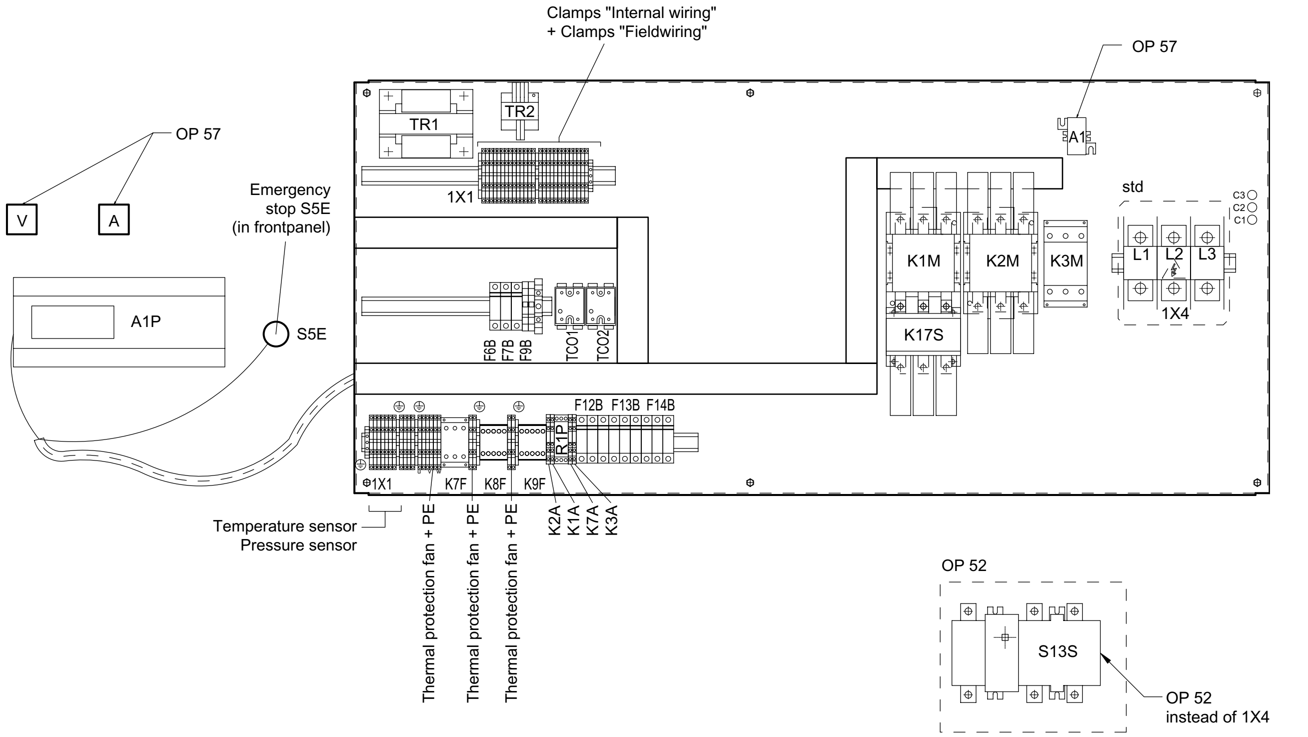
EWAP110~160MBYNN and ERAP110~170MBYNN

The illustration below shows the switch box layout for a double circuit.

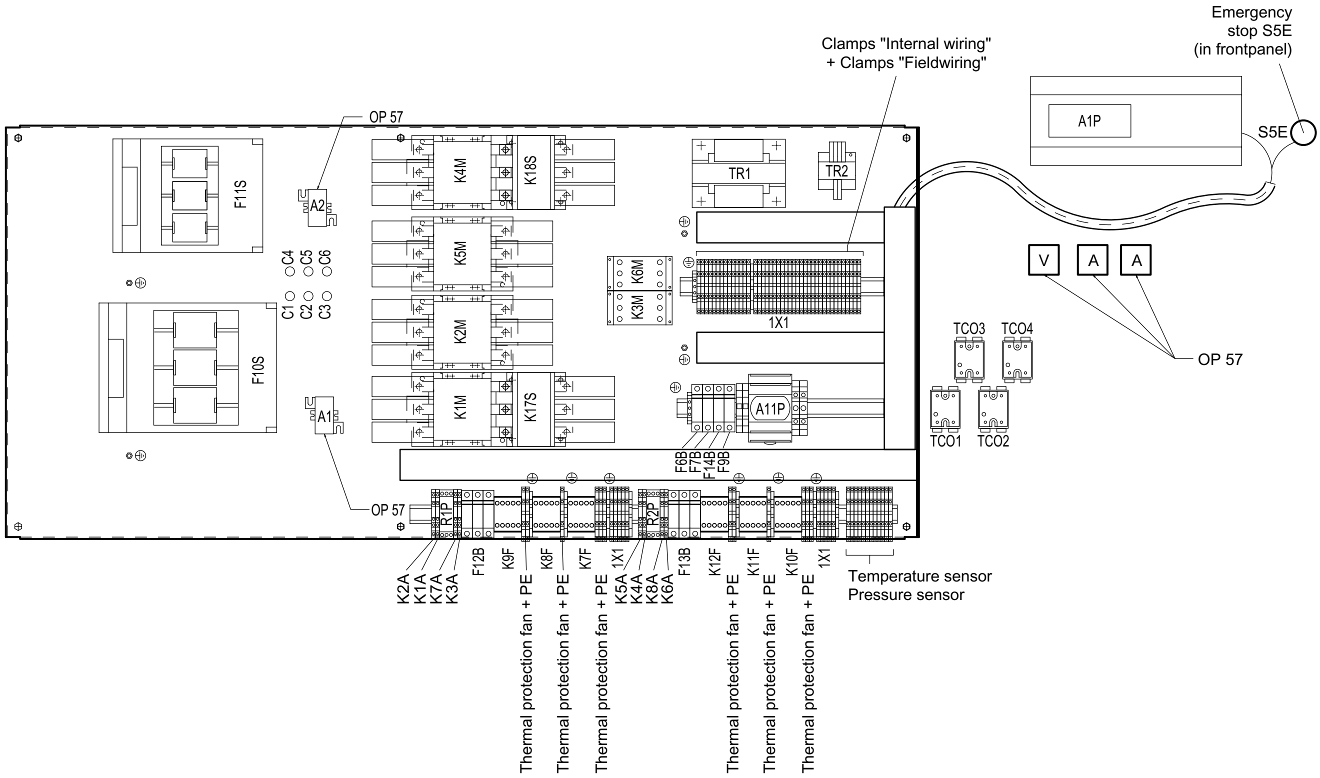


1

EWAP240~340MBYNN The illustration below shows the switch box layout for a double circuit.



EWAP400~540MBYNN The illustration below shows the switch box layout for a double circuit.



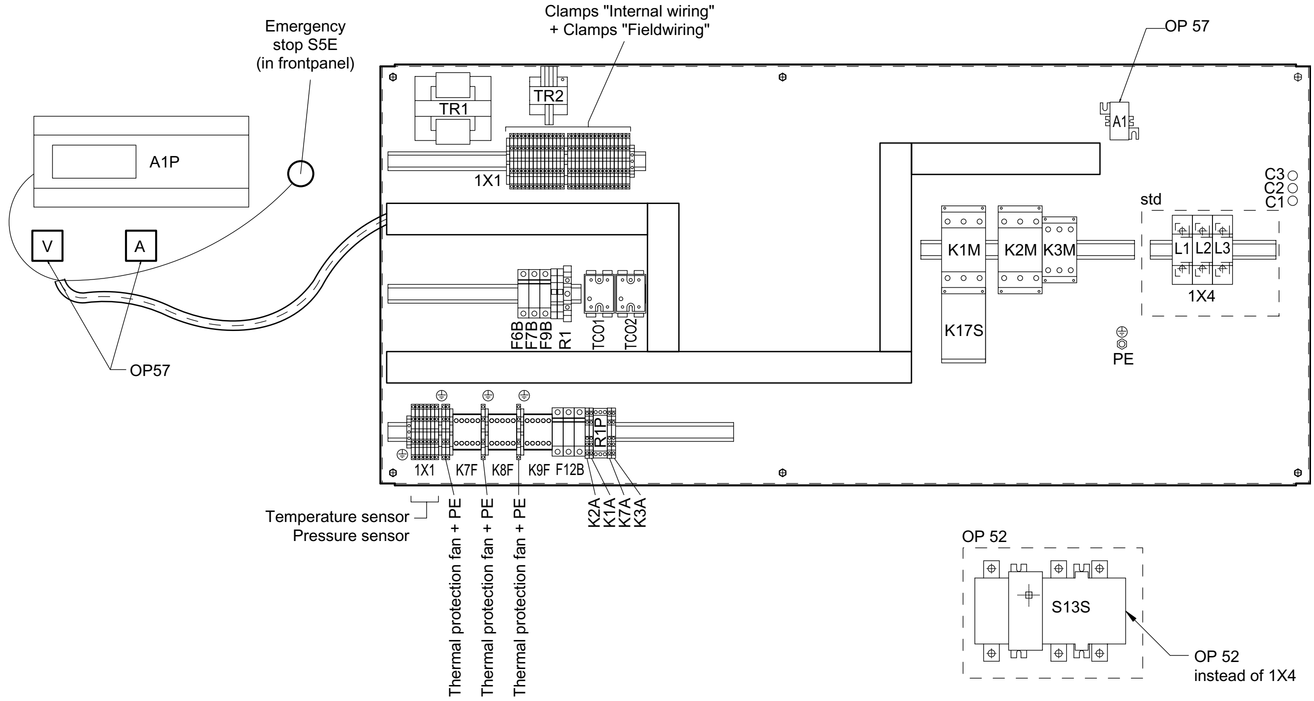
1

The table below describes the components of the switchbox for EWAP110~540MBYNN and EWAP110~170MBYNN.

Wiring diagram symbol	Description
V1	V-meter for circuit 1-2
TR2	Transfo supply controller + digital inputs
TR1	Transfo control circuit
TCO1, TCO4	Optocoupler (analog to Digital signal)
S13S	Main isolator switch
S5E	Emergency stop push button
R1P, R2P	Reverse phase protector circuit 1, circuit 2
K7A, K8A	Auxiliary relay for safety High Pressure circuit 1, circuit 2
K3A, K6A	Auxiliary relay for discharge thermal protector circuit 1, circuit 2
K2A, K5A	Auxiliary relay for compressor thermal protector circuit 1, circuit 2
K1A, K4A	Auxiliary relay for safeties circuit 1, circuit 2
K17S, K18S	Overcurrent relay for circuit 1, circuit 2
K9F, K12F	Fancontactor for circuit 1, circuit 2
K8F, K11F	Fancontactor for circuit 1, circuit 2
K7F, K10F	Fancontactor for circuit 1, circuit 2
K3M, K6M	Starcontactor for circuit 1, circuit 2
K2M, K5M	Deltacontactor for circuit 1, circuit 2
K1M, K4M	Linecontactor for circuit 1, circuit 2
F14B	Fuse for fanmotor switchbox
F12B, F13B	Fuse for fanmotor circuit 1, circuit 2
F10S, F11S	Circuit breakers with fuses for circuit 1, circuit 2
F9B	Fuse for secondary of TR2
F7B	Fuse for secondary of TR1
F6B	Fuse for primary of TR1
C1..C3, C4..C6	Capacitor
A1P	PCB-Controller
A1, A2	Current tranfo / A-meter for circuit 1, circuit 2
A11P	Expansion board controller

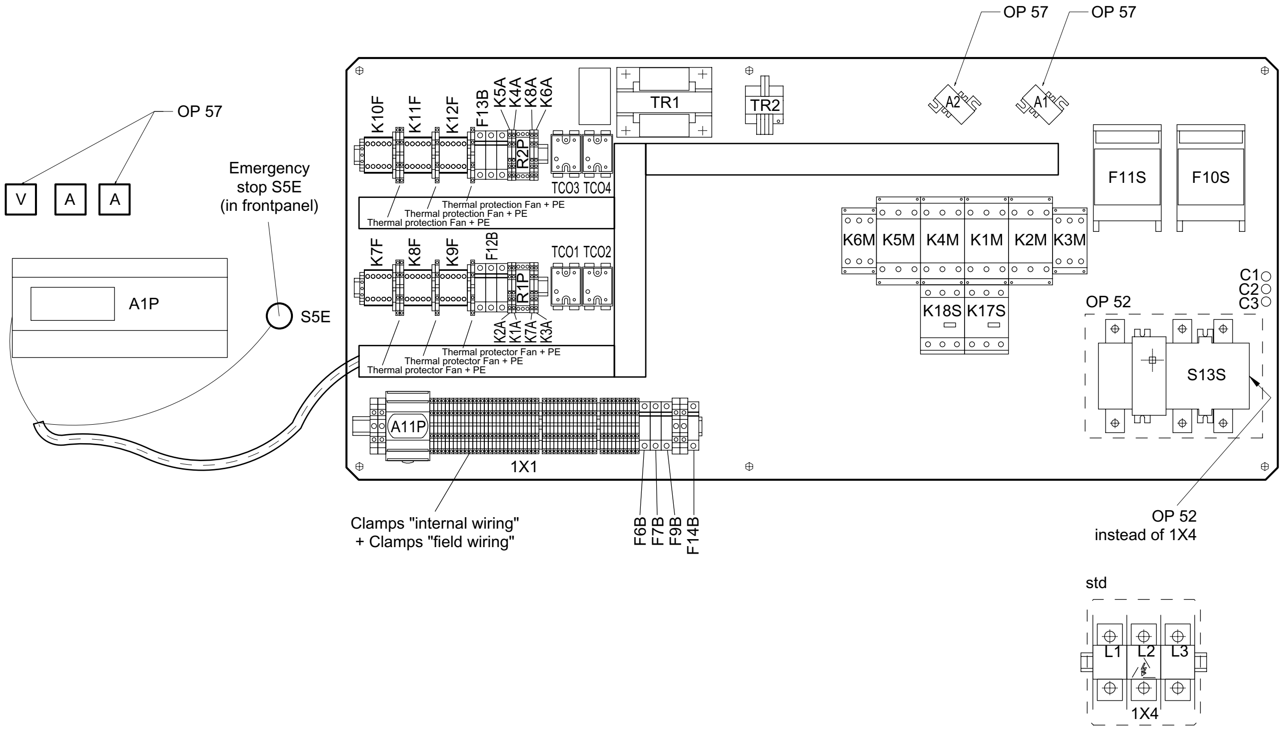
3.6 Switch Box Layout EWAD

EWAD120~170MBYNN The illustration below shows the switch box layout for a double circuit.



1

EWAD240~340MBYNN The illustration below shows the switch box layout for a double circuit.



The table below describes the components of the switchbox for EWAD120~340MBYNN

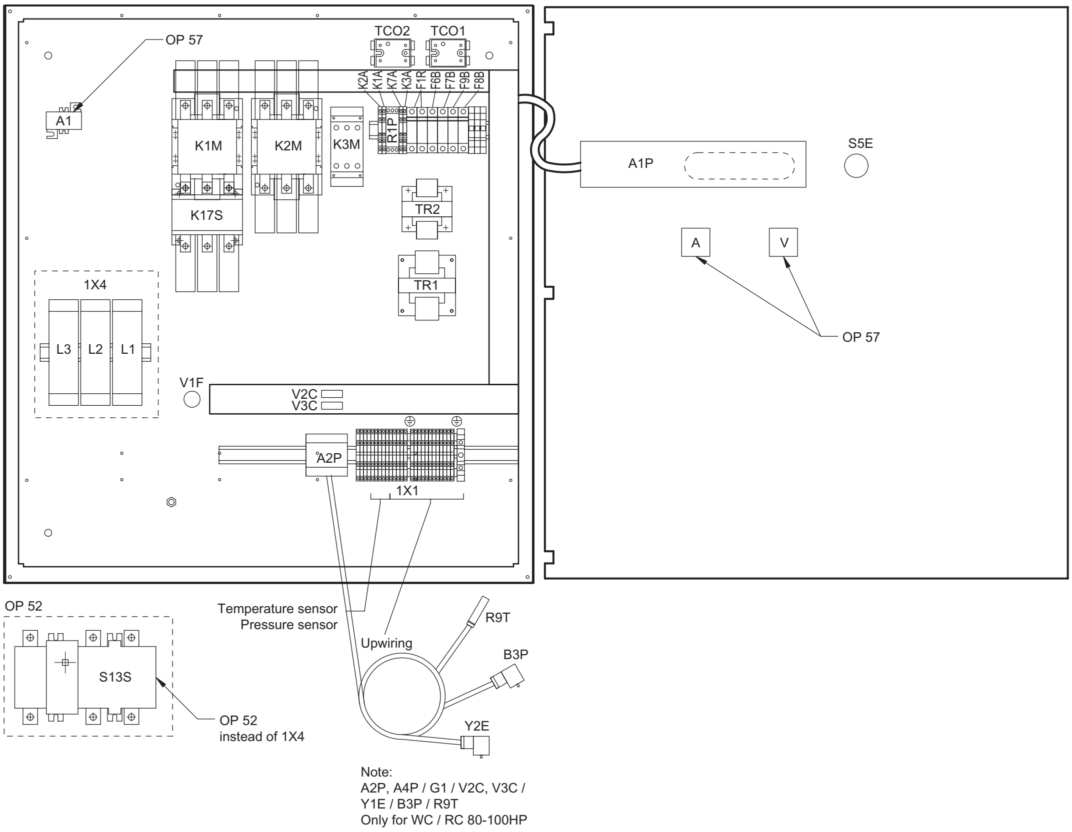
Wiring diagram symbol	**Description**
V1	V-meter for circuit 1-2
TR2	Transfo supply controller + digital inputs
TR1	Transfo control circuit
TCO1, TCO2, TCO3, TCO4	Optocoupler (analog to Digital signal)
S13S	Main isolator switch
S5E	Emergency stop push button
R1P, R2P	Reverse phase protector circuit 1, circuit 2
K7A, K8A	Auxiliary relay for safety High Pressure circuit 1, circuit 2
K3A, K6A	Auxiliary relay for discharge thermal protector circuit 1, circuit 2
K2A, K5A	Auxiliary relay for compressor thermal protector circuit 1, circuit 2
K1A, K4A	Auxiliary relay for safeties circuit 1, circuit 2
K17S, K18S	Overcurrent relay for circuit 1, circuit 2
K9F, K12F	Fancontactor for circuit 1, circuit 2
K8F, K11F	Fancontactor for circuit 1, circuit 2
K7F, K10F	Fancontactor for circuit 1, circuit 2
K3M, K6M	Starcontactor for circuit 1, circuit 2
K2M, K5M	Deltacontactor for circuit 1, circuit 2
K1M, K4M	Linecontactor for circuit 1, circuit 2
F14B	Fuse for fanmotor switchbox
F12B, F13B	Fuse for fanmotor circuit 1, circuit 2
F10S, F11S	Circuit breakers with fuses for circuit 1, circuit 2
F9B	Fuse for secondary of TR2
F7B	Fuse for secondary of TR1
F6B	Fuse for primary of TR1
A1P	PCB-Controller
A1, A2	Current tranfo / A-meter for circuit 1, circuit 2
A11P	Expansion board controller

1

3.7 Switch Box Layout EWWD/EWLD

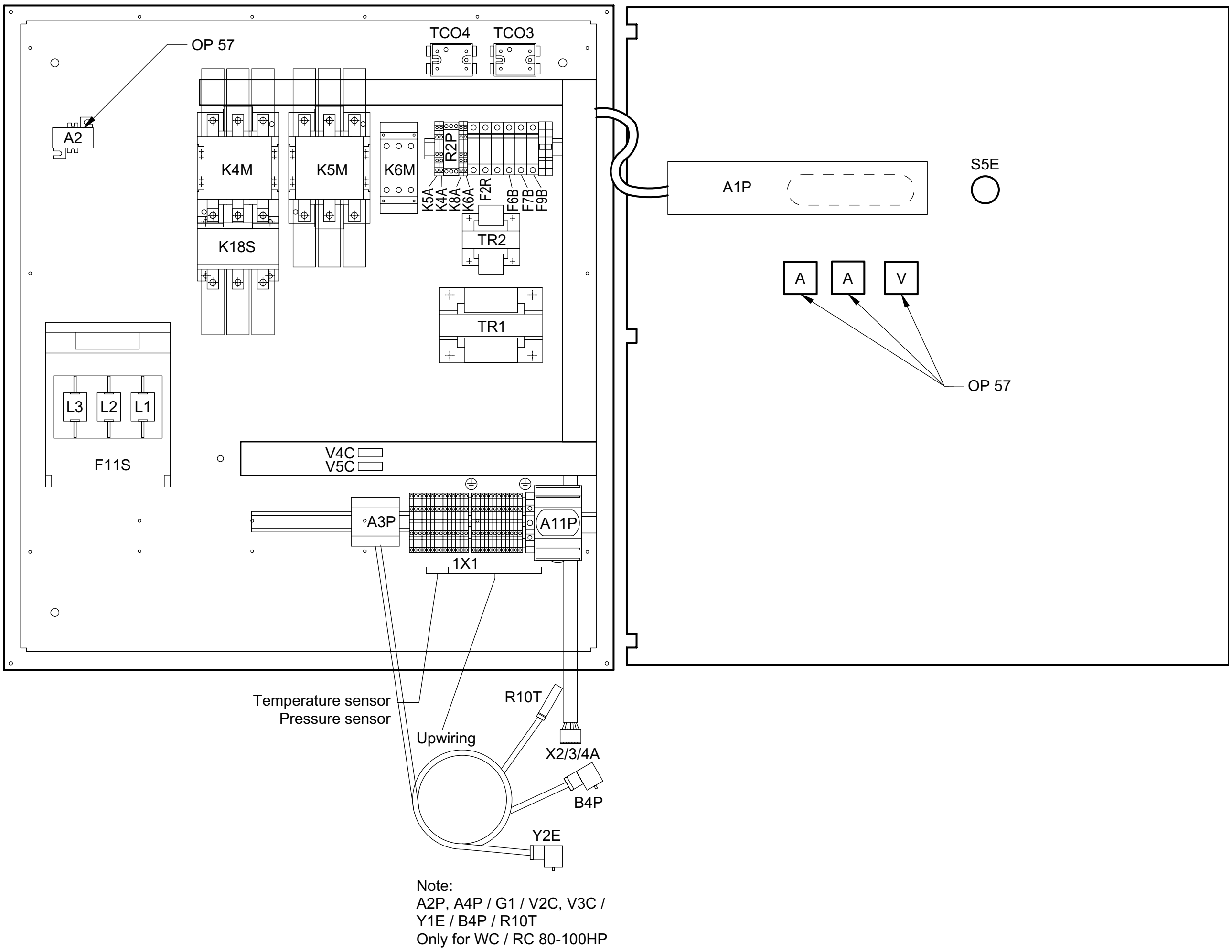
EWWD120~280MBYNN and EWLD120~260MBYNN

The illustration below shows the switch box layout for a double circuit.



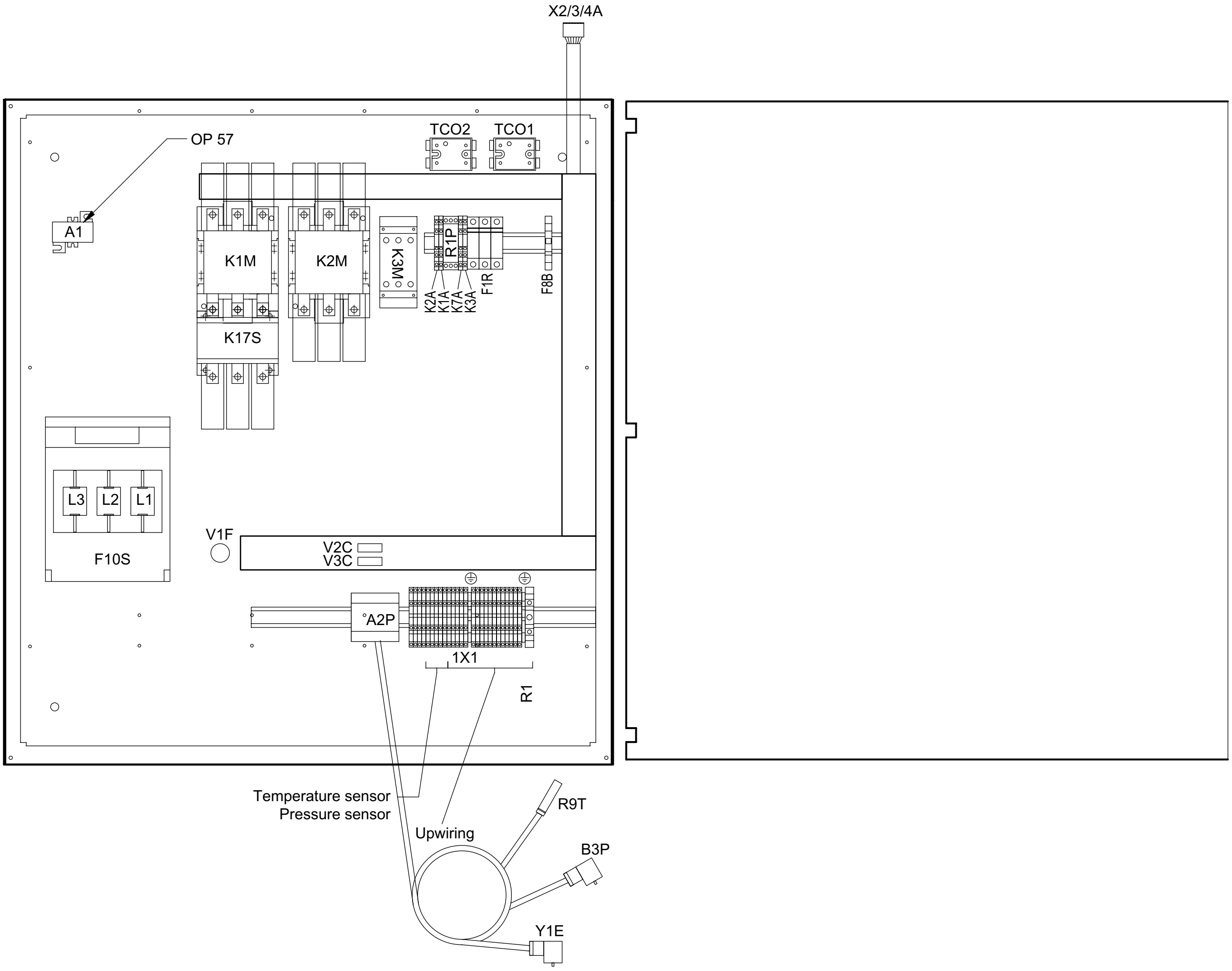
EWWD360~540MBYNN and EWLD340~540MBYNN

The illustration below shows the Top switch box layout for a circuit 2.



EWWD360~540MBYNN and EWLD340~540MBYNN

The illustration below shows the Lower switch box layout for a circuit 1.



Note:
A2P, A4P / G1 / V2C, V3C /
Y1E / B3P / R9T
Only for WC / RC 80-100HP

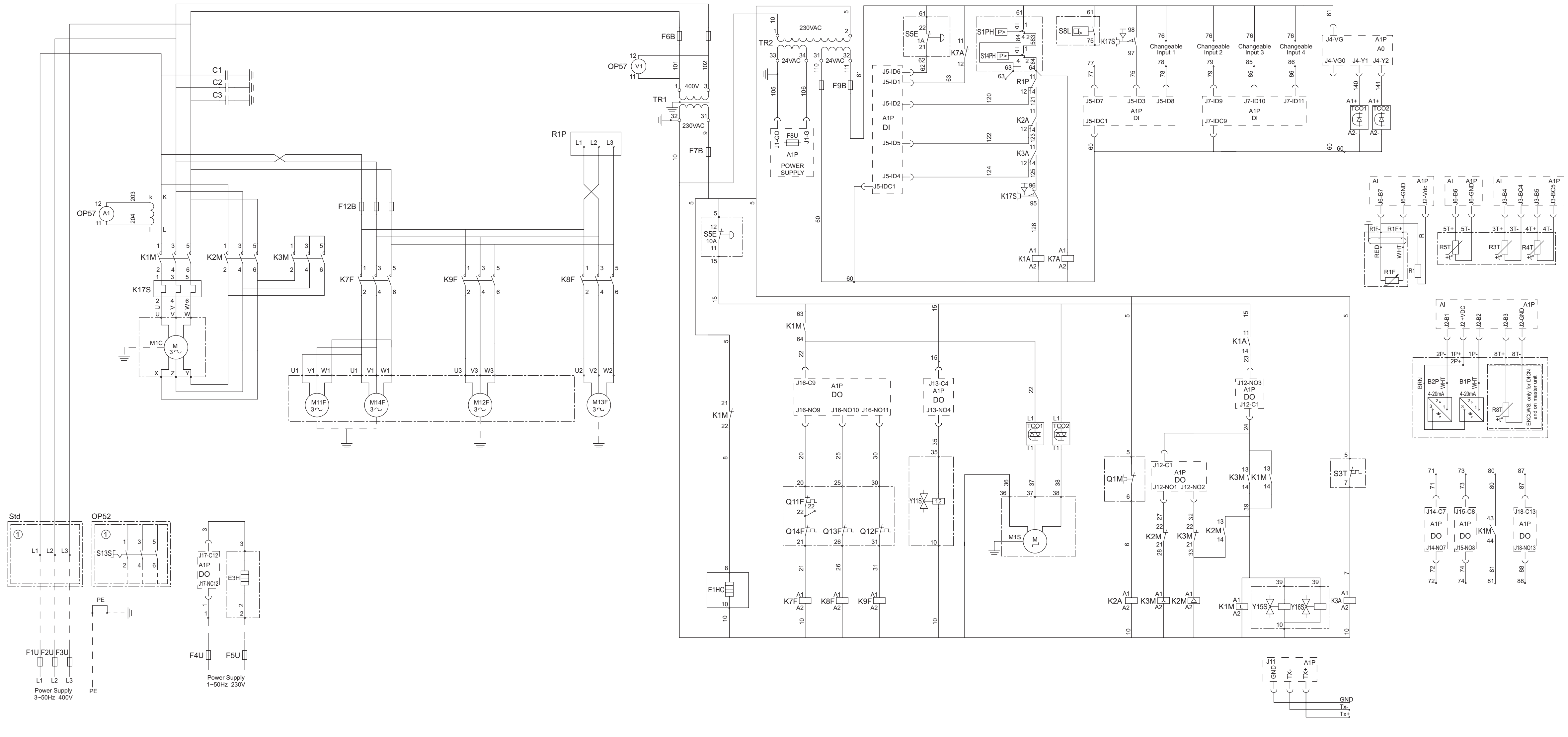
1

The table below describes the components of the switchbox for EWWD360~540MBYNN and EWLD340~540MBYNN.

Wiring diagram symbol	Description
Y1E, Y2E	Electronic expansion valve circuit 1 (A2P), circuit 2 (A3P)
X2A, X3A, X4A	Connector 24, 20, ‘6 pole to main switchbox
V2C-V5C	Ferrite for EEV
V1F	Filter for EEV
V1	V-meter for circuit 1-2
TR2	Transfo supply controller + digital inputs
TR1	Transfo control circuit
TCO1..TCO4	Optocoupler (analog to Digital signal)
S13S	Main isolator switch
S5E	Emergency stop push button
R9T, R10T	Temperature sensor EEV for circuit 1 (A2P), 2 (A3P)
R1P, R2P	Reverse phase protector circuit 1, circuit 2
K7A, K8A	Auxiliary relay for safety High Pressure circuit 1, circuit 2
K3A, K6A	Auxiliary relay for discharge thermal protector circuit 1, circuit 2
K2A, K5A	Auxiliary relay for compressor thermal protector circuit 1, circuit 2
K1A, K4A	Auxiliary relay for safeties circuit 1, circuit 2
K3M, K6M	Starcontactor for circuit 1, circuit 2
K2M, K5M	Deltacontactor for circuit1, circuit 2
K1M, K4M	Linecontactor for circuit1, circuit 2
F10S, F11S	Circuit breakers with fuses for circuit 1, circuit 2
F9B	Fuse for secondary of TR2
F8U	Surge proof fuse for A1P
F8B	Fuse for EEV driver
F7B	Fuse for secondary of TR1
F6B	Fuse for primary of TR1
F1R, F2R	Fuse for reverse phase protector circuit1, circuit2
A11P	Expansion board controller
A2P, A3P	PCB-EEV driver circuit1, circuit2
A1P	PCB-controller
A1	Current transfo / A-meter for circuit1, circuit2

3.8 Wiring Diagram: EWAP110~160MBYNN

Diagram



NOTES TO GO THROUGH BEFORE STARTING THE UNIT :

(1)
- L1,L2,L3 : main terminals
- 1 - 70 : terminals on main rail
- 71 -88 : terminal on field rail
- U - Z : main terminals in compressor switchbox
- A - N : other terminals in compressor switchbox

(2) = earth wiring

(3) 15 = wire number 15

(4) 15 = terminal number 15

(5) = Field supply

(6) = option

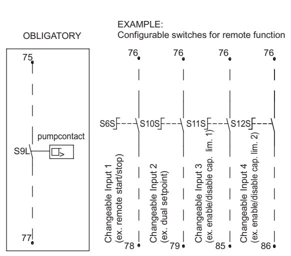
(7) = not mounted in switchbox

(8) = PCB

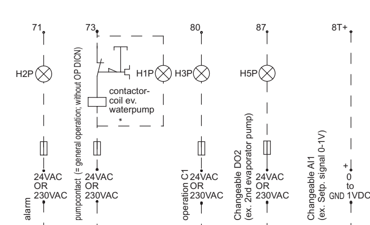
(9) F1 = connection continues on field 'F1'

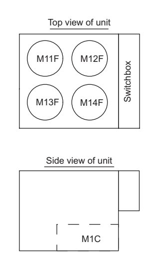
(10) 1 = several wiring possibilities

(11) input terminals for fieldwiring



(12) output terminals for fieldwiring
Maximum output current: Resistive: 2A, Inductive: 2A/Cos Phi 0,4
EXAMPLE





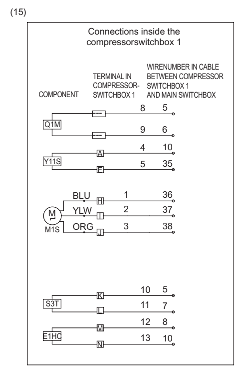
(13)

	Standard Fan			OP ESP		
FUSES + OVERCURRENT	EWAP 110	EWAP 140	EWAP 160	EWAP 110	EWAP 140	EWAP 160
F1U,F2U,F3U	3x125gL	3x160gL	3x160gL	3x160gL	3x160gL	3x200gL
F4U,F5U	2A	2A	2A	2A	2A	2A
F6B	4A	4A	4A	4A	4A	4A
F7B	2A aM	2A aM	2A aM	2A aM	2A aM	2A aM
F8U	2A	2A	2A	2A	2A	2A
F9B	1A T	1A T	1A T	1A T	1A T	1A T
F12B	10A	16A	16A	32A	32A	32A
K17S	51	62	70	51	62	70

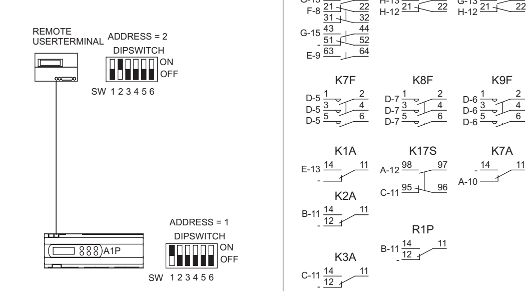
- recommended fuses gL/gG (aM also admitted) according to IEC standard 269-2 (F1U,F2U,F3U = gL/gG , F4U,F5U= gL/gG)

(14) OPTIONAL:
- ☐ OP ESP = Option High ESP Fans
- ☐ OP52 = main isolator switch
- ☐ OP57 = A-meter, V-meter

(15)



(16) Connection between PCB and remote user terminal position of jumpers and dipswitches
In a DICN system only valid for the master unit.
For the slave units see the installation manual.



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

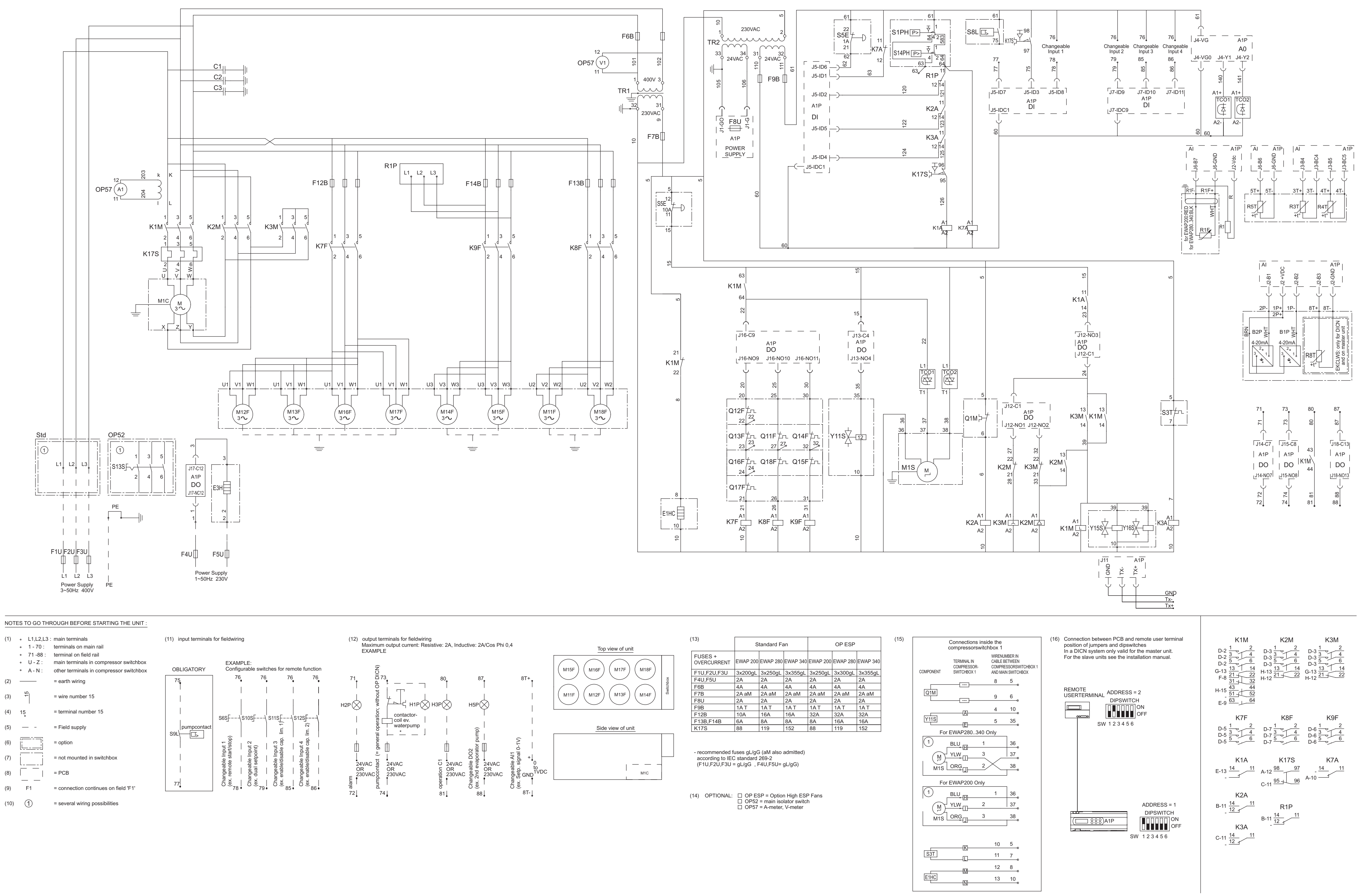
No.	Function / remark	No.	Function / remark
Y11S	12% capacity step for compressor circuit 1	K17S	overcurrent relay for circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K9F	fancontactor for circuit 1
Y16S	liquid line solenoid valve circuit 1	K8F	fancontactor for circuit 1
V1 **	V-meter for circuit 1	K7F	fancontactor for circuit 1
TR1	transfo control circuit	K1M	linecontactor for circuit 1
TR2	transfo supply controller + digital inputs	K2M	deltacontactor for circuit 1
TC01..TCO2	optocoupler (Analog to Digital signal)	K3M	starcontactor for circuit1
S8L	flowswitch	J4	analogue output
S9L #	contact that closes if the pump is working	J12, J13, J14, J15, J16, J17, J18	digital output
S14PH	high pressure switch circuit 1		
S13S ##	main isolator switch	J5, J7, J8	digital input
S6S, S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable / disable cap. lim. 1 / 2 / 3 / 4)	J2, J3, J6	analogue input
		J11	RS485 connection
S5E	emergency stop push button	J1	power supply
S3T	discharge thermal protector circuit 1	H5P *	changeable output
S1PH	high pressure switch circuit 1	H3P *	indication lamp operation compressor 1
R8T	sensor for evaporator outlet water temperature DICN	H2P *	indication lamp alarm
R5T	sensor for ambient temperature	H1P *	indication lamp general operation
R4T	sensor for outlet water temperature	F12B	fuse for fanmotors circuit 1
R3T	sensor for evaporator inlet water temperature	F9B	fuse for secondary of TR2
R1P	reverse phase protector circuit 1	F8U	surge proof fuse for A1P
R1F	feedback resistance for circuit 1	F7B	fuse for secondary of TR1
R1	auxiliary resistance for feedback	F6B	fuse for primary of TR1
Q1M	thermal protector compressor motor circuit 1	F4U, F5U #	fuses for evaporator heater
Q11F-Q14F	thermal protectors fan motors circuit 1	F1U, F2U, F3U #	main fuses
PE	main earth terminal	E3H	evaporator heater circuit 1
M1S	stepless capacity ctrl for compressor circuit 1	E1HC	crankcase heater compressor circuit 1
M1C	compressor motor circuit 1	C1..C3	capacitor
M11F-M14F	fan motors circuit 1	B2P	high pressure transmitter for circuit 1
K7A	auxiliary relay for safety High Pressure circuit 1	B1P	low pressure transmitter for circuit 1
K3A	auxiliary relay for discharge thermal protector circuit 1	A1P	PCB-controller
K2A	auxiliary relay compressor thermal protector circuit 1	A1 **	current transfo / A-meter for circuit 1
K1A	auxiliary relay for safeties circuit 1		

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap Outlet water sensor C1 J6 (B6-GND): Ambient J6 (B7-VDC): Capacity feedback of C1 J6 (B8-VDC): --	J4 (VG0-Y1): Ctrl motor Loadup C1 J4 (VG0-Y2): Ctrl motor Loaddown C1	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): -- J8 (ID13-IDC13): -- J8 (ID14-IDC13): --

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO2	Overview of changeable analog input AI 1:
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO 1: Evap. heatertape J18 (C13-NO13): Changeable DO 2	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint/Remote On -Off / enable / disable capacity limitation 1-2-3-4	J18 (C13-NO13): 2nd evaporator pump / General operation / 100 capacity / free cooling	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.9 Wiring Diagram: EWAP200~340MBYNN

Diagram



	Standard Fan			OP ESP		
FUSES + OVERCURRENT	EWAP 200	EWAP 280	EWAP 340	EWAP 200	EWAP 280	EWAP 340
F1U,F2U,F3U	3x200gL	3x250gL	3x355gL	3x250gL	3x300gL	3x355gL
F4U,F5U	2A	2A	2A	2A	2A	2A
F6B	4A	4A	4A	4A	4A	4A
F7B	2A aM	2A aM	2A aM	2A aM	2A aM	2A aM
F8U	2A	2A	2A	2A	2A	2A
F9B	1A T	1A T	1A T	1A T	1A T	1A T
F12B	10A	16A	16A	32A	32A	32A
F13B,F14B	6A	8A	8A	8A	16A	16A
K17S	88	119	152	88	119	152

- recommended fuses gL/gG (aM also admitted) according to IEC standard 269-2 (F1U,F2U,F3U = gL/gG , F4U,F5U= gL/gG)

	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

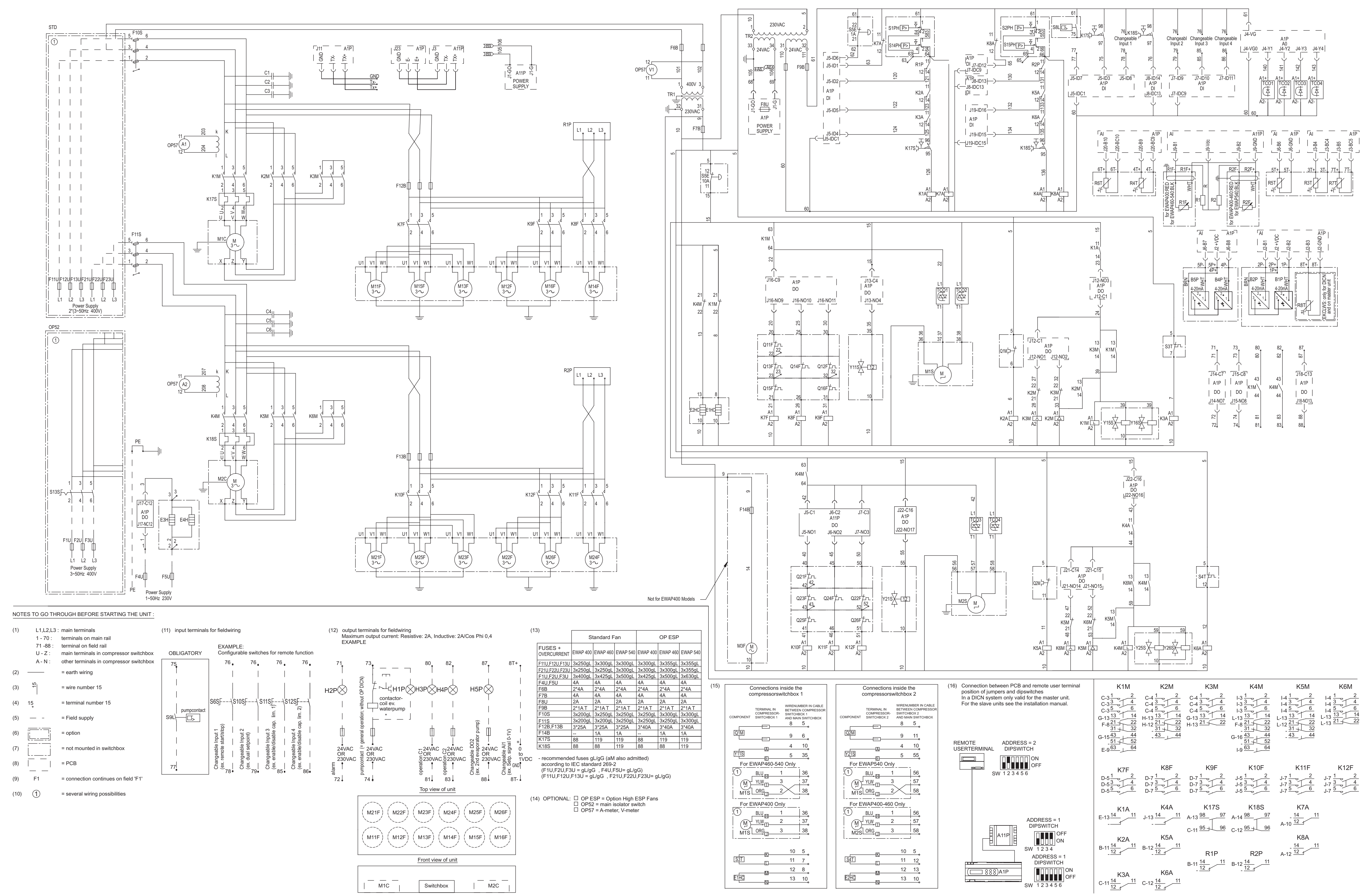
No.	Function / remark	No.	Function / remark
Y11S	12% capacity step for compressor circuit 1	K17S	overcurrent relay for circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K9F	fancontactor for circuit 1
Y16S	liquid line solenoid valve circuit 1	K8F	fancontactor for circuit 1
V1 **	V-meter for circuit 1	K7F	fancontactor for circuit 1
TR1	transfo control circuit	K1M	linecontactor for circuit 1
TR2	transfo supply controller + digital inputs	K2M	deltacontactor for circuit 1
TC01..TCO2	optocoupler (Analog to Digital signal)	K3M	starcontactor for circuit1
S14PH	high pressure switch circuit 1	J4	analogue output
S13S ##	main isolator switch	J12, J13, J14, J15 J16, J17, J18	digital output
S8L	flowswitch		
S9L #	contact that closes if the pump is working	J5, J7, J8	digital input
S6S, S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable / disable cap. lim. 1 / 2 / 3 / 4)	J2, J3, J6	analogue input
		J11	RS485 connection
S5E	emergency stop push button	J1	power supply
S3T	discharge thermal protector circuit 1	H5P *	changeable output
S1PH	high pressure switch circuit 1	H3P *	indication lamp operation compressor 1
R8T	sensor for evaporator outlet water temperature DICN	H2P *	indication lamp alarm
R5T	sensor for ambient temperature	H1P *	indication lamp general operation
R4T	sensor for outlet water temperature	F12B-F14B	fuse for fanmotors circuit 1
R3T	sensor for evaporator inlet water temperature	F9B	fuse for secondary of TR2
R1P	reverse phase protector circuit 1	F8U	surge proof fuse for A1P
R1F	feedback resistance for circuit 1	F7B	fuse for secondary of TR1
R1	auxiliary resistance for feedback	F6B	fuse for primary of TR1
Q1M	thermal protector compressor motor circuit 1	F4U, F5U #	fuses for evaporator heater
Q11F-Q14F	thermal protectors fan motors circuit 1	F1U, F2U, F3U #	main fuses
PE	main earth terminal	E3H	evaporator heater circuit 1
M1S	stepless capacity ctrl for compressor circuit 1	E1HC	crankcase heater compressor circuit 1
M1C	compressor motor circuit 1	C1..C3	capacitor
M11F-M14F	fan motors circuit 1	B2P	high pressure transmitter for circuit 1
K7A	auxiliary relay for safety High Pressure circuit 1	B1P	low pressure transmitter for circuit 1
K3A	auxiliary relay for discharge thermal protector circuit 1	A1P	PCB-controller
K2A	auxiliary relay compressor thermal protector circuit 1	A1 **	current transfo / A-meter for circuit 1
K1A	auxiliary relay for safeties circuit 1		

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap Outlet water sensor C1 J6 (B6-GND): Ambient J6 (B7-VDC): Capacity feedback of C1 J6 (B8-VDC): --	J4 (VG0-Y1): Ctrl motor Loadup C1 J4 (VG0-Y2): Ctrl motor Loaddown C1	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): -- J8 (ID13-IDC13): -- J8 (ID14-IDC13): --

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO2	Overview of changeable analog input AI 1:
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO 1: Evap. heatertape J18 (C13-NO13): Changeable DO 2	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint/Remote On -Off / enable / disable capacity limitation 1-2-3-4	J18 (C13-NO13): 2nd evaporator pump/General operation/100 capacity/free cooling	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.10 Wiring Diagram: EWAP400~540MBYNN

Diagram



FUSES + OVERCURRENT	Standard Fan EWAP 400	Standard Fan EWAP 460	Standard Fan EWAP 540	OP ESP EWAP 400	OP ESP EWAP 460	OP ESP EWAP 540
F11U,F12U,F13U	3x250gL	3x300gL	3x300gL	3x300gL	3x355gL	3x355gL
F21U,F22U,F23U	3x250gL	3x250gL	3x300gL	3x300gL	3x300gL	3x355gL
F1U,F2U,F3U	3x400gL	3x425gL	3x500gL	3x425gL	3x500gL	3x630gL
F4U,F5U	4A	4A	4A	4A	4A	4A
F6B	2*4A	2*4A	2*4A	2*4A	2*4A	2*4A
F7B	4A	4A	4A	4A	4A	4A
F8U	2A	2A	2A	2A	2A	2A
F9B	2*1A T	2*1A T	2*1A T	2*1A T	2*1A T	2*1A T
F10S	3x200gL	3x250gL	3x250gL	3x250gL	3x300gL	3x300gL
F11S	3x200gL	3x200gL	3x250gL	3x250gL	3x250gL	3x300gL
F12B,F13B	3*25A	3*25A	3*25A	3*40A	3*40A	3*40A
F14B	--	1A	1A	--	1A	1A
K17S	88	119	119	88	119	119
K18S	88	88	119	88	88	119

	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

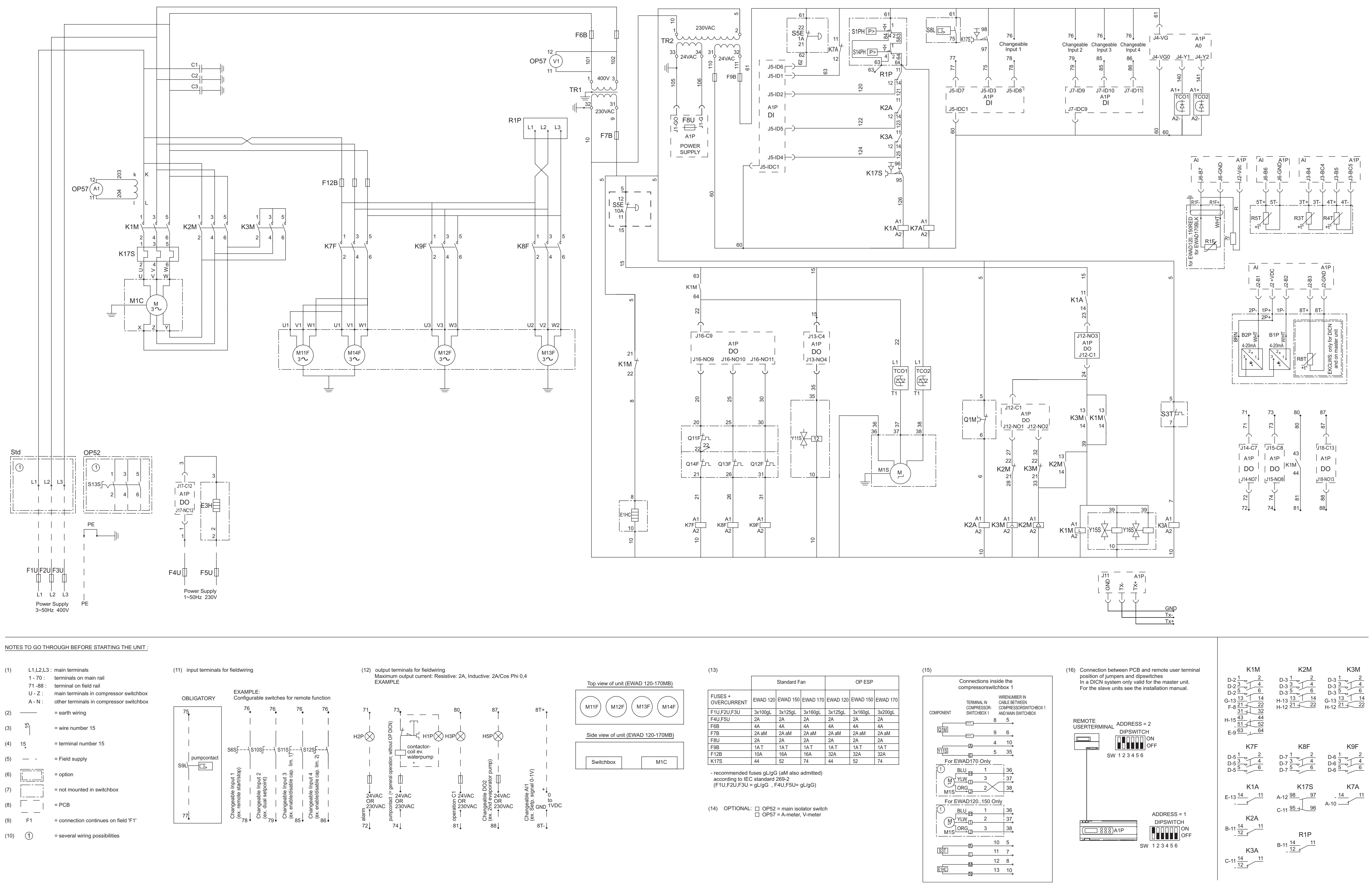
No.	Function / remark	No.	Function / remark
Y11S, Y21S	12% capacity step for compressor circuit 1, circuit 2	K17S, K18S	overcurrent relay for circuit 1, circuit 2
Y15S, Y25S	liquid injection valve of the compressor circuit 1, circuit 2	K9F, K12F	fancontactor for circuit 1, circuit 2
Y16S, Y26S	liquid line solenoid valve circuit 1, circuit 2	K8F, K11F	fancontactor for circuit 1, circuit 2
V1 **	V-meter for circuit 1-2	K7F, K10F	fancontactor for circuit 1, circuit 2
TR2	transfo supply controller + digital inputs	K3M, K6M	starcontactor for circuit1, circuit 2
TR1	transfo control circuit	K2M, K5M	deltacontactor for circuit 1, circuit 2
TC01..TCO4	optocoupler (Analog to Digital signal)	K1M, K4M	linecontactor for circuit 1, circuit 2
S14PH, S15PH	high pressure switch circuit 1, circuit 2	J12...J18 J21, J22	digital output
S8L	flowswitch		
S9L #	contact that closes if the pump is working	J5, J7, J8, J19	digital input
S13S ##	main isolator switch	J4	analogue output
S6S, S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable / disable cap. lim. 1 / 2 / 3 / 4)	J2, J3, J6, J20	analogue input
		J11, J23	RS485 connection
S5E	emergency stop push button	J1	power supply
S3T, S4T	discharge thermal protector circuit 1, circuit 2	H5P *	changeable output
S1PH, S2PH	high pressure switch circuit 1, circuit 2	H4P *	indication lamp operation compressor 2
R8T	sensor for evaporator outlet water temperature DICN	H3P *	indication lamp operation compressor 1
R7T	sensor for mixed outlet water temperature	H2P *	indication lamp alarm
R6T	sensor for evaporator outlet water temperature, circuit 2	H1P *	indication lamp general operation
R5T	sensor for ambient temperature	F14B	fuse for fanmotor switchbox
R4T	sensor for evaporator outlet water temperature, circuit 1	F12B, F13B	fuse for fanmotors circuit 1, circuit 2
R3T	sensor for evaporator inlet water temperature	F10S, F11S	circuit breakers with fuses for circuit 1, circuit 2
R1P, R2P	reverse phase protector circuit 1, circuit 2	F9B	fuse for secondary of TR2
R1F, R2F	feedback resistance for circuit 1, circuit 2	F8U	surge proof fuse for A1P
R1, R2	auxiliary resistance for feedback	F7B	fuse for secondary of TR1
Q1M, Q2M	thermal protector compressor motor circuit 1, circuit 2	F6B	fuse for primary of TR1
Q21F-Q26F	thermal protectors fan motors circuit 2	F4U,F5U #	fuses for evaporator heater
Q11F-Q16F	thermal protectors fan motors circuit 1	F21U..F23U #	main fuses
PE	main earth terminal	F11U..F13U #	main fuses
M1S, M2S	stepless capacity ctrl for compressor circuit 1, circuit 2	F1U, F2U, F3U #	main fuses
M1C, M2C	compressor motors circuit 1, circuit 2	E3H, E4H	evaporator heater circuit 1, circuit 2
M3F	Fanmotor switchbox	E1HC, E2HC	crankcase heater compressor circuit 1, circuit 2
M21F-M26F	fan motors circuit 2	C1..C3, C4..C6	capacitor
M11F-M16F	fan motors circuit 1	B2P,B5P	high pressure transmitter for circuit 1, circuit 2
K7A, K8A	auxiliary relay for safety High Pressure circuit 1, circuit 2	B1P, B4P	low pressure transmitter for circuit 1, circuit 2
K3A, K6A	auxiliary relay for discharge thermal protector circuit 1, circuit 2	A11P	expansion board controller
K2A, K5A	auxiliary relay compressor thermal protector circuit 1, circuit2	A1P	PCB-controller
K1A, K4A	auxiliary relay for safeties circuit 1, circuit 2	A1, A2 **	current transfo / A-meter for circuit 1, circuit 2

Power supply	RS485 connection	(Expansion board A11P)	Digital input	Digital output
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	**Power supply:** J1-G: 24Vac J1-G0: Reference (GND) **Digital output:** J5 (C1-NO1): Fanstep 1 of C2 J6 (C2-NO2): Fanstep 2 of C2 J7 (C3-NO3): Fanstep 3 of C2 **Analogue input:** J9 (B1-GND): Capacity feedback of C1 J9 (B2-GND): Capacity feedback of C2	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): High pressure switch C2 J8 (ID13-IDC13): Reverse phase protector C2 J8 (ID14-IDC13): Overcurrent relay C2 J19 (ID15-IDC15): Discharge thermal prot C2 J19 (ID16-IDC15): Compr thermal prot C2	J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO 1: Evap. heatertape J18 (C13-NO13): Changeable DO 2 J21 (C14-NO14): Compr star C2 J21 (C15-NO15): Compr delta C2 J22 (C16-NO16): Compr on C2 J22 (C16-NO17): 12 C2 J22 (C16-NO18): --

Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO2	Overview of changeable analog input AI 1:
J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J18 (C13-NO13): 2nd evaporator pump / General operation / 100 capacity / free cooling	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.11 Wiring Diagram: EWAD120~170MBYNN

Diagram



	Standard Fan			OP ESP		
FUSES + OVERCURRENT	EWAD 120	EWAD 150	EWAD 170	EWAD 120	EWAD 150	EWAD 170
F1U,F2U,F3U	3x100gL	3x125gL	3x160gL	3x125gL	3x160gL	3x200gL
F4U,F5U	2A	2A	2A	2A	2A	2A
F6B	4A	4A	4A	4A	4A	4A
F7B	2A aM	2A aM	2A aM	2A aM	2A aM	2A aM
F8U	2A	2A	2A	2A	2A	2A
F9B	1A T	1A T	1A T	1A T	1A T	1A T
F12B	10A	16A	16A	32A	32A	32A
K17S	44	52	74	44	52	74

	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

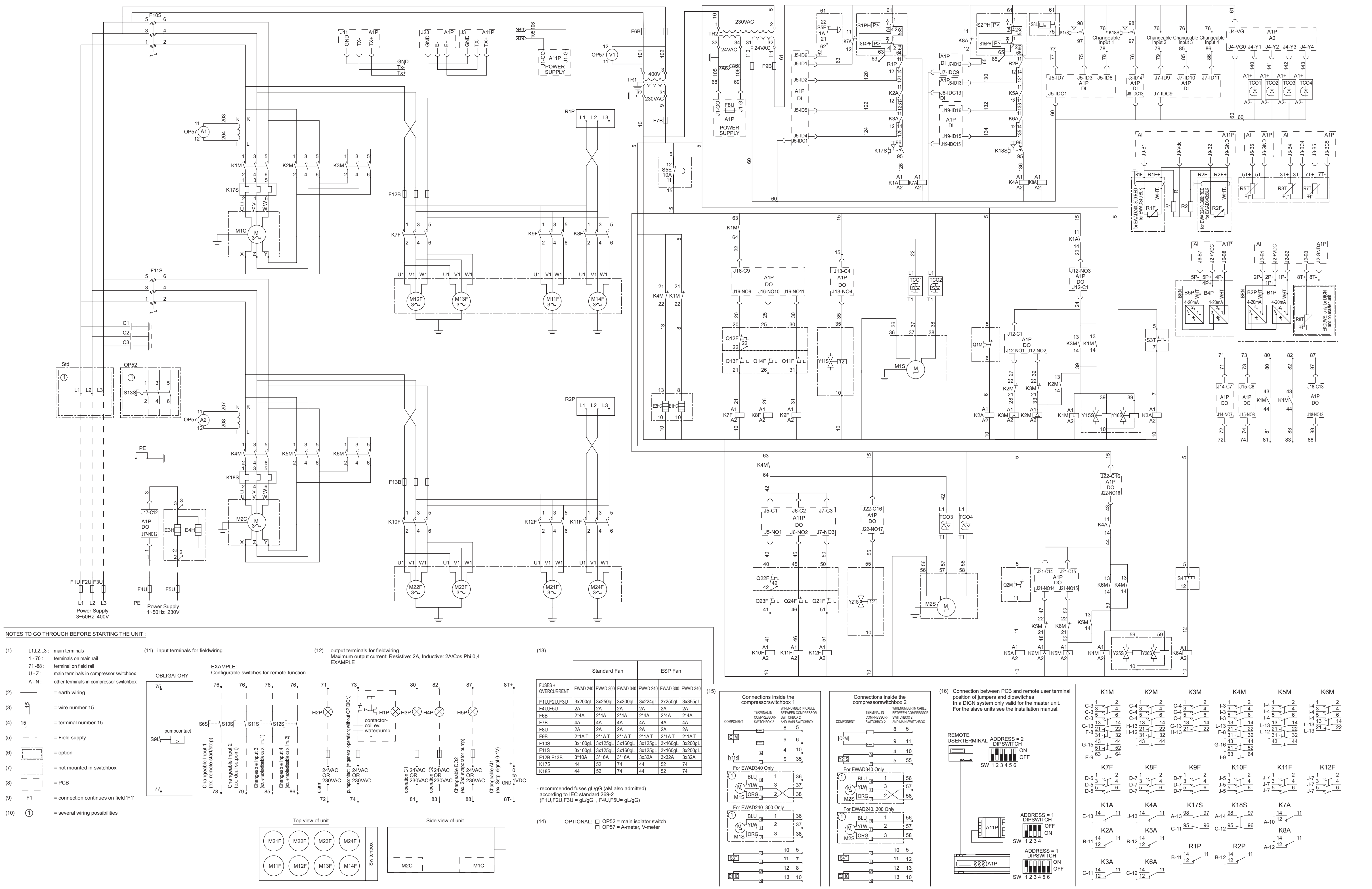
No.	Function / remark	No.	Function / remark
Y11S	12% capacity step for compressor circuit 1	K17S	overcurrent relay for circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K9F	fancontactor for circuit 1
Y16S	liquid line solenoid valve circuit 1	K8F	fancontactor for circuit 1
V1 **	V-meter for circuit 1	K7F	fancontactor for circuit 1
TR1	transfo control circuit	K3M	starcontactor for circuit1
TR2	transfo supply controller + digital inputs	K2M	deltacontactor for circuit 1
TC01..TCO2	optocoupler (Analog to Digital signal)	K1M	linecontactor for circuit 1
S14PH	high pressure switch circuit 1	J4	analogue output
S13S ##	main isolator switch	J12, J13, J14, J15, J16, J17, J18	digital output
S8L	flowswitch		
S9L #	contact that closes if the pump is working	J5, J7, J8	digital input
S6S, S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable/disable cap. lim. 1/2/3/4)	J2, J3, J6	analogue input
		J11	RS485 connection
S5E	emergency stop push button	J1	power supply
S3T	discharge thermal protector circuit 1	H5P *	changeable output
S1PH	high pressure switch circuit 1	H3P *	indication lamp operation compressor 1
R8T	sensor for evaporator outlet water temperature DICN	H2P *	indication lamp alarm
R5T	sensor for ambient temperature	H1P *	indication lamp general operation
R4T	sensor for outlet water temperature	F12B	fuse for fanmotors circuit 1
R3T	sensor for evaporator inlet water temperature	F9B	fuse for secondary of TR2
R1P	reverse phase protector circuit 1	F8U	surge proof fuse for A1P
R1F	feedback resistance for circuit 1	F7B	fuse for secondary of TR1
R1	auxiliary resistance for feedback	F6B	fuse for primary of TR1
Q1M	thermal protector compressor motor circuit 1	F4U, F5U #	fuses for evaporator heater
Q11F-Q14F	thermal protectors fan motors circuit 1	F1U, F2U, F3U #	main fuses
PE	main earth terminal	E3H	evaporator heater circuit 1
M1S	stepless capacity ctrl for compressor circuit 1	E1HC	crankcase heater compressor circuit 1
M1C	compressor motor circuit 1	C1..C3	capacitor
M11F-M14F	fan motors circuit 1	B2P	high pressure transmitter for circuit 1
K7A	auxiliary relay for safety High Pressure circuit 1	B1P	low pressure transmitter for circuit 1
K3A	auxiliary relay for discharge thermal protector circuit 1	A1P	PCB-controller
K2A	auxiliary relay compressor thermal protector circuit 1	A1 **	current transfo / A-meter for circuit 1
K1A	auxiliary relay for safeties circuit 1		

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap Outlet water sensor C1 J6 (B6-GND): Ambient J6 (B7-VDC): Capacity feedback of C1 J6 (B8-VDC): --	J4 (VG0-Y1): Ctrl motor Loadup C1 J4 (VG0-Y2): Ctrl motor Loaddown C1	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): -- J8 (ID13-IDC13): -- J8 (ID14-IDC13): --

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO2	Overview of changeable analog input AI 1:
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO 1: Evap. heatertape J18 (C13-NO13): Changeable DO 2	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J18 (C13-NO13): 2nd evaporator pump / General operation / 100 capacity / free cooling	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.12 Wiring Diagram: EWAD240~340MBYNN

Diagram



	Standard Fan			ESP Fan		
FUSES + OVERCURRENT	EWAD 240	EWAD 300	EWAD 340	EWAD 240	EWAD 300	EWAD 340
F1U,F2U,F3U	3x200gL	3x250gL	3x300gL	3x224gL	3x250gL	3x355gL
F4U,F5U	2A	2A	2A	2A	2A	2A
F6B	2*4A	2*4A	2*4A	2*4A	2*4A	2*4A
F7B	4A	4A	4A	4A	4A	4A
F8U	2A	2A	2A	2A	2A	2A
F9B	2*1A T	2*1A T	2*1A T	2*1A T	2*1A T	2*1A T
F10S	3x100gL	3x125gL	3x160gL	3x125gL	3x160gL	3x200gL
F11S	3x100gL	3x125gL	3x160gL	3x125gL	3x160gL	3x200gL
F12B,F13B	3*10A	3*16A	3*16A	3x32A	3x32A	3x32A
K17S	44	52	74	44	52	74
K18S	44	52	74	44	52	74

	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

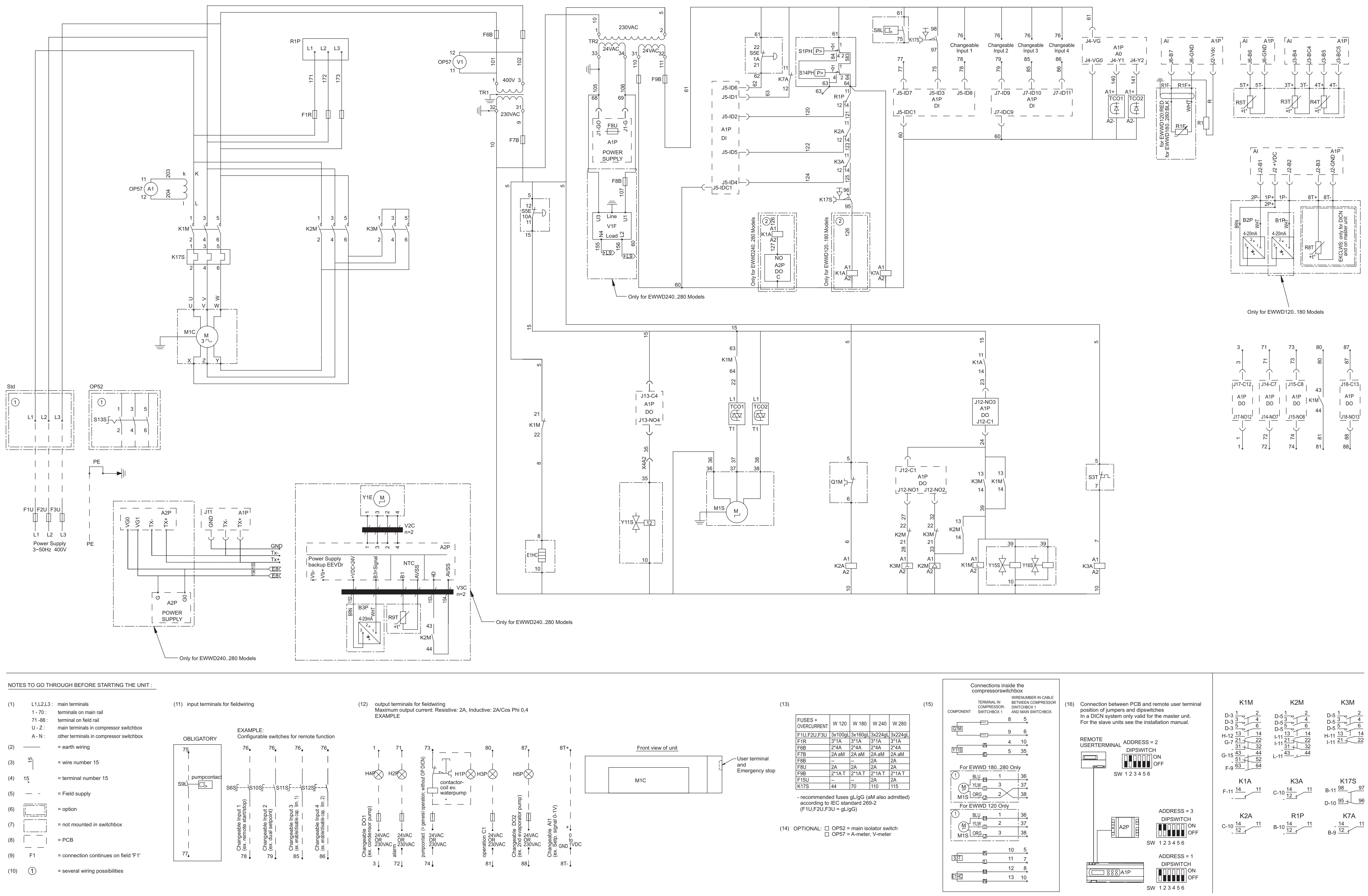
No.	Function / remark	No.	Function / remark
Y11S, Y21S	12% capacity step for compressor circuit 1, circuit 2	K17S, K18S	overcurrent relay for circuit 1, circuit 2
Y15S, Y25S	liquid injection valve of the compressor circuit 1, circuit 2	K9F, K12F	fancontactor for circuit 1, circuit 2
Y16S, Y26S	liquid line solenoid valve circuit 1, circuit 2	K8F, K11F	fancontactor for circuit 1, circuit 2
V1 **	V-meter for circuit 1-2	K7F, K10F	fancontactor for circuit 1, circuit 2
TR1	transfo control circuit	K3M, K6M	starcontactor for circuit1, circuit 2
TR2	transfo supply controller + digital inputs	K1M, K4M	linecontactor for circuit 1, circuit 2
TC01..TCO4	optocoupler (Analog to Digital signal)	K2M, K5M	deltacontactor for circuit 1, circuit 2
S14PH, S15PH	high pressure switch circuit 1, circuit 2	J12..J18	digital output
S13S ##	main isolator switch	J21,J22	
S8L	flowswitch	J5,J7,J8,J19	digital input
S9L #	contact that closes if the pump is working	J4	analogue output
S6S, S10S * S11S, S12S	configurable switch for remote function (rem. start-stop, dual setpoint, enable / disable cap. lim. 1 / 2 / 3 / 4)	J2,J3,J6	analogue input
		J11,J23	RS485 connection
S5E	emergency stop push button	J1	power supply
S3T, S4T	discharge thermal protector circuit 1, circuit 2	H5P *	changeable output
S1PH, S2PH	high pressure switch circuit 1, circuit 2	H4P *	indication lamp operation compressor 2
R8T	sensor for evaporator outlet water temperature DICN	H3P *	indication lamp operation compressor 1
R7T	sensor for mixed outlet water temperature	H2P *	indication lamp alarm
R5T	sensor for ambient temperature	H1P *	indication lamp general operation
R3T	sensor for evaporator inlet water temperature	F12B, F13B	fuse for fanmotors circuit 1, circuit 2
R1P, R2P	reverse phase protector circuit 1, circuit 2	F10S, F11S	circuit breakers with fuses for circuit 1, circuit 2
R1F, R2F	feedback resistance for circuit 1, circuit 2	F9B	fuse for secondary of TR2
R1, R2	auxiliary resistance for feedback	F8U	surge proof fuse for A1P
Q1M, Q2M	thermal protector compressor motor circuit 1, circuit 2	F7B	fuse for secondary of TR1
Q21F-Q24F	thermal protectors fan motors circuit 2	F6B	fuse for primary of TR1
Q11F-Q14F	thermal protectors fan motors circuit 1	F4U, F5U #	fuses for evaporator heater circuit 1, circuit 2
PE	main earth terminal	F1U, F2U, F3U #	main fuses
M1S, M2S	stepless capacity ctrl for compressor circuit 1, circuit 2	E3H, E4H	evaporator heater circuit 1, circuit 2
M1C, M2C	compressor motor circuit 1, circuit 2	E1HC, E2HC	crankcase heater compressor circuit 1, circuit 2
M21F-M24F	fan motors circuit 2	C1..C3	capacitor
M11F-M14F	fan motors circuit 1	B2P, B5P	high pressure transmitter for circuit 1, circuit 2
K7A, K8A	auxiliary relay for safety High Pressure circuit 1, circuit 2	B1P, B4P	low pressure transmitter for circuit 1, circuit 2
K3A, K6A	auxiliary relay for discharge thermal protector circuit 1, circuit 2	A11P	expansion board controller
K2A, K5A	auxiliary relay compressor thermal protector circuit 1, circuit2	A1P	PCB-controller
K1A, K4A	auxiliary relay for safeties circuit 1, circuit 2	A1,A2 **	current transfo / A-meter for circuit 1, circuit 2

Power supply	RS485 connection	(Expansion board A11P)	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	**Power supply**: J1-G: 24Vac J1-G0: Reference (GND) **Digital output**: J5 (C1-NO1): Fanstep 1 of C2 J6 (C2-NO2): Fanstep 2 of C2 J7 (C3-NO3): Fanstep 3 of C2 **Analogue input**: J9 (B1-GND): Capacity feedback of C1 J9 (B2-GND): Capacity feedback of C2	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap mixed outlet water t° J6 (B6-GND): Ambient sensor J6 (B7-VDC): High pressure C2 J6 (B8-VDC): Low pressure C2	J4 (VG0-Y1): loadup ctrl motor C1 J4 (VG0-Y2): loaddown ctrl motor C1 J4 (VG0-Y3): loadup ctrl motor C2 J4 (VG0-Y4): loaddown ctrl motor C2	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): High pressure switch C2 J8 (ID13-IDC13): Reverse phase protector C2 J8 (ID14-IDC13): Overcurrent relay C2 J19 (ID15-IDC15): Discharge thermal prot C2 J19 (ID16-IDC15): Compr thermal prot C2

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO2	Overview of changeable analog input AI 1:
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO 1: Evap. heatertape J18 (C13-NO13): Changeable DO 2 J21 (C14-NO14): Compr star C2 J21 (C15-NO15): Compr delta C2 J22 (C16-NO16): Compr on C2 J22 (C16-NO17): 12 C2 J22 (C16-NO18): --	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J18 (C13-NO13): 2nd evaporator pump / General operation / 100 capacity / free cooling	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.13 Wiring Diagram: EWWD120~280MBYNN

Diagram



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

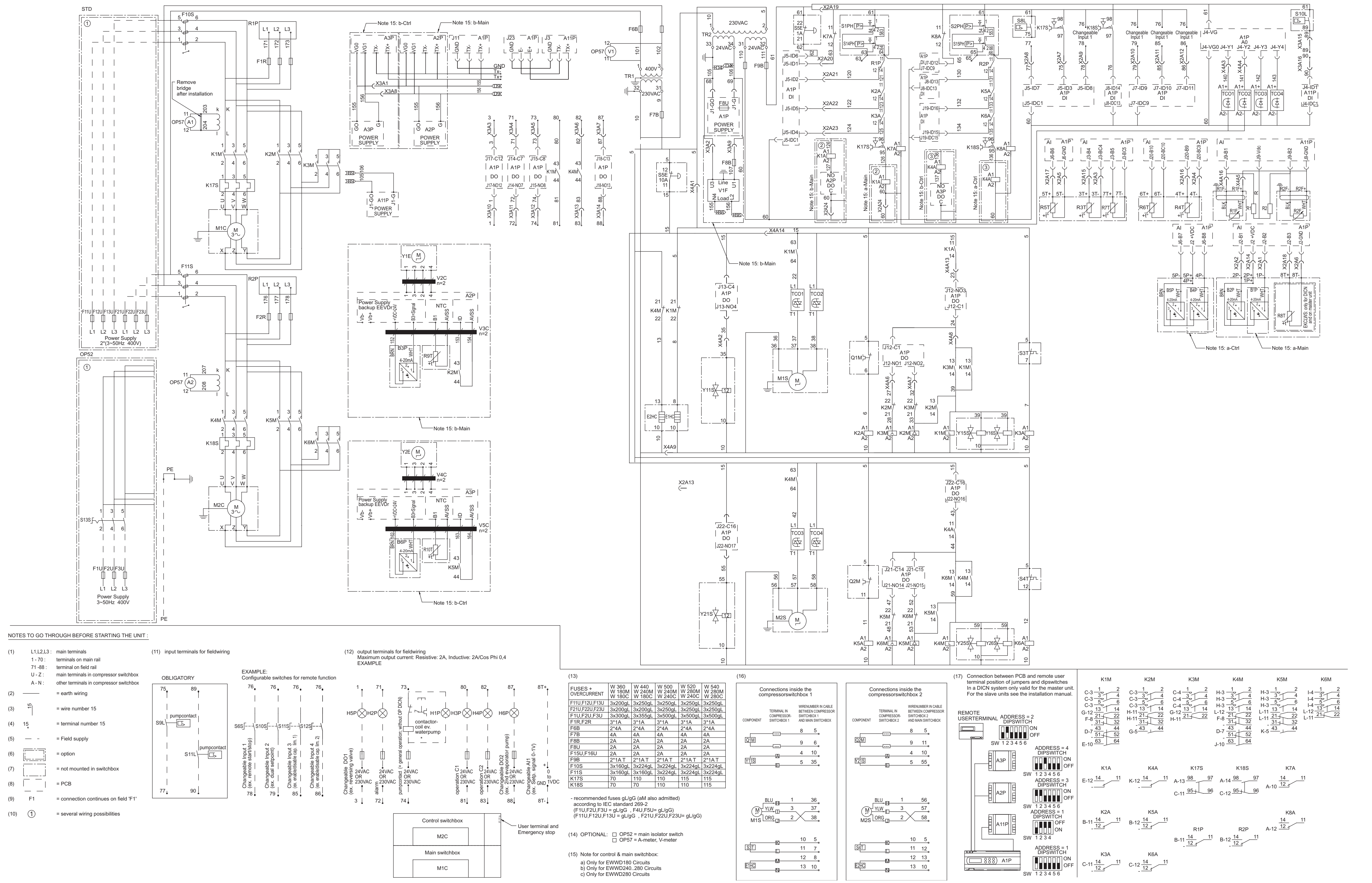
No.	Function / remark	No.	Function / remark
Y1E	electronic expansion valve circuit 1	K1A	auxiliary relay for safeties circuit 1
Y11S	12% capacity step for compressor circuit 1	K2A	auxiliary relay compressor thermal protector circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K3A	auxiliary relay for discharge thermal protector circuit 1
Y16S	liquid line solenoid valve circuit 1	K17S	overcurrent relay for circuit 1
V2C, V3C	ferrite for EEV	K1M	linecontactor for circuit 1
V1F	filter for EEV	K2M	deltacontactor for circuit 1
V1 **	V-meter for circuit 1	K3M	starcontactor for circuit1
TR1	transfo control circuit	J1	power supply
TR2	transfo supply controller + digital inputs	J2, J3, J6	analogue input
TCO1, TCO2	optocoupler (Analog to Digital signal)	J4	analogue input
S1PH	high pressure switch circuit 1	J5, J7, J8	digital input
S14PH	high pressure switch circuit 1	J11	RS485 connection
S13S ##	main isolator switch	J12..J18	digital output
S5E	emergency stop push button	J21,J22	digital input
S8L	flowswitch circuit 1	H1P *	indication lamp general operation
S9L #	contact that closes if the pump is working	H2P *	indication lamp alarm
S3T	discharge thermal protector circuit 1	H3P *	indication lamp operation compressor 1
S6S, S10S * S11S, S12S	configurable switch for remote function (rem. start-stop, dual setpoint, enable/disable cap. lim. 1 / 2 / 3 / 4)	H4P, H5P *	changeable output
		F6B	fuse for primary of TR1
R1F	feedback resistance for circuit 1	F7B	fuse for secondary of TR1
R3T	sensor for evaporator inlet water temperature	F8B	fuse for EEV Driver
R4T	sensor for evaporator outlet water temperature circuit 1	F9B	fuse for secondary of TR2
R5T	sensor for ambient temperature	F12B	fuse for fanmotors circuit 1
R8T	sensor for evaporator outlet water temperature DICN	F8U	surge proof fuse for A1P
R9T	temperature sensor EEV for circuit 1 (A2P)	F1R	fuses for reverse phase protector circuit 1
Q1M	thermal protector compressor motor circuit 1	F1U, F2U, F3U #	main fuses
Q11F-Q13F	thermal protector fan motors circuit 1	E3H	evaporator heater circuit 1
PE	main earth terminal	E1HC	crankcase heater compressor circuit 1
R1P	reverse phase protector circuit 1	B3P	low pressure transmitter EEV for circuit 1 (A2P)
M1S	stepless capacity ctrl for compressor circuit 1	B2P	high pressure transmitter for circuit 1
R1	auxiliary resistance for feedback	B1P	low pressure transmitter for circuit 1
M11F-M13F	fan motors circuit 1	A2P	PCB-EEV Driver circuit1
K7F,K8F,K9F	fancontactor for circuit1	A1P	PCB-controller
M1C	compressor motor circuit 1	A1 **	current transfo / A-meter for circuit 1
K7A	auxiliary relay for safety High Pressure circuit 1		

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input	Digital output
J1-G: 24Vac	J11-TX-	J2 (B1-VDC): High pressure C1	J4 (VG0-Y1): Ctrl motor loadup C1	J5 (ID1-IDC1): High pressure switch C1	J12 (C1-NO1): Compr star C1
J1-G0: Reference (GND)	J11-TX+	J2 (B2-VDC): Low pressure C1	J4 (VG0-Y2): Ctrl motor loaddown C1	J5 (ID2-IDC1): Reverse phase protector C1	J12 (C1-NO2): Compr delta C1
	J11-GND	J2 (B3-GND): Changeable AI 1		J5 (ID3-IDC1): Overcurrent relay C1	J12 (C1-NO3): Compr on C1
		J3 (B4-BC4): Evap Inlet water sensor		J5 (ID4-IDC1): Discharge thermal prot C1	J13 (C4-NO4): 12 C1
		J3 (B5-BC5): Evap mixed outlet water C1		J5 (ID5-IDC1): Compr thermal prot C1	J13 (C4-NO5): --
		J6 (B6-GND): Condenser Inlet sensor		J5 (ID6-IDC1): Emergency stop	J13 (C4-NO6): --
		J6 (B7-VDC): Capacity feedback of C1		J5 (ID7-IDC1): Flowswitch C1	J14 (C7-NO7): Alarm
				J5 (ID8-IDC1): Changeable DI 1	J15 (C8-NO8): Pump
				J7 (ID9-IDC9): Changeable DI 2	J16 (C9-NO9): --
				J7 (ID10-IDC9): Changeable DI 3	J17 (C12-NO12): Changeable DO1
				J7 (ID11-IDC9): Changeable DI 4	J18 (C13-NO13): Changeable DO2

Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable analog input AI 1	Overview of changeable digital outputs DO 1-2
J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)	J17 (C12-NO12): J18 (C13-NO13): 2nd evaporator pump / Condenser pump / 100 capacity / reversing valve / general operation

3.14 Wiring Diagram: EWWD360~540MBYNN

Diagram



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

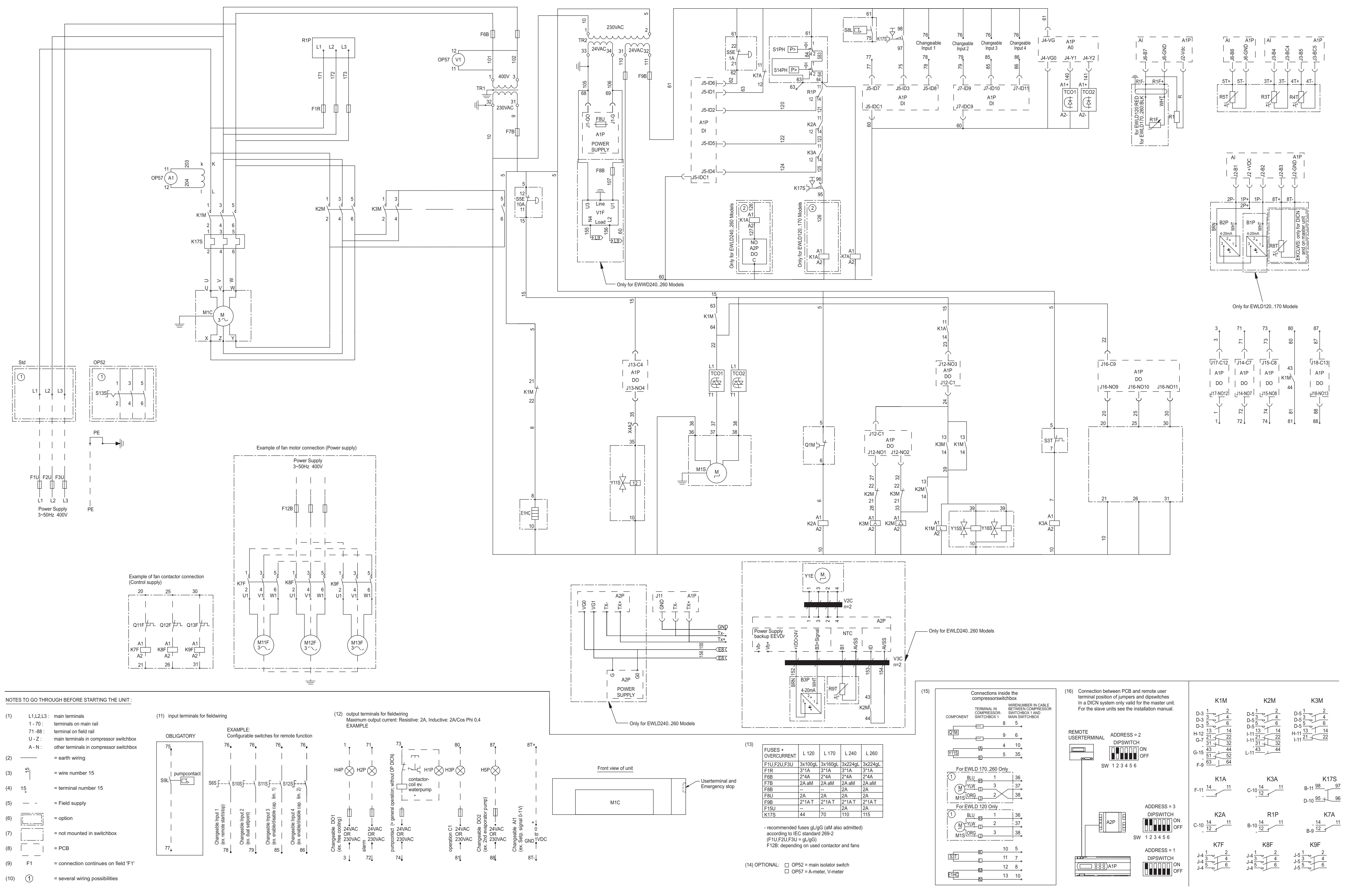
No.	Function / remark	No.	Function / remark
Y1E, Y2E	electronic expansion valve circuit 1, circuit 2	K7A, K8A	auxiliary relay for safety High Pressure circuit 1, circuit 2
Y11S, Y21S	12% capacity step for compressor circuit 1, circuit 2	K1A, K4A	auxiliary relay for safeties circuit 1, circuit 2
Y15S, Y25S	liquid injection valve of the compressor circuit 1, circuit 2	K17S, K18S	overcurrent relay for circuit 1, circuit 2
X2A, X3A, X4A	Connector 24,20,16pole to Main Switchbox	K9F, K12F	fancontactor for circuit 1, circuit 2
V2C-V5C	ferrite for EEV	K8F, K11F	fancontactor for circuit 1, circuit 2
V1F	filter for EEV	K7F, K10F	fancontactor for circuit 1, circuit 2
V1 **	V-meter for circuit 1-2	K1M, K4M	linecontactor for circuit 1, circuit 2
TR1	transfo control circuit	K2M, K5M	deltacontactor for circuit 1, circuit 2
TR2	transfo supply controller + digital inputs	K3M, K6M	starcontactor for circuit1, circuit 2
TC01..TCO4	optocoupler (Analog to Digital signal)	J1	power supply
S14PH, S15PH	high pressure switch circuit 1, circuit 2	J4	analogue output
S6S, S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable / disable cap. lim. 1 /2 / 3 / 4)	J2, J3, J6, J20	analogue input
		J5, J7, J8, J19	digital input
S14PH, S15PH	high pressure switch circuit 1, circuit 2	J11, J23	RS485 connection
S13S ##	main isolator switch	J12..J18	digital output
S9L, S11L #	contact that closes if the pump is working	J21, J22	digital output
S8L, S10L	flowswitch circuit 1, circuit 2	H5P, H6P *	changeable output
S5E	emergency stop push button	H4P *	indication lamp operation compressor 2
S3T,S4T	discharge thermal protector circuit 1, circuit 2	H3P *	indication lamp operation compressor 2
S1PH, S2PH	high pressure switch circuit 1, circuit 2	H2P *	indication lamp alarm
R9T, R10T	temperature sensor EEV for circuit 1 (A2P), circuit 2 (A3P)	H1P *	indication lamp general operation
R1F, R2F	feedback resistance for circuit 1, circuit 2	F12B, F13B	fuse for fanmotors circuit 1, circuit 2
R8T	sensor for evaporator outlet water temperature DICN	F10S, F11S	circuit breakers with fuses for circuit 1, circuit 2
R7T	sensor for mixed outlet water temperature	F9B	fuse for secondary of TR2
R6T	sensor for evaporator outlet water temperature circuit 2	F8U	surge proof fuse for A1P
R5T	sensor for ambient temperature	F8B	fuse for EEV Driver
R4T	sensor for evaporator outlet water temperature circuit 1	F7B	fuse for secondary of TR1
R3T	sensor for evaporator inlet water temperature	F6B	fuse for primary of TR1
R1P, R2P	reverse phase protector circuit 1, circuit2	F1R, F2R	fuses for reverse phase protector circuit 1, circuit 2
R9T, R10T	temperature sensor EEV for circuit 1 (A2P), circuit 2 (A3P)	F21U..F23U #	main fuses
R1, R2	auxiliary resistance for feedback	F11U..F13U #	main fuses
Q1M, Q2M	thermal protector compressor motor circuit 1, circuit 2	F1U, F2U, F3U #	main fuses
Q21F-Q26F	thermal protectors fan motors circuit 2	E1HC, E2HC	crankcase heater compressor circuit 1, circuit 2
Q11F-Q16F	thermal protectors fan motors circuit 1	C11, C21	capacitor for capacity control
PE	main earth terminal	B3P, B6P	low pressure transmitter for circuit 1 (A2P), circuit 2 (A3P)
M1S, M2S	stepless capacity ctrl for compressor circuit 1, circuit 2	B2P, B5P	high pressure transmitter for circuit 1, circuit 2
M1C, M2C	compressor motors circuit 1, circuit 2	B1P, B4P	low pressure transmitter for circuit 1, circuit 2
M21F-M26F	fan motors circuit 2	A11P	expansion board controller
M11F-M16F	fan motors circuit 1	A2P, A3P	PCB-EEV Driver circuit1, circuit 2
K2A, K5A	auxiliary relay compressor thermal protector circuit 1, circuit2	A1P	PCB-controller
K3A, K6A	auxiliary relay for discharge thermal protector circuit 1, circuit 2	A1, A2 **	current transfo / A-meter for circuit 1, circuit 2

Power supply	RS485 connection	(Expansion board A11P)	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	**Power supply:** J1-G: 24Vac J1-G0: Reference (GND) **Digital output:** J4 (ID1-IDC1): Flowswitch C2 **Analogue input:** J9 (B1-GND): Capacity feedback of C1 J9 (B2-GND): Capacity feedback of C2	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap mixed outlet water t° J6 (B6-GND): Cond Inletwater sensor J6 (B7-VDC): High pressure C2 J6 (B8-VDC): Low pressure C2 J20 (B9-BC9): Evap Outlet water sensor C1 J20 (B10-BC10: Evap Outlet water sensor C2	J4 (VG0-Y1): loadup ctrl motor C1 J4 (VG0-Y2): loaddown ctrl motor C1 J4 (VG0-Y3): loadup ctrl motor C2 J4 (VG0-Y4): loaddown ctrl motor C2	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): High pressure switch C2 J8 (ID13-IDC13): Reverse phase protector C2 J8 (ID14-IDC13): Overcurrent relay C2 J19 (ID15-IDC15): Discharge thermal prot C2 J19 (ID16-IDC15): Compr thermal prot C2

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO1-2	Overview of changeable analog input AI 1:
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): -- J16 (C9-NO10): -- J16 (C9-NO11): -- J17 (C12-NO12): Changeable DO 1 J18 (C13-NO13): Changeable DO 2 J21 (C14-NO14): Compr star C2 J21 (C15-NO15): Compr delta C2 J22 (C16-NO16): Compr on C2 J22 (C16-NO17): 12 C2 J22 (C16-NO18): --	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J17 (C12-NO12): J18 (C13-NO13): 2nd evaporator pump / condenser pump / general operation / 100 capacity / reversing valve	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.15 Wiring Diagram: EWLD120~260MBYNN

Diagram



(13)

FUSES + OVERCURRENT	L 120	L 170	L 240	L 260
F1U,F2U,F3U	3x100gL	3x160gL	3x224gL	3x224gL
F1R	3*1A	3*1A	3*1A	3*1A
F6B	2*4A	2*4A	2*4A	2*4A
F7B	2A aM	2A aM	2A aM	2A aM
F8B	--	--	2A	2A
F8U	2A	2A	2A	2A
F9B	2*1A T	2*1A T	2*1A T	2*1A T
F15U	--	--	2A	2A
K17S	44	70	110	115

- recommended fuses gL/gG (aM also admitted) according to IEC standard 269-2 (F1U,F2U,F3U = gL/gG) F12B: depending on used contactor and fans

(14) OPTIONAL:
- ☐ OP52 = main isolator switch
- ☐ OP57 = A-meter, V-meter

	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

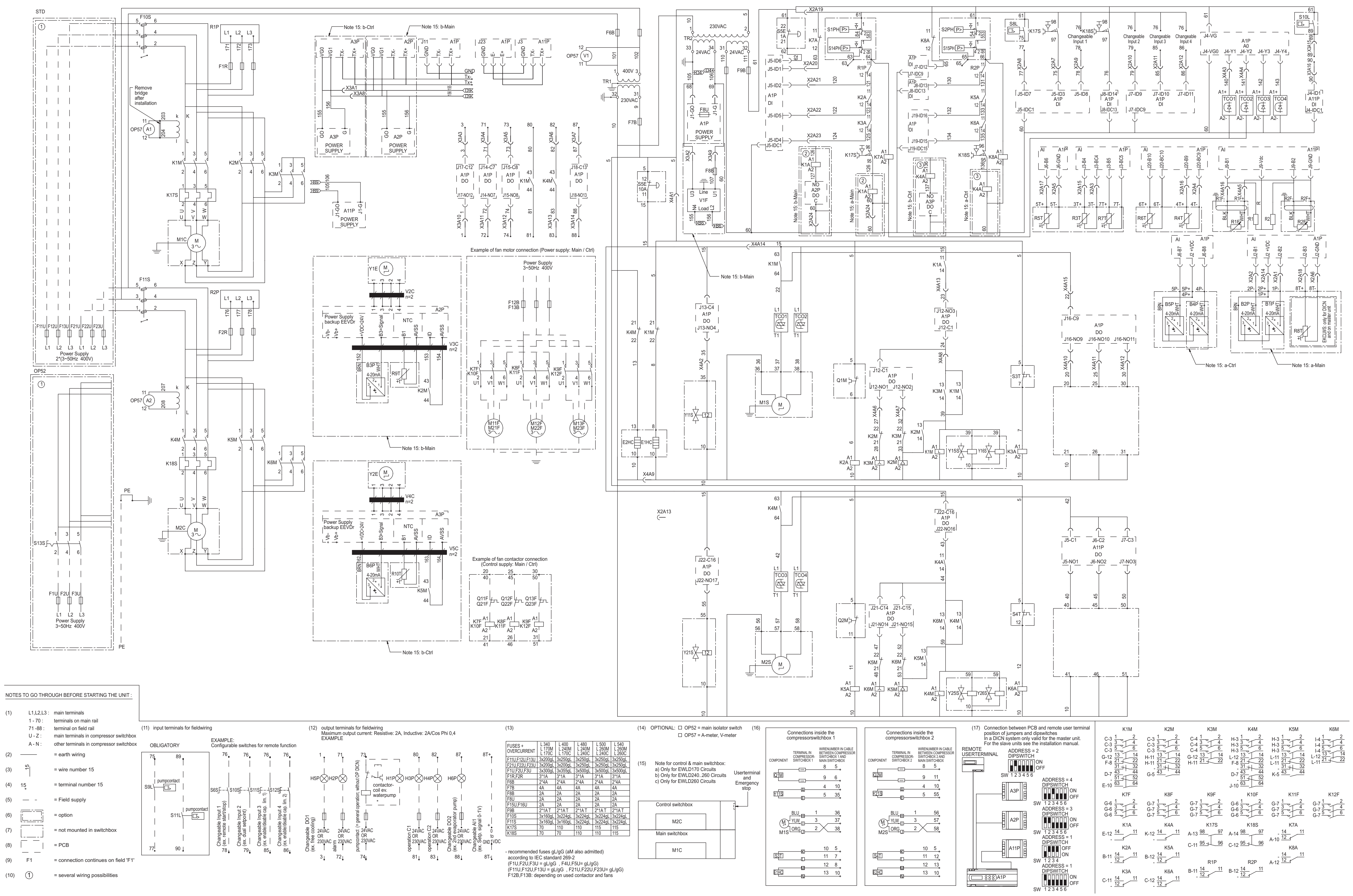
No.	Function / remark	No.	Function / remark
Y1E	electronic expansion valve circuit 1	K7A	auxiliary relay for safety High Pressure circuit 1
Y11S	12% capacity step for compressor circuit 1	K1A	auxiliary relay for safeties circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K2A	auxiliary relay compressor thermal protector circuit 1
Y16S	liquid line solenoid valve circuit 1	K3A	auxiliary relay for discharge thermal protector circuit 1
V2C, V3C	ferrite for EEV	K17S	overcurrent relay for circuit 1
V1F	filter for EEV	K1M	linecontactor for circuit 1
V1 **	V-meter for circuit 1	K2M	deltacontactor for circuit 1
TR1	transfo control circuit	K3M	starcontactor for circuit1
TR2	transfo supply controller + digital inputs	J1	power supply
TCO1, TCO2	optocoupler (Analog to Digital signal)	J2, J3, J6	analogue input
S1PH	high pressure switch circuit 1	J4	analogue input
S14PH	high pressure switch circuit 1	J5, J7, J8	digital input
S13S ##	main isolator switch	J11	RS485 connection
S5E	emergency stop push button	J12, J13, J14, J15	digital output
S8L	flowswitch circuit 1	J16, J17, J18	
S9L #	contact that closes if the pump is working	H1P *	indication lamp general operation
S3T	discharge thermal protector circuit 1	H2P *	indication lamp alarm
S6S, S10S * S11S, S12S	configurable switch for remote function (rem. start-stop, dual setpoint, enable/disable cap. lim. 1 / 2 / 3 / 4)	H3P *	indication lamp operation compressor 1
		H4P, H5P *	changeable output
R1	auxiliary resistance for feedback	F6B	fuse for primary of TR1
R1F	feedback resistance for circuit 1	F7B	fuse for secondary of TR1
R3T	sensor for evaporator inlet water temperature	F8B	fuse for EEV Driver
R4T	sensor for evaporator outlet water temperature circuit 1	F9B	fuse for secondary of TR2
R5T	sensor for ambient temperature	F12B	fuse for fanmotors circuit 1
R8T	sensor for evaporator outlet water temperature DICN	F8U	surge proof fuse for A1P
R9T	temperature sensor EEV for circuit 1 (A2P)	F1R	fuses for reverse phase protector circuit 1
Q1M	thermal protector compressor motor circuit 1	F1U, F2U, F3U #	main fuses
Q11F-Q13F	thermal protector fan motors circuit 1	E1HC	crankcase heater compressor circuit 1
PE	main earth terminal	B3P	low pressure transmitter EEV for circuit 1 (A2P)
R1P	reverse phase protector circuit 1	B2P	high pressure transmitter for circuit 1
M1S	stepless capacity ctrl for compressor circuit 1	B1P	low pressure transmitter for circuit 1
M11F-M13F	fan motors circuit 1	A2P	PCB-EEV Driver circuit1
K7F, K8F, K9F	fancontactor for circuit1	A1P	PCB-controller
M1C	compressor motor circuit 1	A1 **	current transfo / A-meter for circuit 1

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input	Digital output
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap mixed outlet water C1 J6 (B6-GND): Ambient sensor J6 (B7-VDC): Capacity feedback of C1	J4 (VG0-Y1): Ctrl motor loadup C1	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch C1 J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4	J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): --

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable analog input AI 1	Overview of changeable digital outputs DO 1-2
J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NO12): Changeable DO1 J18 (C13-NO13): Changeable DO2	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1)	J17 (C12-NO12): J18 (C13-NO13): 2nd evaporator pump / Condenser pump / 100 capacity / reversing valve / general operation

3.16 Wiring Diagram: EWLD340~540MBYNN

Diagram



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

No.	Function / remark	No.	Function / remark
Y11S, Y21S	12% capacity step for compressor circuit 1, circuit 2	K1A, K4A	auxiliary relay for safeties circuit 1, circuit 2
Y15S, Y25S	liquid injection valve of the compressor circuit 1, circuit 2	K17S, K18S	overcurrent relay for circuit 1, circuit 2
Y16S, Y26S	liquid line solenoid valve circuit 1, circuit 2	K9F, K12F	fancontactor for circuit 1, circuit 2
Y1E,Y2E	electronic expansion valve circuit 1, circuit 2	K8F, K11F	fancontactor for circuit 1, circuit 2
X2A,X3A,X4A	Connector 24,20,16pole to Main Switchbox	K7F, K10F	fancontactor for circuit 1, circuit 2
V2C-V5C	ferrite for EEV	K3M, K6M	starcontactor for circuit1, circuit 2
V1F	filter for EEV	K1M, K4M	linecontactor for circuit 1, circuit 2
V1 **	V-meter for circuit 1-2	K2M, K5M	deltacontactor for circuit 1, circuit 2
TR1	transfo control circuit	J12..J18	digital output
TR2	transfo supply controller + digital inputs	J21,J22	digital output
TC01..TCO4	optocoupler (Analog to Digital signal)	J5,J7,J8,J19	digital input
S14PH, S15PH	high pressure switch circuit 1, circuit 2	J4	analogue output
S13S ##	main isolator switch	J2,J3,J6,J20	analogue input
S8L, S10L	flowswitch circuit 1, circuit 2	J11,J23	RS485 connection
S9L, S11L #	contact that closes if the pump is working	J1	power supply
S6S, S10S * S11S, S12S	configurable switch for remote function (rem. start-stop, dual setpoint, enable/disable cap. lim. 1 / 2 / 3 / 4)	H1P *	indication lamp general operation
		H2P *	indication lamp alarm
S5E	emergency stop push button	H3P *	indication lamp operation compressor 1
S3T, S4T	discharge thermal protector circuit 1, circuit 2	H4P *	indication lamp operation compressor 2
S1PH, S2PH	high pressure switch circuit 1, circuit 2	H5P, H6P*	changeable output
R3T	sensor for evaporator inlet water temperature	F12B, F13B	fuse for fanmotors circuit 1, circuit 2
R4T	sensor for evaporator outlet water temperature circuit 1	F10S, F11S	circuit breakers with fuses for circuit 1, circuit 2
R5T	sensor for ambient temperature	F9B	fuse for secondary of TR2
R6T	sensor for evaporator outlet water temperature circuit 2	F8U	surge proof fuse for A1P
R7T	sensor for mixed outlet water temperature	F8B	fuse for EEV Driver
R8T	sensor for evaporator outlet water temperature DICN	F7B	fuse for secondary of TR1
R9T, R10T	temperature sensor EEV for circuit 1 (A2P), circuit 2 (A3P)	F6B	fuse for primary of TR1
R1P, R2P	reverse phase protector circuit 1, circuit 2	F1U, F2U, F3U #	main fuses
R1F, R2F	feedback resistance for circuit 1, circuit 2	F4U, F5U #	fuses for evaporator heater circuit 1, circuit 2
R1, R2	auxiliary resistance for feedback	F11U..F13U #	main fuses
Q1M, Q2M	thermal protector compressor motor circuit 1, circuit 2	F21U..F23U #	main fuses
Q21F-Q24F	thermal protectors fan motors circuit 2	F1R,F2R	fuses for reverse phase protector circuit 1, circuit 2
Q11F-Q16F	thermal protectors fan motors circuit 1	E1HC, E2HC	crankcase heater compressor circuit 1, circuit 2
PE	main earth terminal	C11,C21	capacitor for capacity control
M1S, M2S	stepless capacity ctrl for compressor circuit 1, circuit 2	B1P, B4P	low pressure transmitter for circuit 1, circuit 2
M1C, M2C	compressor motor circuit 1, circuit 2	B2P, B5P	high pressure transmitter for circuit 1, circuit 2
M21F-M26F	fan motors circuit 2	B3P,B6P	low pressure transmitter for circuit 1 (A2P), circuit 2 (A3P)
M11F-M16F	fan motors circuit 1	A1P	PCB-controller
K7A, K8A	auxiliary relay for safety High Pressure circuit 1, circuit 2	A1,A2 **	current transfo / A-meter for circuit 1, circuit 2
K3A, K6A	auxiliary relay for discharge thermal protector circuit 1, circuit 2	A2P,A3P	PCB-EEV Driver circuit1, circuit 2

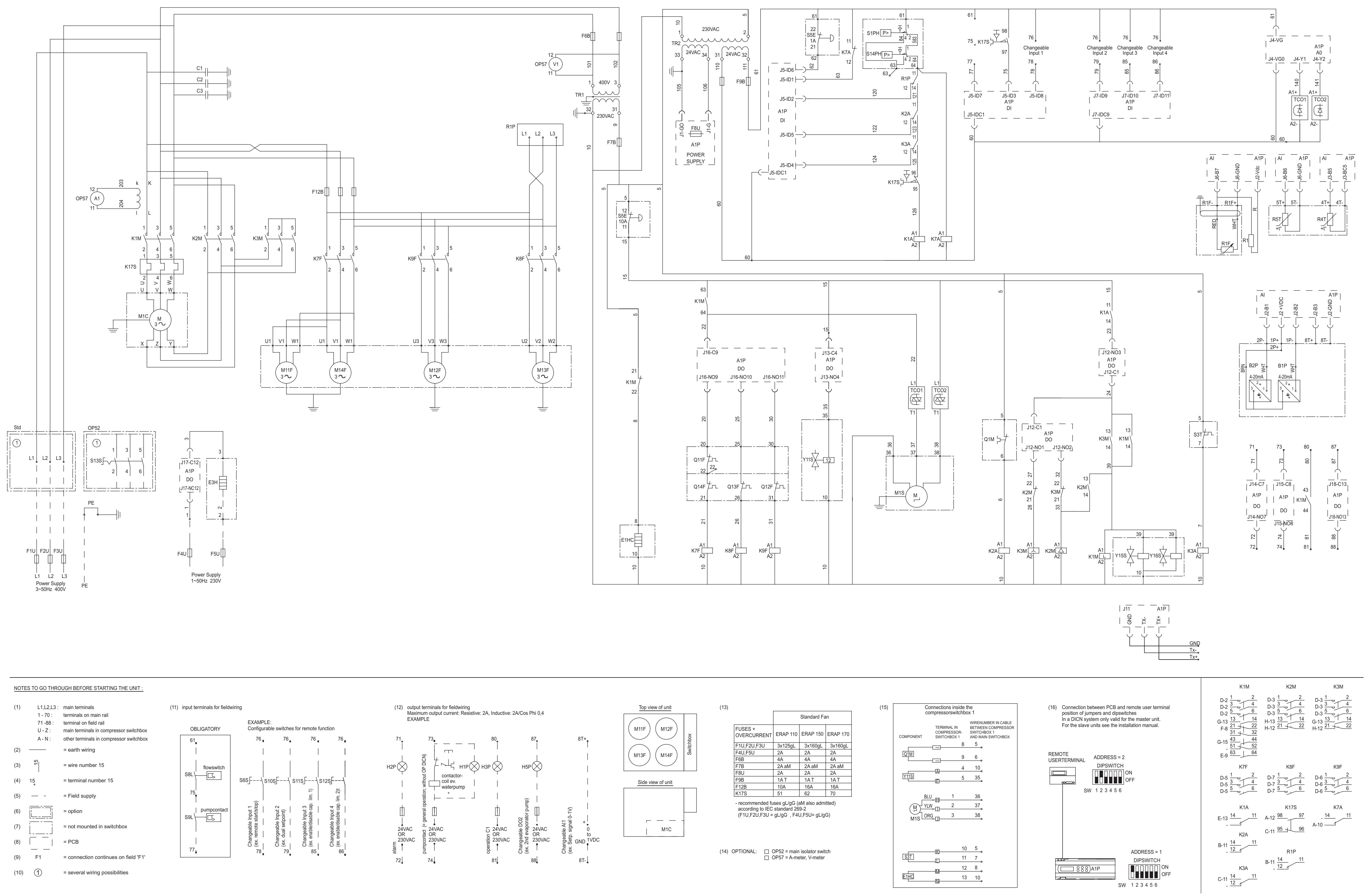
No.	Function / remark	No.	Function / remark
K2A, K5A	auxiliary relay compressor thermal protector circuit 1, circuit2	A11P	expansion board controller

Power supply	RS485 connection	(Expansion board A11P)	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	**Power supply:** J1-G: 24Vac J1-G0: Reference (GND) **Digital output:** J4 (ID1-IDC1): Flowswitch C2 J5 (C1-NO1): Fanstep 1 of C2 J6 (C2-NO2): Fanstep 2 of C2 J7 (C3-NO3): Fanstep 3 of C2 **Analogue input:** J9 (B1-GND): Capacity feedback of C1 J9 (B2-GND): Capacity feedback of C2	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI 1 J3 (B4-BC4): Evap Inlet water sensor J3 (B5-BC5): Evap mixed outlet water t° J6 (B6-GND): Ambient sensor J6 (B7-VDC): High pressure C2 J6 (B8-VDC): Low pressure C2 J20 (B9-BC9): Evap Outlet water sensor C1 J20 (B10-BC10: Evap Outlet water sensor C2	J4 (VG0-Y1): loadup ctrl motor C1 J4 (VG0-Y2): loaddown ctrl motor C1 J4 (VG0-Y3): loadup ctrl motor C2 J4 (VG0-Y4): loaddown ctrl motor C2	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): High pressure switch C2 J8 (ID13-IDC13): Reverse phase protector C2 J8 (ID14-IDC13): Overcurrent relay C2 J19 (ID15-IDC15): Discharge thermal prot C2 J19 (ID16-IDC15): Compr thermal prot C2

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable digital outputs DO1-2	Overview of changeable analog input AI 1:
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO 1: Evap. heatertape J18 (C13-NO13): Changeable DO 2 J21 (C14-NO14): Compr star C2 J21 (C15-NO15): Compr delta C2 J22 (C16-NO16): Compr on C2 J22 (C16-NO17): 12 C2 J22 (C16-NO18): --	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable/disable capacity limitation 1-2-3-4	J17 (C12-NO12): J18 (C13-NO13): 2nd evaporator pump / General operation / 100 capacity / free cooling	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave1) / Evap. Outlet water sensor DICN (only Master)

3.17 Wiring Diagram: ERAP110~170MBYNN

Diagram



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

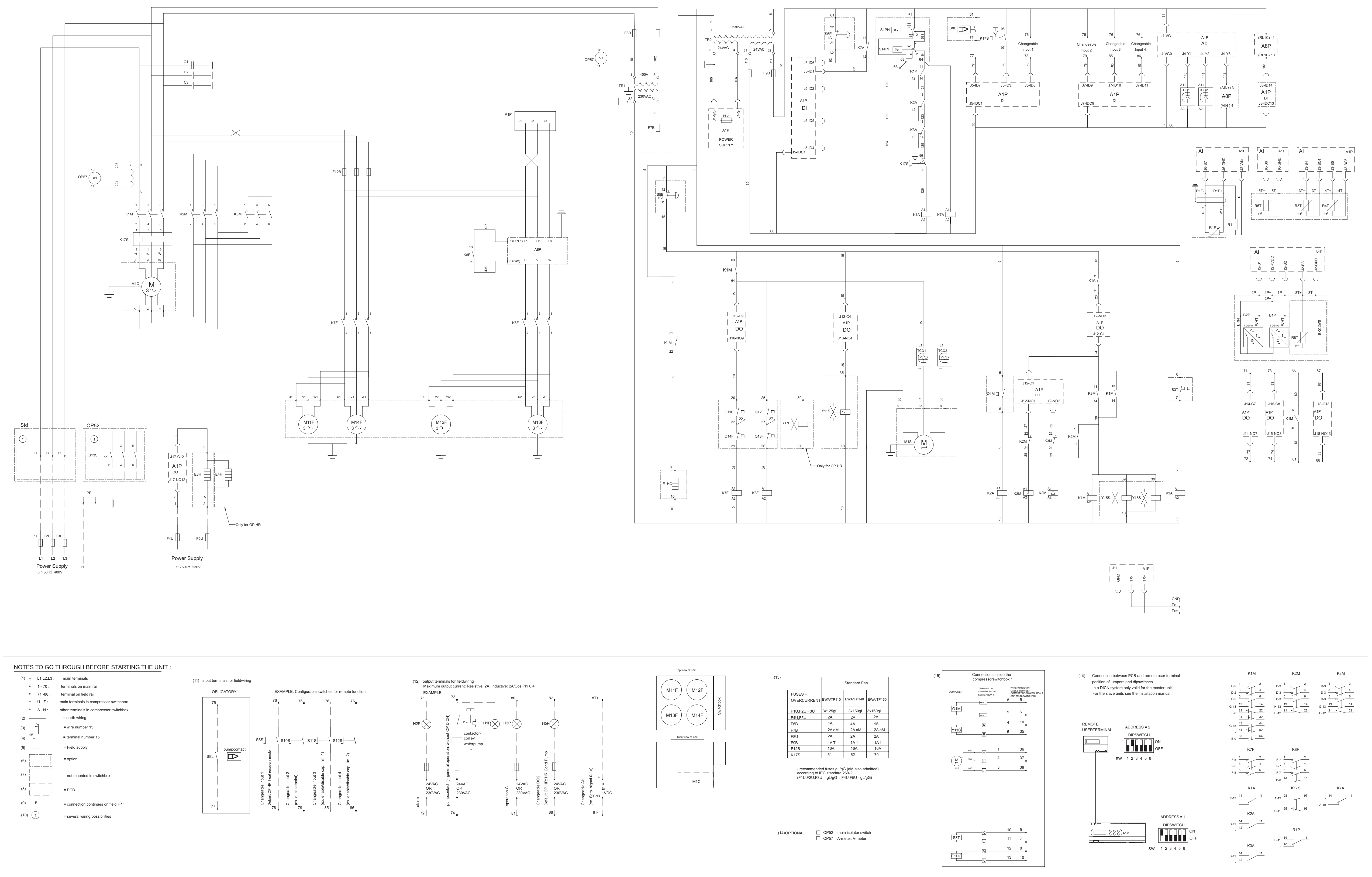
No.	Function / remark	No.	Function / remark
Y11S	12% capacity step for compressor circuit 1	K3A	auxiliary relay for discharge thermal protector circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K17S	overcurrent relay for circuit 1
Y16S	liquid line solenoid valve circuit 1	K1M	linecontactor for circuit 1
V1 **	V-meter for circuit 1	K2M	deltacontactor for circuit 1
TR1	transfo control circuit	K3M	starcontactor for circuit1
TR2	transfo supply controller + digital inputs	J1	power supply
TCO1,TCO2	optocoupler (Analog to Digital signal)	J2, J3, J6	analogue input
S1PH	high pressure switch circuit 1	J4	analogue input
S14PH	high pressure switch circuit 1	J5, J7, J8	digital input
S13S ##	main isolator switch	J11	RS485 connection
S5E	emergency stop push button	J12,J13,J14,J15 J16,J17,J18	digital output
S8L	flowswitch circuit 1		
S9L #	contact that closes if the pump is working	H1P *	indication lamp general operation
S3T	discharge thermal protector circuit 1	H2P *	indication lamp alarm
S6S, S10S * S11S, S12S	configurable switch for remote function (rem. start-stop, dual setpoint, enable / disable cap. lim. 1 / 2 / 3 / 4)	H3P *	indication lamp operation compressor 1
		H5P *	changeable output
R1	auxiliary resistance for feedback	F6B	fuse for primary of TR1
R1F	feedback resistance for circuit 1	F7B	fuse for secondary of TR1
R4T	sensor for evaporator outlet water temperature circuit 1	F9B	fuse for secondary of TR2
R5T	sensor for ambient temperature	F12B	fuse for fanmotors circuit 1
Q1M	thermal protector compressor motor circuit 1	F8U	surge proof fuse for A1P
Q11F-Q14F	thermal protector fan motors circuit 1	F1U, F2U, F3U #	main fuses
PE	main earth terminal	F4U,F5U #	fuses for evaporator heater
R1P	reverse phase protector circuit 1	C1..C3	capacitor
M1S	stepless capacity ctrl for compressor circuit 1	E1HC	crankcase heater compressor circuit 1
M11F-M14F	fan motors circuit 1	E3H *	evaporator heater circuit 1
K7F,K8F,K9F	fancontactor for circuit1	B2P	high pressure transmitter for circuit 1
M1C	compressor motor circuit 1	B1P	low pressure transmitter for circuit 1
K7A	auxiliary relay for safety High Pressure circuit 1	A2P	PCB-EEV Driver circuit1
K1A	auxiliary relay for safeties circuit 1	A1P	PCB-controller
K2A	auxiliary relay compressor thermal protector circuit 1	A1 **	current transfo / A-meter for circuit 1

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): -- J3 (B5-BC5): Thermostat sensor J6 (B6-GND): Ambient J6 (B7-VDC): Capacity feedback of C1 J6 (B8-VDC): --	J4 (VG0-Y1): Ctrl motor loadup C1 J4 (VG0-Y2): Ctrl motor Loaddown C1	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Interlock air / water flow J5 (ID8-IDC1): Changeable DI 1 J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI4 J7 (ID12-IDC9): -- J8 (ID13-IDC13): -- J8 (ID14-IDC13): --

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable analog input AI 1	Overview of changeable digital outputs DO2
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Air/water flowcontact J16 (C9-NO9): Fanstep 1 of C1 J16 (C9-NO10): Fanstep 2 of C1 J16 (C9-NO11): Fanstep 3 of C1 J17 (C12-NC12): Ch. DO1: Evap. heatertape J18 (C13-NO13): Changeable DO2	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4	J2 (B3-GND): Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA	J18 (C13-NO13): 2nd evaporator pump / General operation / 100 capacity

3.18 Wiring Diagram: EWTP110~160MBYNN

Diagram



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

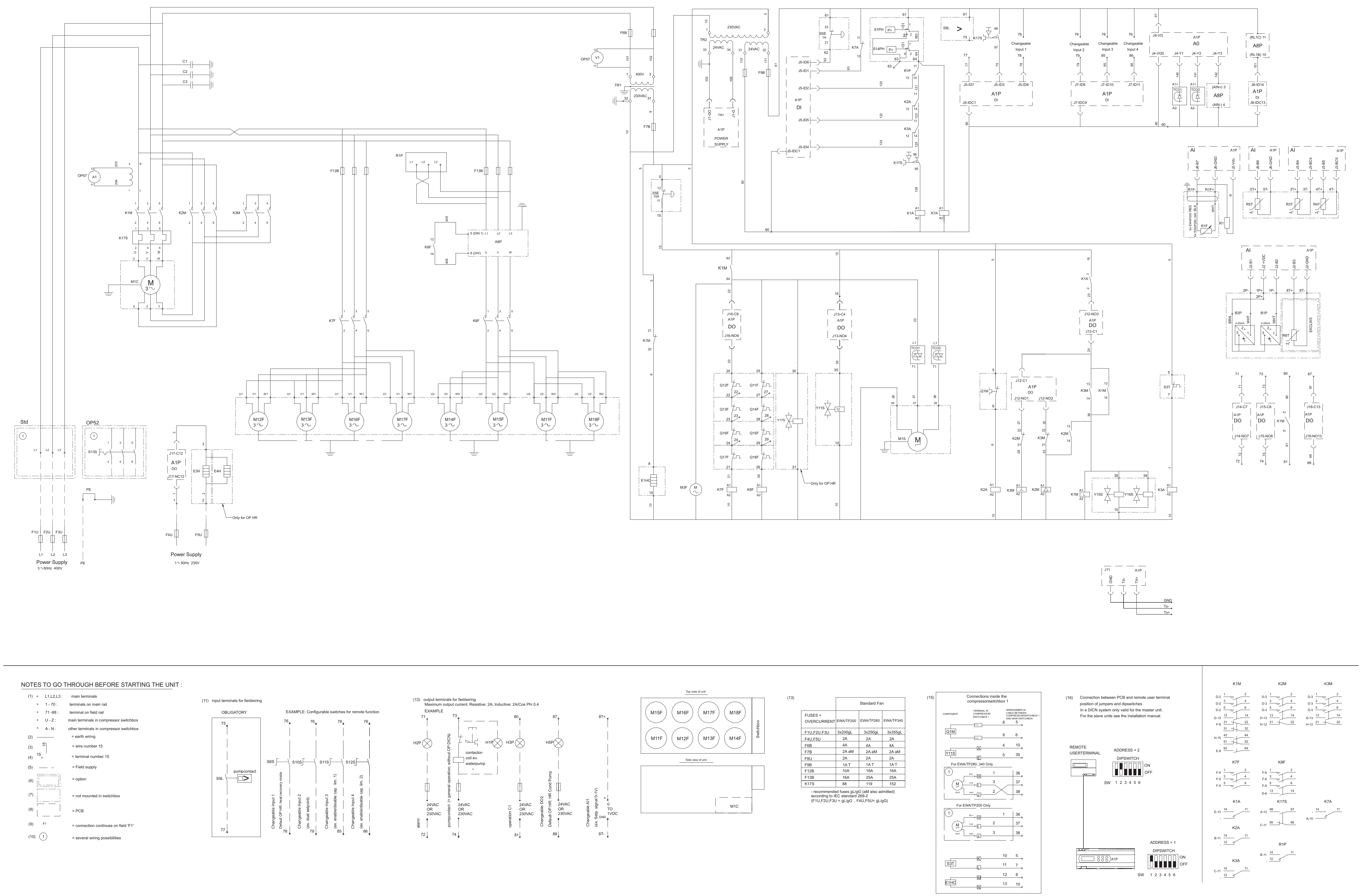
No.	Function / remark	No.	Function / remark
Y11S	12% capacity step for compressor circuit 1	K7A	auxiliary relay for safety High Pressure circuit 1
Y15S	liquid injection valve of the compressor circuit 1	K1A	auxiliary relay for safeties circuit 1
Y16S	liquid line solenoid valve circuit 1	K2A	auxiliary relay compressor thermal protector circuit 1
Y17S	economizer valve circuit 1	K3A	auxiliary relay for discharge thermal protector circuit 1
V1 **	V-meter for circuit 1	K17S	overcurrent relay for circuit 1
TR1	transfo control circuit	K1M	linecontactor for circuit 1
TR2	transfo supply controller + digital inputs	K2M	deltacontactor for circuit 1
TCO1,TCO2	optocoupler (Analog to Digital signal)	K3M	starcontactor for circuit1
S1PH	high pressure switch circuit 1	J1	power supply
S14PH	high pressure switch circuit 1	J2, J3, J6	analogue input
S13S ##	main isolator switch	J4	analogue output
S5E	emergency stop push button	J5, J7, J8	digital input
S8L	flowswitch	J11	RS485 connection
S9L #	contact that closes if the pump is working	J12,J13,J14,J15	digital output
S3T	discharge thermal protector circuit 1	J16,J17,J18	
S10S *	changeable switch for remote function	H1P *	indication lamp general operation
S11S, S12S	(rem. start-stop, dual setpoint, enable/disable cap. lim. 1/2/3/4)	H2P *	indication lamp alarm
S6S	switch for heatrecovery mode (only for OP HR)	H3P *	indication lamp operation compressor 1
R1	auxiliary resistance for feedback	H5P *	changeable output
R1F	feedback resistance for circuit 1	F6B	fuse for primary of TR1
R3T	sensor for evaporator inlet water temperature	F7B	fuse for secondary of TR1
R4T	sensor for evaporator outlet water temperature circuit 1	F9B	fuse for secondary of TR2
R5T	sensor for ambient temperature	F12B	fuse for fanmotors circuit 1
R8T **	temperature sensor with changeable function sensor for evaporator outlet water temperature	F8U	surge proof fuse for A1P
	DICN OR sensor for HR condenser water temperature	F1U, F2U, F3U #	main fuses
Q1M	thermal protector compressor motor circuit 1	F4U,F5U #	fuses for evaporator heater
Q11F-Q14F	thermal protector fan motors circuit 1	C1..C3	capacitor
PE	main earth terminal	E1HC	crankcase heater compressor circuit 1
R1P	reverse phase protector circuit 1	E3H, E4H	evaporator, condenser heater circuit 1
M1S	stepless capacity ctrl for compressor circuit 1	B2P	high pressure transmitter for circuit 1
M11F-M14F	fan motors circuit 1	B1P	low pressure transmitter for circuit 1
K7F	fancontactor for circuit 1 (On / Off)	A8P	frequency inverter circuit 1
K8F	fancontactor for circuit 1 (Inverter)	A1P	PCB-controller
M1C	compressor motor circuit 1	A1 **	current transfo / A-meter for circuit 1

Power supply	RS485 connection	Analogue input	Analogue output (Converted to digital outputs = DO)	Digital input
J1-G: 24Vac J1-G0: Reference (GND)	J11-TX- J11-TX+ J11-GND	J2 (B1-VDC): High pressure C1 J2 (B2-VDC): Low pressure C1 J2 (B3-GND): Changeable AI1 J3 (B4-BC4): Evap inlet water sensor J3 (B5-BC5): Thermostat sensor C1 J6 (B6-GND): Ambient J6 (B7-VDC): Capacity feedback of C1 J6 (B8-VDC): --	J4 (VG0-Y1): Ctrl motor loadup C1 J4 (VG0-Y2): Ctrl motor Loaddown C1 J4 (VG0-Y3): Fanstep inv C1	J5 (ID1-IDC1): High pressure switch C1 J5 (ID2-IDC1): Reverse phase protector C1 J5 (ID3-IDC1): Overcurrent relay C1 J5 (ID4-IDC1): Discharge thermal prot C1 J5 (ID5-IDC1): Compr thermal prot C1 J5 (ID6-IDC1): Emergency stop J5 (ID7-IDC1): Flowswitch J5 (ID8-IDC1): Changeable DI 1: OP HR = Heat recovery mode J7 (ID9-IDC9): Changeable DI 2 J7 (ID10-IDC9): Changeable DI 3 J7 (ID11-IDC9): Changeable DI 4 J7 (ID12-IDC9): -- J8 (ID13-IDC13): -- J8 (ID14-IDC13): Fanstep inv C1 error

Digital output	Overview of changeable digital inputs DI 1-2-3-4	Overview of changeable analog input AI 1	Overview of changeable digital outputs DO2
J12 (C1-NO1): Compr star C1 J12 (C1-NO2): Compr delta C1 J12 (C1-NO3): Compr on C1 J13 (C4-NO4): 12 C1 J13 (C4-NO5): -- J13 (C4-NO6): -- J14 (C7-NO7): Alarm J15 (C8-NO8): Pump J16 (C9-NO9): Fanstep on-off of C1 J16 (C9-NO10): -- J16 (C9-NO11): -- J17 (C12-NC12): Ch. DO1: Evap. heatertape J18 (C13-NO13): Changeable DO2: OP HR = Heat Cond Pump	J5 (ID8-IDC1): J7 (ID9-IDC9): J7 (ID10-IDC9): J7 (ID11-IDC9): Dual setpoint / Remote On -Off / enable / disable capacity limitation 1-2-3-4 / Low noise	J2 (B3-GND): HR Cond. water temp. sensor / Setp Signal 0-1V / 0-10V / 0-20mA / 4-20mA (only standalone unit or Slave 1) / Evap. Outlet water sensor DICN (only Master)	J18 (C13-NO13): HR Condenser pump / 2nd evaporator pump / General operation / 100 % capacity / Free Cooling

3.19 Wiring Diagram: EWTP200~340MBYNN

Diagram



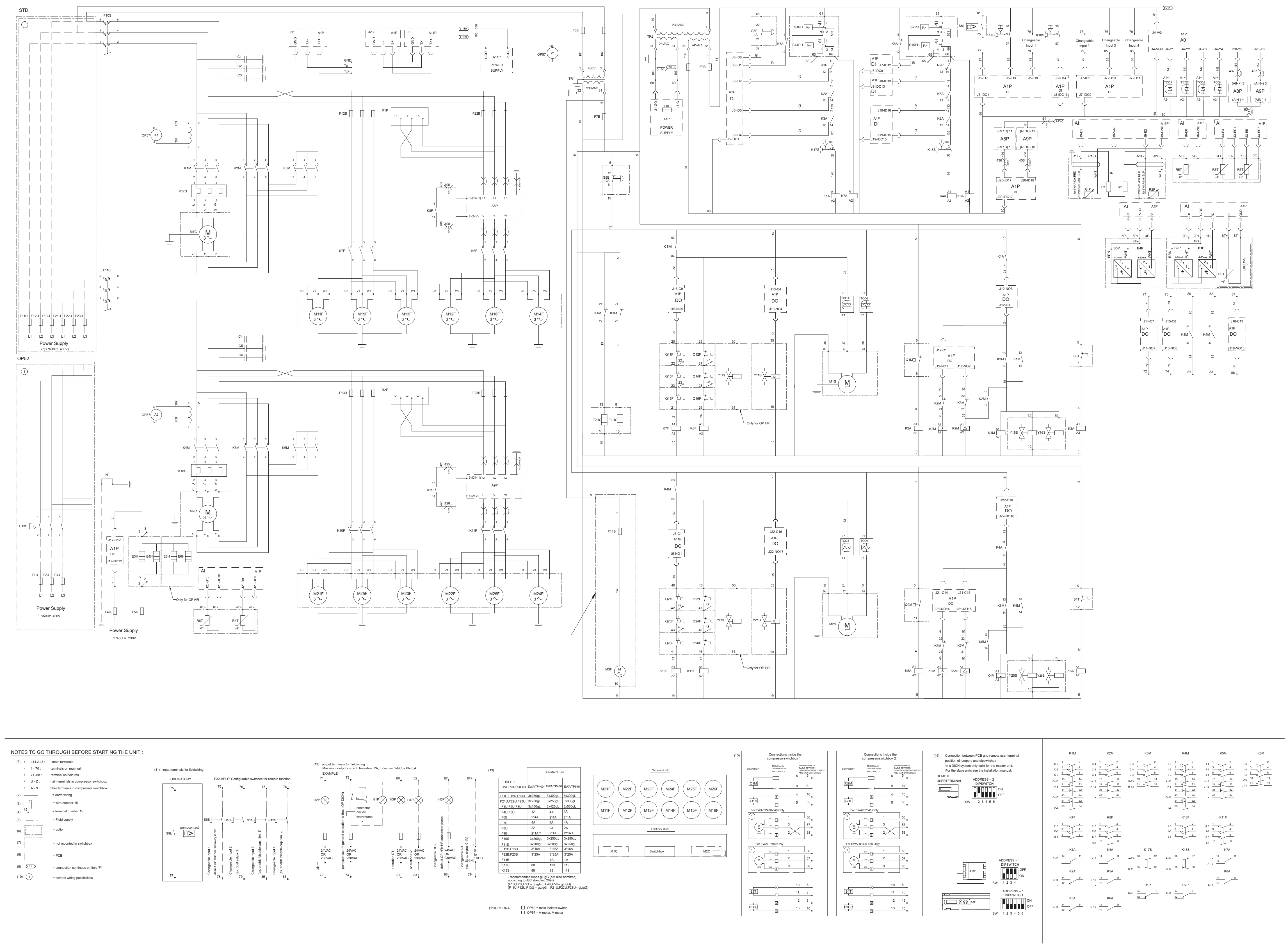
	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

No.	Function / remark
Y11S	12% capacity step for compressor circuit 1
Y15S	liquid injection valve of the compressor circuit 1
Y16S	liquid line solenoid valve circuit 1
Y17S	economizer valve circuit 1
V1 **	V-meter for circuit 1
TR1	transfo control circuit
TR2	transfo supply controller + digital inputs
TCO1, TCO2	optocoupler (Analog to Digital signal)
S1PH	high pressure switch circuit 1
S14PH	high pressure switch circuit 1
S13S ##	main isolator switch
S5E	emergency stop push button
S8L	flowswitch
S9L #	contact that closes if the pump is working
S3T	discharge thermal protector circuit 1
S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable/disable cap. lim. 1/2/3/4)
S6S	switch for heatrecovery mode (only for OP HR)
R1	auxiliary resistance for feedback
R1F	feedback resistance for circuit 1
R3T	sensor for evaporator inlet water temperature
R4T	sensor for evaporator outlet water temperature circuit 1
R5T	sensor for ambient temperature
R8T **	temperature sensor with changeable function sensor for evaporator outlet water temperature DICN OR sensor for HR condenser water temperature
Q1M	thermal protector compressor motor circuit 1
Q11F-Q18F	thermal protector fan motors circuit 1
PE	main earth terminal
R1P	reverse phase protector circuit 1
M1S	stepless capacity ctrl for compressor circuit 1
M3F	fanmotor switchbox
M11F-M18F	fan motors circuit 1
K7F	fancontactor for circuit 1 (On/Off)
K8F	fancontactor for circuit 1 (Inverter)
M1C	compressor motor circuit 1

No.	Function / remark
K7A	auxiliary relay for safety High Pressure circuit 1
K1A	auxiliary relay for safeties circuit 1
K2A	auxiliary relay compressor thermal protector circuit 1
K3A	auxiliary relay for discharge thermal protector circuit 1
K17S	overcurrent relay for circuit 1
K1M	linecontactor for circuit 1
K2M	deltacontactor for circuit 1
K3M	starcontactor for circuit1
J1	power supply
J2, J3, J6	analogue input
J4	analogue input
J5, J7, J8	digital input
J11	RS485 connection
J12, J13, J14, J15 J16, J17, J18	digital output
H1P *	indication lamp general operation
H2P *	indication lamp alarm
H3P *	indication lamp operation compressor 1
H5P *	changeable output
F6B	fuse for primary of TR1
F7B	fuse for secondary of TR1
F9B	fuse for secondary of TR2
F12B-F13B	fuse for fanmotors circuit 1
F8U	surge proof fuse for A1P
F1U, F2U, F3U #	main fuses
F4U, F5U #	fuses for evaporator heater
C1..C3	capacitor
E1HC	crankcase heater compressor circuit 1
E3H, E4H	evaporator, condenser heater circuit 1
B2P	high pressure transmitter for circuit 1
B1P	low pressure transmitter for circuit 1
A8P	frequency inverter circuit 1
A1P	PCB-controller
A1 **	current transfo / A-meter for circuit 1

3.20 Wiring Diagram: EWTP400~540MBYNN

Diagram



	Field supply	
	NOT possible as Option	Possible as Option
Obligatory	#	##
NOT Obligatory	*	**

No.	Function / remark	No.	Function / remark
Y11S, Y21S	12% capacity step for compressor circuit 1, circuit 2	K1A, K4A	auxiliary relay for safeties circuit 1, circuit 2
Y15S, Y25S	liquid injection valve of the compressor circuit 1, circuit 2	K2A, K5A	auxiliary relay compressor thermal protector circuit 1, circuit 2
Y16S, Y26S	liquid line solenoid valve circuit 1, circuit 2	K3A, K6A	auxiliary relay for discharge thermal protector circuit 1, circuit 2
Y17S, Y27S	economizer valve circuit 1, circuit 2	K17S, K18S	overcurrent relay for circuit 1, circuit 2
V1 **	V-meter for circuit 1-2	K1M, K4M	linecontactor for circuit 1, circuit 2
TR1	transfo control circuit	K2M, K5M	deltacontactor for circuit 1, circuit 2
TR2	transfo supply controller + digital inputs	K3M, K6M	starcontactor for circuit1, circuit 2
TCO1..TCO4	optocoupler (Analog to Digital signal)	J1	power supply
S1PH, S2PH	high pressure switch circuit 1, circuit 2	J2, J3, J6, J20	analogue input
S14PH, S15PH	high pressure switch circuit 1, circuit 2	J4	analogue input
S13S ##	main isolator switch	J5, J7, J8, J19	digital input
S5E	emergency stop push button	J11, J23	RS485 connection
S8L	flowswitch circuit 1	J12..J18 J21, J22	digital output
S9L #	contact that closes if the pump is working		
S3T, S4T	discharge thermal protector circuit 1, circuit 2	H1P *	indication lamp general operation
S10S * S11S, S12S	changeable switch for remote function (rem. start-stop, dual setpoint, enable/disable cap. lim. 1/2/3/4)	H2P *	indication lamp alarm
		H3P *	indication lamp operation compressor 1
S6S	switch for heatrecovery mode (only for OP HR)	H4P	indication lamp operation compressor 2
R1, R2	auxiliary resistance for feedback	H5P *	changeable output
R1F, R2F	feedback resistance for circuit 1, circuit 2	F6B	fuse for primary of TR1
R3T	sensor for evaporator inlet water temperature	F7B	fuse for secondary of TR1
R4T	sensor for evaporator outlet water temperature circuit 1	F9B	fuse for secondary of TR2
R5T	sensor for ambient temperature	F12B-F13B	fuse for fanmotors circuit 1, circuit 2
R6T	sensor for evaporator outlet water temperature circuit 2	F14B	fuse for fanmotors switchbox
R7T	sensor for mixed outlet water temperature	F22B-F23B	fuse for fanmotors circuit 1, circuit 2
R8T **	temperature sensor with changeable function: sensor for evaporator outlet water temperature DICN OR sensor for HR condenser water temperature	F8U	surge proof fuse for A1P
		F1U, F2U, F3U #	main fuses
R1P, R2P	reverse phase protector circuit 1, circuit 2	F4U, F5U #	fuses for evaporator heater
Q1M, Q2M	thermal protector compressor motor circuit 1, circuit 2	F11U, F13U #	main fuses
Q21F-Q26F	thermal protector fan motor, circuit 2	F21U, F23U #	main fuses
Q11F-Q16F	thermal protector fan motors circuit 1	F10S, F11S	circuit breakers with fuses for circuit 1, circuit 2
PE	main earth terminal	C1..C3, C4..C6	capacitor
M1S, M2S	stepless capacity ctrl for compressor circuit 1, circuit 2	E1HC, E2HC	crankcase heater compressor circuit 1, circuit 2
M1C, M2C	compressor motors circuit 1, circuit 2	E3H..E6H	evaporator, condenser heater circuit 1, circuit 2
M3F	fanmotor switchbox	B1P, B4P	low pressure transmitter for circuit 1, circuit 2
M11F-M16F	fan motors circuit 1	B2P, B5P	high pressure transmitter for circuit 1, circuit 2
M21F-M26F	fan motors circuit 2	A8P, A9P	frequency inverter circuit 1, circuit 2
K7F, K10F	fancontactor for circuit 1, circuit 2 (On/Off)	A11P	expansion board controller
K8F, K11F	fancontactor for circuit 1, circuit 2 (Inverter)	A1P	PCB-controller
K7A, K8A	auxiliary relay for safety High Pressure circuit 1, circuit 2	A1, A2 **	current transfo / A-meter for circuit 1, circuit 2

Part 2
Functional Description

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.

The functional control description is split up in two chapters, one concerning the standalone units and a second one concerning DICN setup. The DICN is the Daikin Integrated Chiller Network, also known as Master Slave Option. When we talk about operating as a standalone unit we mean a standalone unit (MSOption = "NO") or a unit in DICN (MSOption = "YES") but set to mode disconnected. When operating in DICN setup we mean with MS Option set to "YES" and Mode set to "Normal" or "Standby".

What is in this part?

This part contains the following chapters:

2

1 Operation Range

1.1 What Is in This Chapter?

Introduction

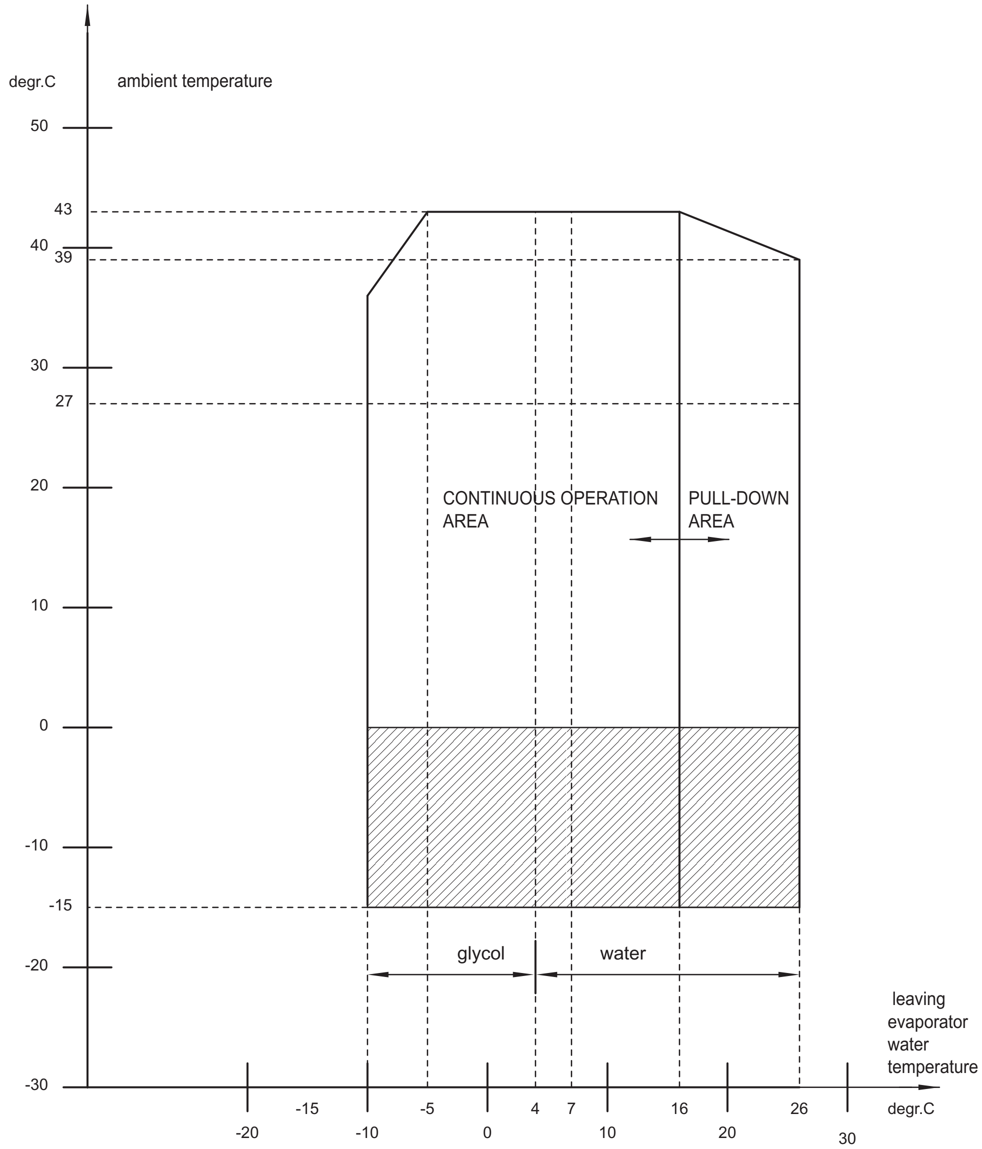
This chapter contains information on the functions used to control the system. Understanding these functions is vital when diagnosing a malfunction that is related to the functional control.

Overview

This chapter contains the following topics:

1.2 Operational Range: EWAP110~540MBYNN

Operational range The illustration below shows the operational range of EWAP110~540MBYNN.



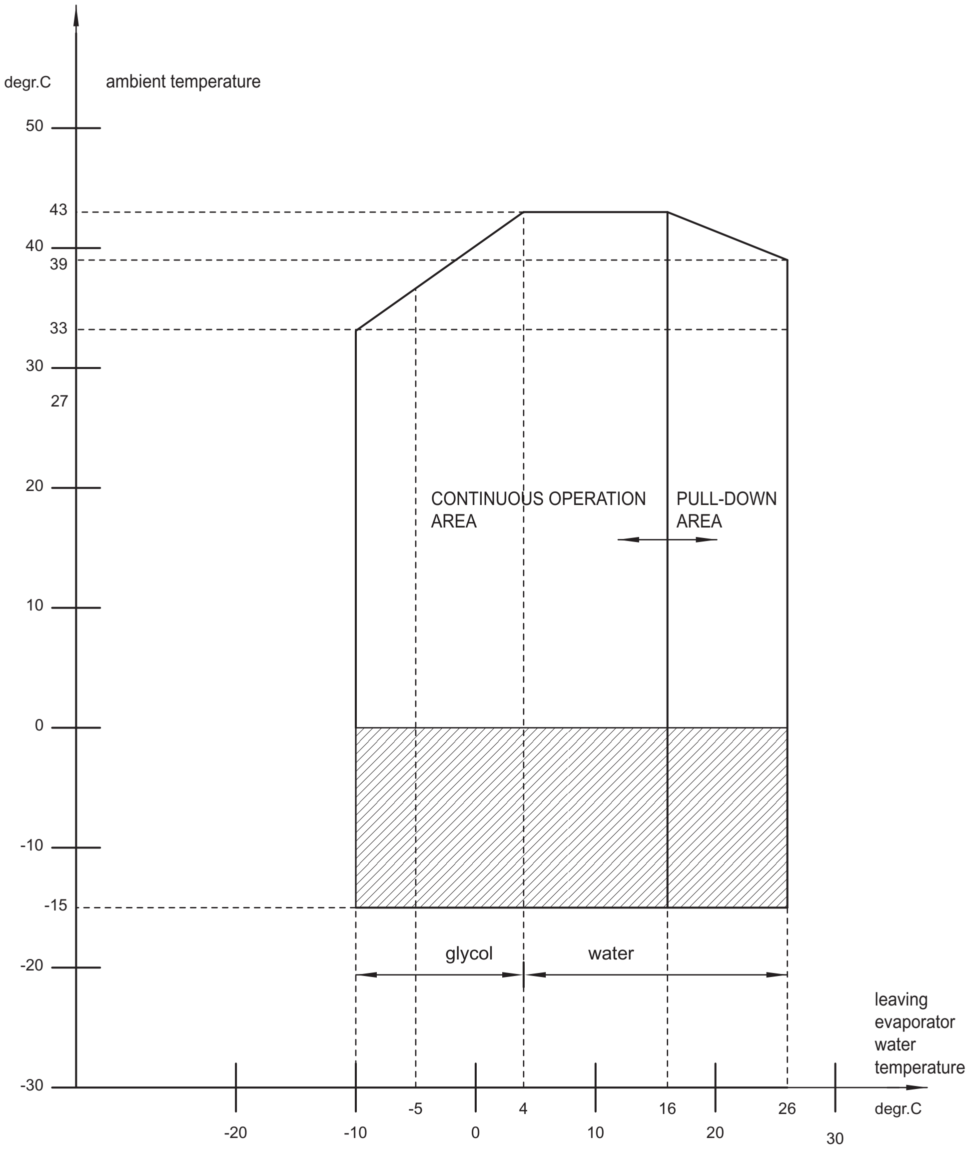
Protect the water circuit against freezing by:

- Or heater tape (standard)
- Or filling up the system with a glycol solution

1.3 Operational Range: EWAD110~540MBYNN

Operational range

The illustration below shows the operational range of EWAP110~540MBYNN.



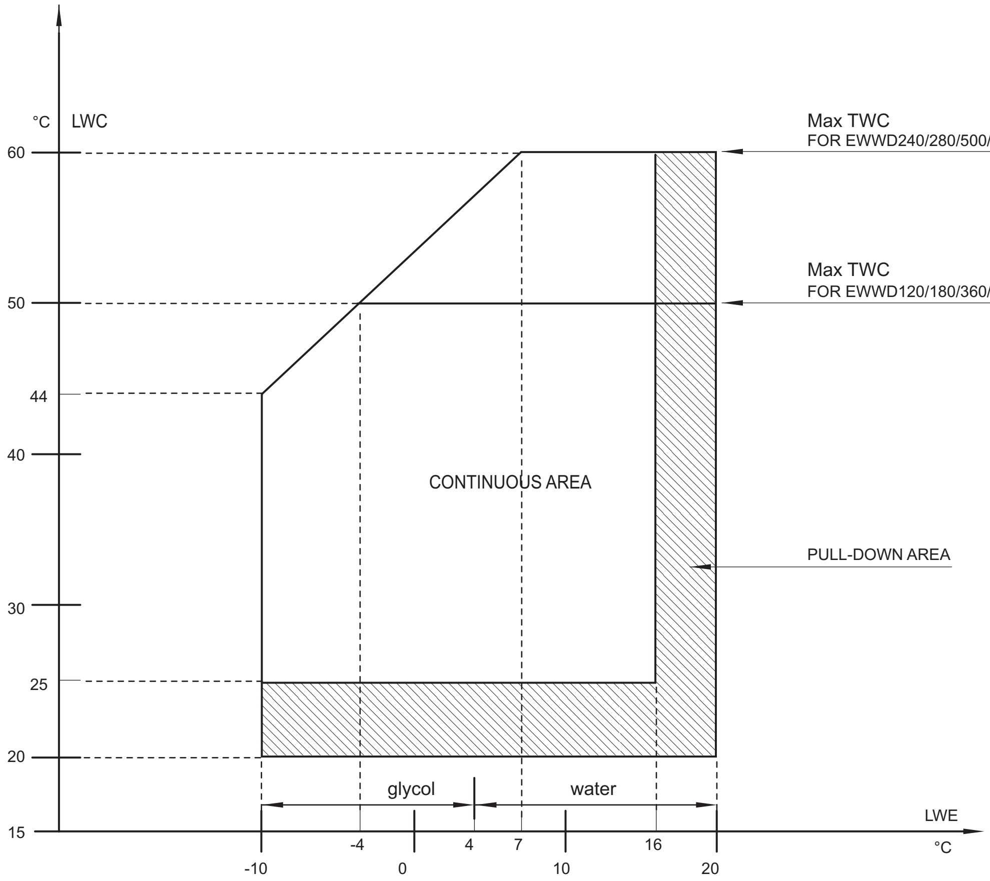
Protect the water circuit against freezing by:

- ➤ Or heater tape (standard)
- ➤ Or filling up the system with a glycol solution

1.4 Operational Range: EWWD120~540MBYNN

Operational range in cooling mode

The illustration below shows the operational range in cooling mode of the EWWD120~540MBYNN.



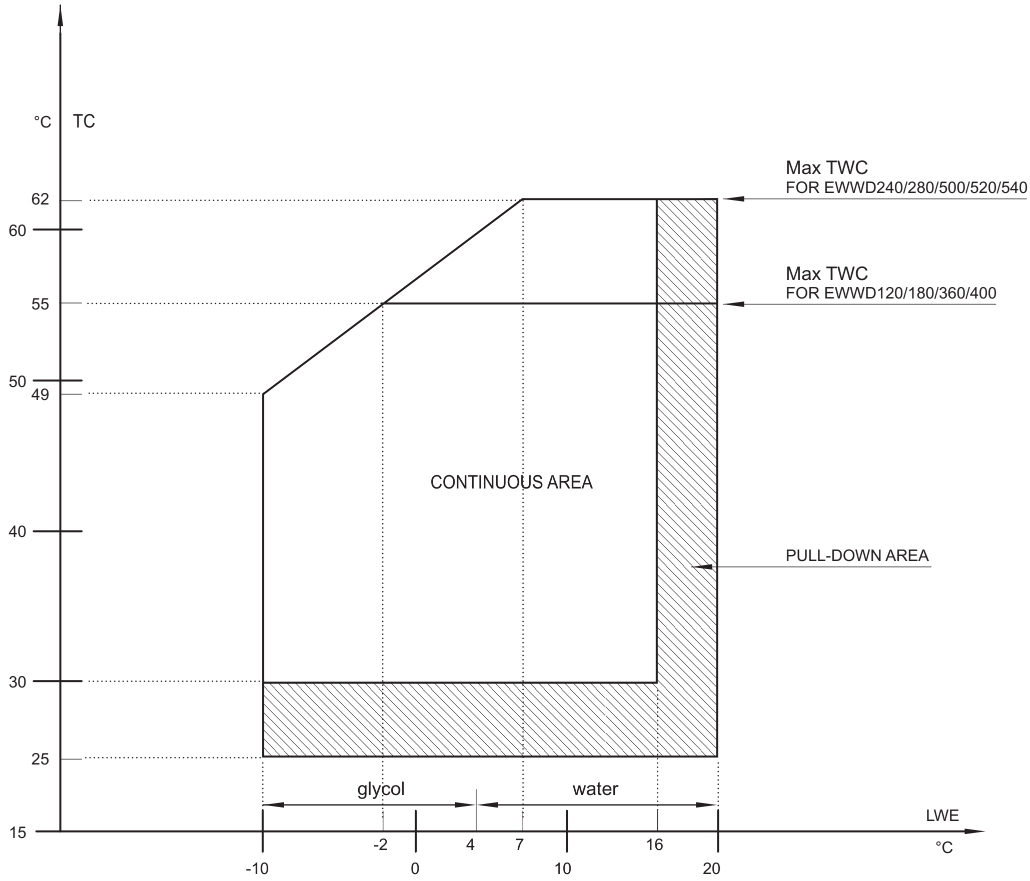
LWE: Leaving Water Evaporator
LWC: Leaving Water Condenser

Pull down Area

1.5 Operational Range: EWLD120~540MBYNN

Operational range in cooling mode

The illustration below shows the operational range in cooling mode of the EWLD120~540MBYNN.

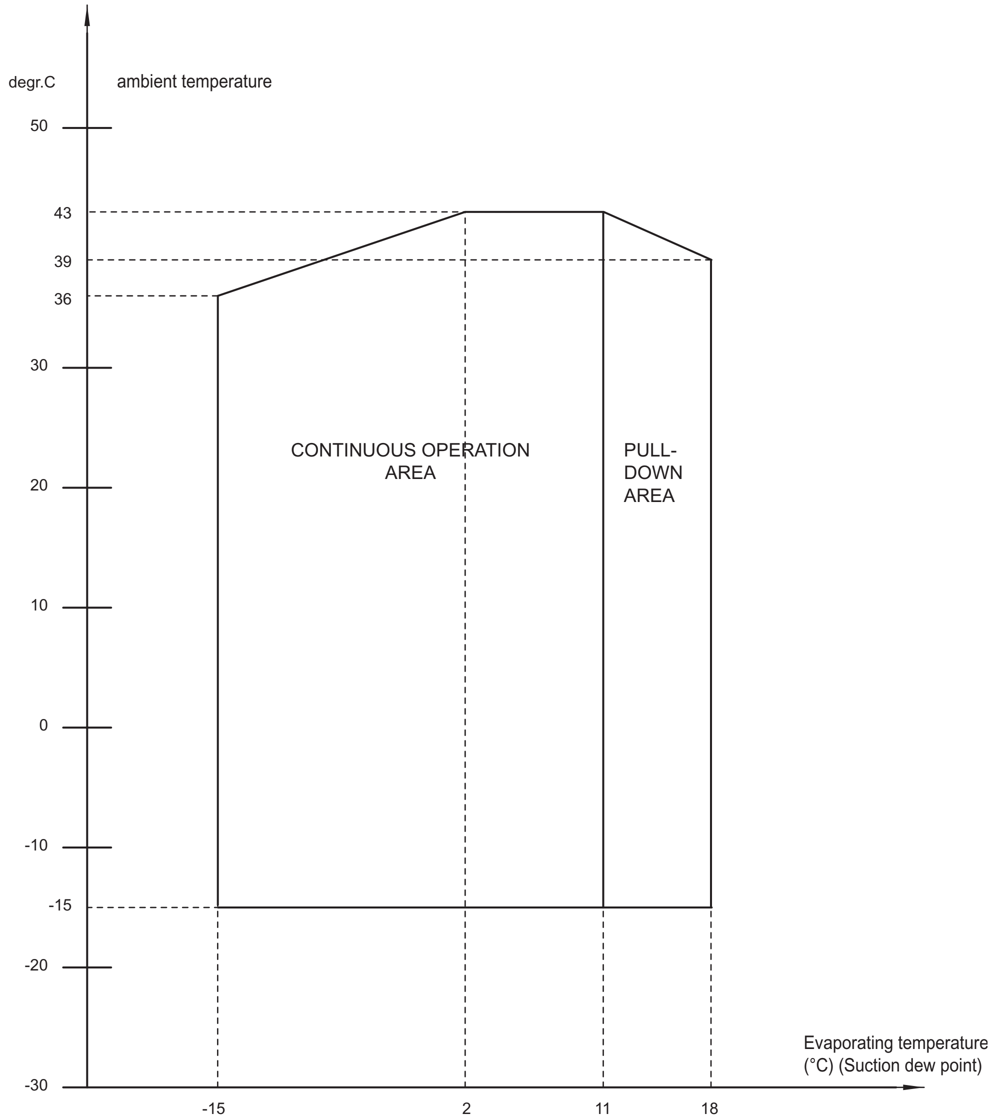


LWE: Leaving Water Evaporator
TC: Condensing Temperature
Pull down Area

1.6 Operational Range: ERAP110~170MBYNN

Operational range in cooling mode

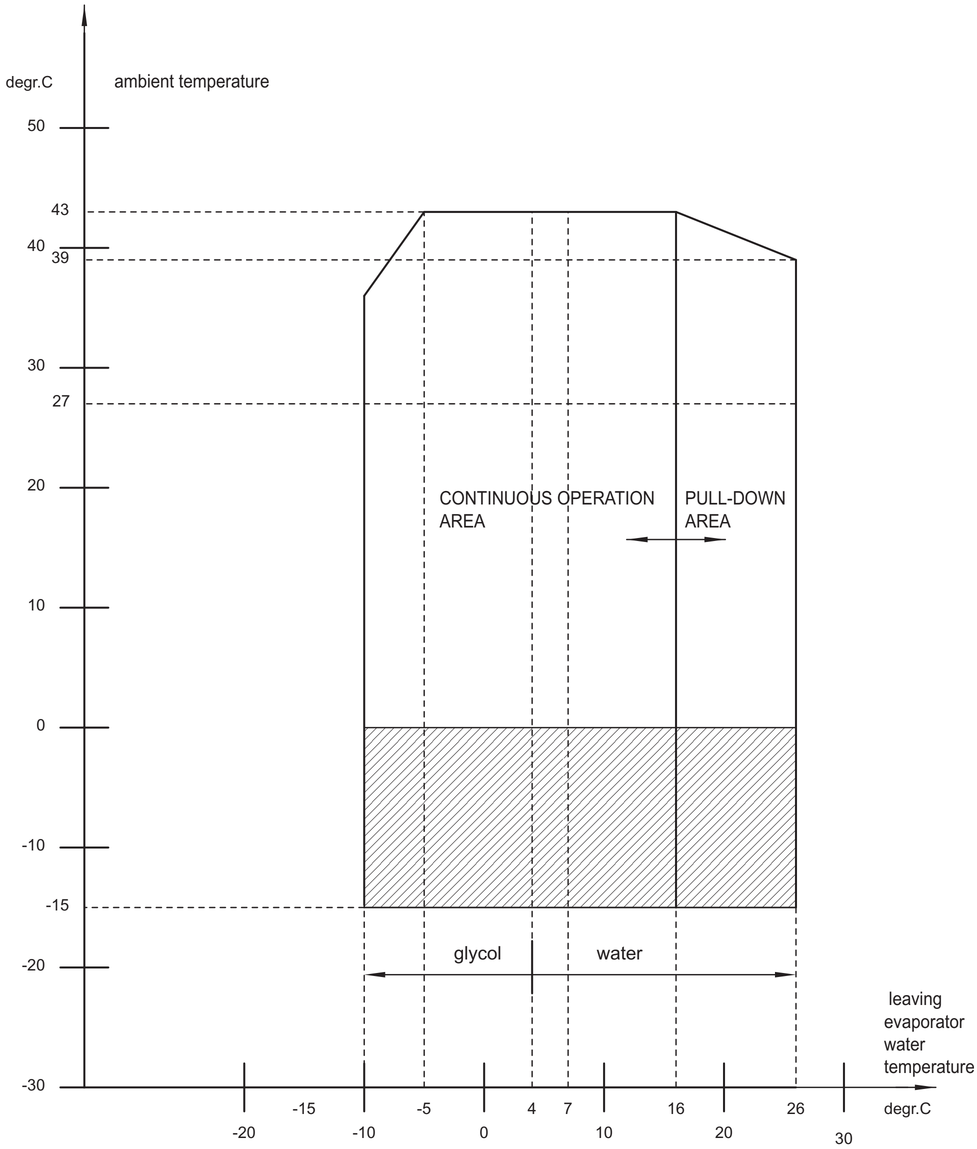
The illustration below shows the operational range in cooling mode of the ERAP110~170MBYNN.



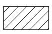
1.7 Operational Range: EWTP110~540MBYNN

Operational range in cooling mode

The illustration below shows the operational range in cooling mode of the ERAP110~540MBYNN.



Entering water of heat recovery condenser >30°C

 Protect the water circuit against freezing by:

- ➤ Or heater tape (standard)
- ➤ Or filling up the system with a glycol solution

2 Functional Control for a Standalone Unit

2.1 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. In this chapter we will discuss these functions for standalone units only. By standalone unit we mean MS Option is "NO" or MS Option is "YES" and Mode is "Disconnected". (MS Option = Master Slave Option)

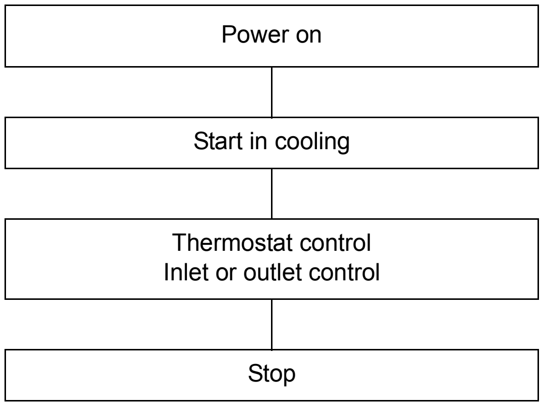
Overview

This chapter contains the following topics:

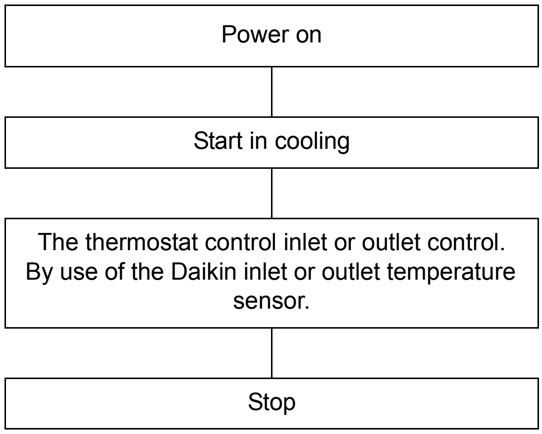
2

2.2 Operation Flowchart

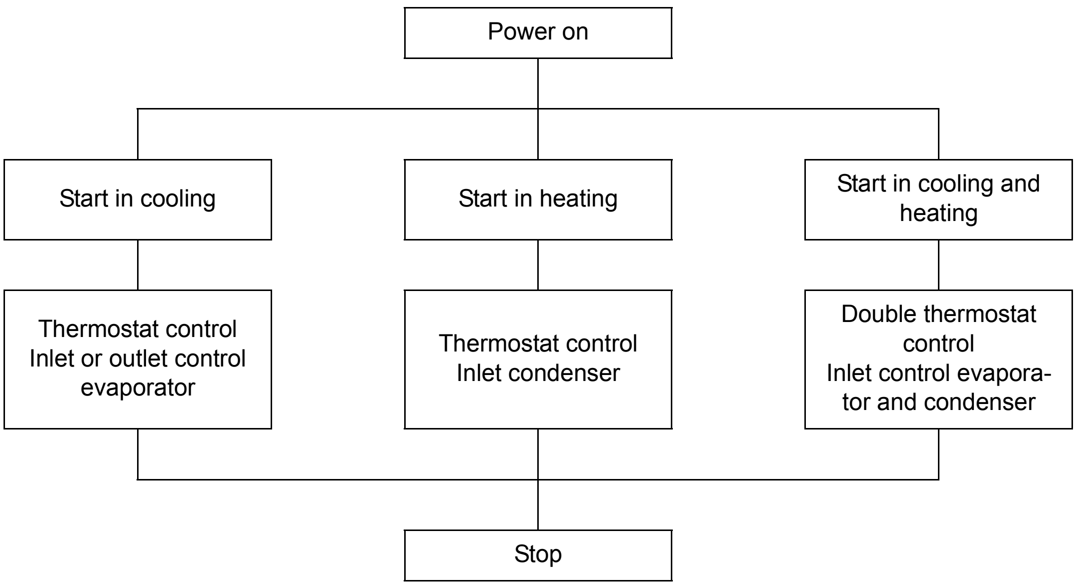
Air-cooled units or remote condenser units: cooling only



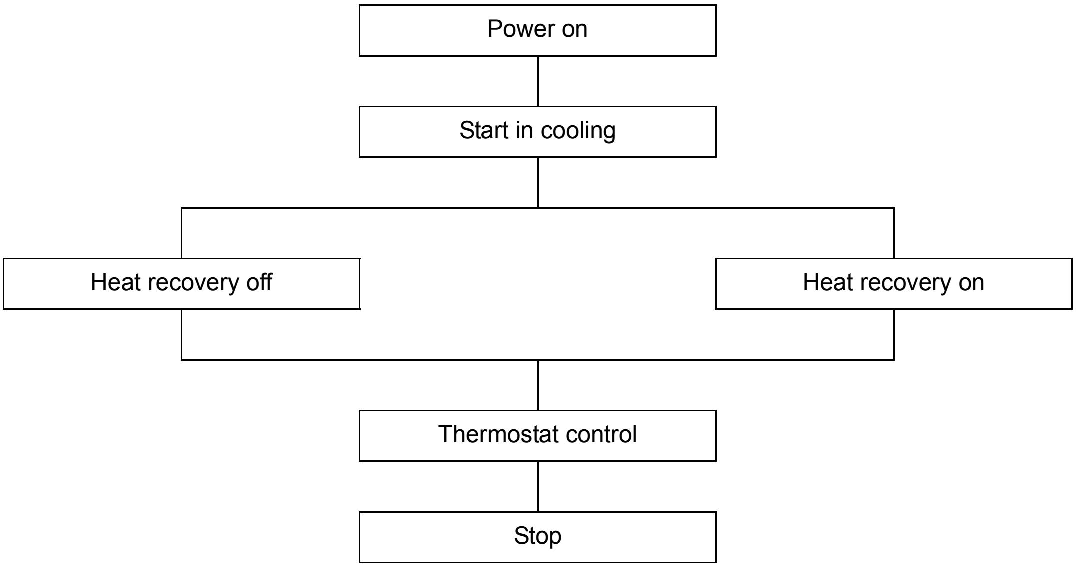
Evaporator-less units: cooling only



Water-cooled units: cooling only, heating only or double thermostat



Heat recovery units: cooling only and heat recovery



2

2.3 On/Off Management

Introduction

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

- ➤ Through the local key of the controller.
- ➤ Through the schedule timer.
- ➤ Through the BMS.

  The last command, of these three, determines the status of the local key.

- ➤ Through a remote switch. The remote switch gives an on/off signal to one of the changeable digital inputs of the controller.

  If the remote switch function is used, then an AND function with the first three commands determines the on/off status of the unit.

Power on

- ➤ The initialization takes 10 seconds.
- ➤ The controller automatically goes to the menu overview.

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

Remote on/off

The procedure to switch the unit on/off depends on the settings of the changeable inputs/outputs. These settings can be made in the service menu.

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

On/off status

This table gives an overview of the status of the unit and LEDs in applications with a remote switch. In case there's no remote switch the status of the unit only depends on the status of the local key.

Local key	Remote Switch	Unit	ⓘ LED
ON	ON	ON	ON
ON	OFF	OFF	Flashing
OFF	ON	OFF	OFF
OFF	OFF	OFF	OFF

Emergency stop

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

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

Remarks

1. To prevent the unit from stopping at 100%, the unit will always loaddown to 12% and operate at this capacity for 4 seconds before shutting down. During 8 seconds (default C12% stop time) the 12% coil will be energized, after time/2 the compressor will stop.

   This way the difference between high and low pressure side is smaller, which means the backspin will be less and the wear of the compressor will also be reduced.
2. When the remote switch is "OFF" it isn't possible to switch the unit on with the controller.

2.4 Thermostat Control

Introduction

The thermostat control is used to generate a load -up or load-down according to the active thermostat, if the load-up respectively load-down timer is finished (this means gone to "0").

The thermostat can be set to regulate on different signals:

- ➤ Signal from the water sensor at the inlet of the evaporator.
- ➤ Signal from the water sensor at the outlet of the evaporator.
- ➤ Signal from the water sensor at the inlet of the condenser.

There are several possible functions for the thermostat control:

- ➤ Cooling: inlet evaporator control.
- ➤ Cooling: outlet evaporator control.
- ➤ Heating: inlet condenser control.
- ➤ Double thermostat: inlet condenser and inlet evaporator control.
- ➤ External analog signal. (0 - 1V, 0 - 10V, 4 -20 mA ,0 - 20 mA).
- ➤ Floated setpoint.
- ➤ Thermostat: This function is only available on ER units by use of air sensor (No exterminal capacity control possible).

Overview of the possibilities

		Air-cooled cooling only		Evaporator-less	Water-cooled	Condenser-less
		EWAP	EWTP	ERAP	EWWD	EWLD
		CO	HR	CA	HP	RC
Cooling mode	Inlet water step	X	X		X	X
	Outlet water step	X	X		X	X
	Floated Setpoint	X	X			X
	Thermostat			X		
	External analog signal	X	X		X	X
Heating mode	Inlet water step		X		X	
	External analog signal				X	X
Double thermo-stat mode	Inlet water step				X	
	External analog signal				X	X
Manual control		X	X	X	X	X

2

Mode change over

Modechange inlet/outlet:

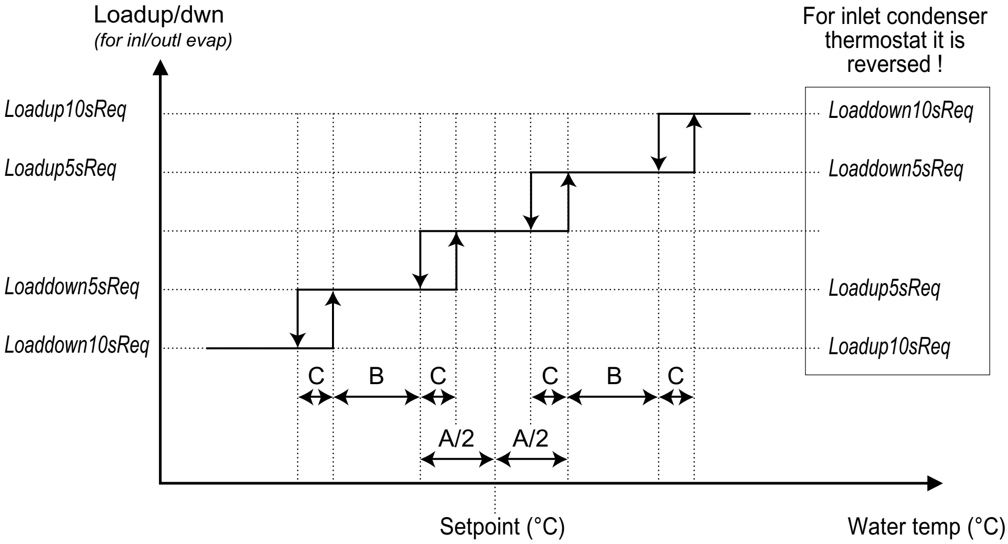
- From Manual to inlet (cooling or heating): switch off all compressors.
- From inlet to outlet (or reverse): No change of compressors (only reset timers!).
- From Cooling inlet to heating inlet: No change in compressors status (If on then on, if off then off).

Modechange cooling/heating/double thermostat:

- From Cooling (inlet) to heating or double thermostat: No change of inlet, no change of compressors (only reset timers!).
- From Cooling (outlet) to heating or double thermostat: **Outlet is changed to inlet**, no change of compressors (only reset timers!).
- From Cooling (manual) to heating or double thermostat: Manual is ok, no change of compressors.

Stepless: differentail thermostat

The operation in this mode is described in the following picture.
This mode is only possible on stepless units, for inlet and outlet evaporator and condenser control.



A loadup/down request of 10 sec is approx. 7% compressor capacity.
A loadup/down request of 5 sec is approx. 3.5 % compressor capacity.

Sampling time of 12 sec (default outlet control) or 48 sec (default inlet control): each 12 or 48 sec a loadup/down is possible (TimLoadup = 0), depending on the request (loadup/down).

Remarks

When starting the unit and there is demand for load but the unit does not start, keep in mind the following:

- ➤ Timers are still busy.
- ➤ Control motor feedback (compressor capacity) is not on minimum value, and controller is still busy downloading.
- ➤ Control motor feedback value is on minimum (12% compressor capacity) but the controller is still busy checking the feedback value. After 5 loaddows with no change in feedback, the unit can startup.

The control motor feedback value and the indication if the controller is uploading or downloading can be found in the I/O menu.

Default and limit values

Stepless control	Default value	Lower limit	Upper limit
A (K)	0.8	0.8	6.0
B (K)	0.5	0.5	1.0
C (K)	0.2	0.2	0.4
Setpoint (°C)	12.0	9.0	23.0
Load-up time (sec)	12	12	300
Load-down time (sec)	12	12	300

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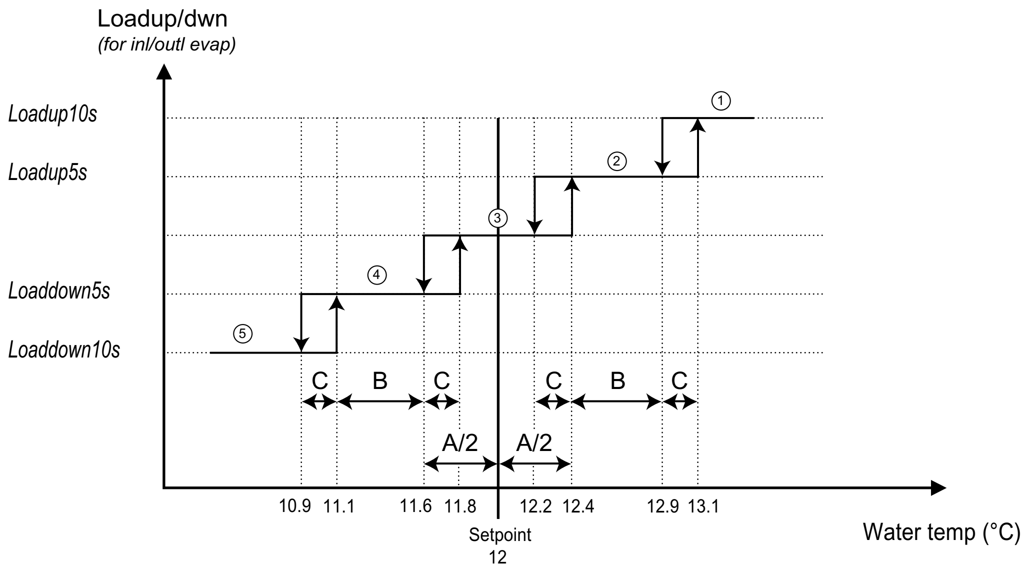
Loadup/down (for inl./outl. evap.)

Example for setpoint of 12°C.



Example: Start temperature 12 °C

- ➤ If water temp. is above 13.1°C > unit will start up
  - Unit start at 12%.
  - After timer unit will loadup to 30%.
  - After timer unit can loadup every sampling time.

1 If water temperature is still above 12.9°C:

➤ Loadup after every sampling time with 10 seconds

2 If water temperature is between 12.2°C and 13.1°C:

➤ Loadup after every sampling time with 5 sec.

3 If water temperature is between 11.6°C and 12.4°C:

➤ Operation in same compressor capacity.

4 If water temperature is between 10.9°C and 11.8°C:

➤ Loaddown after every sampling time with 5 sec.

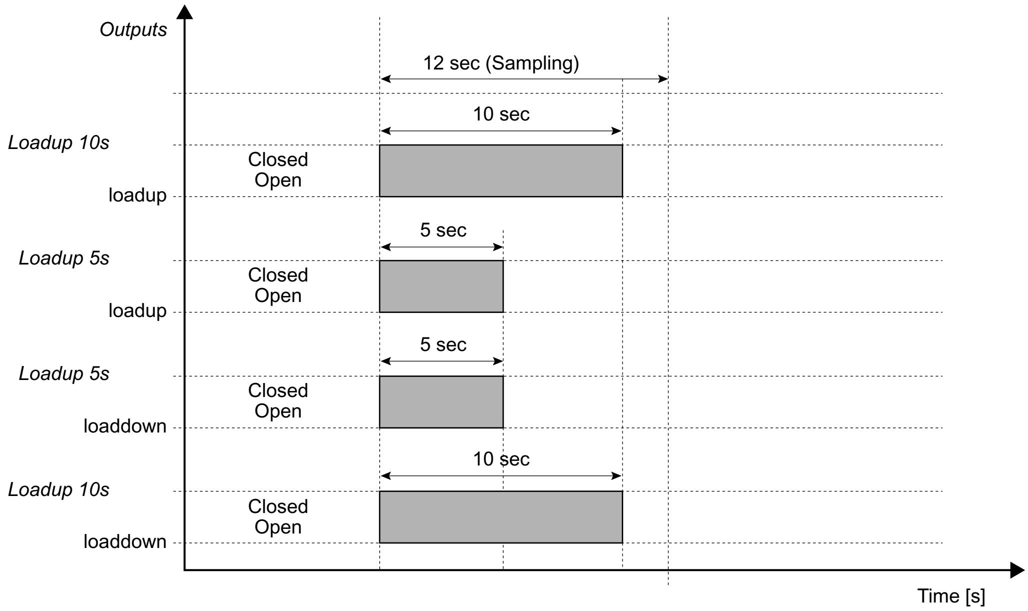
5 If water temperature is below 11.1°C:

➤ Loaddown after every sampling time with 10 sec.

Loadup/down management

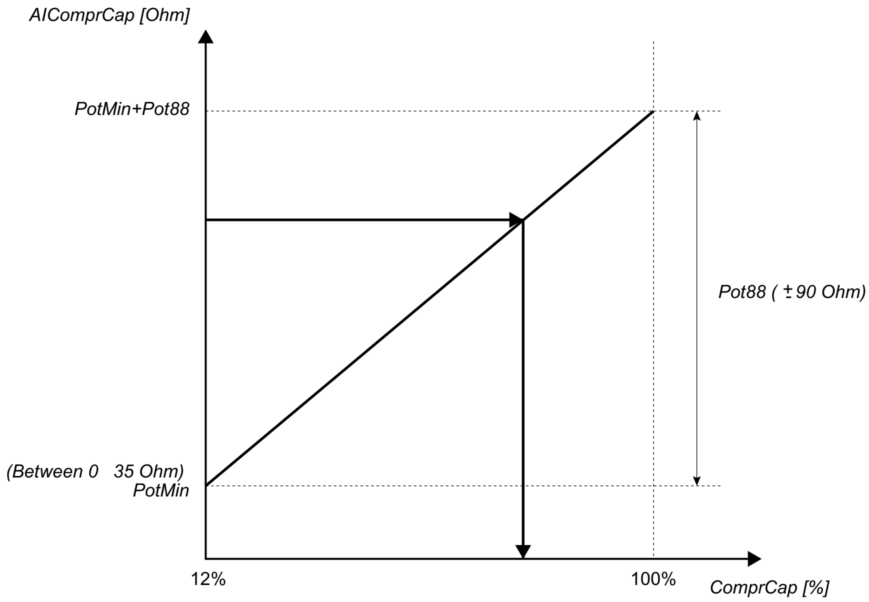
Loadup/down management for Stepless screw compr:

Each stepless screw compressor can go stepless from 30% to 100%
The actual compressor capacity is calculated based on the feedbacksignal of the potentio meter.



Determination of circuit capacity is done each software loop.

Name	Full name & Description	Default
ComprCap(%)	Compressor capacity: Calculated based on the input of the feedback signal of the potentio meter.	Calculated
AIComprCap(Ohm)	Compressor capacity: Based on read out value of the analog input of the feed-back signal of the potentio meter, the resistance is cal-culated.	Calculated
PotMin(Ohm)	Potentiometer value in Ohm that is equal to minimum compr cap of unit default: 12%.	Calculated
Pot88Startup(Ohm)	Potentiometer value in Ohm that is equal to reach 100% starting from 12% at each startup.	90 Ohm
Pot88 (Ohm)	Potentiometer value in Ohm that is equal to reach 100% starting from 12%. At load default Pot88 = Pot88Startup	Calculated



➤ Feedback check function.

PotMin:

During 'loaddown to physical minimum (limit switch)' (after unit turned OFF and stop sequence):
1. If feedback signal is not changing after 5 loaddown request, this means unit has reached MinComprCap and limit switch disables more loaddown, then PotMin = AIComprCap.
2. If compressor is turned off, then after feedbackvalue becomes minimum (12%) there are 5 extra loaddowns of 10s done. If after 5 loaddowns the feedback is not changed, the feedback is stored as new minimum feedback (PotMin = AIComprCap). (After Power on, the pumpleadtimer is prevented to run before this evaluation is finished. During normal operation, this extra loaddown is only done if the thermostat is not requesting loadup).
   - Extraloaddown is stopped when emergency stop safety is active. (reason: control motor has no power anymore).
   - Extraloaddown is also stopped when any control motor safety is present. After the reset of the control motor ERR, an extraloaddown procedure is activated and the compressor of that circuit is prevented to start up.

Pot88:

During working of unit:
1. If feedback signal is not changing after 5 loadup request, this means unit is on 100% and limit switch disables extra loadup, then Pot88 = AIComprCap.
2. If unit has reached 100%, then a Pot88 check will be done by giving a Request for extra Loadups of 10s. As long as the feedback value changes (goes higher), this extra loadup is done again. After 5 loadups with no change in feedback, Pot88 = AIComprCap.
   (This extra loadup is stopped if unit requests a loaddown by thermostat for that circuit).

➤ Stop sequence for Stepless screw compr:

When unit is on and running on for example 100%, then when unit is turned off, the compressor must go to 12% Delta and after compressor stop timer go off. After this the stepless control motor must go to its minimum position (until limit switch disables to go lower) instead of staying at the position it was before unit is turned off (100% in this example).

After Power ON of the unit, the compressor will go from 12% valve to stepless control when control motor is at minimum position (startup condition) to prevent the compressor to be restart at the same capacity after a power failure. Also when unit is turned off, the control motor will go to minimum position (limit switch).

Double thermostat control

This mode regulates on both inlet water sensor of the evaporator and the condenser.

This is only applicable on water-cooled chillers.

The same functions are used as in inlet condenser control and inlet evaporator control.

Load-up will be requested when both functions request a load-up and the load-up time = 0. This is an "AND" function.

Load-down will be requested when one of the functions requests a load-down and the load-down time = 0. This is an "OR" function.

Remote cooling or heating

Only applicable on water-cooled units.

This function allows switching from cooling to heating mode trough a remote switch connected to one of the digital inputs.

For details about the possible settings of the digital inputs refer to the chapters about the changeable digital inputs and the service menu.

Dual setpoint

This function allows switching between two set-points, either with a switch or with the schedule timer.

The actual setpoint can also be influenced by the floating setpoint function.

The set-points can be set in the according menu, refer to the chapter about the set-points menu.

For details about the possible settings of the digital inputs refer to the chapters about the changeable digital inputs and the service menu.

Thermostat

This function is only available for single circuit evaporator-less units (ER).

This function generates a load-up/-down request according to the temperature from the thermostat temperature sensor. This thermostat control is the same as normal outlet evaporator water control.

In this mode freeze-up prevention & freeze-up safety are disabled, but high pressure setback and capacity limitations will remain active.

Controller

The set point menu allows setting the set-points

Line n°	Display	Description	Default value	Lower limit	Upper limit
1	INLSETP1 E	Inlet water temp. set point 1 evaporator	12.0 °C	MOW+3°C	23°C
1a	INLSETP1 C	Inlet water temp. set point 1 Condenser	30.0 °C	15°C	50°C
2	INLSETP2 E	Inlet water temp. set point 2 evaporator	12.0 °C	MOW+3°C	23°C
2b	INLSETP2 C	Inlet water temp. set point 2 Condenser	30.0 °C	15°C	50°C
3a	OUTLSETP1 E	Outlet water temp. set point 1 evaporator	7.0 °C	MOW	16°C
3b	SETPOINT1	Thermostat setpoint (only for ER units)	7.0 °C	MOW	16°C
4a	OUTLSETP2 E	Outlet water temp. set point 2 evaporator	7.0 °C	MOW	16°C
4b	SETPOINT2	Thermostat setpoint (only for ER units)	7.0 °C	MOW	16°C

The user setting menu provides the ability to modify the control mode and the thermostat parameters and can be accessed by using the password "1234"

Line n°	Display	Description	Possible settings
1	CONTROL SETTINGS	screen title	
2	MODE:	to select the control mode	MANUAL CONTROL INL WATER STEP OUTL WATER STEP THERMOSTAT (ER units)
3	CIR1: CIR2:	status of corresponding compressor (only for manual mode)	0%, 30 – 100%
4a	F1*: F2*:	status of corresponding fan speed (only for manual mode)	OFF / LOW / MED / HIGH for 3step fans 0 to 100% for inverter driven fans

Line n°	**Display**	**Description**	**Default** (Depending on control mode)	**Lower limit**	**Upper limit**	**Unity**
1	THERMOST. SETTINGS	screen title				
2						
3						
4.1	LOADUP - DOWN	Sampling time to loadup or -down	12 S 12 S	12 S 12 S	300 S 300 S	12 S 12 S
4.2	LOADUP - DOWN	Sampling time to loadup or -down	48 S 24 S	12 S 12 S	300 S 300 S	12 S 12 S

Line 4.1: For outlet water control
Line 4.2: For inlet water control

Line n°	**Display**	**Description**	**Default** (Depending on control mode)	**Lower limit**	**Upper limit**
1	Service Menu	Screen Title			
2					
3	A: B: C:	Thermostat setting A/B/C	0.8 0.5 0.2	0.8 0.5 0.2	6.0 1 0.4
4	INLDIFF	Inlet water check that allows restart of unit only if inlet water temp rises with 0.5°C	Y 0.5	N 0.3	Y 2

2.5 Manual Control

Introduction

Only available on standalone unit or in disconnected mode. This function must only be used for testing of the unit, e.g. during commissioning or trouble shooting.

2

Manual mode versus thermostat mode

The following table shows the difference between manual and automatic mode:

If…	Then there is…
Manual capacity control (=fixed capacity step control)	No thermostat control the unit is set to fixed steps manually.
Thermostat control	An inlet/outlet thermostat control.

When changing from manual to thermostat control all compressors will shut down before operating in thermostat mode the compressors will remain off for 10 minutes because of the guard timer.

Description

This function allows setting the compressors & fans to fixed capacity steps, without thermostat control. In manual mode freeze-up prevention, high pressure setback and capacity limitation are not active. In manual mode the load-up and load-down timers are not active (only the first capacity timer).

Manual pump control

In the service menu it is possible to switch on the pump manually, when the unit is off. This makes it possible to check the operation of the pump.

Controller

The user setting menu provides the ability to modify the control mode.

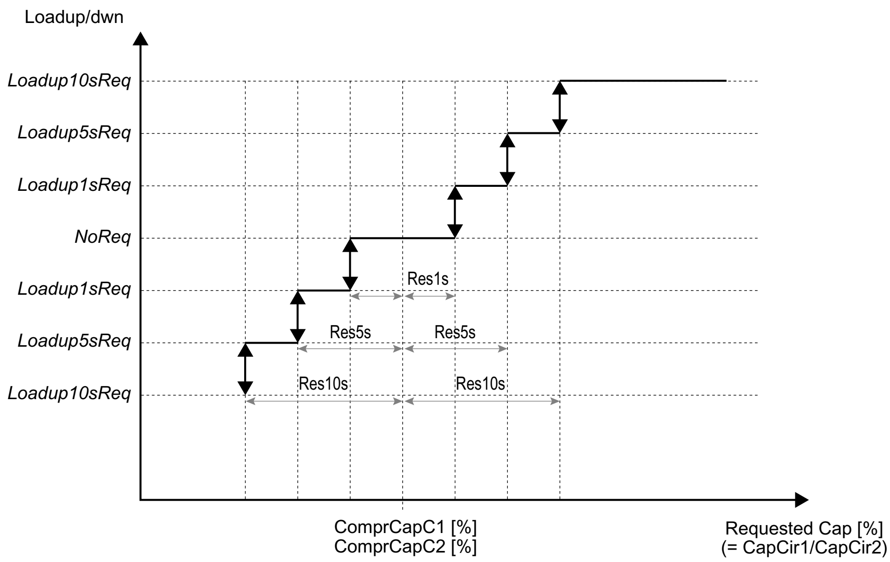
Line n°	Display	Description	Possible settings
1	CONTROL SETTINGS	screen title	
2	MODE:	to select the control mode	MANUAL CONTROL INL WATER STEP OUTL WATER STEP THERMOSTAT
3	CIR1: CIR2:	status of corresponding compressor (only for manual mode)	0%, 30 – 100%
4a	F1*: F2*:	status of corresponding fan speed (only for manual mode)	OFF / LOW / MED / HIGH for 3step fans
			0 to 100% for inverter driven fans

Capacity control with manual mode

CapCir1and Capcir2 are the requested capacities for circuit1 and circuit2. ComprCapC1 / ComprCapC2 are the calculated compressor capacities based on the feedback signal of the potentio meters.

There are three possible times for a loadup or loaddown request. One possibility has a fixed time of 1s and this has a fixed resolution (Res1s) of 0,72%. To know the resolution of Restime10s (default 10s) and Restime 5s (default 5s) their time values have to be multiplied by Res1s. For example, Res10s = Restime10s * Res1s = 10 * 0,72% = 7,2%.

Remark: The loadup-down of 1s is only for the manual mode! not used in automatic mode!



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2.6 Freeze-up Control

Introduction

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

Two protections are present: freeze-up prevention and freeze-up protection.

However this function is not applicable on evaporator-less units.

Applicable units

	Air-cooled cooling only			Evaporator-less	Water-cooled unit	Condenser-less unit
	EWAD	EWAP	EWTP	ERAP	EWWD	EWLD
	CO	CO	HR	CA	HP	RC
Freeze-up prevention	X	X	X		X	X

Freeze-up prevention

Freeze-up prevention will request a load-down when the temperature of the evaporator outlet water gets 0.5°C below the minimum outlet water (MOW) temperature. This activates the freeze-up timer if after the sampling time the temperature is still too low another load-down will be requested. When the temperature rises above the MOW temperature again the freeze-up prevention is reset and the unit will work in its initial mode. The compressor will go back to the necessary capacity, depending on the load-up possible status.

When freeze-up prevention is active the compressor status in the readout menu is blinking: "ON - XX% DELTA".

Characteristics	Freeze up prevention
Control device	Sensor
Diagram name	R3T, R4T
Activation Result	Outlet water temperature < M.O.W.-0.5K Load-down of 10 sec each sampling time (default 12 sec)
Reset Result	Outlet water temperature > M.O.W. Normal mode

Freeze-up protection

When the evaporator outlet water temperature sinks 1.5° below the MOW temperature freeze-up protection is activated and the compressor is shut down. When the temperature rises above the MOW temperature again the freeze-up prevention is reset and the unit will work in its initial mode after resetting the fault on the controller. The compressor will go back to the necessary capacity step, depending on the load-up possible status.
A maximum number of freeze-up protections per hour can be set in the Service Menu, when the unit exceeds this number in less than an hour an alarm (manual reset) will be activated.

Characteristics	Freeze up protection
Control device	Sensor
Diagram name	R3T, R4T
Activation Result	Outlet water temperature < M.O.W.-1.5K (= 2.5°C for standard unit) unit disabled + register inlet water temperature
Reset Result	Manual reset if outlet water temperature is higher then MOW (1)

(1) Alarm is held and must be reset manually. It can only be reset when the temperature rises with 1.5°C.

Temperatures overview

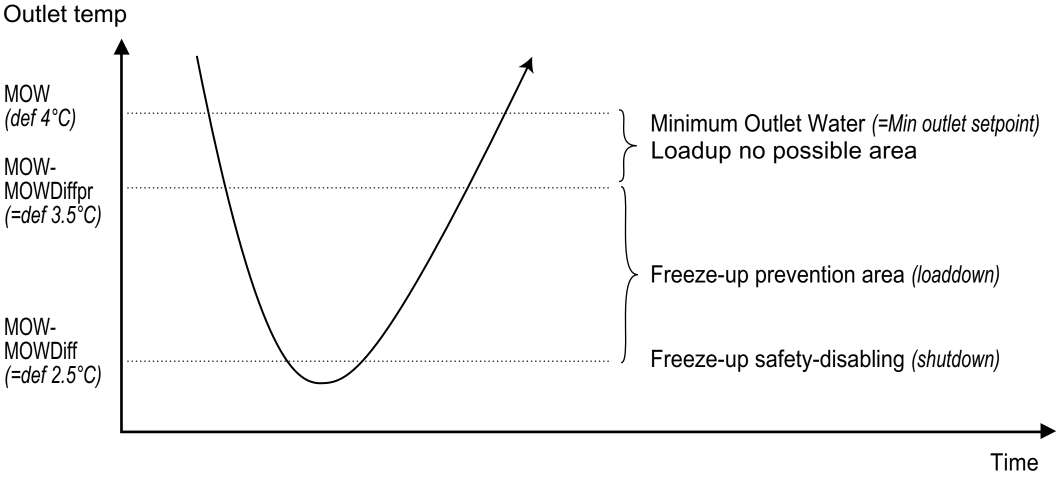
The following table shows a general view of freeze-up temperatures in case of protection and prevention

The MOW temperature can be set from 8.0°C to -10.0°C, with steps of 0.1°C, in the Service Menu.

	Minimum outlet water (M.O.W.)	Freeze-up protection	Freeze-up prevention
Standard	4°C	2.5°C	3.5°C
	2°C	0.5°C	1.5°C
	0°C	-1.5°C	-0.5°C
ZH	-5°C	-6.5°C	-5.5°C
ZL	-10°C	-11.5°C	-10.5°C

2

Function description



- Loadup not possible area: If outlet water is lower then MOW then loadup is not possible.
- Freeze-up prevention area: If outlet water temperature is lower then MOW - 0.5°C then a loaddown of 10 seconds. Will be executed each sampling time (default 12 sec.),as long as the outlet water temp is to low. During this Freeze-up prevention the compressor status in the read-out menu is blinking.
- Freeze-u safety disabling area: Unit will shutdown.

Freeze-up protection control

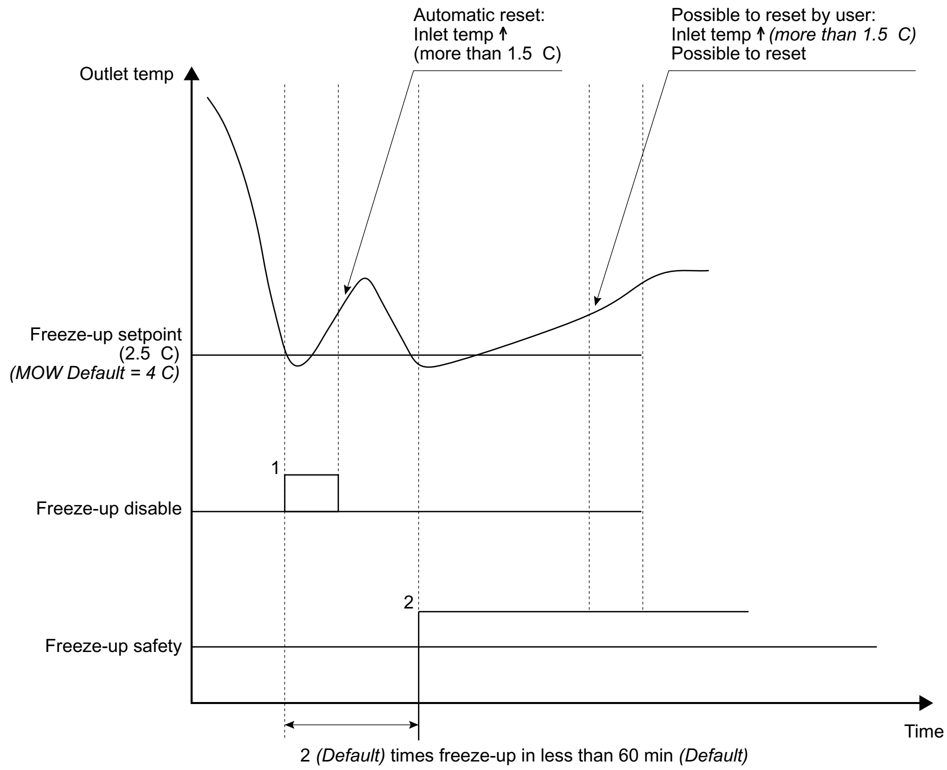
It is possible to disable the freeze-up alarm when the unit is switched off. This can be done in the service menu.

Line N°	Display	Setting	Description	Explanation
1	FREEZE UP	DIS. ONLY	Disable only	No alarm indication after Freeze up. After defrost the unit will restart automatically.
1	FREEZE UP	DIS&SAFETY (default)	Disable and safety	Alarm indication after expiration of programmed number of freeze-ups

The number of allowed freeze-ups, without shutdown of the unit, during a certain period can be set in the service menu.

Line N°	Display	Description	Lower limit	Upper limit	Step	Default
2.1	SAFETY:	Number of freeze-ups	1	5	1	2
2.2	IN	Period (minutes)	5	180	1	60

Example of Freeze-up with inlet check at reset.



The system has also the possibility to check the inlet water temperature before reset. If the setting is put on "Y", then the system will look at the evaporator outlet water temperature as well as at the evaporator inlet water temperature. If the setting is put on "N" then the system will only look to the evaporator outlet water temperature.

Line N°	Display	Description	Possibility	Default
3	INL CHECK AT RESET	Evaporator inlet water temperature check before reset	Y/N	N

When you use inlet check at reset not only the outlet water must rise above the MOW but also the evaporator inlet water temperature must rise with 1.5°C step-length

Setting of MOW

It is possible to change the MOW temperature (from -10 to 8°C) in the service menu if necessary. e.g. for applications with glycol.

General overview

The following table shows a general view of freeze-up temperatures in case of protection and prevention.

	Minimum outlet water (M.O.W.)	freeze-up protection setpoint	freezing-point of the solution	Glycol percentage
Standard	4°C	2.5°C	0°C	0%
ZH	-5°C	-6.5°C	-16°C	30%
ZL	-10°C	-11.5°C	-22°C	40%

2.7 Heat Pressure Control

2.7.1 Fan management

Purpose

To regulate high pressure.

There are 3 possible settings depending on the unit:

1 No fan management. For water-cooled units.

2 3 Steps on/off fan management.

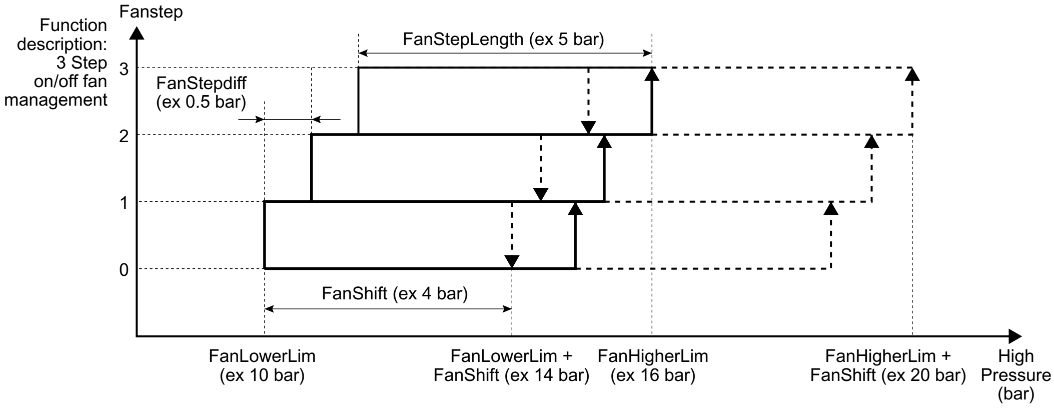
- ➤ 3 fan steps for single circuit.
- ➤ 2x3 fan steps for double circuit.

3 Inverter fan management.

- ➤ 1x on/off fans and 1x inverter fans for single circuit.
- ➤ 2x on/off fans and 2x inverter fans for double circuit.

Function description: 3 Step on/off fan management

The fan will work according to following regulation (for three fansteps):



- ➤ The high pressure boundaries (Fan Lower Lim and Fan Higher Lim) for the fan control can be set in the service menu.
- ➤ The **fan-step difference** has a default value of 0.5 bar and can be changed. The fan-step length is then calculated by using following formula:

  Fan-step length = (Fan Higher Lim - Fan Lower Lim) - (n-1).fan-step difference

  (With n = number of fan-steps, default = 3).
- ➤ By choosing the fan-step length big enough, hunting or unstable operation will be avoided.
- ➤ With the fan-timer (see service menu) it is possible to choose a minimum time between transitions (load-up/load-down).The default value is 10 seconds for loadup and 180 seconds for loaddown. This option is used to increase flexibility and to avoid unstable operation.
- ➤ If a changeable digital input is selected as Low Noise, following function will be active:
  If digital input (Remote Low noise: Yes) is closed, then:
  Minimum = Fan Lower Limit + Fan-Shift
  And
  Maximum = Fan higher Limit + Fan-Shift.

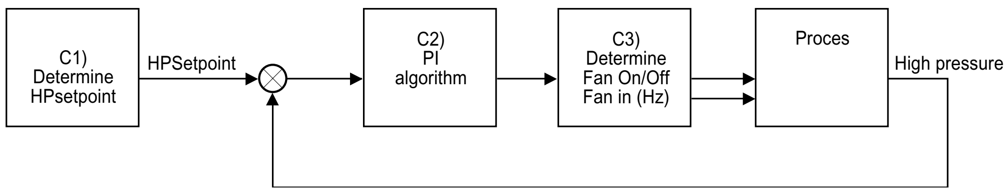
Remark:
Maximum Fan-shift-value is determined as follows: (Fan Lower Lim +Fan-step Difference + Fan-Shift) ≤ HP-Setback - 0.5 bar.

If this is not the case then Fan-Shift = HP-Setback - 0.5 bar - Fan Higher Lim.

Function description: Inverter fan management

The inverter fan management uses a PI-logic algorithm to determine the optimal fan speed. The inverter uses a 0 to 10 V signal to regulate the fan speed between 0 and 50 Hz.

The global logic is represented in following figure:



C1) Determine setpoint

If heat recovery is not active then the high pressure setpoint is equal to Fan Inverter setpoint.
If heat recovery is active then the high pressure setpoint is calculated.
If low noise is active then the high pressure setpoint = Fan Inverter setpoint + Fan setpoint Shift
Remark:
- Minimum shift = 0.0 bar.
- Maximum shift = HP Setback – 0.5 bar- Fan Inverter setpoint.

Remark: if both low noise and heat recovery are selected, the highest setpoint of these two will be selected.

C2) PI algorithm

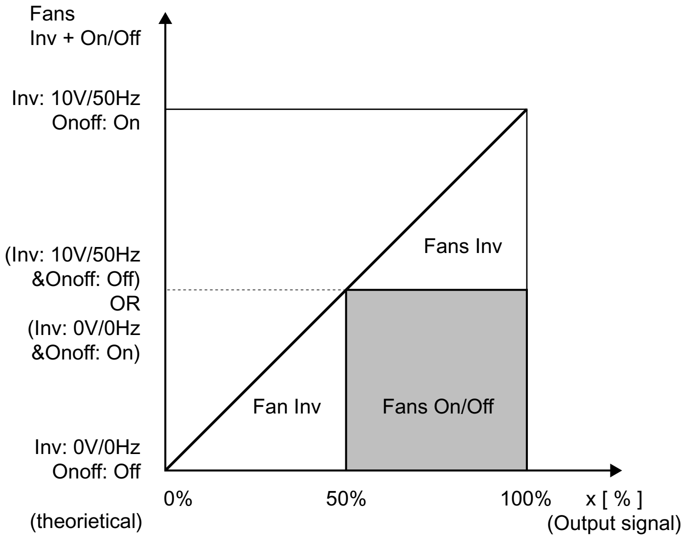
This is a mathematical algorithm that consists of a proportional and an integrating term, which is used to determine the necessary fan capacity.

C3) Determine fan on/off and fan inverter value

1) Transformation table (theoretical)

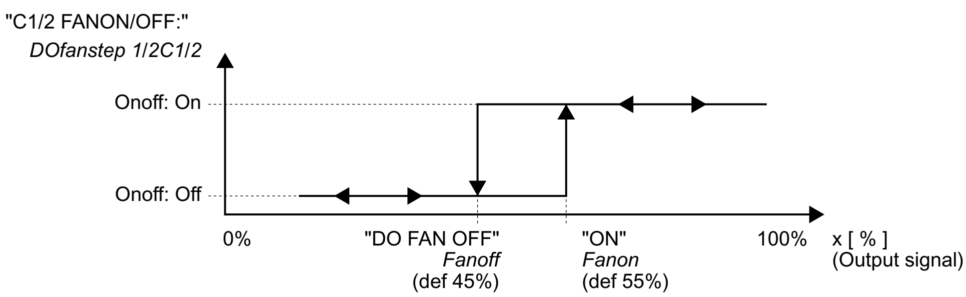
This function transforms the results of the PI algorithm into a signal which will activate the fans.
The theoretical values are listed below:

	x [%] (Output signal)	**Inverter fans**		**On/Off fans**
Up	0 → 50%	0 → 10V	0 → 50Hz	Off
	50%	0V	0Hz	On
	50 → 100%	0 → 10V	0 → 50Hz	On
Down	100 → 50%	10 → 0V	50 → 0hz	On
	50%	10V	50Hz	Off
	50 → 0%	10 → 0V	50 → 0Hz	Off

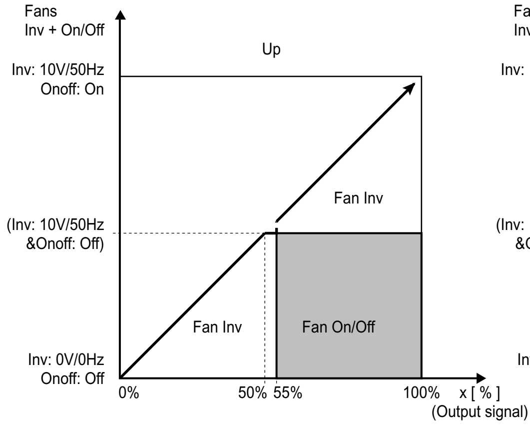


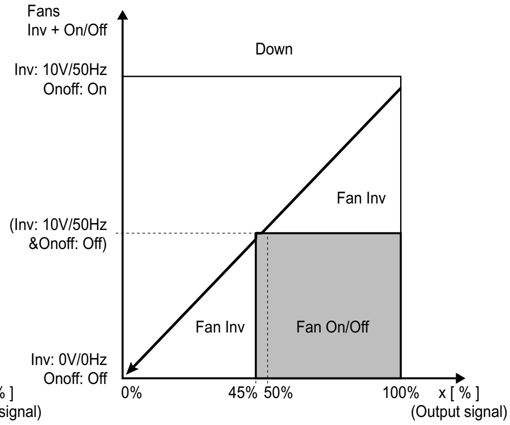
2) Transform margin (50% solution)

With these theoretical values there would be a problem, around the 50% output signal. In this area the on/off fans would switch on and off all the time. Therefore a transform margin is implemented.



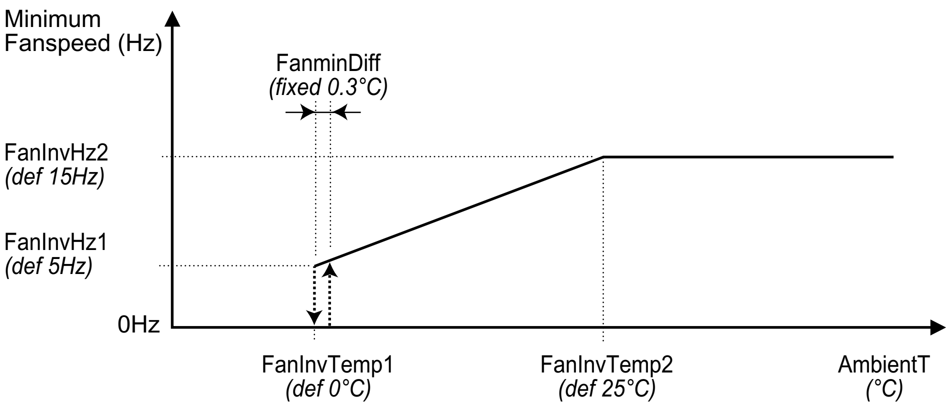
	x [%] (Output signal)	Inverter fans		On/Off fans
Up	0 → 50%	0 → 10V	0 → 50Hz	Off
	50 → 55%	10V	50Hz	Off
	50 → 100%	1 → 10V	10 → 50Hz	On
Down	100 → 50%	10 → 0V	50 → 0hz	On
	50 → 45%	0V	0Hz	On
	45 → 0%	9 → 0V	45 → 0Hz	Off





3) Heat rise protection Limit:

Another problem that could occur is the heat-rise of the fan motors. To avoid this, a minimum fan speed is needed. This minimum fan speed is the result of the function beneath. The settings that determine the minimum value can be set in the service menu.



Example

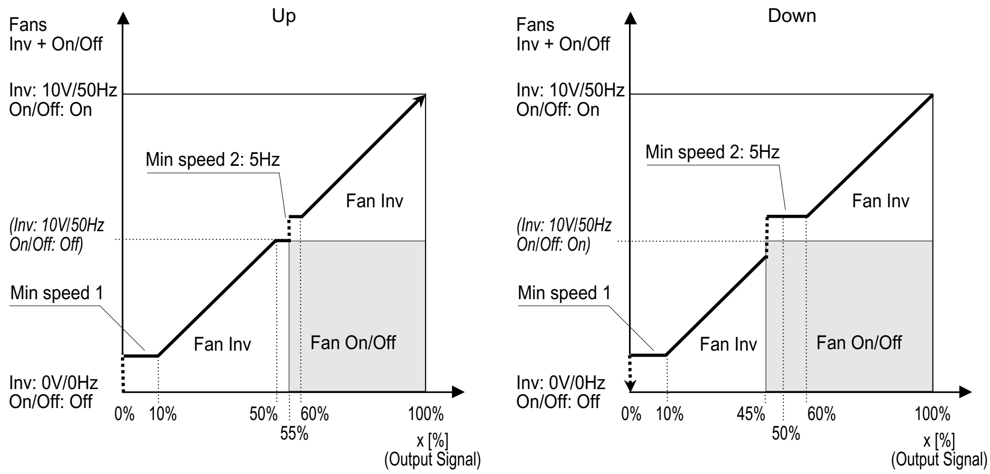
In the following table an overview is given of the actual values that will be used for the fan management, the transform margin and the minimum fan speed are included.

(In this example the min. speed is 2V/10Hz).

	x [%] (Output signal)	Inverter fans		On/Off fans
Up	0%	**2V**	**10Hz**	**Off**
	0 → 10%	2V	10Hz	Off
	10 → 50%	2 → 10V	10 → 50Hz	Off
	50 → 55%	10V	50Hz	Off
	55 → 60%	2V	10Hz	On
	60 → 100%	2 → 10V	10 → 50Hz	On

	x [%] (Output signal)	Inverter fans		On/Off fans
Down	100 → 60%	10 → 2V	50 → 10Hz	On
	60 → 45	2V	10Hz	On
	45 → 10%	9 → 2V	45 → 10Hz	Off
	10% → 0%	2V	10Hz	Off
	0%	**2V**	**10Hz**	**Off**

The same values as mentioned in the previous table are illustrated in the next picture:



Min speed1: Minimum fan speed depending on the ambient.

Min speed 2: Around 50% of the total fan, the minimum fanspeed is not depending on the ambient (default 5HZ). This minimum setting is calculated based on the transform parameter fan on. Minfanspeed 2 = Fan on (55%) - 50%.

Remark:

The inverter fan will only completely shut down (0V / 0Hz) when either:

- ➤ The compressor shuts down.
- ➤ The minimum fan speed is 0Hz, because the ambient is below 0°C.

C4) Allowable deviation to prevent hunting

When the load conditions of a unit requests a fan output of example 53%, then PI will try to reach this output. But because of the transform margin the output will be between 45% & 55%. As consequence the fans will continuously hunt between 45% & 55%.

To avoid this phenomena between 45% and 55% fanoutput, a deviation from the setpoint will be allowed. During this condition, the PI will be fixed to 45% or 55%. This to avoid that after this condition the PI will request 0% or 100%.

2.7.2 Low noise function

Description

The low noise function allows the unit to run at a lower fan speed although the high pressure is higher. This will reduce the operation noise considerably.

In this condition the fan set point is the fan set point plus the fan shift value. This value can be set in the service menu. The maximum value will always be at least 0.5bar below the high pressure setback value.

This function is activated by a changeable digital input.

Remark

In software version V2.4M6 this function was called fanshift.

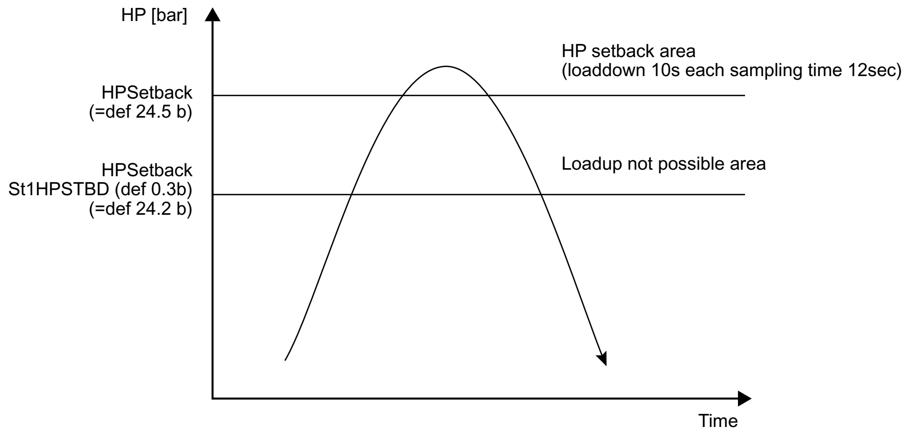
2.7.3 High pressure setback

Description

This is a safety prevention function, when high pressure is near to the high pressure switch setpoint. The unit will load-down to prevent that the unit trips on high pressure switch the unit will loaddown.

Function

- Loadup not possible area: If high pressure is above HP setback -0.3 bar then loadup is not possible.
- HPSetback area:
  If high pressure is above HP setback then loaddown10 sec. is executed each sampling time (def 12s).
  If high pressure is above HP setback then compressor status in readoutmenu is blinking.



Remark: The maximum high pressure depends on the type of refrigerant:

- HP setback for R407c is default 24.5 bar.
- HP setback for R134a is default 16.5 bar.

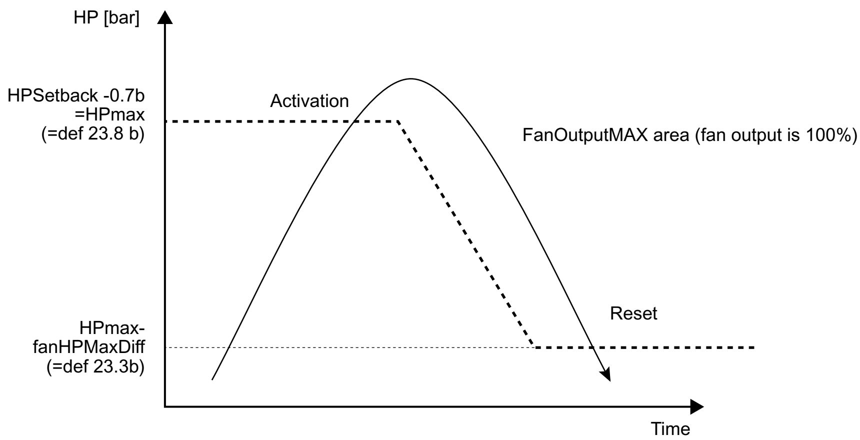
2.7.4 Fan output maximum

Description

This safety prevention function is only available on units with inverter driven fans. It is meant to prevent the unit from reaching high pressure setback.
When fan output maximum is activated, the fan output is 100%.

Function

If HP > HPmax (= HPSetback -0.7b) (= R407C def 23,8 b) then activate FanOutputMax.
If HP < HPmax - FanHPMaxDiff (= R407C def 23,3 b) then reset FanOuputMax.
During FanOutputMax the fanouput is put on 100% & the readoutmenu is blinking: "ON - xx% DELTA".



Remark: Setting FanHPMaxDiff can be changed in the service menu
(screens that allow you to customize the fan settings, see page 2-196).

2

2.8 Superheat Control

Introduction

To control the superheat there are two possibilities: either a thermostatic expansion valve either an electronic expansion valve.

The thermostatic expansion valve works independently and is not connected to the controller.

The electronic expansion valve (EEV) is connected to the controller through a driver. (EEV-driver). The controller controls the EEV-driver by exchange of parameters.

Applicable units

- EWWD240~280MBYNN
- EWWD440~540MBYNN
- EWLD240~260MBYNN
- EWLD400~540MBYNN

Basic unit setup

The unit setup is shown in **Part 1 chapter 3–Basic unit setup**.

The table below gives an overview of the dipswitch settings.

		PCB (pCO² medium or large)	**User terminal (optional)**	**EEV1 (if present)**	**EEV2 (if present)**
Unit 1	Master	1	2	3	4
Unit 2	Slave 1	5	6	7	8
Unit 3	Slave 2	9	10	11	12
Unit 4	Slave 3	13	14	15	16

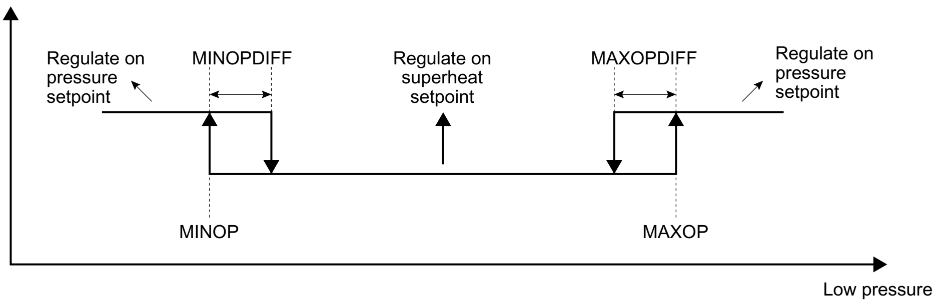
Example of dipswitch setting:

- Address 1 = 100000
- Address 2 = 010000
- Address 3 = 110000
- Address 4 = 001000

The dipswitches of the EEV driver can be found on the inner side of the driver. The cap of the EEV driver (cap with the LED's) must be removed. When the cap is removed, the address dipswitches are accessible on the inner side of the cap.

Functional description

The basic operation is shown in the picture below. However it is important to know that in changing some of the parameters with the pCO^2, the EEV power must be shut off before the parameters are actually changed: e.g. battery on NO, addressing.



Superheat setpoint: 5°C (default).

Pressure setpoint: 3.5 bar (default).

Min op: Minimum operation pressure:

➤ Below this pressure no regulation anymore
on superheat setpoint (try to built-up pressure again).

Max op: Maximum operation pressure:

➤ Above this pressure no regulation anymore on superheat setpoint (try to decrease the pressure).

Max opdiff: Minimum operation pressure differential.

Important: The values of the Maxop an d Minop are chosen in this way that in normal operation always regulation on superheat setpoint is used. Therefor these Minop and Maxop should never been changed (setpoint menu).

Related software menus

The list below gives an overview of the superheat and EEV(driver) related parameters and the menus in which they can be found.

Parameter	Item	Concerned menus
ACT. PRESSURES C1	LP1	Readout menu
ACT. PRESSURES C2	LP2	
EEV SERVICE MENU		Service menu
EEV DRIVER C1(03)	EEV1status	
EEV DRIVER C2(04)	EEV2status	
1A9: EEV *** ERR		Alarm menu
2A9: EEV *** ERR		
UNIT INFORMATION	EEV1 version parameter	Info menu
UNIT INFORMATION	EEV2 version parameter	
EEV1 IN/OUTPUTS	Battery1 status & Valve position	I/O status menu
EEV2 IN/OUTPUTS	Battery2 status & Valve position	

2

Related LEDs

➤ pLAN LED's on pCO² controller (Next to pLAN connection - can be consulted with a small mirror on the unit)

Label	Color	Status	
		On	**Off**
	RED	Error	No error
	ORANGE	Communication between pCO^2 and EEV driver(s)	No communication
	GREEN	Communication between pCO^2 and EEV driver(s)	No communication

➤ LED's on front of EEV driver

Label	Color	Status		
		On	**Off**	**Blinking**
Power	green	Power supply to EEV driver is present	No power supply to EEV	EEV battery problem active
Valve Opening	green		No valve opening	Valve is opening (not continuously)
Valve Closing	green		No valve closing	Valve is closing (not continuously)
Alarm	Red	Alarm is present	No alarm is present	Alarm present (EEV NOT CLOSED Error)
pLAN	Green	pLAN operates correctly	pLAN does not operate (no communication)	pLAN does not operates correctly (or busy to initialize)

Legend:

Status during normal operation

If the alarm LED, the Valve Opening LED and the Valve Closing LED are continuously blinking then the "EEV NOT CLOSED"-alarm is present.

Overview of alarms

Circuit Alarms (Circuit will NOT be able to startup)		
CIRCUIT1 SAFETY	CIRCUIT2 SAFETY	
1A9: EEV DRIVER ERROR	2A9: EEV DRIVER ERROR	EEV driver is not found
1A9: EEV NOT CLOSED	2A9: EEV NOT CLOSED	EEV Valve did not close during stop (for example during power off) Refer to "8. –Reset procedures for "EEV NOT CLOSED" alarm

Circuit Alarms (Circuit will NOT be able to startup)		
1A9: EEV SUPERHEAT ER	2A9: EEV SUPERHEAT ER	EEV Superheat to low / high
1A9: EEV EEPROM ERR	2A9: EEV EEPROM ERR	EEV EEPROM problem
1A9: ST.MOTER ERR	2A9: ST.MOTER ERR	EEV Step motor problem
1A9: EEV PROBE ERR	2A9: EEV PROBE ERR	EEV Sensor out of range (LP probe or NTC probe)

Network Alarms (Unit will be able to startup)		
NETWORK SAFETY		
0U4: PCB COMM. PROBLEM		Status of the pLAN network is nok.

Warnings (Unit/Circuit will be able to startup)		
CIRCUIT1 SAFETY	CIRCUIT2 SAFETY	
1A9: EEV BATTERY ERR	2A9: EEV BATTERY ERR	EEV Battery problem

Remark: Battery is default programmed to NO.

2

Reset procedures for "EEV NOT CLOSED" alarm

(Refer also to installation manual).

EEV NOT CLOSED ALARM
Because an "EEV NOT CLOSED" alarm can have a dangerous situation for the unit there is a special procedure to reset this alarm.

1. The service person must check if there is no problem to start the unit (no liquid into the compressor? …).
2. The service person can consult the reason for the EEV NOT CLOSED alarm in the service menu
   Ex.
   EEV DRIVER C1(03)
   SYSTEM WAITING FOR:
   VALVE OPEN
   GO AHEAD: NO
3. After this the service person can give a "go ahead" by changing the "NO" into "YES" and confirm (= push ENTER).

After this action the EEV NOT CLOSED alarm can be reset in the ALARM MENU.

Remarks

1. EEV errors are delayed, with a timer, after power ON of unit.(Can be set in service menu: default 90sec).
   This is to avoid that an autorestart is prevented by an alarm that happens to fast at the power on of the unit.
2. pLAN= Internal network between pCO^2 controller / User terminals and EEV drivers. (Connections: tx+/tx-/GND).
3. Change of address is only noticed after power off/on by software (for pCO^2 controller & EEV driver).
4. It is possible to read present pLAN address by using external user terminal (confirm first address setting).
   push up/down & enter simultaneous for 10 sec (or 5 sec 2 times after each-other)
   (or first 3 menu buttons).
   (pCO^2 controller or EEV-driver = square, User terminal = smaller square).
5. EEV additional info screens are activated in service menu when an EEV is present.
   Additional info:
   READOUT MENU: Superheat, suction temp.
   SETPOINT MENU: Superheat setpoint, pressure setpoint

2.9 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.

If a second evaporator pump is installed a second safety check is performed: the double evaporator pump control, in case of failure of one pump the other one takes over.

Another advantage of this control is the fact that the system switches from one pump to the other in case failure during operation.

The status of the condenser pump can also be indicated via the changeable relay outputs.

Pump lead/lag time

The PUMPCONTROL of the user settings menu allows the user to define the pump-lead time and pump-lag time.

Line n°	Display	Description	Default value	Limit values
1	PUMP CONTROL	Screen title		
2	PUMPLEADTIME	Time the water pump will run before starting up the chiller	020 s	020-180 s
3	PUMPLAGTIME	Time the water pump will keep running after stop-ping the chiller	000 s	000-180 s

Remark: The default value for the PUMPLAGTIME is 0 s but it is recommended to set the lag time to 120s. This is to prevent the evaporator from freezing up.

Daily pump startup

The user will get the choice to perform a pump start every day to prevent obstruction of the pump and to increase its lifetime. Everyday at pump start time, which can be set in the timers menu, the pump will be started automatically for a short period (5s) if the unit is off.
If dual pump control is selected by changeable digital output, then it is also possible to start up this pump in the service menu.

Line n°	Display	Description	Default value	Limit value
4	DAILY ON	Activation of daily pump start	N	N-Y
4	AT	Daily pump start up time	12h00	00h00-24h60

2

Dual evaporator pump control

When dual pump control is allowed an extra digital output is needed (see Service Menu). In total four choices will be possible: one pump (default), two pumps with automatic rotation (by running hours and with a certain offset), priority pump 1 and priority pump 2.

Line n°	Display	Possible setting	Description
1	DUAL EVAP. PUMP		
2a	MODE	AUTOM. ROTATION	The controller decides whether pump 1 or pump 2 starts up first
2b	MODE	PUMP 1>PUMP 2	Pump 1 starts up before pump 2
2c	MODE	PUMP 2>PUMP 1	Pump 2 starts up before pump 1

(The default setting is automatic rotation)

When the dual evaporator pump control is set in automatic rotation, the software calculates the differences in operation time between the two pumps. When this time exceeds the chosen offset time, the pump will shut down and the other pump will start up, during this the unit keeps running. The switchover will happen immediately, there is no transition time.

Line n°	Display	Description	Default value	Limit value
3	OFFSET ON RH	Running hours offset value	048h	001h-999h

Remark: In case two pumps are present and the running pump fails then the unit is stopped and started up again with the other pump. When the first pump fails a visible warning will be given. The failed pump can not start up before this warning is reset. If the running pump fails while the other pump is already in warning a unit alarm will be given.

Condenser pump

This function is only available on water-cooled units.
The condenser pump control can operate in two ways:

- In cooling mode: the condenser pump contact will close on command of the thermostat function.
- In other mode (heating/double thermostat): the condenser pump contact will close if the evaporator pump contact is closed.

When condenser pump control is allowed an extra digital output is needed (see service menu).

Heat recovery condenser pump

This function is only available on heat recovery units.
If Heat recovery mode is active in circuit1 or circuit2 then HR pump contact is closed. This pump is the waterpump that circulates the water of the heat recovery load.
The HR pump contact is a changeable digital output.

2.10 Lead-lag Control

Introduction

This function only applies on units with double circuit.
The lead-lag mode determines which circuit starts up first in case of a capacity demand. It prevents the unit from always starting up the same circuit.

Possible modes:

- **Automatic:** The controller decides whether circuit 1 or circuit 2 starts up first.
- **Manual C1 > C2:** Circuit 1 starts up before circuit 2. If circuit 1 is deactivated due to a failure, circuit 2 will start up instead.
- **Manual C1 < C2:** Circuit 2 starts up before circuit 1. If circuit 2 is deactivated due to a failure, circuit 1 will start up instead.

Remark: the different modes can be selected in the user settings menu.

Lead-lag hours in automatic mode

When the lead-lag control is done automatically, the software calculates the differences in operation time between the circuits. When this time is higher than the preset lead-lag hour value, the start sequence of both circuits is swapped.
The limit values of the lead-lag hours are the following:

- lower limit: 100 hours
- upper limit: 1000 hours
- default value: 1000 hours

Remark: This value is important for maintenance purposes. It should be set high enough so that the two compressors (if double circuit) do not require maintenance at the same time and that at least one compressor can remain constantly active.

Equal start up compressors

- Yes: both circuits will go up in capacity alternating.
- No: the leading circuit will go to full capacity before the lagging circuit can start up.

2

2.11 Capacity Limitation

Introduction

This function allows you to limit the capacity of the chiller. Depending on the adjusted mode, it is possible to control the capacity limitation via remote digital input, programmable schedule timer. From software version V3.0M6 onwards it is also possible to activate and deactivate the limitations manually or through BMS.
The limitation settings can be set in the user settings menu. In manual mode this function is not active.
If the limitation of that circuit is activated then:

- ➤ It is not possible to go to a higher capacity than the limitation. The compressor will stop uploading when compressor capacity > (limit x - 5 seconds download).
- ➤ If the present capacity is higher then the limitation than the compressor will download till: compressor capacity < (limit x - 5 seconds download).

Remote digital input mode

There are four different possible limitation settings which can be set in the user settings menu (L1CIR1 CIR2, L2 CIR1 CIR2, L3 CIR1 CIR2 and L4 CIR1 CIR2).
To activate the remote digital input mode just set one of the digital inputs to the desired setting in the service menu (DI1, DI2, DI3 and DI4) (possible settings: CAP. LIMIT 1, 2, 3 or 4) and connect the limitation switch to the right remote digital input terminals.

Schedule timer mode

The schedule timer screen of the user settings menu allows the user to define the capacity limitation setting according to a programmed time.

- ➤ MON, TUE, WED, THU, FRI, SAT and SUN: are used to define to which group each day of the week belongs (-/G1/G2/G3/G4).
- ➤ For each of the four groups up to nine actions can be set, each with their respective timing.
- ➤ Beside these four groups there is also a holiday period group which is set the same way as the other groups. Up to 12 holiday periods can be entered in the HD PERIOD screen. During these periods the schedule timer will follow the settings of the holiday period group.

Unit Limitation LIM 1

This unit Limitation “ LIM1” allows the user to use the limitation setting 1 (L1, CIR1, CIR2) without the need of a digital input, or schedule timer. To activate this unit Limitation just set “ Mode LIM1” and change the capacity of L1, CIR1 and CIR2 to the desired value.

Remark: Only the first limitation setting (L1) can be used in “LIM1” mode.

2.12 Floating Setpoint - Ambient Mode

Introduction

The ambient mode can be used to modify the setpoint in function of the ambient temperature.
The user is able to choose to use the floating setpoint 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 floating setpoint parameters and function can be set in the user settings menu.

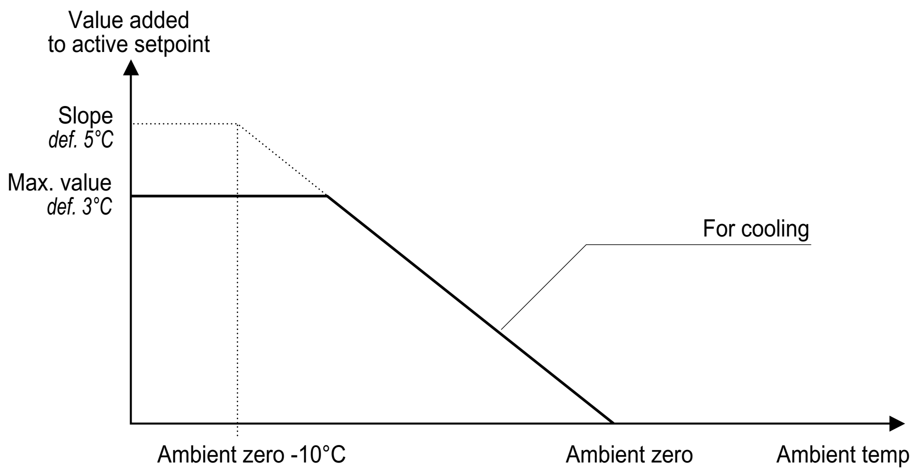
Applicable units

This function is active in cooling and heating, for units with an ambient sensor present.

	1. Air-cooled		2. Evaporater-less unit	3. Water-cooled unit	4. Condenser-less units
	EWTP	EWAP/EWAD	ERAP	EWWD	EWLD
	HR	CO	CA	HP	RC
Floating setpoint	O	O	O	--	O

Function description

1. Source of the floating setpoint outdoor temperature = **floating source**.
2. A reference at which the floating setpoint value is equal to zero = **ambient zero** (zero on screen).
3. A reference at which the floating setpoint value is maximum = **ambient - 10°**.
4. The maximum floating setpoint value = **max value** (max. value on screen).



Remark: the default and limit values for this function are given in the chapter concerning the user settings menu.

Explanation:

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

Remark: When you use the floating setpoint, the value of the setpoint on the readout and set point menu can be different. The readout screen will show the calculated value and the setpoint screen the set value.

2.13 Free Cooling on Ambient Temperature

Introduction

When ambient temperature is low, cool water can be made easily by direct heat exchange with ambient air. Free cooling can work on ambient or difference between inlet water temperature and ambient temperature.
When free cooling is activated a 3 way valve will be closed.

Free cooling can only be used if the changeable digital output "free cooling" is selected in the service menu.
Free cooling function is only active if unit is on.

It is possible to work with indirect or direct free cooling on ambient temperature.
With indirect free cooling the water of the load circulates through a separate heat exchanger instead of through the chiller. A second water circuit circulates through the other side of that heat exchanger.
In direct free cooling it is the water from the load that is directly cooled by the ambient air.

Applicable units

Only applicable on units with an ambient sensor.

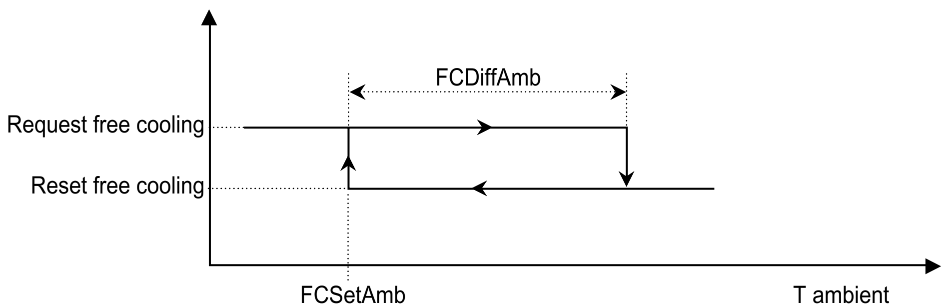
	1. Air-cooled		**2. Evaporater-less unit**	**3. Water-cooled unit**	**4. Condenser-less units**
	EWTP	EWAP/EWAD	ERAP	EWWD	EWLD
	HR	CO	CA	HP	RC
Floating setpoint	O	O	--	--	O

Function description

Depending on the settings and according to the function below free cooling is requested or not.

Mode: Free cooling on ambient:

- ➤ When free cooling is active, turn off compressor.
- ➤ When deactivating free cooling, there is a leadtimer to startup the compressors.
- ➤ When freecooling is active, it is possible to select whether the pump contact must be closed or opened.



T ambient ≤ Free cooling setpoint	Free cooling requested
T ambient ≥ Free cooling setpoint + free cooling difference	free cooling is reset

(The setpoint and the difference can be set in the user settings menu)

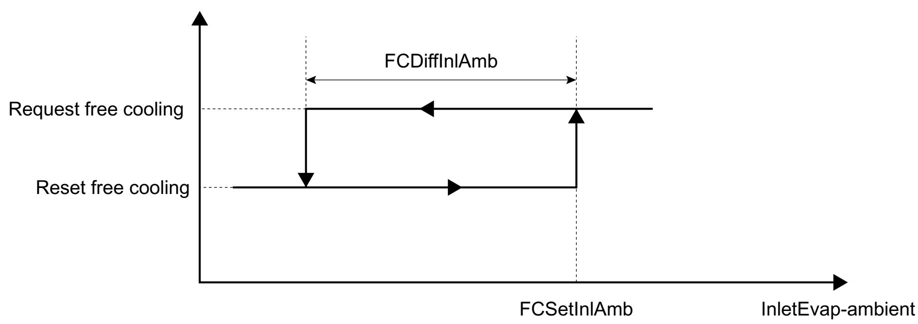
	Free cooling requested	Free cooling reset
Indirect free cooling	➤ Compressor off ➤ Evaporator water pump on ➤ Digital output for 3way valve closed	➤ Evaporator water pump on ➤ Digital output for 3way valve opens and lead timer starts ➤ Compressor on when lead timer is finished
Direct free cooling	➤ Compressor off ➤ Evaporator water pump off ➤ Digital output for 3way valve closed	➤ Evaporator water pump on ➤ Digital output for 3way valve opens and lead timer starts ➤ Compressor on when lead timer is finished

Remark: the lead timer and the choice for the status of the pump during free cooling can be set in the user settings menu.

Mode: Inlet - Ambient

Free cooling on difference between inlet & ambient:

- ➤ Compressors are not turned off (no leadtimer).
- ➤ Pumpcontact always on.



Inlet evap - Ambient > FCSetInlAmb	Free cooling requested
Inlet evap - Ambient < FCSetInlAmb - FCDiffInlAmb	Free cooling is reset

2.14 Heat Recovery

Introduction

This function allows recovering heat from a cooling only unit. This is done by means of a second plate heat exchanger and regulation on a higher high pressure setpoint.

This function is only available on air-cooled cooling only units with inverter fan management.

2

Defining the heat recovery mode

The decision whether the unit works in heat recovery mode or not can be done in 2 ways:

1. Through a heat recovery mode switch (S6S field installed):

➤ When the heat recovery mode switch is closed, heat recovery is asked.

➤ When open, cooling mode is asked.

Note: It is clear that the cooling capacity and the cooling efficiency will be higher when the unit is running in cooling mode. For this reason, we advise to use a external thermostat for S6S that switches the unit automatically to the cooling mode when the target temperature of the hot water is reached.

The changeable digital input 1 is by default defined as “Heat recovery”.

2. Through the heat recovery thermostat function of the controller.
The heat recovery mode is controlled by the hot water temperature measured by an additionally installed sensor R8T (EKCLWS) in the hot water.
To achieve this setting a changeable analog input must be defined as “HR inlet water c”.

Note:

➤ If the heat recovery thermostat function of the controller will be used and the heat recovery mode switch will not be installed, then the changeable digital input 1, default defined as “Heat recovery”, must be changed to “None”. (refer to service menu, screen changeable inputs”).

➤ If the heat recovery thermostat function of the controller will be used and the heat recovery mode switch will not be installed, then the unit will only run in heat recovery when the heat recovery themostat function requests heat recovery and when the heat recovery mode switch is closed (AND function). Else the unit will run in cooling mode.

An additional sensor R8T (EKCLWS) must be connected directly to the PCB of the unit.

The units with heat recovery installed can also be used in a DICN setup.

➤ If the system is controlled on inlet water temperature, the 2 ways to define the heat recovery mode are available on the master unit.

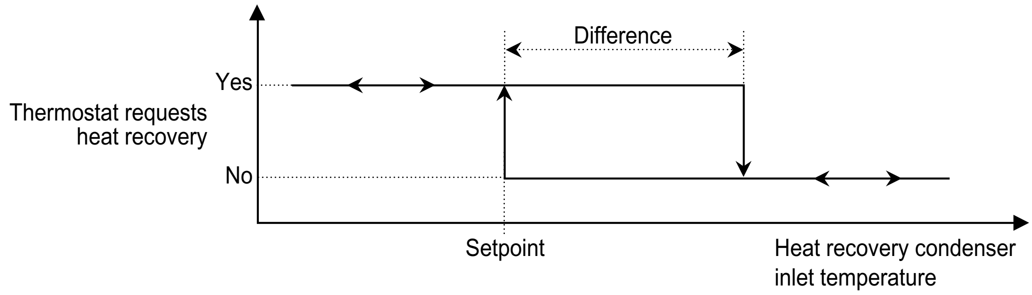
➤ If the system is controlled on outlet water temperature, the heat recovery mode can only be controlled by the heat recovery mode switch on the master unit.

➤ On the slave units, the 2 ways to define the heat recovery mode are available.

Function description

Heat recovery is requested if the digital input sets the mode to heat recovery and the thermostat requests heat recovery, based on the analogue signal of the inlet condenser sensor.

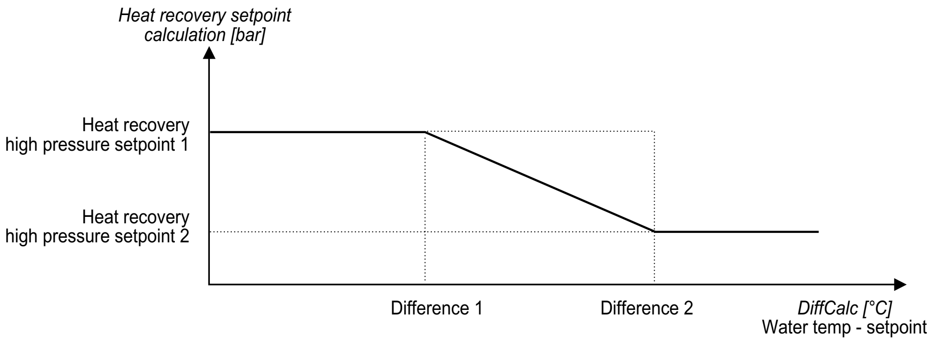
Thermostat function of Heat Recovery:



Heat recovery mode is activated if there's a heat recovery request, the circuit is on and the timer is finished.

When heat recovery mode is activated following actions are taken:

➤ Heat recovery high pressure setpoint calculation:



➤ The condenser pump is activated. This pump remains "ON" until the heat recovery mode is deactivated and the lag timer is 0.

➤ Inverter fan management is adapted to the new high pressure setpoint.

The economizer valve is operated. The economizer is used to avoid flash gas. This is accomplished by expanding part of the refrigerant, and uses it to sub-cool the rest before expansion. The heat exchange takes place in a smaller heat exchanger.

Operation of the economizer valve: economizer valve is activated when compressor is on

2.15 Changeable Digital Inputs

Introduction

4 changeable digital inputs are available and can be assigned to 10 different functions in the service menu.

2

Range of application

Input	Parameter on controller	Air-cooled		Evaporator -less	Water-cooled	Condenser -less
		EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
		CO	HR	CA	HP	RC
DI8	DI1	O	O	O	O	O
DI9	DI2	O	O	O	O	O
DI10	DI3	O	O	O	O	O
DI11	DI4	O	O	--	O	O

Functions overview

Possible functions	Air-cooled		Evaporator-less	Water-cooled	Condenser-less
	EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
	CO	HR	CA	HP	RC
0. None	O	O	O	O	O
1. Status	O	O	O	O	O
2. Dual setpoint	O	O	--	O	O
3. Remote On -Off	O	O	O	O	O
4. Remote Cooling / Heating	--	--	--	O	--
5/6/7/8. Capacity limitation 1-2-3-4	O	O	O	O	O
9. Fan Low noise	O	O	O	--	O
10. Heat Recovery	--	O	--	--	--

Remark: the selected function will only be accepted if it hasn't already been assigned to another digital input.

(*): DI1 is default programed as “heat recovery”.

2.16 Changeable Analogue Inputs

Introduction

1 changeable analogue input can be assigned in the service menu.

Range of application

Input	Parameter on controller	Air-cooled		Evaporator-less	Water-cooled	Condenser-less
		EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
		CO	CO	CA	HP	RC
AI1	AI3	O	O	--	O	O

Functions overview

Possible functions	Air-cooled		Evaporator-less	Water-cooled	Condenser-less
	EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
	CO	HR	CA	HP	RC
0. None	O	O	O	O	O
1. MS Mixed outlet sensor (NTC)	O (*1)	O (*1)	O (*1)	O (*1)	O (*1)
2. Setpoint signal 0/1V	O (*2)	O (*2)	--	O (*2)	O (*2)
3. Setpoint signal 0/10V	O (*2)	O (*2)	--	O (*2)	O (*2)
4. Setpoint signal 0/20mA	O (*2)	O (*2)	--	O (*2)	O (*2)
5. Setpoint signal 4/20mA	O (*2)	O (*2)	--	O (*2)	O (*2)
6. HR condenser inlet sensor	--	O	--	--	--

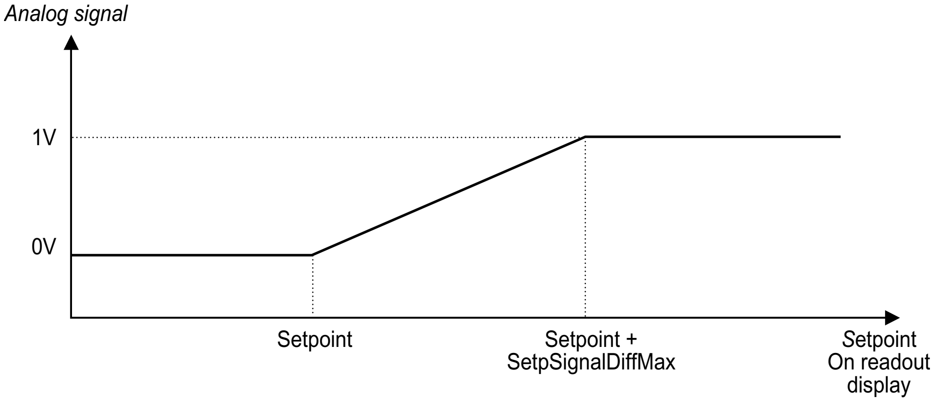
*1 only if unit is Master in DICN setup
*2 only if unit is Standalone (MSOption=No) or only if unit is Slave1 (MSOption=Yes)

- ➤ An analog input signal can be used to modify the setpoint. The user is able to choose to use the setpoint signal or not.
- ➤ The setpoint signal parameters can be set in the user settings menu.

2

Function description of the setpoint signal

Example setpoint signal 0-1V:



- If analog input AI3 has 1V then setpoint signal diff is equal to setpoint signal Diff max
- If analog input AI3 has 0V then setpoint signal diff is equal to 0.
- This value can also have a negative value (ex -10.0°C).

2.17 Changeable Digital Outputs

Introduction

2 changeable digital outputs can be assigned in the service menu.

Range of application

Input	Parameter on controller	Air-cooled		Evaporator-less	Water-cooled	Condenser-less
		EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
		CO	HR	CA	HP	RC
DO12	DO1	O (*)	O (*)	O (*)	O	O
DO13	DO2	O	O	O	O	O

Remark: (*) DO12 for CO, HR and ER units is fixed to evaporator heatertape, therefore it will not be visible in the service menu.

Functions overview

Possible functions	Air-cooled		Evaporator-less	Water-cooled	Condenser-less
	EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
	CO	HR	CA	HP	RC
0. None (open)	O	O	O	O	O
1. 1 (closed)	O	O	O	O	O
2. 2nd evaporator pump	O	O	O	O	O
3. Condenser pump	--	--	--	O	--
4. 100% capacity	O	O	O	O	O
5. free cooling	O	O	--	--	O
6. general operation	O	O	O	O	O
7. Reversing valve	--	--	--	O	--
8. Evaporator heater-tape	O	O	O	--	O
9. HR condenser pump	--	O	--	--	--

2

2.18 Schedule Timer Management

Introduction

The schedule timer consists of 5 groups, which can contain up to 9 actions each. 4 of these groups can be applied to different days of the week and the 5th one can be used for holiday periods.

Overview

This screen allows you to enable or disable the schedule timer and the holiday period timer.
This screen is only visible if the unit is operating as a standalone unit or if the unit is the master in a DICN setup.

Screen 8

Line n°	Display	Description	Possible settings
1	SCHEDULE TIMER	Screen title	
2	ENABLE TIMER	To enable the programmable schedule timer	N/Y
3	ENABLE HOLIDAY PER	To enable the programmable holiday period timer	N/Y

Remark: New screens will be available if one or both timer possibilities are set to Yes.
When the user has selected to work with a schedule timer it will be possible to define up to four groups. The each day of the week can be appointed to one of these groups and each group can contain up to nine different actions (capacity limitation, set points, cooling / heating selection) for different time periods. If both the schedule timer and the holiday period timer are enabled, the holiday period will get the priority.

Screen 8a1

This additional screen appears when the schedule timer is enabled.
This screen is only visible if the unit is operating as a standalone unit or if the unit is the master in a DICN setup.

Line n°	Display	Description	Possible settings
1	SCHEDULE TIMER	screen title	
2	MON: THU: SAT:	To allocate a certain group to one of these days	-, G1, G2, G3 or G4
3	TUE: FRI: SUN:	To allocate a certain group to one of these days	-, G1, G2, G3 or G4
4	WED:	To allocate a certain group to this day	-, G1, G2, G3 or G4

For each group mentioned in the above table up to 4 additional screens will follow.

Screen 8b1

This additional screen appears when the schedule timer is enabled and one or more days are dedicated to a group.
This screen is only visible if the unit is operating as a standalone unit or if the unit is the master in a DICN setup.

Line n°	Display	Description
1a	GROUP 1/2/3/4:01 TO 03	To set action 1 to 3 for group 1.
1b	GROUP 1/2/3/4:04 TO 06	To set action 4 to 6 for group 1.
1c	GROUP 1/2/3/4:07 TO 09	To set action 7 to 9 for group 1.
1d	HOLIDAY	To set actions for the holiday period
2	X:00h00 - 00.0	To set one of the nine times and actions And specify a setpoint or capacity limitation. (see below for possibilities)
3	X:00h00 - 00.0	
4	X:00h00 - 00.0	

Possible operation time settings:

Lower limit	Upper limit	Step	Default
00h00	23h59	1 min	00h00

2

Possible action setting

Possible content of 1 action			Air-cooled		Evaporator -less	Water -cooled	Condenser -less
Nr.	Display	Description	EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
			CO	HR	CA	HP	RC
0	-	No action	O	--	O	O	O
1	ON	On	O	O	O	O	O
2	ON COOL	On and Cooling	--	--	--	O	--
3	ON HEAT	On and heating	--	--	--	O	--
4	OFF	Off	O	O	O	O	O
5	LIM1	Activate Limitation 1	O	O	O	O	O
6	LIM2	Activate Limitation 2	O	O	O	O	O
7	LIM3	Activate Limitation 3	O	O	O	O	O
8	LIM4	Activate Limitation 4	O	O	O	O	O
9	NO LIM	Disactivate limitation	O	O	O	O	O
10	LOWNOIS	Activate Low noise	O	O	O	--	O
11	NO-LOWN	Disactivate Low noise	O	O	O	--	O
12	ISP 1 E:	Inlet set point 1 Evaporator	O	O	--	O	O
13	ISP 2 E:	Inlet set point 2 Evaporator	O	O	--	O	O
14	OSP 1 E:	Outlet set point 1 Evaporator	O	O	--	O	O
15	OSP 2 E:	Outlet set point 2 Evaporator	O	O	--	O	O
16	ISP 1 C:	Inlet set point 1 Condenser	--	--	--	O	--
17	ISP 2 C:	Inlet set point 2 Condenser	--	--	--	O	--
18	SP1:	Set point 1 thermostat	--	--	O	--	--
19	SP2:	Set point 2 thermostat	--	--	O	--	--

Remark:

- In the user settings menu it is possible to assign every day of the week to one of the four groups. Then 1 to 9 actions can be assigned to each group.
- The holiday timer can be applied to up 12 holiday periods and up to 9 actions can be assigned to this group.
- The operation mode of the unit will depend on the last command it has received. This can be from the timer, the terminal or BMS.
- The values of ISP1 (2) E, OSP1 (2) E and ISP1 (2) C can be chosen and can thus be different from the values stated in the setpoint menu.

Screen 8a2

This additional screen appears when the holiday period timer is enabled. This screen is only visible if the unit is operating as a standalone unit or if the unit is the master in a DICN setup and the holiday timer is activated.

Line n°	Display	Description
1a	HOLIDAY:01 TO 03	To select the programmed holiday actions 1 to 3.
1b	HOLIDAY:04 TO 06	To select the programmed holiday actions 4 to 3.
1c	HOLIDAY:07 TO 09	To select the programmed holiday actions 7 to 9.
2	X:00h00 - 00.0	To set one of the nine times and actions And specify a setpoint or capacity limitation.
3	X:00h00 - 00.0	
4	X:00h00 - 00.0	

For possible operation times and action settings, see the possible settings for the schedule timer.

Remark: Only 1 group of settings (holiday) is possible for all programmed holidays (max. 12).

Screen 8b2

This additional screen appears when the holiday period timer is enabled. This screen is only visible if the unit is operating as a standalone unit or if the unit is the master in a DICN setup. In this menu it is possible to define up to 12 holiday periods.

Line n°	Display	Description
1a	HD PERIOD:01 TO 03	To set holiday period 1 to 3.
1b	HD PERIOD:04 TO 06	To set holiday period 4 to 6.
1c	HD PERIOD:07 TO 09	To set holiday period 7 to 9.
1d	HD PERIOD:10 TO 12	To set holiday period 10 to 12.
2	X:00/00 TO 00/00	To set one of the twelve holiday periods
3	X:00/00 TO 00/00	To set one of the twelve holiday periods
4	X:00/00 TO 00/00	To set one of the twelve holiday periods

Schedule timer example

			MARCH			
MON	**TUE**	**WED**	**THU**	**FRI**	**SAT**	**SUN**
1 G1	**2** G1	**3** G2	4 G1	**5** G1	**6** G3	**7** G3
8 G1	**9** G1	**10** G2	11 G1	**12** G1	**13** G3	**14** G3
15 G1	**16** G1	**17** G2	18 G1	**19** G1	**20** G3	**21** G3
22 G1	**23** H	**24** H	25 H	**26** H	**27** H	**28** H
29 H	**30** G1	**31** G2				

To come to the schedule above following settings have to be made:

```
_V           SCHEDULE TIMER
MON: G1   THU: G1   SAT: G3
TUE : G1  FRI : G1  SUN: G3
WED: G2
```

•
•
•

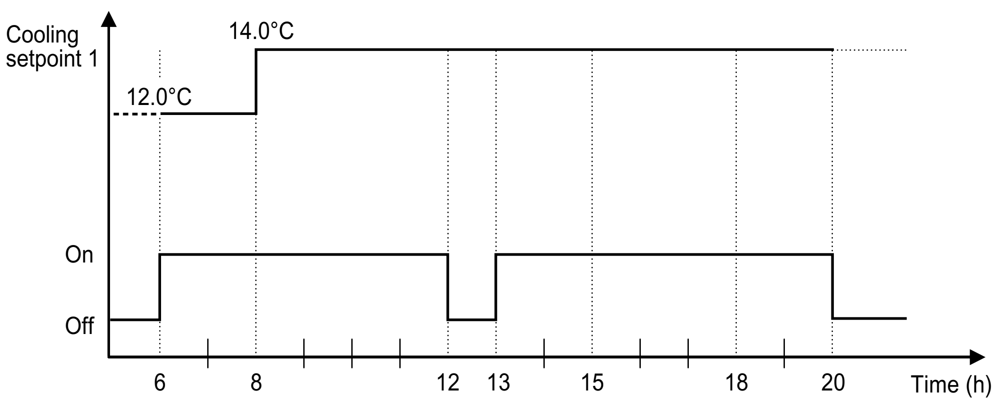
```
_V          HO PERIOD : 01 10 03
01 : 23/03  TO 29/03
02 : 00/00  TO 00/00
03 : 00/00  TO 00/00
```

All days assigned to the same group will work according to the settings of this group.

In this example settings:

- ➤ all Mondays, Tuesdays, Thursdays and Fridays will work according to the settings in group 1 (G1),
- ➤ all Wednesdays will work according to the settings in group 2 (G2),
- ➤ all Saturdays and Sundays will work according to the settings in group 3 (G3),
- ➤ all holiday days will work according to the settings in the holiday group (H).

All group settings of groups G1, G2, G3, G4 and H work similair as folowing exaple (settings for group 1):



```
_V          GROUP1:01 TO 03
1: 06H00 1SP1 E: 12.0
2: 06H00 ON
3: 08H00 1SP1 E: 14.0
```

Screen 1

•
•
•

```
_V          GROUP1:04 TO 06
4: 12H00  OFF
5: 13H00  ON
6: 20H00  OFF
```

Screen 2

2

2.19 Pumpdown

How to access

To enter the pump-down menu

Built-in display	Remote terminal
1 Go to the second screen of the user password menu ("change password")	**1** Go to the second screen of the user password menu.
2 Press Enter Key and Menu Key at the same time and hold them for 5 seconds.	**3** Press Enter Key and Menu Key at the same time and hold them for 5 seconds.

Controller

To execute a pump down follow instructions on screens.

Screen 1

Line n°	Display	Description	Possible settings
1	CIRCUIT 1(2) :	Displays circuit to pump down. (Select between C1 or C2)	PUMPDOWN
2	CLOSE LIQUIDE LINE		
3	stop valve		
4	(ENTER WHEN READY)		

Screen 2

Line n°	Display	Description	Possible settings
1	_PUMPDOWN		
2	PUT UNIT 'ON' TO		
3	START PUMPDOWN		
4	PROCEDURE		

Screen 3

Line n°	Display	Description	Possible settings
1	_PUMPDOWN BUSY	Number indicate the number of start-up cycles of the compressor	1 2 3
2	CLOSE THE DIS-CHARGE		
3	STOPV.IF PUMPDOWN IS		
4	FINISHED LP:	Displays the low pressure	bar

The compressor will execute 3 pump-down cycles. See upper line in controller screen 'PUMPDOWN BUSY123' (compressor stops at LP<0.2bar and starts again at LP>0.2bar).

Screen 4

Line n°	Display	Description	Possible settings
1	PUMPDOWN FINISHED		
2	PRESS ENTER TO STOP		
3	PUMPDOWN		
4			

2

2.20 Password Function

Introduction

A user password can be chosen, in the user password menu, to protect the user settings.

In the user settings menu it can be chosen whether a password is needed to change the setpoint.

In the service menu you can choose if a password is needed to reset safeties. This password can be either the user password either the service password.

Overview of possibilities

A user password is used to protect the user parameters. This password can be set in the user password menu.

A service password is used to protect the service parameters; this password is factory set and cannot be changed.

Menu \ Possible to enter with		User password	Service password
		1234 (default)	1914 (fixed)
1.	Setpoint menu (only if Setpoint password is enabled in the user settings menu)	Yes	Yes
2.	User settings menu	Yes	Yes
3.	Service menu	No	Yes
4.	User password menu	Yes	Yes
Additionally: depending on the status of the "password needed to reset safety" parameter in the service menu.			
5.	Possible to reset a safety in safety menu if user password is required	Yes	Yes
6.	Possible to reset a safety in safety menu if service password is required	No	Yes

2.21 100% Capacity, General Operation

100% capacity

This is a digital output related function.

The function activates a digital output when the unit is operating at 100% capacity.

General operation

This is another digital output related function.

This function activates a digital output whenever the unit is "ON".

2.22 Reversing Valve

This digital output function allows switching a reversing valve by closing a contact in heating mode and opening the contact in cooling or double thermostat mode.

2.23 Evaporator Heater-tape

This is a digital output function that is used to prevent the evaporator from freezing up when the pump is switched off.

Remark

Evaporator heater-tape is standard on all cooling only, heat recovery and evaporator less unit.

2.24 Low pressure Bypass

To avoid low pressure errors during start up of the unit the low pressure error is disabled for a certain time.

The low pressure bypass can be set from 0 to 180 seconds in the service menu. The default value is 120 seconds.

2.25 Simulation

This is an operation mode for the controller in a simulation board because then the actual unit and components are replaced by electrical and electronic components. These components would not allow correct operation of the controller if it was in normal mode.

This mode can only be used on simulation boards.

2

Possible settings (Service menu):

➤ Simulation setting:

Simulation parameter	Application
Simulation = NO	actual unit
Simulation = YES	simulation board is selected

➤ AI Setting:

Simulation parameter	Application
AI = 0	actual unit = actual sensors are used on the analog inputs
AI = 1	simulation board (all analog inputs use potentiometers = NTC)

➤ AO Setting:

Simulation parameter	Application
AO = 0	variable analog output from 0V to 10V
AO = 1	analog output with 2 possible outputs, 0V or 5V output

➤ DIS. EEV Setting:

Simulation parameter	Application
DIS. EEV = 0	actual unit with EEV driver
DIS. EEV = 1	If no EEV driver is connected to the simulation board this parameter should be put on 1. This will dissable the EEV control on the controller.

➤ STL Setting:

Simulation parameter	Application
STL = O	actual unit, controller uses the feedback from the compressor. The compressor capacity is calculated based on the feedback value
STL = 1	if no compressor control motor is connected to the controller of the simulation board, then this parameter should be programmed on 1. Now the controller will simulate the feedback resistance.

2.26 BMS Function

Introduction

BMS stands for Building Management Systems. These systems were developed for centralized overview and control of technical installation for complete sites.
The Daikin BMS option makes it possible to connect the Daikin chillers to a larger control system. The necessary tools for this communication are the Gateway and the address card.

In this chapter we will give a short overview of the possibilities and settings for the BMS function.
For more detailed information we refer to the service manual "BMS option for Daikin water chillers"

2

Function description

In the service menu it is possible to set the parameter "BMS control allowed". If this parameter is "YES" then the supervisor can read and write parameters from and to the unit. If however the parameter is set to "NO" then the supervisor can only read parameters from the unit.
For communication both the address card and the Gateway create a database with the variables.

➤ From address card to Gateway

Variable type	Maximum number
Digital	200
Analogue	128
Integer	128

➤ From Gateway to supervisory BMS

The BACnet and Modbus-Jbus protocols do not distinguish integer from analogue variables. Therefore the integer and analogue variables from the address card will be put together in the analogue variables in the Gateway database.

Variable type	Maximum number	Corresponding BACnet object
Digital	200	Binary value
Analogue	256	Analogue value

Database diagram

In Modbus-Jbus up to 16 units can be connected, in BACnet up to 8.
Each unit has an address 1, 2, 3, etc. These addresses are used to buildup the Gateway database.

Address card database

Address	Variables
1 – 200	Digital variables
1 – 128	Analogue variables
1 – 128	Integer variables

Gateway database

Digital variables

Address	Variables
1 – 200	Digital variables from unit 1
201 – 400	Digital variables from unit 2
401 – 600	Digital variables from unit 3
...	

Analogue variables

Address	Variables
1 – 128	Analogue variables from unit 1
129 – 256	Integer variables from unit 1
257 – 384	Analogue variables from unit 2
385 – 512	Integer variables from unit 2
...	

3 The Functional Controller for DICN

3.1 What Is in This Chapter?

Introduction

The functions that will be described in the next chapters are basically the same as those that were described in previous chapters. Therefore the details and the description of the function itself will not be described again, but only the specific difference that occur when the units are used in a DICN setup (DICN = Daikin Integrated Chiller Network).
By DICN setup we mean MS Option is yes and the mode is "Normal" or "Standby".
Understanding these functions is vital when diagnosing a malfunction, which is related to functional control.

Overview

This chapter contains the following topics:

3.2 DICN (network): Overview

Introduction

DICN = Daikin Integrated Chiller Network
Also referred to as master-slave system.

Remark: In a DICN system (Master-Slave), all the pCO^2-controllers must have the same software, code, bios, and boot version!

Function description

To activate the DICN function MS Option must be set to "Yes" in the service menu. In the user settings menu of the master it must also be specified how many slave units are connected.
When activated, this function will transfer all parameters to the different units through pLAN communication line.

In DICN setup (when MS option is yes): the different units can be put in "normal" or "standby" mode or in disconnected ON / OFF mode. When the mode is disconnected the unit selected will operates as standalone units.

Remark: If the master is down (= no power) then a network safety is activated and all units will work as standalone (no parameters are transferred), and they will work with their own setting in the controller.

Overview of possibilities

Basic principles:

- No ER-units in a DICN-system.
- Possible to combine all air-cooled chillers (including HR options and Fan inverter options: EWAP110~540MBYNN/EWTP110~540MBYNN.
- Possible to combine all water-cooled chillers: EWWD120~540MBYNN.
- Possible to combine all remote condenser water chillers: EWLD120~540MBYNN.
- Max to combine 4 units in one DICN-system.

Important:

- It is not possible to combine pCO and pCO^2 controllers in one DICN system.
- It is not possible to combine step and stepless compressors in one DICN system.

3.3 DICN Basic Setup (= master/slave system)

A site with units installed in a DICN configuration will operate as one big chiller with different water circuits installed in parallel. We can virtually speak about a DICN-unit in stead of a site with different chillers.

The DICN-unit can be controlled via inlet water or outlet water control. For outlet water control, an extra sensor has to be installed in the common leaving water pipe.

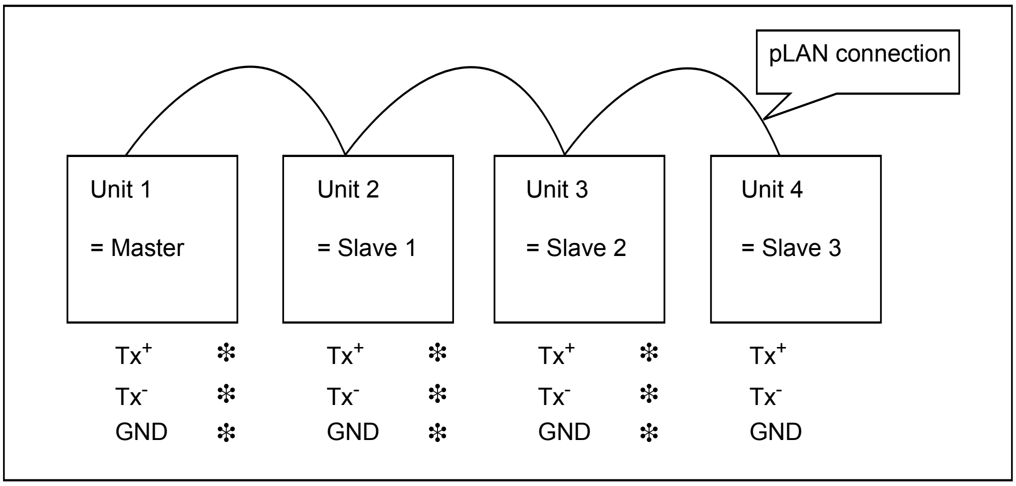
Up wiring

For a system with chillers in a master-slave configuration, the chillers have to be connected witch an AWG20/22 shielded cable, made up of a twisted pair plus shield.

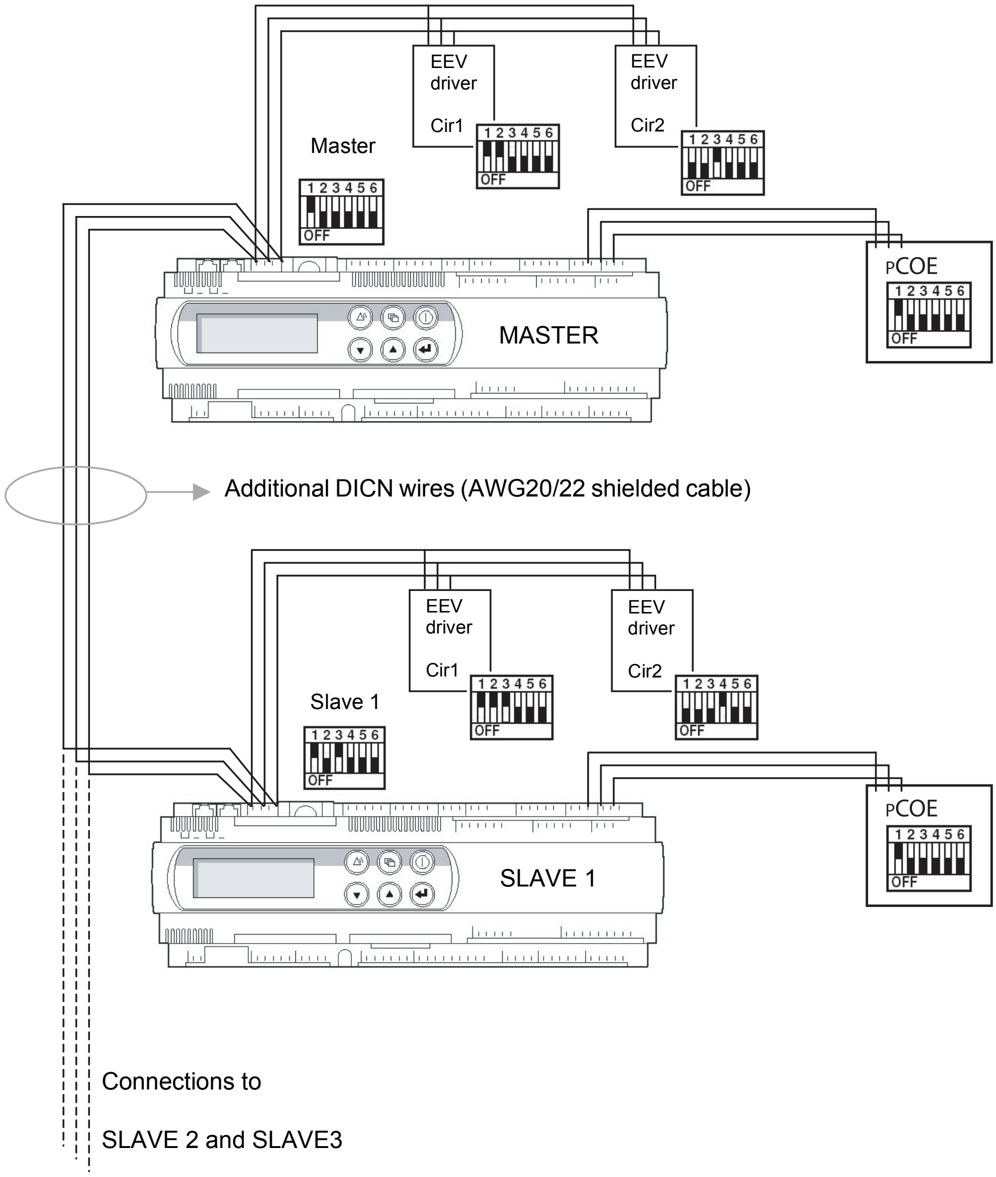
- ➤ Make the connection between the different chillers (see next page).
- ➤ Make first all connections and change addresses (dipswitches).

Take care of the polarity! TX+ on one chiller must be connected to TX+ on another chiller. You have to do the same for TX-. Also connect the shielding to the ground.

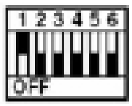
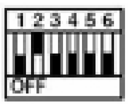
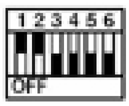
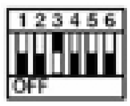
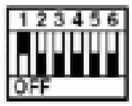
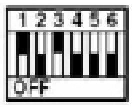
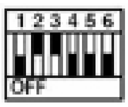
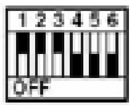
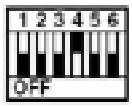
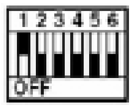
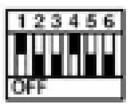
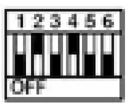
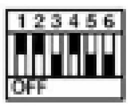
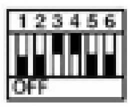
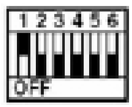
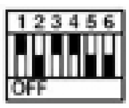
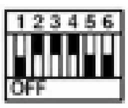
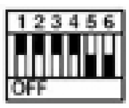
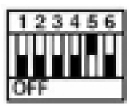
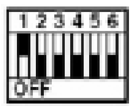
For units in a DICN configuration, be sure to provide every chiller with its own flow switch, and be sure to interlock with the pump that is serving the chiller.



Wiring Example: Master-slave



Overview of addresses in DICN setup

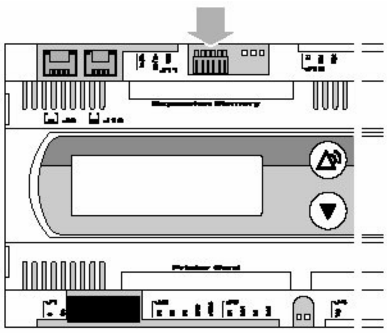
		PCB (pCO^2)	User terminal (option)	EEV 1 (If present)	EEV 1 (If present)	PCOE (If present)
Unit 1	Master	1	2	3	4	1
						
Unit 2	Slave 1	5	6	7	8	1
						
Unit 3	Slave 2	9	10	11	12	1
						
Unit 4	Slave 3	13	14	15	16	1
						

Remark:

- PCOE expansion board address is always 1.
- PCOE is only used on all double circuits.

Place of Dipswitches

Place of dipswitches on the pCO^2 controller:



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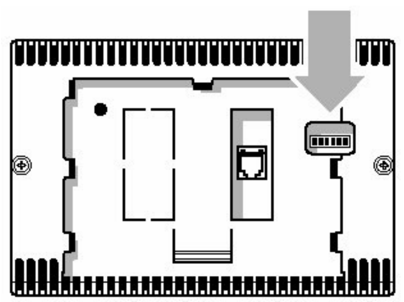
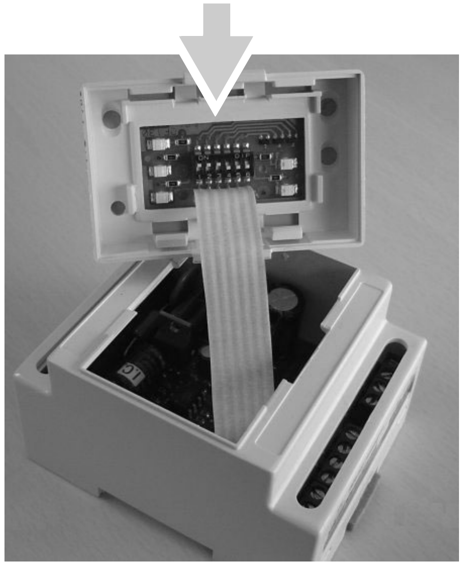
Place of dipswitches on the User terminal:



Place of dipswitches on the EEV driver:



Settings on the controller

DICN settings for the pCO2 controller

Remark: The remote start/stop, is the same as with individual units. In case of DICN, the remote start/stop to be used, is the one from then master unit. In case of a disconnect unit, you must use the remote start-stop of this unit.

➤ **STEP 1: GO TO THE SERVICE MENU**

You need the password to enter this menu. The unit leaves the factory with password fixed to "1914" (to enter the user menu, use default password 1234).

Line n°	**Display**	**Description**
1	ENTER SERVICE	Screen title
3	PASSWORD: 0000	Enter the correct password

Remark: When the unit is running it is not possible to enter the service menu.

2

➤ **STEP 2: SELECT THE MASTER-SLAVE OPTION (ON THE MASTER AND SLAVES)**

This screen allows you to modify the master-slave option
Line 4 (DICN option) is not visible on ER units.

Service screen 1:

Line n°	Display	Description	Default	Possible settings
1	SERVICE MENU	Screen title		
2	MIN. OUTL. WATER	To select the minimum outlet water temperature	4°C	From -10 till 8
3	FINETUNE(BMS)	To select the communication interval	30s	From 0s till 60s
4	**MS OPTION**	To select master-slave option yes or no	N	Y or N

➤ Change the MS OPTION to Yes

➤ **STEP 3: SELECT UNIT PRIORITY -STEPL PRIORITY (ON THE MASTER AND SLAVE)**

Line 4 is only visible if MS option setting = Yes

Line n°	Display	Description	Default	Lower limit	Upper limit
1	SERVICE MENU	Screen title			
2.1	C12%:	Set the timer to run in 12% mode to start up	20s	20s	180s
2.2	START:	Timer to set the compressor to the first capacity step for a certain time before the first loadup is allowed	180s	20s	360s
3.1	STOP:	Timer to set to 12% before stop.	8s	0s	99s
3.2	HP SETBACK:	Function used to prevent the unit from going into high pressure safety	15.5bar (R134a)	15.5 bar	17.0 bar
			24.5bar (R407C)	23.5 bar	26.0 bar
4.1	**MS PR:**	Unit priority -stepL Priority	0-2	0-0	3-4
4.2	AI3:	Offset of analogue input 3	0°C	-0.5°C	+0.5°C

Remark: Unity priority - stepL Priority

The first digit of the Master Slave Priority refers to the Unit priority. With this digit you can give each unit a certain start up priority.

The second digit refers to the Step Length priority. This setting reacts only on load up steps and avoids that one of the DICN units goes into freeze-up alarm because the common leaving water is still to high.

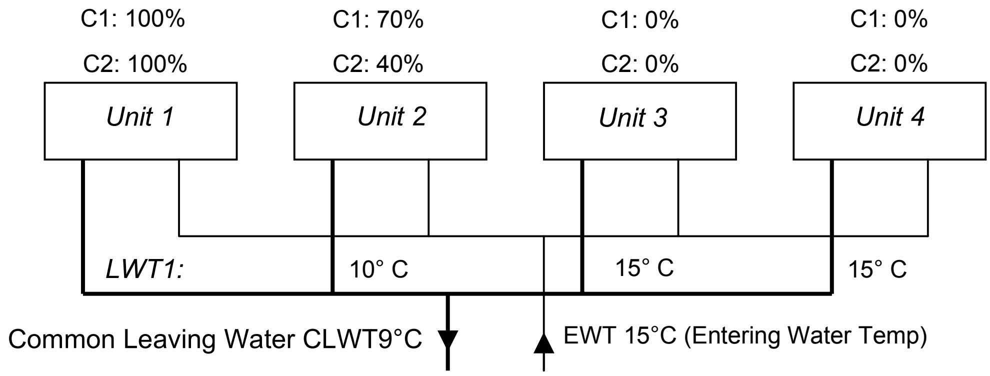
Explanation of Unit priority - stepL Priority Settings

There is a possibility to put a priority parameter in the service menu. This parameter is standard set on 2 and can be changed from 0 till 4. The setting reacts only on load up steps and avoid that one of the DICN unit goes into freeze-up alarm because the common leaving water is still to high.

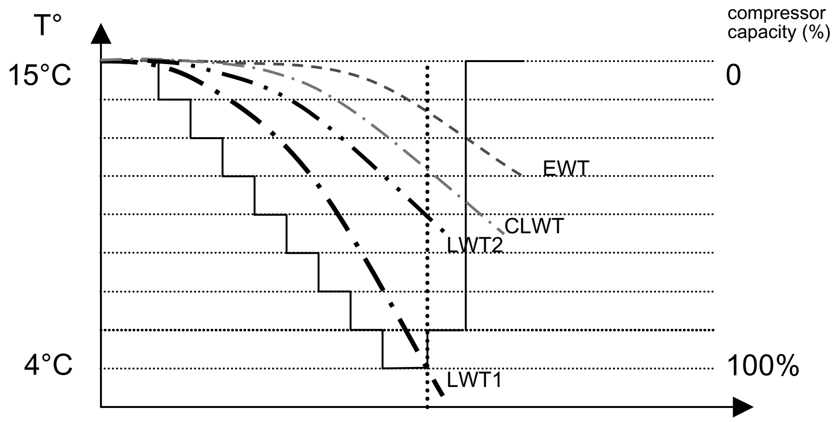
Load up priority result:

If an unit has an LWE < MOW + Stepl priority*steplength,
than it has a lower priority than the rest.

EXAMPLE: LWE setpoint = 6°C

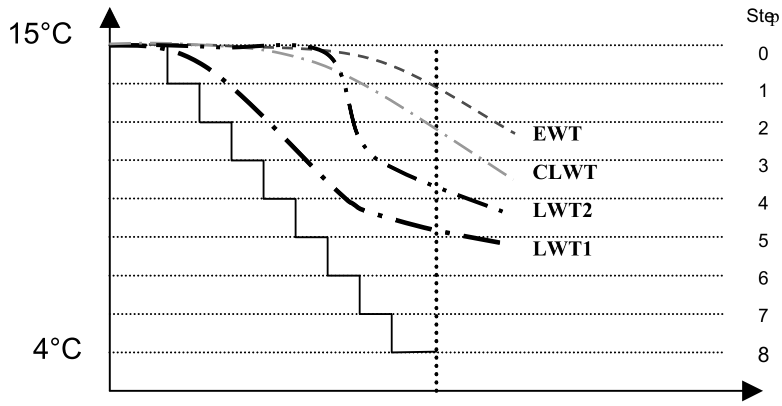


Without Priority Parameter



LWT1 = leaving water temperature unit 1.
LWT2 = leaving water temperature unit 2.
CLWT = common leaving water temperature DICN system.
EWT = Entering water temperature.

With Priority Parameter



If unit 1 gets priority 3 than we get : If LWE < 4+(3*1.5)
If LWE < 8.5 than this unit get a lower priority than the other units.

For units with more than 2 circuits, the individual lead/lag setting of a unit to determine the priority of the circuits - remain valid. Every unit should be configured as either a "NORMAL", "STANDBY" or "DISCONNECT" unit. This setting will be mentioned on the display of each chiller.

➤ **STEP 4: GO TO THE USER MENU (OF THE MASTER AND SLAVE)**

Screen on the master:

Line n°	Display	Description	Possible settings
1	MASTER SETTING	screen title	
2	NR OF SLAVES	Enter the number of slaves you want to use the DICN network	0 / 1 / 2 / 3

Enter the number of slaves

Remark: this screen is only available on the Master unit.

Screen on the master:

Line n°	Display	Description	Possible settings
1	MASTER SETTING	screen title	
2	MODE	Normal: the unit is in normal operation Standby: the unit is in standby Disconnected: the unit is disconnected of the DICN setup and will operate as a standalone.	NORMAL DISCONN. ON/OFF STANDBY
3	OFFSET	After the adjusted hours the units will change the sequence of start-up.	0h till 9000h
4	PUMP ON IF	Select when the pump must start	UNIT ON COMPR ON

Screen on the slave:

Line n°	Display	Description	Possible settings
1	SLAVE SETTING	screen title	
2	MODE	Normal: the unit is in normal operation Standby: the unit is in standby Disconnected: the unit is dis-connected of the DICN setup and will operate as a stan-dalone.	NORMAL DISCONN. ON/OFF STANDBY
3	OFFSET	After the adjusted hours the units will change the sequence of start-up.	0h till 9000h
4	PUMP ON IF:	Select when the pump must start	UNIT ON COMPR ON

Description of the different operation modes and settings.

NORMAL

The network controls the unit. Loading and unloading is decided by the central control of the network. Putting this unit ON or OFF will also put all other units ON or OFF, unless their status is "DISCONNECT ON/OFF".

Changing CONTROL SETTINGS or THERMOSTAT SETTINGS on this unit, will apply to all other units. MANUAL CONTROL on such a unit is not possible.

STANDBY

The unit is considered as a "NORMAL" unit and its function is then also similar to a unit defined as "NORMAL", but this unit however, will only come into operation if:

- another unit is in alarm (unit safety or circuit safety)
- another unit is in "DISCONNECT ON/OFF" mode
- the setpoint is not reached when all other units have been running on 100% capacity.

"If more than one unit is defined as STANDBY, only 1 of the units will be really standby. The number of running hours will decide the unit that is really standby.

Also, more than 1 unit (up to 4) can be defined as a "STANDBY" unit. In that case, only the unit which is most near to its target running hours will be considered as a "STANDBY" unit. This means, if a customer wants to have 1 particular unit always to be in "off" mode (except for alarm or capacity shortage of the other chillers), then he only has to define this 1 unit as "STANDBY".

But if a customer wants to have more than 1, or even all chillers to be a standby unit alternately (each on its turn), then more than 1 or all chillers should be defined as "STANDBY".

DISCONNECT

DISCONNECT: Units which are defined as "DISCONNECTED", can be put "ON/OFF" or set to MANUAL MODE independent from the other units. This can be very useful e.g. in case of servicing. When changing to "NORMAL" or "STANDBY", the unit becomes part of the system again.

OFFSET

The OFFSET time defines the target difference in running hours between one unit and another unit with OFFSET:0000 h. This value is important for maintenance purposes. The difference in setting among different units should be high enough as to avoid servicing of the units all at the same time. The lower and upper limits are 0 and 9000 hours respectively. The default value is 0 hours.

For units with 2 circuits, the individual lead/lag setting is valid as to determine the priority of the circuits.

E.g. if following setting is made:

Unit 1 = 0 h
Unit 2 = 1000 h
Unit 3 = 2000 h
Unit 4 = 2000 h

Then unit 3 and 4 will be operated most. They will get priority in operation as to reach 2000 running hours more than unit 1. Unit 1 will be the unit with the lowest running hours.

PUMP ON IF

Set if the pump must operate as long as the chiller is ON (UNIT ON), or during compressor on condition only (COMPR ON).

➤ When UNIT ON is selected, the voltage free contact S9L will remain closed as long as the chiller is ON.
  The pump of individual unit will run if unit is on.

➤ When COMPR ON is selected, the voltage free contact S9L will remain closed as long as the compressor is ON.

The pump of an individual unit will run only if the compressor is on of that unit.

➤ When COMPR ON is selected, the voltage free contact S9L will remain closed as long as the compressor is ON.
  The pump of an individual unit will run only if the compressor is on of that unit.

➤ **STEP 5: NETWORK MENU**

The network menu is only accessible when MS OPTION is set to "YES" in the service menu.

Screen 1

Line2, 3, 4 only visible if MSOption = Yes

Line n°	Display	Description	Possible settings
1	NETWORK		
2	XXXXXXX	Gives the setpoint you selected to use (usersettings menu and dual setpoint if selected)	MANUAL MODE INLSETP1 (2) E OUTSETP1 (2) E INLETSP1 5 (2) C SP1(2) E: C: THERMOSTAT
3	INL WATER E	Inlet temperature of the inlet water on the master unit	°C

Line n°	Display	Description	Possible settings
4	OUTL WATER E	Gives the temperature of the Common outlet water temperature (only displayed when sensor R8T is installed)	°C

2

Line 4 is only visible if in user settings menu the control setting mode is "outlet water setpoint" and an extra temperature sensor must be installed to measure the mixed outlet water temperature.

Screen 2

Line n°	Display	Description	Possible settings
1.1	M:	Displays status of Master (as selected in user settings menu)	NORMAL/STANDBY DISCONN/SAFETY
1.2	CAP:	Displays the capacity of the master unit	
2.1	SL1:	Displays status of the slave (as selected in user settings menu)	NORMAL/STANDBY DISCONN/SAFETY
2.2	CAP:	Displays the capacity of the slave1 unit	
3.1	SL2:	Displays status of the slave (as selected in user settings menu)	NORMAL/STANDBY DISCONN/SAFETY
3.2	CAP:	Displays the capacity of the slave2 unit	
4.1	SL3:	Displays status of the slave (as selected in user settings menu)	NORMAL/STANDBY DISCONN/SAFETY
4.2	CAP:	Displays the capacity of the slave3 unit	

3.4 On/Off Management

Overview

The table below gives an overview of the status of the unit in different situations.

<table>
<tr><td rowspan="2"></td><td>MS Option = yes (network unit)</td><td></td><td rowspan="2">MS Option = no (standalone unit)</td></tr>
<tr><td>NORMAL or STANDBY</td><td>DISCONN.ON/OFF</td></tr>
<tr><td>On/Off status</td><td>Equal for all units that are in "NORMAL/STANDBY" mode</td><td>Dedicated to this unit only.</td><td>Dedicated to this unit only.</td></tr>
<tr><td>Changing the On/Off status on the controller</td><td>When you push the ON/OFF button on a unit that is in "NOMAL/STANDBY" mode the status (ON/OFF) will be transferred to all the other units in "NORMAL/STANDBY" mode</td><td>The status (On/Off) is dedicated to this unit only.</td><td>The status (On/Off) is dedicated to this unit only.</td></tr>
<tr><td rowspan="2">Changing the On/OF status remotely</td><td>Into the service menu of the master, you can select a changeable Digital Input as "Remote On/Off"</td><td>Into the service menu of that unit, you can select a changeable Digital Input as "Remote On/Off"</td><td>Into the service menu of that unit, you can select a changeable Digital Input as "Remote On/Off"</td></tr>
<tr><td colspan="3">Remark:
➤ If the master is "DISCONN.ON/OFF" then the DI will change the On/Off status of the master & all the units with "NORMAL/STNADBY" mode.
➤ If a slave (=not the master) is "NORMAL/STNADBY" and the DI= "Remote On/Off" then the DI of that slave will not change the On/Off status of the unit &all the "NORMAL/STNADBY" units.</td></tr>
</table>

Remark: If a remote ON/OFF switch is present this switch must be set to "ON" before the unit can start up.

2

3.5 Thermostat Control

Overview

When connected in DICN the regulation mode (inlet/outlet) is transferred to all units with MS Option set to "YES".

	MS Option = yes (network unit)		**MS Option = no** (standalone unit)
	NORMAL or STANDBY	DISCONN.ON/OFF	
Inlet/Outlet mode	Equal for all units	Equal for all units	Dedicated to this unit only.
Changing to Inlet/Outlet	When you change the Inlet/outlet mode in a unit. Status is transferred to all other units. Except units that are in ("DIS-CONN.ON/OFF" mode and manual mode).	When you change the Inlet/outlet mode in a unit. Status is trans-ferred to all other units. Except units that are in ("DIS-CONN.ON/OFF" mode and manual mode).	When you change the Inlet/outlet mode in that unit. No status is transferred to other units.

Overview of the possibilities

		Air-cooled cool-ing only		**Evaporator-less**	**Water-cooled**	**Condenser -less**
		EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
		CO	HR	CA	HP	RC
Cooling mode	Inlet water step	X	X		X	X
	Outlet water step	X	X		X	X
	Thermo-stat			X		
	External Analog signal	X	X		X	X
Heating mode	Inlet water step				X	
	External analog signal				X	
Double thermo-stat mode	Inlet water step				X	
	External analog signal				X	
Manual Controll		X	X	X	X	X

Stepless: differential thermostat

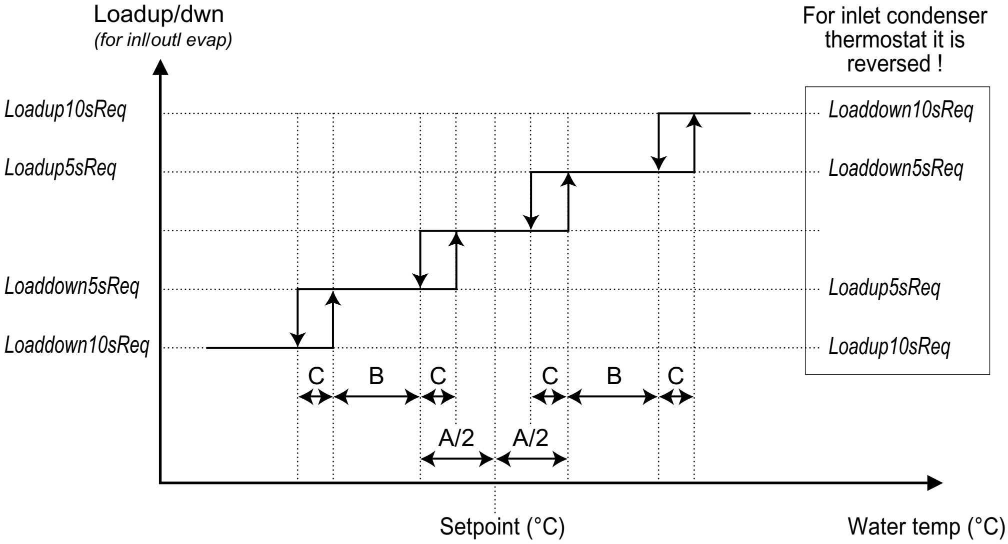


Fig. Differential thermostat.

Double thermostat control

This mode regulates on both inlet water sensor of the evaporator and the condenser.
This is only applicable on water-cooled chillers.

The same functions are used as in inlet condenser control and inlet evaporator control.
Load-up will be requested when both functions request a load-up and the load-up time = 0. This is an "AND" function.
Load-down will be requested when one of the functions requests a load-down and the load-down time = 0. This is an "OR" function.

External thermostat

Not accessible because DICN is not possible for condenser-less units and this function is only available on condenser-less units.

2

(Remote) cooling heating management

- ➤ Cooling mode: thermostat function on evaporator.
- ➤ Heating mode: thermostat function on condenser.
- ➤ Double thermostat: thermostat function on evaporator and condenser.

Remark: heating is only available for water-cooled units.

	MS Option = yes (network unit)	**MS Option = no (standalone unit)**
Mode cool heat	Equal for all units.	Dedicated to this unit only
Changing mode cool heat	When you change the mode cool heat on one unit. Then the status is transferred to all units	When you change the mode cool heat on a unit. Then the status is NOT transferred to other units
Mode cool heat status	Equal for all units	Dedicated to this unit only.
Remotely changing mode cool heat status	Into the service menu of the master, you can select a changeable digital input as "Remote C/H"	Into the service menu of that unit, you can select a change-able Digital Input as "Remote C/H"
	Remark: If a digital input is selected as "Remote C/H" on a slave unit then this switch will only change the status of this unit when it is in mode "DISCONN. ON/OFF"	

Dual setpoint

	MS Option = yes (network unit)	**MS Option = no (standalone unit)**
Setpoint value (1&2)	Equal for all units	Dedicated to this unit only.
Changing setpoint value	When you change the setpoint of one unit. Then the value is transferred to all units	When you change the setpoint of each unit. Then the value is NOT transferred to other units
Dual setpoint status	Equal for all units	Dedicated to this unit only.
Changing remotely dual setpoint status	Into the service menu of the master, you can select a changeable Digital Input as "Dual setpoint"	Into the service menu of that unit, you can select a change-able Digital Input as "Dual set-point"
	Remark: ➤ If in a slave (=not the master) DI="Dual setpoint" then the DI of that slave will not change the dual setpoint status ➤ If the slave is standalone (= if MS Option = No), no set points are transferred and dual setpoint from the unit changes the status of that unit.	

3.6 Manual Mode

Only available on standalone unit or in disconnected mode.

Only accessible when the status of the unit is disconnected.

	MS option = Yes	
	NORMAL or STANDBY	**DISCONN. ON/OFF**
Manual mode	Not possible	Dedicated to this unit only.
Changing to manual mode	Not possible	Possible to select in user settings

3.7 Freeze-up Control

This function remains the same as in standalone setup in order to protect each unit against freeze up.

2

3.8 Heat Pressure Control

	MS Option = yes (network unit)	**MS Option = no (standalone unit)**
Low noise Mode	Equal for all units	Dedicated to this unit only
Changing Low noise mode	If changed in one unit the value is transferred to all units	Change in each unit. Value is not transferred to other units.
Active low noise by schedule timer	Schedule timer in Master (see remark) Then activation is transferred to all units.	Schedule timer (unit) Dedicated to this unit only
Enable/disable low noise by digital inputs	Select a changeable DI of each unit. Dedicated to this unit only	Select a changeable DI of each unit Dedicated to this unit only
Yes low noise	Yes for all units in DICN	Yes dedicated to this unit only
No low noise	No for all units in DICN	No dedicated to this unit only
	Remark: Schedule timer is only available on master unit.	

3.9 Superheat Control

This function remains the same as for standalone units.

2

3.10 Pump Control

The basic operation of this function is the same as for standalone units.

In DICN setup units and MS Option =yes an extra pump procedure is active. This procedure operates the water pump of the unit with the highest priority whenever the unit is "ON" but no load is requested. This is done in order to be able to measure the correct water temperature.

3.11 Lead Lag Control

This function remains the same as in standalone setup for regulation of running hours of compressors in a unit.

For priority management of different units in DICN see next chapter.

3.12 Priority Management

Introduction

This function determines the priority of each unit in a master slave setup.

Basic rules:

- ➤ Load-up as fast as possible.
- ➤ Use as less possible units.

The following items determine the priority:

- ➤ Standby function.
- ➤ Load-up or load-down request. Possibility evaluated according to: outlet water temp, unit priority, unit running, unit offset.

Standby function

This function determines which unit will be used as standby unit.

How to determine which unit is set in standby mode

If only one unit is in “STANDBY” mode	This unit will be the standby unit.
If more than one unit is in “ STANDBY” mode	The standby unit will be the one with capacity step 0% and with the highest Running hours-Offset.

The standby unit will be needed if:

- ➤ All units are operating at 100% capacity.
- ➤ All units are operating at 100% capacity and the standby unit is not at 0% request capacity.
- ➤ A unit safety is present on a unit.
- ➤ A circuit safety is present on a unit.
- ➤ The "DICONNECT ON/OFF" mode is selected on a unit.

Determine priority for each unit according to

1. Load-up requested

	LOW Priority		**High Priority**	
1. Unit Loadup possible	No loadup possible		Loadup possible	
2. Unit Outlet water temperature	Outlet temp(unit) < MOW + steplPriority *steplength		Outlet temp(unit) ≥ MOW + step 1 Priority * steplength	
3. Unit priority	0 (lowest priority)	1	2	3 (highest priority)
4. Units that are already running	Unit capacity step = 0		Unit capacity step<>0	
5. unit offset (running hours-RHOffset)	Highest (running hours-RHOffset)	>	>	Smallest (running hours-RHOffset)

Remark: Steplength value = 1.5

2. Loaddown requested

<table>
<tr><th></th><th colspan="3">LOW Priority</th><th colspan="3">High Priority</th></tr>
<tr><td>1. Unit Loaddown possible</td><td colspan="3">No loaddown possible</td><td colspan="3">Loaddown possible</td></tr>
<tr><td>2. Unit Outlet water temperature</td><td colspan="3">Outlet temp(unit) ≥ MOW</td><td colspan="3">Outlet temp(unit) < MOW</td></tr>
<tr><td>3. Unit on step 1</td><td colspan="2">Unit step = 1& all other units are running on 0 or 100%</td><td colspan="2">NOT (unitstep = 1)</td><td colspan="2">Unitstep =1</td></tr>
<tr><td>4. Standby Unit</td><td colspan="3">Unit ≠ Actual standby unit</td><td colspan="3">Unit = Actual standby unit</td></tr>
<tr><td>5. Unit priority</td><td>3
(lowest priority)</td><td colspan="2">2</td><td colspan="2">1</td><td>0
(highest priority)</td></tr>
<tr><td>6. Unit offset (running hours-RH Offset)</td><td>Smallest (running hours RHOffset</td><td colspan="2"><</td><td colspan="2"><</td><td>Highest (running hours RHOffset)</td></tr>
</table>

Into the service menu you can specify the "MS PR (Unit Priority) - (Step Length Priority)" this value is used to select the priority. The priority depends on different points. See above.

3.13 Capacity Limitation

	MS Option = yes (network unit)	***MS Option = no*** **(standalone unit)**
Limitation Mode	Equal for all units	Dedicated to this unit only.
Changing Limitation mode	When changed in one unit the value is transferred to all units.	When changed in a unit the value is NOT transferred to other units
Activate limitation by Schedule timer	Set schedule timer of the Master unit (see remark).When a limitation is activated it will be transferred to all units.	Set schedule timer of unit Dedicated to this unit only.
Enable/disable limitation By remote digital inputs	In the service menu of each unit, you can select a changeable Digital Input. The limitation is dedicated to this unit only.	Into the service menu of each unit, you can select a changeable Digital Input. The limitation is dedicated to this unit only.
	Remark: schedule timer is only available on master unit.	

3.14 Floating Setpoint

This function is basically the same as for a standalone unit.
In DICN setup it will be the master unit that executes the function and the ambient temperature will be measured with the temperature probe of the master unit.

3.15 100% Capacity, General Operation

This function is the same as for standalone units.

2

3.16 Free Cooling

The operation of this function is the same as for standalone units.
In DICN setup it is the master that executes this function and the temperature will be measured by the temperature probe on the master unit.

Remark: If a digital output is set to "Free cooling" on a slave unit, the function will only be executed if the MS Option is set to no on that unit.

3.17 Reversing Valve

This function is the same as for standalone units.

3.18 Evaporator Heater-tape

This function is the same as for standalone units.

3.19 Heat Recovery

This function can be selected on each unit separately and will then be executed on each unit separately.

Remark: If the unit is the master unit in a DICN setup the analogue input can be set to mixed evaporator outlet water. But it is preferable to use heat recovery units as standalone or slave units.

3.20 Changeable Digital Inputs

	MSOption = yes (network unit)	**MSOption = No (standalone unit)**
Dual setpoint	DI of Master	DI of Unit
Remote On/Off	DI of Master	DI of Unit
Remote Cooling/Heating (only for water-cooled units)	DI of Master	DI of Unit
Capacity limitation 1/2/3/4	DI of unit	DI of Unit
Low noise	DI of unit	DI of unit

2

3.21 Changeable Analogue Input

	MSOption = yes (network units)	**MSOption = no (standalone units)**
1. Master slave mixed outlet water temperature sensor	Only for AI1 of the master unit of a DICN setup	Only for AI1 of the master unit of a DICN setup
2. Setpoint signal	AI1 of Slave1! (0-1V) (not possible on master unit or slave 2/3)	AI1 of unit (0-1V)
3. HR selection based on the condenser inlet water	If master unit is a heat recovery unit AND DICN is working on outlet water control then: ➤ AI3 needs to be programmed as MS outlet water E ➤ HR selection has to be used with external thermostat (changeable Input)	AI1 can be programmed as HR inlet water C

3.22 Changeable Digital Outputs

Introduction

This function is the same as for standalone units.

Range of application

Input	Parameter on controller	Air-cooled		Water-cooled	Condenser-less
		EWAP /EWAD	EWTP	EWWD	EWLD
		CO	HR	HP	RC
DO12	DO1	O (*)	O (*)	O	O
DO13	DO2	O	O	O	O

Remark: (*) DO1 for CO, HR and ER units is fixed to evaporator heatertape, therefore it will not be visible in the service menu.

Functions overview

Possible functions	Air-cooled		Evaporator-less	Water-cooled	Condenser-less
	EWAP/ EWAD	EWTP	ERAP	EWWD	EWLD
	CO	HR	CA	HP	RC
0. None (open)	O	O	O	O	O
1. 1 (closed)	O	O	O	O	O
2. 2nd evaporator pump	O	O	O	O	O
3. Condenser pump	--	--	--	O	--
4. 100% capacity	O	O	O	O	O
5. free cooling	O	O	--	--	O
6. general operation	O	O	O	O	O
7. Reversing valve	--	--	--	O	--
8. Evaporator heater-tape	O	O	O	--	O
9. HR condenser pump	--	O	--	--	--

3.23 Schedule Timer

The function is basically the same as for standalone units.

For DICN units:

- This option is only available on the master unit.
- If the master unit is down (=no power) the schedule of the master unit is not executed and each slave unit will be working as a standalone unit in its last activated status.
- If a limit is activated by the schedule timer of the master this limit will be transferred to all the units in the DICN.

3.24 Pump-down

For DICN units it is only possible to enter the menu if unit is in "DISCONN.ON/OFF" mode and the unit is in status "OFF".

2

4 The Digital Controller For Large chillers

2

4.1 What Is in This Chapter?

Introduction

In this chapter the practical use of the pCO² controller for large chillers will be explained.

Overview

This chapter contains the following topics:

4.2 The Controller

Digital controller

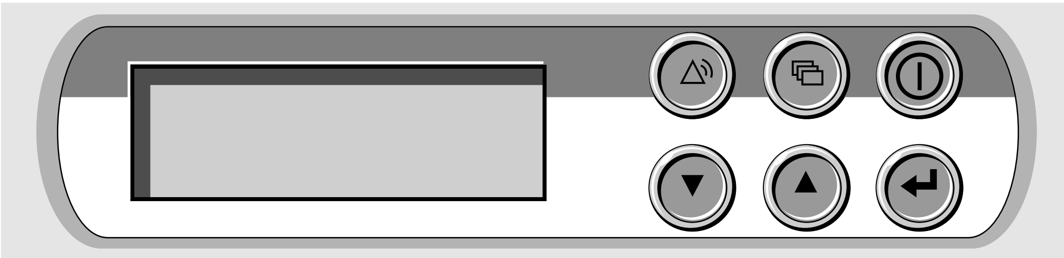
The (EWAP110~540MBYNN / EWAD120~340MBYNN / EWWD120~540MBYNN / EWLD120~540MBYNN / ERAP110~170 MBYNN / EWTP110~540MBYNN) units are equipped with a digital controller offering a user-friendly way to configure, use and maintain the unit.

The digital controller consists of:

- ➤ An alphanumeric LCD display.
- ➤ 6 keys (4 of them are colored when activated).

Front panel

The illustration below shows the front panel of the controller.



Keys

The table below contains an overview of the keys and their functions.

key	Description	LED Color
	Key to enter the safeties menu or to reset an alarm	Red
	Key to enter the main menu	Green
	Key to start up or to shut down the unit	Green
	Key to scroll through the screens of a menu (only in case v, : or ^ appears) or to rise, respectively lower a setting.	-
		
	Key to confirm a selection or a setting	Green

How to switch between Screens

Each menu contains a number of screens. You can switch between the screens using the or keys. In the upper-left corner of the screen you will find a screen indicator, indicating whether there is a previous or next screen.

An overview is given in the below:

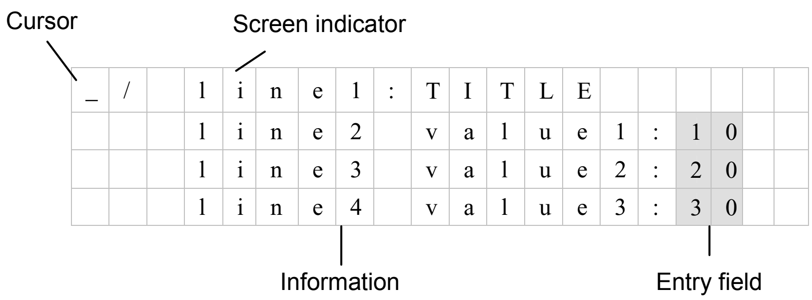
The screen indicator	Indicates that you can
^	return to the previous screen
v	go tot the next screen
/	either return to the previous or go to the next screen

Screen detail

Each screen contains 4 lines which give information about a setting (a description and an entry field). The entry fields can be adjusted using the and the keys.

The cursor is marked by the sign "_". The cursor can be moved between the screen indicator and the entry fields using the key.

The cursor can be moved directly to the screen indicator by pressing the key.



Remark: Make sure that the cursor is at the screen indicator position when scrolling through the screens.

2

4.3 Start/Stop, Cool/Heat and Temperature settings

Power on

- ➤ The initialization takes 10 seconds
- ➤ The controller automatically goes to the menu overview.

Remote start/stop

The procedure to start or stop the unit depends on the settings of the remote start/stop.

Remark: The remote start/stop is field supply.

How to start or stop

Local key	Remote Switch	Unit	LED
ON	ON	ON	ON
ON	OFF	OFF	Flashing
OFF	ON	OFF	OFF
OFF	OFF	OFF	OFF

How to cool or heat

To change from cooling to heating (or visa versa) you have to enter the Cooling/Heating menu through the main menu.

Emergency stop

In case of an emergency: switch off the unit by pushing the emergency button.

Temperature setting

To adjust the inlet or outlet water temperature, go to the Set Points menu through the main menu.

Remark

To prevent the unit from stopping at 100% the unit will always load-down to 12% and operate at this capacity for a couple of seconds before shutting down.

4.4 What happens in Case of an Alarm or a Warning?

Introduction

The units are equipped with four kinds of safety devices: unit safeties, circuit safeties, network safeties and dual pump safety.

For a full list of all possible safeties reffer to overview of fault indications and safeties on page 3-9.

Overview safeties

Unit safety	Description	Safety possible if unit is off?
1. Inlet Condenser sensor error	+Err / -Err read-out by sensor	Y
2. Inlet Evaporator sensor error	+Err / -Err read-out by sensor	Y
3. Reverse phase protector	Safety is activated if digital input is closed	Y
4. Flow stopped	Safety is activated if digital input is longer open then 5 seconds	N

Circuit safety	Description	Safety possible if unit is off?
1. Outlet Evaporator sensor error	+Err / -Err read-out by sensor	Y
2. General module safety	Safety is activated if digital input is opened	Y
3. Freeze-up module safety	Safety is activated if digital input is closed	Y

Network safety	Description	Safety possible if unit is off?
1. PCB Communication problems	Safety is activated if network status is not OK. (Only possible if a network of different controllers exist)	Y

Dual pump safety	Description	Safety possible if unit is off?
1. Flow stopped	Safety is activated if digital input is longer open then 5 seconds	N

Remark: How to view the safeties:

Press the key when the alarm is activated.

The appropriate safety screen with the basic information appears. Press the key to see the detailed information.

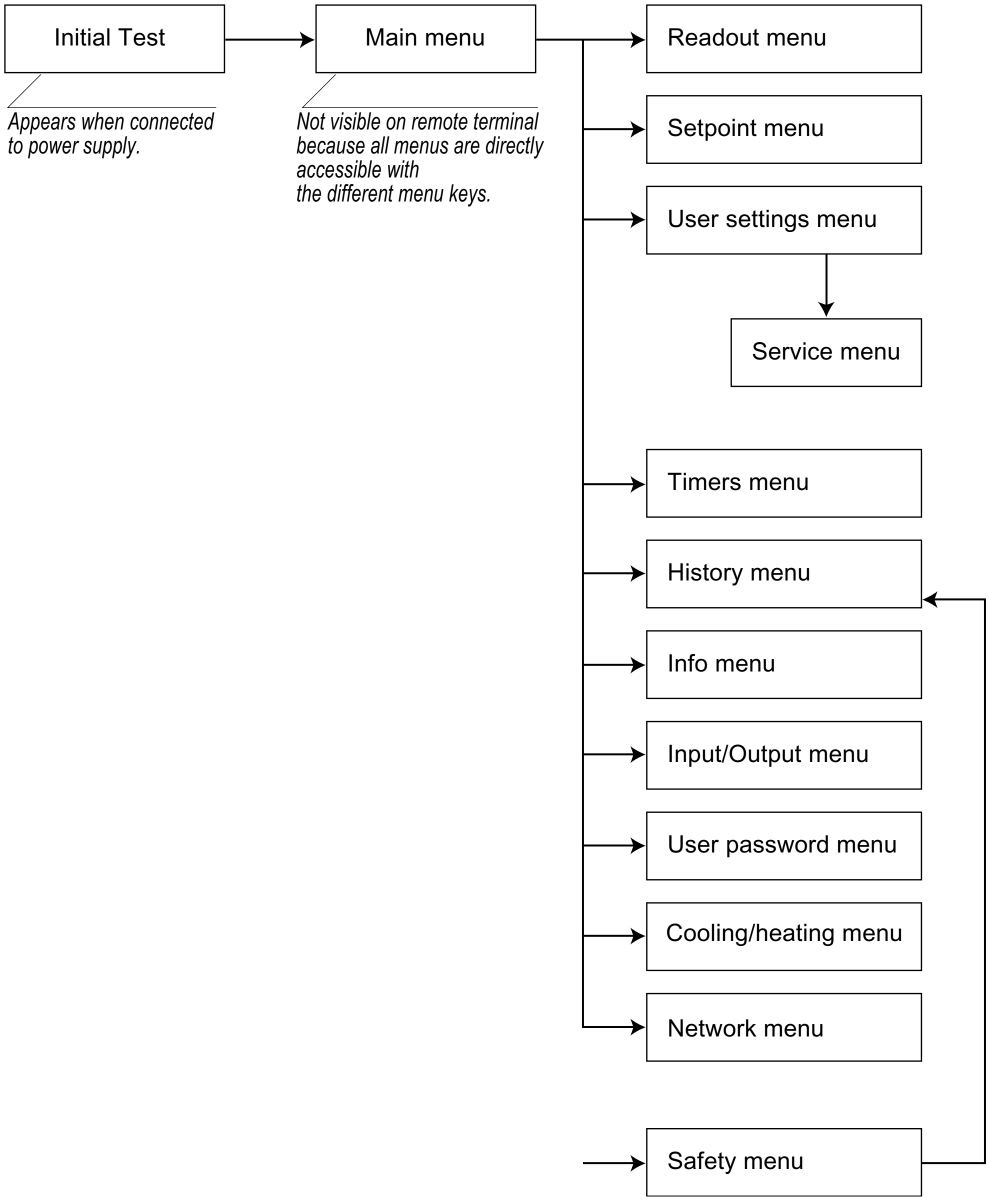
If more than one kind of safety is active (indicated by means of ^, v or ÷), use the and keys to consult them.

2

4.5 Menu Overview

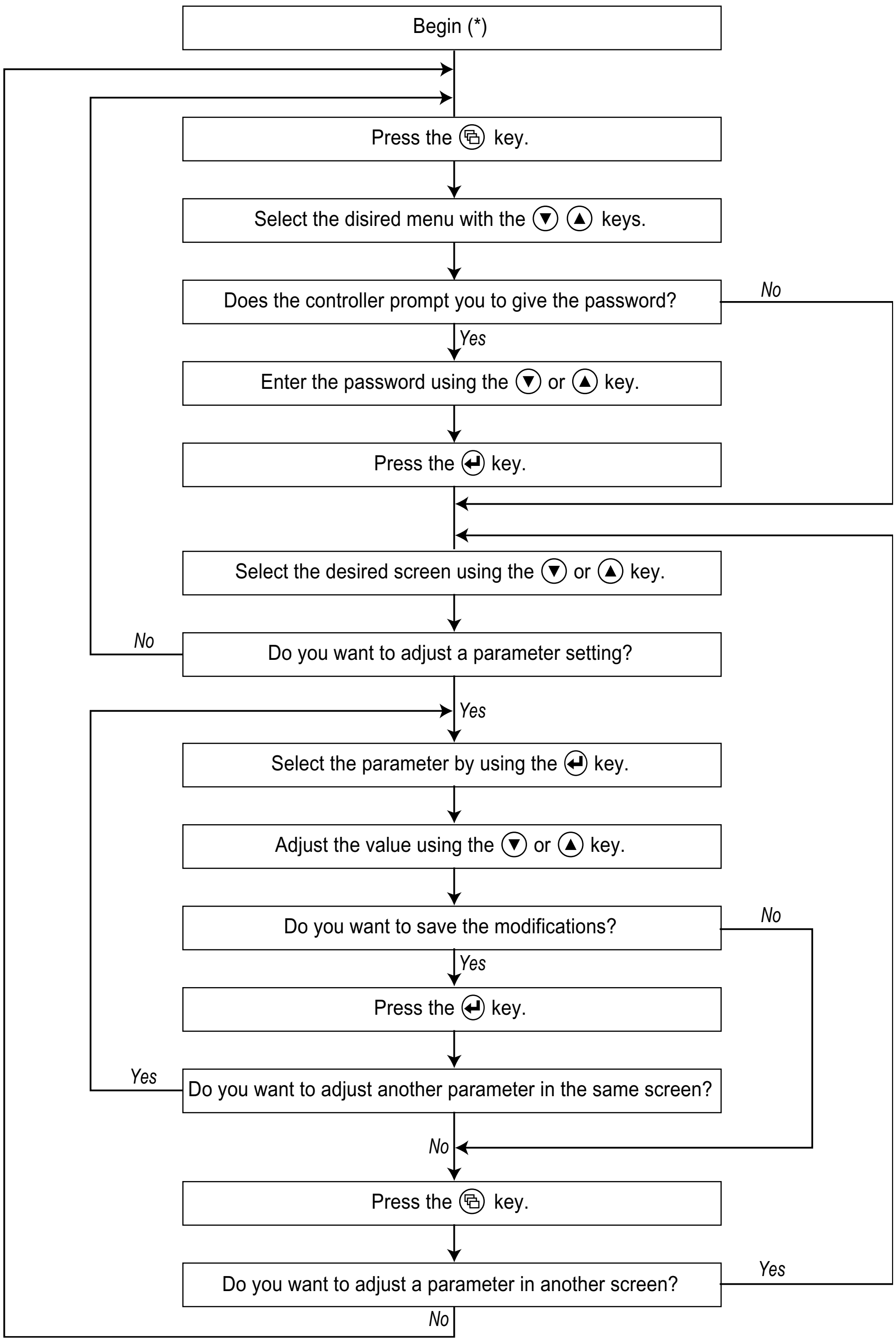
Introduction

This chapter gives an overview of the screens provided by the different menus.



4.6 How to Read or Adjust Parameter Settings: the Programming Procedure

Programming procedure



(*): The display shows the last screen used

2

4.7 Read-out Menu

Operational information

Using this menu you can read the operational information, such as the cooling set points, the inlet and outlet water temperature, the circuit status, etc. This menu allows access to several screens. The number of screens depends on the unit type and the options.

Screen 1

This screen shows information about the operation mode, the setpoints and the temperatures:
Line 1f and 3a only visible if the unit is an ERAP.
Line 4a is only visible if the unit is a "HP".
Line 4b is only visible if the unit is a "HR".

Line n°	Display	Description
1a	INLSETP1 (2) E	Evaporator inlet water temperature setpoint 1 (or setpoint 2 in case of dual setpoint setting).
1b	OUTSETP1 (2) E	Evaporator outlet temperature setpoint 1 (or setpoint 2 in case of dual setpoint setting).
1c	MANUAL MODE	If the controller is programmed in manual control
1d	INLSETP1(2) C	Condenser inlet temperature setpoint 1 (or setpoint 2 in case of dual setpoint setting).
1e	SP1(2)E: C:	Set point 1 Evaporator: Condenser: (or setpoint 2 in case of dual setpoint setting), setpoint from schedule timer.
1f	SETPOINT1(2)	The unit works on thermostat control (ERAP units).
2	INL WATER E	Actual evaporator inlet water temperature.
3	OUTL WATER E	Actual evaporator outlet water temperature.
3a	TEMP SENSOR	Actual temperature of the thermostat sensor (ERAP units)
4a	INL WATER C	Actual condenser inlet water temperature
4b	HR SP: C: C	Heat recovery setpoint and actual heat recovery condenser temperature.

Screen 2

This screen shows information about the evaporator outlet water temperature:

Line n°	Display	Description
1	EVAPORATOR	Evaporator related data.
2	OUT WATER C1	Actual evaporator outlet water temperature of circuit 1
3	OUT WATER C2	Actual evaporator outlet water temperature of circuit 2.

Screen 3

This screen shows information about the status of compressors C1 or C2

Line n°	Display	Description
1	UNIT STATUS	Compressor status data
2	C1	Actual status of compressor 1
3	C2	Actual status of compressor 2
4a	UNITCAPACITY	Indicates the actual capacity use (from 0 to 100%).
4b	UNIT: % LOWNOISE:	Indicates the actual capacity use (from 0 to 100%) and if low noise is active or not.

The possible status of a compressor can be:

Display	Description
OFF-CAN STARTUP	The compressor is ready to start up when extra cooling is requested.
OFF-TIMER BUSY	One of the software timers is counting. Compressor cannot start up.
ON – 12% STAR	Compressor works on 12% in star (this mode is used to start up).
ON – 12% DELTA	Compressor works on 12% on delta.
ON – XX% DELTA	Compressor works on XX% on delta.
OFF–0% LIMIT	Compressor is disabled, to limit the unit capacity. This can be activated with a schedule timer, a remote digital input or with a fixed Limitation.
ON – YY% (LIMIT)	Compressor works on YY% and reached the limit specified in user settings menu
OFF–SAFETY ACTIVE	One of the safeties prevents starting of the compressor.
OFF–FREEZE UP DIS	The compressor is shut off due to freeze up prevention.
ON – 12% SHEAT REC	Compressor works on 12% in star (this mode is used to start up) and heat recovery is activated.
ON – 12% DHEAT REC	Compressor works on 12% in delta (this mode is used to start up) and heat recovery is activated.
ON – ZZ% HEAT REC	Compressor works on ZZ% and heat recovery is activated.

Remark: Possible values for xx, yy and zz are between 12% and 100%.

2

Screen 4

This screen shows information about the pressures of circuit 1:

Line n°	Display	Description
1	ACT. PRESSURES C1	Pressure data of circuit 1
2	HP1: b = °C	Actual high pressure and corresponding temperature
3	LP1: b = °C	Actual low pressure and corresponding temperature
4	HP SETPOINT C1: b	This line is only for units with inverter fan control. It shows the target high pressure set point.

Screen 5

This screen shows information about the pressures of circuit 2:

Line n°	Display	Description
1	ACT. PRESSURES C2	Pressure data of circuit 2
2	HP2: b = °C	Actual high pressure and corresponding temperature
3	LP2: b = °C	Actual low pressure and corresponding temperature
4	HP SETPOINT C: b	This line is only for units with inverter fan control. It shows the target high pressure set point.

Screen 6

This screen shows information about the compressor running hours:

Line n°	Display	Description
1	EXTRA READ-OUT	Compressor running hours.
2.1	RH 1	Total running hours of compressor 1
2.2	CS 1	Total amount of start-ups of compressor 1.
3.1	RH 2	Total running hours of compressor 2
3.2	CS 2	Total amount of start-ups of compressor 2.
4	AMBIENT	Actual ambient temperature (this line is only visible if the unit is not water-cooled).

Screen 6a

This screen shows extra information about the compressor running hours for heat pump units:

Line n°	Display	Description
1	EXTRA READ-OUT	Compressor running hours.
2.1	C1C: h	Total running hours of compressor 1 in cooling mode.
2.2	H: h	Total running hours of compressor 1 in heating mode.
3.1	C2C: h	Total running hours of compressor 2 in cooling mode.
3.2	H: h	Total running hours of compressor 2 in heating mode.

2

Screen 7 and 8

These screens show information about the EEV and will therefore only be visible if electronic expansion valves are present.

Line n°	Display	Description
1	EEV 1 (2) READ-OUT	Read-out off EEV driver of circuit 1 or 2
2	SUCTION TEMP:	Actual suction temperature (unity: 0.1°C)
3	SUPERHEAT:	Actual superheat temperature (unity: 0.1°C)

Remark: This screen is only visible if the parameter SCREENS is put on Yes (see EEV service menu on page 2–141)

2

4.8 Set Points Menu

Screen 1: password

Depending on the settings in the user settings menu explained further on, the system may require the user password to enter the screens in this menu.

This screen will only appear if a password is required.

Line n°	Display	Description
1	ENTER PASSWORD	Screen title
3	PASSWORD: 0000	Enter the correct password

Remark: The units leave the factory with the user password set to "1234". This user password can be modified in the user password menu.

Screen 2:

This menu allows you to set the inlet/ outlet water temperature of the evaporator/condenser of circuit 1 and 2. These set points will not be active in the Manual Control Mode.

Line n°	Display	Description	Default value	Lower limit	Upper limit
1	INLSETP1 E	Inlet water temp. set point 1 evaporator	12.0 °C	MOW+3°C	23°C
1a	INLSETP1 C	Inlet water temp. set point 1 Condenser	12.0 °C	15°C	50°C
2	INLSETP2 E	Inlet water temp. set point 2 evaporator	12.0 °C	MOW+3°C	23°C
2a	INLSETP2 C	Inlet water temp. set point 2 Condenser	12.0 °C	15°C	50°C
3	OUTLSETP1 E	Outlet water temp. set point 1 evaporator	7.0 °C	MOW	16°C
3a	SETPOINT 1	Temp. setpoint 1 for ER units	7.0 °C	MOW	16°C
4	OUTLSETP2 E	Outlet water temp. set point 2 evaporator	7.0 °C	MOW	16°C
4a	SETPOINT 2	Temp. setpoint 2 for ER units	7.0 °C	MOW	16°C

Not all lines are visible. The type of unit and the operating mode determine which lines are visible:

- Line 1, 2, 3, 4: Water and air-cooled units: Cooling mode(Inlet/Outlet/Manual).
- Line 1a, 2a: only for water-cooled units: Heating mode(Inlet/Manual).
- Line 1, 2, 1a, 2a: only for water-cooled units: Double thermostat (Inlet/manual).
- Line 3a, 4a: only for ER units (Thermostat setpoint).

A ">" symbol is displayed in front of the active setpoint in this screen.

Remark: You can select setpoint 1 or 2 with a digital input from a switch. In the service menu you can select which digital input you want to use for this.

Remark:

- ➤ The limit values mentioned in the table above are valid for the standard MOW (Minimum Outlet Water) setting of 4°C.
- ➤ For glycol units the lower limit of the cooling temperature set point depends on the MOW setting. The possible MOW settings depend on the percentage of glycol in the water.

2

Screen 3:

This menu allows you to set the EEV set points.
This screen is only visible if electronic expansion valves are present.

Line n°	Display	Description	Default value	Limit value
1	EEV SETPOINTS			
2	SH SP1: 2:	Superheat setpoint	5°C	0 to 9.9 °C
3	PR SP1: 2:	Pressure setpoint of superheat	3.5 bar	0 to 7 bar

Screen 4

This menu allows you to set the EEV set points.
This screen is only visible if electronic expansion valves are present.

Line n°	Display	Description	Default value	Limit value
1	EEV SETPOINTS			
2	MINOP1: 2:	Min operation pressure	0 bar	0 to MAXOP bar
3	MAXOP1: 2:	Max operation pressure	6.5 bar	MINOP to 30 bar

Between the min and the max operation pressures the unit will regulate on superheat setpoint.

The details of this function are explained in the chapter about superheat control.

See chapter superheat control for more information.

2

4.9 User Settings & Service Menu

User Settings menu

Screen 1: password

You need the user password to enter this menu.

Line n°	Display	Description
1	ENTER PASSWORD	Screen title
3	PASSWORD: 0000	Enter the correct password

Remark: The units leave the factory with the user password set to "1234". This user password can be modified in the user password menu.

Screen 2

This screen allows modification of the control settings:

Line n°	Display	Description	Possible settings
1	CONTROL SETTINGS	screen title	
2	MODE:	to select the control mode	MANUAL CONTROL INL WATER STEP OUTL WATER STEP THERMOSTAT (ERAP units)
3	CIR1: CIR2:	status of corresponding compressor (only for manual mode)	0% 30% till 100%
4a	F1*: F2*:	status of corresponding fan speed (only for manual mode)	OFF / LOW / MED / HIGH for 3step fans 0 to 100% for inverter driven fans

For more info about this function refer to the corresponding chapter.

Screen 3

This screen allows you to modify the thermostat loadup - down parameters.

Line n°	**Display**	**Description**	**Default** (Depending on control mode)	**Lower limit**	**Upper limit**
1	THERMOST.SETTINGS	screen title			
2					
3					
4.1	LOADUP	Loadup time (s) (sampling time)	48 (inlet) 12 (outlet)	12	300
4.2	DWN	Loaddown (s) (sampling time)	24 (inlet) 12 (outlet)	12	300

2

Screen 4

This screen allows you to change the start up priority of the circuits in case of capacity demand:

Line n°	**Display**	**Description**	**Default**	**Lower limit**	**Upper limit**
1	LEAD-LAG SETTINGS	screen title			
2	LEAD-LAG MODE	To select the automatic or manual lead-lag mode *	AUTO		
3	LEAD-LAG HOURS	To select the difference in operation time between the compressors (automatic mode)	1000	100	1000
4	EQUAL STARTUP	Startup both compressors and raise the capacity of both compressors with the same value	NO	NO	YES

If equal startup is set to "NO" then one compressor will go to 100% capacity before the second compressor is started.

* If the lead-lag mode is not set to auto, the possible settings are:

Possible manual setting 1	**Possible manual setting 2**
C1>C2	C2>C1

For more info about this function refer to the corresponding chapter.

2

Screen 5

This screen allows you to choose whether the capacity limitation settings of the circuits are selected by: a digital input (remote switch or timer), via the schedule timer, not active or set to lim1.

Line n°	Display	Description	Possible settings
1	CAP. LIM. SETTINGS	screen title	
2	MODE:	to select the capacity limitation mode	REMOTE DIG INP. SCHEDULE TIMER NOT ACTIVE LIM1
3	L1CIR1 CIR2:	Limitation setting 1	0%, 30% – 100%
4	L2CIR1 CIR2:	Limitation setting 2	

Remark: Only one mode is active at the time. When one mode is selected the other ones can't be used.

For more info about this function refer to the corresponding chapter.

Screen 6

Line n°	Display	Description	Possible settings
1	CAP. LIM. SETTINGS	screen title	
2	L3CIR1 CIR2:	Limitation setting 3	0%, 30% – 100%
3	L4CIR1 CIR2:	Limitation setting 4	
4	LOW NOISE MODE	This setting selects which action activates the low noise function	CH.DI (chang.dig.input) SCH.T (schedule timer) YES/NO

For more info about this function refer to the corresponding chapter.

Screen 7

This screens allows to set the pump lead and lag times. It is also in this screen that the "pump daily on" function can be activated.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	PUMPCONTROL	screen title			
2	PUMPLEAD-TIME	Time to run the water pump before starting up the chiller	020 sec	020 sec	180 sec
3	PUMPLAGTIME	Time to keep the pump on, after stopping the chiller	000 sec	000 sec	180 sec
4.1	DAILY ON	To activate a daily pump start up	N	N	Y
4.2	AT	Pump start time	12h00	00h00	24h00

The user will get the choice to perform a pump start every day to prevent obstruction of the pump and to increase the lifetime of the pump. Every day at pump start time, which can be chosen, the pump will be started automatically for a short time period (5s) when the unit is not on.

Remark: The default value for the PUMPLAGTIME is 0 sec, but it is recommend setting the lag time to 120s. This is to prevent the evaporator from freezing up when there is no flow.

For more info about this function refer to the corresponding chapter.

Screen 8

This screen allows you to enable or disable the schedule timer and the holiday period timer.
This screen is only visible if the unit is operating as a standalone unit or if the unit is the master in a DICN setup.

Line n°	Display	Description	Possible settings
1	SCHEDULE TIMER	screen title	
2	ENABLE TIMER	To enable the programmable schedule timer	N/Y
3	ENABLE HOLIDAY PER	To enable the programmable holiday period timer	N/Y

Remark: New screens will be available if one or both timer possibilities are set to Yes.
For more info and all the sceens about these schedule and holiday timers refer to the schedule timer managment chapter on page 2–56.

2

Screen 9

This screen will only be visible if in service menu "Dual Evap. Pump" is selected as digital output

Line n°	Display	Description	Possible settings
1	DUAL EVAP. PUMP	screen title	
2	MODE	Select the start-up mode	AUTOM. ROTATION PUMP2 > PUMP1 PUMP1 > PUMP 2
3	OFFSET ON RH	Running hours offset value (default value 048h)	001h-999h

For more info about this function refer to the corresponding chapter.

Screen 10

This screen allows you to set the floating setpoint.
Only available on a Cooling only unit, heat recovery or RC unit.

Line n°	Display	Description	Possible settings
1	FLOATING SETPOINT	screen title	
2	MODE		NOT ACTIVE AMBIENT

2

Screen 10a

When you choose ambient mode the following settings will appear.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	FLOATING SETPOINT	screen title			
2	MODE :	Selected mode			
3	MAX VALUE :	Max value of floating setpoint correction	3°C	0°C	5°C
4.1	ZERO:	Here the setpoint value will be equal to 0.	20°C	20°C	43°C
4.2	SLOPE	This parameter is necessary to draw the angle of the curve	5°C	0°C	10°C

For more info about this function refer to the corresponding chapter.

Screen 11

This screen allows you to modify the display language.

Line n°	Display	Description	Possible settings
1	DISPLAY SETTINGS	screen title	
2	PRESS ENTER TO		
3	CHANGE LANGUAGE		
4	XXXXXXXXX	The actual language is displayed	Depending on the controller memory 1 or more languages are available

When in this screen just press enters to change language, this is a loop function which means when you reached the last selectable language you are sent back to the first. If only one language is available the screen will not change when enter is pressed.
Depending on the memory size of the pCO^2 controller 2 or 5 language are stored in the memory.

Screen 12

This screen allows you to modify time and date.

Line n°	Display	Description	Possible settings
1	DISPLAY SETTINGS	screen title	
2	TIME	To set the actual time	00h00–23h59
3	DATE	To set the actual date	MON-SUN 01/01/00-31/12/99

2

Screen 13

This screen will only be visible if in the service menu free cooling is selected as digital output. Free cooling is only selectable on units with an ambient sensor (air-cooled cooling only or condenserless).

Line n°	Display	Description	Possible settings
1	FREE COOLING	screen title	
2	MODE:	Choose mode to regulate the free cooling on	NOT ACTIVE INLET-AMBIENT AMBIENT

Ambient: free cooling is based on ambient temperature
Inlet-Ambient: free cooling is based on the difference between inlet water temperature and ambient temperature

For more info about this function refer to the corresponding chapter.

Screen 13a

When you choose (Inlet -)ambient mode the following settings will appear.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	FREE COOLING	screen title			
2	MODE	Selected mode			
3.1	SP	Define setpoint of free cooling	5°C	-30°C	25°C
3.2	DI	Setting of the free cooling difference	1.0°C	1.0°C	5.0°C
4.1	PUMP	Status of the evaporator water pump	ON	OFF	ON
4.2	LEAD	The lead time of the evaporator water pump	0s	0s	999s

Line 4 will only be visible if Ambient is selected. Inlet-Ambient is chosen the pump will remain "ON"

Screen 14

This screen is used to set the heat recovery parameters.
Line 2 and 3 are only visible if Analog input AI1 is set to HR INLET WATER C.
Line 4 is only visible if digital output 2 is set to heat recovery condenser pump in the service menu.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	HEAT RECOVERY	screen title			
2	HR INLSETP C:	Heat recovery condenser inlet setpoint	45°C	30°C	70°C
3	HR INLDIFF:	Inlet step difference	3°C	2°C	5°C
4	HR COND PUMPLAG:	Lag time of the heat recovery condenser pump	5s	0s	999s

For more info about this function refer to the corresponding chapter.

Screen 15

Additional screens if DICN is selected.

For more info about this function refer to ”The fuction controller for DICN”.

Remark: When used in DICN option, the Schedule Timer (screens 8…) will only be available on the master unit

Screens on the master unit.

Line n°	Display	Description	Possible settings
1	MASTER SETTING	screen title	
2	NR OF SLAVES:	Enter the number of slaves you want to use on the DICN network	0 / 1 / 2 / 3

Screen 15a

Line n°	Display	Description	Possible settings
1	MASTER SETTING	screen title	
2	MODE	Normal: the unit works normally. Standby: if the unit is in standby it will only start-up in case the other DICN units don't have enough capacity or error on other unit, ... Disconnected: the unit is disconnected of the DICN setup and will operate as a standalone.	NORMAL DISCONN. ON/OFF STANDBY
3	OFFSET	After the adjusted hours the units will change the sequence of start-up.	0h till 9000h
4	PUMP ON IF:	Select when the pump must start	UNIT ON COMPR ON

Screen 15b

Screens on the slave unit:

Line n°	Display	Description	Possible settings
1	SLAVE “X” SETTINGS	screen title	SLAVE 1 / 2 / 3
2	MODE	Normal: the unit works normally. Standby: if the unit is in standby it will only start-up in case the other DICN units don't have enough capacity or error on other unit, ... Disconnected: the unit is disconnected of the DICN setup and will operate as a stan-dalone.	NORMAL DISCONN. ON/OFF STANDBY
3	OFFSET	After the adjusted hours the units will change the sequence of start-up.	0h till 9000h
4	PUMP ON IF:	Select when the pump must start. This selection is for the unit only	UNIT ON COMPR ON

Screen 16

This screen allows you to protect the access of the setpoint menu with a password.

Line n°	Display	Description	Possible settings
1	SETPOINT PASSWORD	screen title	
2	PASSWORD NEEDED TO	Depending on the setting the system may require the user password to enter the setpoint menu.	No Yes
3	CHANGE SETPOINTS:		

Service menu

Operational information

The service menu is accessible through the last screen of the user settings menu, to enter the service menu you need the service password. Please contact your distributor for this password.
It is only possible to access the service menu when the unit is "OFF".

Screen 1

You need the password to enter this menu.

Line n°	Display	Description
1	ENTER SERVICE	Screen title
3	PASSWORD: 0000	Enter the correct password

Remark: when the unit is operating it is not possible to enter the service menu.

Screen 2

This screen allows you to modify the minimum outlet water, the BMS communication interval and the master-slave option.
Line 4 is not visible for ER units.

Line n°	Display	Description	Default	Possible settings
1	SERVICE MENU	Screen title		
2	MIN. OUTL. WATER	To select the minimum outlet water temperature	4°C	From MOW to 8°C
3	FINETUNE(BMS)	To select the communication interval	30s	From 0s till 60s
4	MS OPTION	To select master-slave option yes or no	N	Y or N

The minimum outlet water temperature is restricted depending on the percentage of glycol in the water.

Screen 3

This screen allows you to modify the low pressure bypass timer, the low pressure setpoint and delay network error.
Line 4 is only visible if MS Option setting = Yes or if PCOE is present.

Line n°	Display	Description	Possible settings	Default
1	SERVICE MENU	Screen title		
2.1	LP SP	Specify the low pressure limit	02bar till 3.5bar	**
2.2	PDWN	Low pressure setpoint for pump down.	0.2bar till 3.5bar	0.2bar
3	LP BYPASSTIMER	To set the low pressure bypass timer	From 0s to 180s	120s
4	DELAY NETW. ERR.	To set the delay of the net-work error	From 30s to 600s	120s

** Default setpoint depends on refrigerant type:

➤ 1 bar for R134a
➤ 1.5 bar for R407c

2

Screen 4

This screen allows modifying the compressor running hours and number of start-ups (e.g. after replacing a compressor).

Line n°	Display	Description	Possible settings
1	SERVICE MENU	Screen title	
2	RUN.HRS-COMPR STARTS	Screen title	
3.1	RH1:	Read-out of actual running hours of compressor 1	Changeable from 00000h to 99999h
3.2	CS1:	Read-out of actual number of starts of compressor 1	Changeable from 00000h to 99999h
4.1	RH2:	Read-out of actual running hours of compressor 2	Changeable from 00000h to 99999h
4.2	CS2:	Read-out of actual number of starts of compressor 2	Changeable from 00000h to 99999h

Screen 5

This screen allows modifying the extra data about the compressor running hours in heating or cooling (e.g. after replacing a compressor).

Line n°	Display	Description	Possible settings
1	SERVICE MENU	Screen title	
2	RUN.HRS COOL-HEAT	Screen title	
3.1	C1C:	Read-out of actual running hours of compressor 1 in cooling	Changeable from 00000h to 99999h
3.2	H:	Read-out of actual running hours of compressor 1 in heating	Changeable from 00000h to 99999h
4.1	C2C:	Read-out of actual running hours of compressor 2 in cooling	Changeable from 00000h to 99999h
4.2	H:	Read-out of actual running hours of compressor 2 in heating	Changeable from 00000h to 99999h

Screen 6

This screen allows you to set the changeable digital inputs.

<table>
<tr><th>Line n°</th><th>Display</th><th>Description</th><th>Possible settings</th></tr>
<tr><td>1</td><td>CHANG.INP/OUTPUTS</td><td>Screen title</td><td></td></tr>
<tr><td>2</td><td>DI1:</td><td>To set the digital input 1</td><td rowspan="3">NONE
STATUS
DUAL SETPOINT
REMOTE ON/OFF
REMOTE COOL/HEAT
CAP. LIMIT 1
CAP. LIMIT 2
CAP. LIMIT 3
CAP. LIMIT 4
LOW NOISE
HEAT RECOVERY</td></tr>
<tr><td>3</td><td>DI2:</td><td>To set the digital input 2</td></tr>
<tr><td>4</td><td>DI3:</td><td>To set the digital input 3</td></tr>
</table>

When you want to program on of these inputs, check the field wiring to see if this input is installed correctly.

Each setting can only be assigned to one input, if you try to select it a second time it will not be accepted.

For more info about this function refer to the corresponding chapter.

2

Screen 7

This screen allows you to set the changeable digital in- and output.
Line 3 not visible in case of CO, HR or ERAP unit.

Line n°	Display	Description	Possible settings
1	CHANG.INP/OUTPUTS	Screen title	
2	DI4:	To set the digital input 4	NONE STATUS DUAL SETPOINT REMOTE ON/OFF REMOTE COOL/HEAT CAP. LIMIT 1 CAP. LIMIT 2 CAP. LIMIT 3 CAP. LIMIT 4 LOW NOISE HEAT RECOVERY
3	DO1:	To set the digital output	NONE (open) 1 (closed) REV. VALVE(C/H) 2ND EVAP PUMP CONDENSER PUMP 100% CAPACITY FREE COOLING EVAP.HEATERTAPE GEN.OPERATION HR COND PUMP
4	DO2:		

When you want to program on of these inputs, check the field wiring to see if this input is installed correctly.

Each setting can only be assigned to one input or output, if you try to select it a second time it will not be accepted.

For more info about this function refer to the corresponding chapter.

Screen 8

This screen allows you to set a changeable analogue input
Line 3 only visible if setpoint signal is selected.

Line n°	Display	Description	Possible settings
1	CHANG.INP/OUT-PUTS	Screen title	
2	AI1	➤ To set a floating setpoint with an electrical signal. ➤ To select if AI1 is used for HR inlet water C ➤ To select if AI1 is used for MS outlet water E	NONE MS OUTL WATER E SETP.SIGN.0/1V SETP.SIGN.0/10V SETP.SIGN.0/20mA SETP. SIGN.4/20mA HR INLET WATER C
3	MAX SETP.DIF:	Maximum difference between set-points.	Between -50°C and 50°C

When you want to program this input, check the field wiring to see if this input is installed correctly. For more info about this function refer to the corresponding chapter.

Remark:

- ➤ If AI1 is programmed as HR inlet water C then Heat recovery mode is enabled, and the heat recovery setpoint screen will appear in the user menu.
- ➤ If AI1 is programmed as MS outlet water E, the controller will take the temperature reading from AI1 as the DICN common outlet water temperature. If this AI1 is not programmed when DICN is used, the controller will automatically take the AI1 input as DICN sensor. If the slave 1 setpoint signal is used, the master must be programmed manually to MS outlet water C.

Screen 9

This screen allows you to adjust the offset of the probe.
Line 2/3 not visible in case of 'ERAP' unit type.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	PROBE OFFSET	Screen title			
2	AI4 INLET E :	To set the accuracy of the evaporator inlet water temperature	0.0°C	-0.5°C	0.5°C
2	AI5 OUTLET E :	To set the accuracy of the evaporator outlet water temperature	0.0°C	-0.5°C	0.5°C
3	AI6 AMBIENT :	To set the accuracy of the ambient tempera-ture	0.0°C	-0.5°C	0.5°C

2

Screen 10

This screen allows you to adjust the BMS settings.

Line n°	Display	Description	Default	Possible settings
1	BMS SETTINGS	Screen title		
2	SER. BOARD:	To select the communication protocol between the BMS and the gateway	NONE	NONE RS485 RS232 (not used) RS422 (not used) LON FFT (not used) LON RS485 (not used)
3	PROTOCOL:	Indicates the communication protocol	CAREL	CAREL MODEM (not used) MODBUS (not used) LON (not used)
4	BAUD RATE:	To select the baud rate for communication between the BMS card and the gateway	19200 bps	1200 2400 4800 9600 19200

For more info about this function refer to the corresponding chapter.

Remark: Refer to the BMS manual (Service Manual BMS option for Daikin water chillers) for more detailed information.

Screen 11

This screen allows you to activate the PC control mode and to modify the BMS settings.

Line n°	Display	Description	Default	Possible settings
1	BMSBOARD SETTINGS	Screen title		
2	BMSCONTROL ALLOWED:	To allow BMS control to read and write parameters	N	N/Y
3	BMS ADDRESS PCB:	Used to address circuits of the unit towards the gate-way	01	01 till 32
4	ON LINE:	Indicates if there is commu-nication between controller and gateway.	-	YES - NO

For more info about this function refer to the corresponding chapter.

Remark: Refer to the BMS manual (Service Manual BMS option for Daikin water chillers) for more detailed information.

2

Screen 12

This screen allows you to customize the flow indication after start up.

Line n°	Display	Description	Default	Possible settings
1	SERVICE MENU	Screen title		
2/3	IF NO FLOW AFTER PUMPLEADTIME:	To select if the unit should go into alarm or standby status if there is no flow after start up.	ALARM	ALARM/STANDBY
4	MAN. PUMP OR MAN.PUMP: 2ND: (if a DO is set to dual evaporator pump)	To be able to check the operation of pump 1 and 2 manually. This means that when the unit is off the pump can also be turned on at any time to check the pump.	OFF	ON/OFF

For more info about this function refer to the corresponding chapter.

Remark: In this menu you can turn 1 or 2 pumps on manually. The pump(s) will operate until they are switched off or until you exit the service menu.

Screen 13

This screen allows you to customize the freeze up safety.

Line n°	Display	Description	Default	Possible settings
1	SERVICE MENU	Screen title		
2	FREEZE UP:	To select one of the freeze up settings.	DIS&SAFETY	DIS&SAFETY/DIS. ONLY
3.1	SAFETY:	Number of allowed freeze ups during a specified time before the circuit would stop.	2	0 to 5
3.2	IN	To select the time in which the specified number of freeze ups is allowed.	60 min	5 till 180min
4	INL CHECK AFTER RESET:	To select if the unit should check the inlet water temperature before reset.	N	Y/N

Remark:

DISABLE ONLY:

- The circuit will shut off after every freeze up protection (activated from MOW-1.5K) and will reset automatically if evaporator outlet temperature > MOW. There will be no fault indication on the controller.

DISABLE & SAFETY:

- The circuit will shut off after every freeze up protection (activated from MOW-1.5K) and give a fault indication after the number of allowed freeze ups during a specified time has expired. The safety must be reset manually.

For more info about this function refer to the corresponding chapter.

2

Screen 14

This screen allows you to customize the fan safety.

In case of 3 step fans:

Line n°	Display	Description	Default	Lower limit	Upper limit
1	SERVICE MENU	Screen title			
2.1	FAN UP:	Delay timer for switching on the fans one step up after Fan HP is reached	10s	0s	180s
2.2	DOWN :	Delay timer for switching off the fans after Fan LP is reached	180s	0s	180s
3.1	FAN LP :	Fan lower Limit, when pressure is reached the fan down timer starts counting	6.0 bar (R134a)	5.5 bar	8.7 bar
			11 bar (R407C)	10.0bar	15.0 bar
3.2	HP :	Fan higher Limit, fans start when pressure is reached	10 bar (R134a)	8.0 bar	11.2 bar
			17 bar (R407C)	14.0 bar	19.0 bar
4	DIFF :	Fan step difference	0.5 bar	0.5 bar	3 bar
4.2	SHIFT	To set fan shift	4.0 bar (R134a)	0.0 bar	**
			7.0 bar (R407C)	0.0 bar	**

** Maximum fan-shift = HPSETB - HP - 0.5 bar.

For more info about this function refer to the corresponding chapter.

In case of inverter driven fans:

This screen is shown in case of a heat recovery unit.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	SERVICE MENU	Screen title			
2.1	HRSP1:	High pressure setpoint 1 for heat recovery.	22.0 bar (R407C)	16.0 bar	23.0 bar
2.2	D1:	High pressure difference 1.	2.0 °C	0.0 °C	2.0 °C
3.1	HRSP2:	High pressure setpoint 2 for heat recovery.	19.0 bar (R407C)	16.0 bar	23.0 bar
3.2	D2:	High pressure difference 2.	8.0 °C	6.0 °C	8.0 °C
4.1	HPSP:	HP inverter setpoint if no HR is requested.	13.0 bar (R407C)	12.0 bar	14.0 bar
4.2	SHIFT:	To set fan shift for low noise operation	9.0 bar (R407C)	0.0 bar	**

** Maximum fan shift = HPSETB - HP - 0.5 bar.

For more info abaut these functions refer to the corresponding chapter.

The following screens are additional screens that appear in case of inverter driven fans.

Line n°	Display	Description	Default	Lower limit	Upper limit
1	SERVICE MENU	Screen title			
2.1	DO FAN OFF: %	Digital output to switch the on/off fans, depending on the output signal of the inverter.	45%	0%	50%
2.2	ON: %		55%	50%	99%
3.1	INVMIN1: °C	Parameters to define the minimum fan speed of the inverter driven fans in function of the outdoor ambient temperature.	0	-99	99
3.2	- Hz		5	0	50
4.1	INVMIN2: °C		25	-99	99
4.2	- Hz		15	0	50

Line n°	Display	Description	Default	Lower limit	Upper limit
1	SERVICE MENU	Screen title			
2.1	HPDIFF:	Allowable deviation from the setpoint. when fan output is around 50% (see page 2–34).	0.3 bar	0.1 bar	0.4 bar
2.2	MAX:	FanHPMaxDiff setting to set the reset value of the Fan output Maximum function (see page 2–37).	0.5 bar	0.5 bar	8 bar

For more info about these functions refer to the corresponding chapter.

2

Screen 15

Line 4 is only visible if MS Option setting = Yes

Line n°	Display	Description	Default	Lower limit	Upper limit
1	SERVICE MENU	Screen title			
2.1	C12%:	Set the timer to run in 12% mode to start up	20s	20s	180s
2.2	START:	Timer to set the compressor to the first capacity step for a certain time before the first load-up is allowed	180s	120s	360s
3.1	STOP:	Timer to set to 12% before stop.	8s	0s	99s
3.2	HP SETBACK:	Function used to prevent the unit from going into high pressure safety	16.5 bar (R134a)	14 bar	18.0 bar
			24.5 bar (R407C)	23.5 bar	26.0 bar
4.1	MS PR:	Unit priority –step Length Priority	0-2	0-0	3-4
4.2	AI3	To set the accuracy of the sensor, Ms outlet water E or HR inlet water C	0	-0.5	0.5

Remark: *Unity priority – step Length Priority*

- The first digit of the Master Slave Priority refers to the Unit priority. With this digit you can give each unit a certain start up priority.
- The second digit refers to the Step Length priority. This setting reacts only on loadup steps and avoids that one of the DICN units goes into freeze-up alarm because the common leaving water is still too high.

For more info about this function refer to the corresponding chapter.

Remark: Stop: This timer allows you to set the time of the 12% capacity step before stopping the compressor. When a time is entered:

- Time /2 is used to run in 12% capacity step.
- Time /2 is used to still activate the 12% coil even if the compressor is switched off.

Screen 16

This screen allows you to choose whether a password is needed to reset safeties.

Line n°	Display	Description	Possible settings
1	SERVICE MENU	Screen title	
2	PASSWORD NEEDED TO		
3	RESET SAFETIES:		
4		Indication of the password needed to reset safeties.	NONE USER PASSWORD (DEFAULT) SERVICE PASSWORD

For more info about this function refer to the corresponding chapter.

Screen 17

This screen allows you to adjust the EEV settings
Only visible if EEV1 or EEV2 is present

Line n°	Display	Description	Possible settings
1	EEV SERVICE MENU	Screen title	
2	SCREENS:	Enabling additional screens, EEV read-out	N/Y
2.1	BATTERY:	Enable battery	N/Y
3	POWER ON,NO SAF:	Set delay timer before safety will be displayed (default 90s)	10 – 120 s

For more info about this function refer to the corresponding chapter.

Screen 18a

This screen allows you to adjust the EEV settings
Only visible if EEV1 or EEV2 is present

Line n°	Display	Description
1	EEV DRIVER C1(2)	Screen title
3	NO WARNINGS	No warnings on EEV driver

Screen 18b

This screen allows you to see and reset the warning
Only visible if EEV1 or EEV2 is present

Line n°	Display	Description	Possible settings
1	EEV DRIVER C1(2)	Screen title	
2	SYSTEM WAITING FOR:		
3	VALVE OPEN		
4	GO AHEAD:		N - Y

Remark: After setting GO AHEAD on Y you will be able to reset the Valve Open error on the Error menu

2

Screen 18c

This screen allows you to see if the battery is charged
Only visible if EEV1 or EEV2 is present

Line n°	Display	Description	Possible settings
1	EEV DRIVER C1(2)	Screen title	
3	BATTERY CHARGED	Indicates if battery is charged	
4		Status	N – Y

Screen 19

Line n°	Display	Description	Possible settings
1	SERVICE MENU	Screen title	
2	SIMULATION:	Indicates if the controller is set to simulation board or standard parameters	NO – YES
3.1	AI:	Setting (default = 0)	0 – 2
3.2	AO:	Setting (default = 0)	0 – 1
3.3	DIS.EEV:	Setting (default = 0)	0 – 1
4	STL	Setting (default = 0)	0 – 1

For more info about this function refer to the corresponding chapter.

Screen 20

This screen allows you to modify the stepless differential thermostat settings

Line n°	Display	Description	Default	Lower Limit	Upper Limit
1	SERVICE MENU	Screen title			
3.1 3.2 3.3	A: B: C:	Setting A Setting B Setting C	0.8 °C 0.5 °C 0.2 °C	0.8 °C 0.5 °C 0.2 °C	6 °C 1 °C 0.4 °C
4.1	InlDiff	Selection if inlet differential check is used	Y	N	Y
4.2		Valve of inlet differential	0.5 °C	0.3 °C	2 °C

For more info about this function refer to the corresponding chapter.

Remark: Inlet differentional check:

When a unit is on outlet control, then the inlet water temperature is stored in the memory at the moment the last compressor is stopped by thermostat (not when stopped by safety, change mode...). The unit will only restart if the thermostat ON is requested and if the inlet evapovator water temperature > stored value + inldiff.

4.10 Timers Menu

Software timers

Using this menu you can read the actual value of the software timers. This menu displays four screens.

Screen 1

This screen shows the actual value of the general timers:

Line n°	Display	Description
1	GENERAL TIMERS	Screen title
2a.1	LOADUP:	Delay timer for loading up; during countdown, the unit is unable to load up
2a.2	-DWN:	Delay timer for loading down; during countdown, the unit is unable to load down
3a	PUMPLEAD:	The time the pump has to run before the chiller can start up.
3b	PUMPLAG:	The time the pump still has to keep running after the chiller has stopped. (appears when PUMPLEAD TIME =0)
3c	PUMPDAILY:	Countdown timer, counts if the daily pump start is activated and if the start time is reached.
4	FLOWSTOP:	Delay timer that starts counting when the water flow through the evaporator stops during normal operation; if the water flow has not restarted during the countdown, the unit will shut down (default: 5s)

For more info about this function refer to the corresponding chapter.

Screen 2

This screen shows the actual value of the startup difference timer:

Line n°	Display	Description
1	COMPRESSOR TIMERS	Screen title
2	COMPR. STARTED	Startup difference timer (5s). If more then one compressor starts up at the same time than there has to be 5 seconds between startups.

For more info about this function refer to the corresponding chapter.

2

Screen 3

This screen shows the actual value of the compressor timers:

Line n°	Display	Description
1	COMPRESSOR TIMERS	Screen title
2	GRD1: s AREC1: s	Guard timer & Anti recycling timer for compressor 1
3	GRD2: s AREC2: s	Guard timer & Anti recycling timer for compressor 2

Remark: Guard timer: delay timer to prevent compressor from restarting after a shutdown (default 60s). Only if AREC timer is already on 0s.

Anti recycling timer: AREC timer is used to limit the starts per hour, means counting after starting the compressor. For a screw compressor the default value is 600sec (max. 6 starts/hour).

Screen 4

This screen shows the actual value of the compressor timers:

Line n°	Display	Description
1	COMPRESSOR TIMERS	Screen title
2.1	START1:	Delay timer that shows the remaining time that the unit has to run in its first capacity step at start up.
2.2	STOP:	Delay timer that shows the remaining time that the unit has to run at 12% capacity before shutting down.
3.1	START2:	Delay timer that shows the remaining time that the unit has to run in its first capacity step at start up.
3.2	STOP	Delay timer that shows the remaining time that the unit has to run at 12% capacity before shutting down.

4.11 History Menu

Introduction

The history menu contains all the information concerning the latest shutdowns. The structure of those menus is identical to the structure of the safety menu. Whenever a failure is solved and the operator performs a reset, the concerning data from the safety menu is copied into the history menu. The last 20 errors or warnings are recorded and can be read out.

Additionally the number of safeties that already occurred on each circuit can be consulted on the first line of the history screens.

Screen 1

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates the safety. XXX is the number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	XXhXX – XX/XX/XX	Indicates time and date of safety.
4	INLSETP1 E: XXX°C or INLSETP2 E: XXX°C or OUTSETP1 E: XXX°C or OUTSETP2 E: XXX°C or INLSETP1 C: XXX°C or INLSETP2 C: XXX°C or SP1E: C: or SP2E: C: or THERMOSTAT MANUAL MODE HR INL C SENCOR	Indicates the control mode and setpoint at the moment of shutdown.

When in this main history screen it is possible to go to sub screens for more detailed information. To access these sub screen press the key as many times as needed to reach the desired sub screen.

Remark: The sub-screens automatically disappear after 5 seconds.

2

Sub screen 1.1 Push the ↵ key to enter the first sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates if it was a unit, circ1, circ2 or network safety. XXX is the number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3.1	INL.E: XX.X°C	Actual measured evaporator inlet temperature at the moment of shutdown.
3.2	INL.C: XX.X°C	Actual measured condenser inlet temperature at the moment of shutdown. (The value is shown on line 4!)
4	OUT.E: XX.X°C	Actual measured evaporator outlet temperature at the moment of shutdown.

Screen 1.2 Push the ↵ key again to enter the second sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates if it was a unit, circ1, circ2 or network safety. XXX is the number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	OUTC1: XXX°C	Actual measured evaporator outlet temperature of circuit 1 at the moment of shutdown.
4	OUTC2: XXX°C	Actual measured evaporator outlet temperature of circuit 2 at the moment of shutdown.

Screen 1.3

Push the key once more to enter the third sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates if it was a unit, circ 1, circ2, or network safety. XXX is the number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	C1:	Actual status of the compressor of circuit 1 at the moment of shutdown.
4	C2:	Actual status of the compressor of circuit 2 at the moment of shutdown.

Screen 1.4

Push the key once more to enter the fourth sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates if it was a unit, circ 1, circ2, or network safety. XXX is the number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	HP1: = °C	Actual status of the high pressure of circuit 1 at the moment of shutdown.
4	LP1: = °C	Actual status of the low pressure of circuit 1 at the moment of shutdown.

2

Screen 1.5

Push the ↵ key once more to enter the fifth sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates if it was a unit, circ 1, circ2, or network safety. XXX is the number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	HP2: = °C	Actual status of the high pressure of circuit 2 at the moment of shutdown.
4	LP2: = °C	Actual status of the low pressure of circuit 2 at the moment of shutdown.

Screen 1.6

Push the ↵ key once more to enter the sixth sub-screen.

Line n°	Display	Description
1	UNIT HISTORY:XXX CIRC 1 HISTORY:XXX CIRC 2 HISTORY:XXX NET HISTORY:XXX U WARN HISTORY:XXX C1WARN HISTORY:XXX C2WARN HISTORY:XXX	Indicates if it was a unit, circ 1, circ2, network or pump safety. XXX is the serial number of the alarm.
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.
3	RH 1:	Actual running hours of the compressor of circuit 1 at the moment of shutdown.
3a	AMB.T: XX.X°C	Actual ambient temperature at the moment of shut-down. (The value is shown on line 4!)
4	RH 2:	Actual running hours of the compressor of circuit 2 at the moment of shutdown.

4.12 Info Menu

Introduction

Using this menu you can consult additional information about the unit. There are four screens.

Screen 1

This screen shows the actual time and date.

Line n°	Display	Description
1	TIME INFORMATION	Screen title
2	TIME: XXhXX	Actual time
3	DATE:XXX XX/XX/XX	Actual day en date

For more info about how to set these parameters refer to the corresponding chapters.

Screen 2

This screen shows the unit type.

Line n°	Display	Description
1	UNIT INFORMATION	Screen title
2a	UNITTYPE: XX-XX-XXX	The first two letters tell if the unit is air- or water-cooled, the following two give the type of unit and the number indicates the capacity power of the unit.
2b	C:	Indicates the type of the compressor: STL: Stepless compressor ST: Step compressor
3a	CIRC: EVAP:	Indicates the quantity of circuits and Evaporators
3b	FAN:	Indicates the type of the fans: N: No fans 3ST: on/off fans with 3 fan steps INV: on/off fans and Inverter fans
4	REFRIGERANT: XXXX	Refrigerant type (R407C / R134a)

Remark: Unit type explanation: WW: Water-Water-cooled
AW: Air-water-cooled

CO: cooling only
HP: Heat-pump
HR: Heat recovery
RC: Remote condenser
CA: ER

2

Screen 3

This screen shows additional information about the unit, especially about the software and the EEV drivers if present on the unit.

Line 4 only visible if EEV1 = Yes or EEV2 = Yes

Line n°	Display	Description
1	UNIT INFORMATION	Screen title
2	SW:	Indicates the software version and date.
3	SW CODE:	Indicates the software code.
4 EEV1: -2:	XXXXXX	The hardware (first 3 digits) and software version (last 3 digits) of the EEV driver

Screen 4

This screen shows PCB information.

Line n°	Display	Description
1	PCB INFORMATION	Screen title
2	BOOT:	Indicates boot version and date.
3	BIOS:	Indicates bios version and date.
4	pLAN ADDRESS :	Gives the address that is set on the dipswitch (For DICN)

For more info about how to set these parameters refer to the corresponding chapters.

4.13 Input/Output Status Menu

Introduction

Using this menu you can read the status of the digital inputs and the status of the relay outputs.

- Screen 1 to 5 provides the status of the digital inputs.
- Screen 7 to 13 provides the status of the relay outputs.
- Screen 6 and 14 provides the status of the changeable digital inputs and outputs.
- Screen 15 provides the status of the EEV inputs and outputs.

Screen 1

This screen shows the status of the emergency stop and the flow switch.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	EMERGENCY STOP:	Status of emergency stop	OK/NOK
3	FLOWSWITCH:	Status of flow switch	FLOW OK/NO FLOW

Screen 2

This screen shows the status of digital inputs of circuit 1.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C1 HIGH PR. SW. :	Status of high pressure switch of circuit 1	OK/NOK
3	C1 REV.PH.PROT.:	Status of reverse phase protector of circuit 1	OK/NOK
4	C1 OVERCURRENT :	Status of the overcurrent switch of circuit 1	OK/NOK

Screen 3

This screen shows the status of digital inputs of circuit 1.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C1 DISCH. TH. PR.:	Status of discharge temperature protection switch of circuit 1	OK/NOK
3	C1 COMPR. TH. PR.:	Status of compressor thermal protection of circuit 1	OK/NOK
4	C1 FAN INV.:	Status of the inverter fan controller of circuit 1 (only visible if inverter driven fans are present)	OK/NOK

Screen 4

This screen shows you the status of digital inputs of circuit 2.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C2 HIGH PR. SW.	Status of high pressure switch of circuit 2	OK/NOK
3	C2 REV.PH.PROT.:	Status of reverse phase protector of circuit 2	OK/NOK
4	C2 OVERCURRENT	Status of overcurrent switch of circuit 2	OK/NOK

Screen 5

This screen shows you the status of digital inputs of circuit 2.

Line n°	Display	Description	Possible settings
1	DIGITAL INPUTS	Screen title	
2	C2 DISCH. TH. PR.	Status of discharge thermal protection switch of circuit 2	OK/NOK
3	C2 COMPR. TH. PR.	Status of compressor thermal protection of circuit 2	OK/NOK
4	C2 FAN INV.:	Status of the inverter fan controller of circuit 2 (only visible if inverter driven fans are present)	OK/NOK

Screen 6

This screen shows the status of changeable digital inputs.

<table>
<tr><th>Line n°</th><th>Display</th><th>Description</th><th>Possible settings</th><th>Possible status</th></tr>
<tr><td>1</td><td>CHANG.
DIG.
INPUTS</td><td>Screen title</td><td></td><td></td></tr>
<tr><td>2</td><td>DI1
XXXX:XXX</td><td>Changeable digital input 1 + status of input</td><td rowspan="3">NONE
DUAL SETPOINT
REMOTE ON/OFF
REMOTE COOL/HEAT
CAP. LIMIT 1
CAP. LIMIT 2
CAP. LIMIT 3
CAP. LIMIT 4
LOW NOISE
STATUS
HEAT REC:</td><td rowspan="3">SETP.1/SETP.2
ON/OFF
COOL/HEAT
NO LIM/LIMIT
NO LIM/LIMIT
NO LIM/LIMIT
NO LIM/LIMIT
N/Y
OPEN/CLOSED
NO REQ/REQ</td></tr>
<tr><td>3</td><td>DI2
XXXX:XXX</td><td>Changeable digital input 2 + status of input</td></tr>
<tr><td>4</td><td>DI3
XXXX:XXX</td><td>Changeable digital input 3 + status of input</td></tr>
</table>

Screen 7

This screen shows the status of the compressor relays of circuit 1.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	CIRCUIT 1 ON:	Indicates the status of the compressor	NO/YES
3	CIRCUIT 1 STAR:	Indicates if the compressor is in star	NO/YES
4	CIRCUIT 1 DELTA:	Indicates if the compressor is in delta	NO/YES

Screen 8

This screen shows the status of the compressor relays of circuit 2.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	CIRCUIT 2 ON:	Indicates the status of the compressor	NO/YES
3	CIRCUIT 2 STAR:	Indicates if the compressor is in star	NO/YES
4	CIRCUIT 2 DELTA:	Indicates if the compressor is in delta	NO/YES

Screen 9

This screen shows the status of the relay outputs of compressor 1.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title.	
2	C1(12%):	Indicates if the 12% coil is energized	N or Y
3	C1: CAPUP DOWN:	Indicates if the compressor is loading up or loading down	N or Y
4	C1 Feedback:	Gives the feedback from the compressor control motor	± 30 Ω = 0% cap ± 120 Ω = 100% cap

Screen 10

This screen shows the status of the relay outputs of compressor 2.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C2(12%):	Indicates if the 12% coil is energized	N or Y
3	C2: CAPUP DOWN:	Indicates if the compressor is loading up or loading down	N or Y
4	C2 Feedback:	Gives the feedback from the compressor control motor	± 30 Ω = 0% cap ± 120 Ω = 100% cap

Screen 11

This screen shows the status of the relay outputs of the fans from circuit 1.

Only for air-cooled units with 3 step fans

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C1 FANSTEP 1	Indicates the status of the fan contactor of circuit 1	Open/closed
3	C1 FANSTEP 2	Indicates the status of the fan contactor of circuit 1	Open/closed
4	C1 FANSTEP 3	Indicates the status of the fan contactor of circuit 1	Open/closed

For units with inverter driven fans

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C1 FANON/OFF:	Indicates the status of the on/off fan contactor of circuit 1	Open/closed
3	C1 FANINV SP:	Indicates the setpoint of the inverter fans of circuit 1	From 0 to 50 Hz

Screen 12

This screen shows the status of the relay outputs of the fans from circuit 2.
Only for air-cooled units with 3 step fans

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C2 FANSTEP 1	Indicates the status of the fan contactor of circuit 2	Open/closed
3	C2 FANSTEP 2	Indicates the status of the fan contactor of circuit 2	Open/closed
4	C2 FANSTEP 3	Indicates the status of the fan contactor of circuit 2	Open/closed

For units with inverter driven fans

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	C2 FANON/OFF:	Indicates the status of the on/off fan contactor of circuit 2	Open/closed
3	C2 FANINV SP:	Indicates the setpoint of the inverter fans of circuit 2	From 0 to 50 Hz

Screen 13

This screen shows the status of the general alarm and the pump contacts.

Line n°	Display	Description	Possible settings
1	RELAY OUTPUTS	Screen title	
2	GEN. ALARM:	Indicates the status of the general alarm contact	Open/closed
3	PUMP/GEN OPER:	Indicates the status of the DO contact for the pump or general operation.	Open/closed
4	AI1:	Indicates the type of signal on analogue input 1 and the actual readout of the temperature or voltage or current	NONE MS OUT E: °C SETP.SIGN. mV SETP.SIGN. V SETP.SIGN. mA HR INL C: °C

Screen 14

This screen shows the status of the changeable digital input and the digital outputs.

Line n°	Display	Description	Possible settings	Possible status
1	CHANG. INP/OUTPUTS	Screen title		
2	DI4 XXXX:XXXX	Changeable digital input 4 + status of input	NONE DUAL SETPOINT REMOTE ON/OFF REMOTE COOL/HEAT CAP. LIMIT 1 CAP. LIMIT 2 CAP. LIMIT 3 CAP. LIMIT 4 LOW NOISE STATUS HEAT REC:	SETP.1/SETP.2 ON/OFF COOL/HEAT NO LIM/LIMIT NO LIM/LIMIT NO LIM/LIMIT NO LIM/LIMIT N/Y OPEN/CLOSED NO REQ/REQ
3	DO1 XXXXXXX	Changeable digital output 1 + status of output	NONE(OPEN) 1(CLOSED) 2ND EVAP PUMP CONDENSER PUMP 100% CAPACITY FREE COOLING GEN.OPERATION REV.VALVE(C/H) EVAPHEATERT.: HR COND PUMP:	O/C (Open/Closed)
4	DO2 XXXXXXX	Changeable digital output 1 + status of output		

Screen 15

This screen shows the status of the In/Outputs of the EEV
Only if 1 or 2 electronic expansion valves are present on the unit.

Line n°	Display	Description	Possible settings
1	EEV1 (2) IN/OUTPUTS	Screen title	
2	BATTERY:	Status of the battery	DISCONNECTED HIGH INT.RES NOT RECHARGE DOWN OK
3	VALVE POSITION	The position of the electronic expansion valve	0 - 9999

4.14 User Password Menu

Password

The user password is used to protect the access to:

- the user settings menu
- the set points menu (if selected so in the user settings menu)
- the user password menu

The password is a 4-digit number between "0000" and "9999".

The units leave the factory with user password "1234". The service password overrides the user password (in case you don't know or forgot the user password).

Screen 1

In this screen the user password must be entered to access the user password menu.
Use the ▼ and ▲ keys to select the password.

Line n°	Display	Description	Possible settings
1	ENTER PASSWORD	Screen title	
3	PASSWORD: 0000	Current password	From 0000 till 9999

Screen 2

In this screen you can change the password.
Use the ▼ and ▲ keys to select the new password, press ↵ key to confirm.

Line n°	Display	Description	Possible settings
1	ENTER PASSWORD	Screen title	
2	NEW PASSWORD:	To set the new password	From 0000 till 9999
3	CONFIRM:	To confirm the new password	From 0000 till 9999

4.15 Network Menu

The network menu is only accessible when MS OPTION is set to "YES" in the service menu.

Screen 1

Line2, 3, 4 only visible if MSOption = Yes

Line n°	Display	Description	Possible settings
1	NETWORK		
2	XXXXXXX	Gives the setpoint you selected to use (usersettings menu and dual setpoint if selected)	INLSETP1(2) E OUTSETP1(2) E INLETSP1(2) C SP1(2) E: C:
3	INL WATER E	Inlet temperature of the inlet water on the master unit.	°C
4	OUTL WATER E	Gives the temperature of the mixed outlet water temperature.	°C

Line 4 is only visible if in user settings menu the control setting mode is "outlet water setpoint".
An extra temperature sensor must be installed to measure the mixed outlet water temperature.

Screen 2

Line n°	Display	Description	Possible settings
1.1	¨M:	Displays status of Master (as selected in user settings menu)	NORMAL/STANDBY/ DISCONN/SAFETY
1.2	ST:	Displays the capacity of the master	
2.1	SL1:	Displays status of the slave (as selected in user settings menu)	NORMAL/STANDBY/ DISCONN/SAFETY
2.2	ST:	Displays the capacity of the slave1	
3.1	SL2:	Displays status of the slave (as selected in user settings menu)	NORMAL/STANDBY/ DISCONN/SAFETY
3.2	ST:	Displays the capacity of the slave2	
4.1	SL3:	Displays status of the slave (as selected in user settings menu)	NORMAL/STANDBY/ DISCONN/SAFETY
4.2	ST:	Displays the capacity of the slave3	

4.16 Cool/Heat Menu

Screen 1

This screen allows you to choose between cooling and heating.

Line n°	Display	Description	Possible settings
1	COOLING/HEATING	Screen title	
3	MODE:	To select cooling or heating mode	COOLING (EVAP) HEATING (COND) DOUBLE THERM.

Remark: Cool/Heat Menu is only available on water-cooled chillers

For more info about how to set these parameters refer to the corresponding chapters.

2

4.17 Safety Menu

Introduction

The safeties menu is only accessible, by pressing the key when a unit/circuit/network safety is activated. The kind of safety will be displayed with a code, followed by its description.

The safeties menu is linked to the history screen. By pushing the key when in the safety menu you jump to the history menu where, along with the basic information, more detailed data screens can be consulted, by pressing the key again.

Remark: In the service menu it is possible to choose the password that will be requested to be able to reset the safeties. This can be either the service either the user password. When one of these passwords is selected in the service menu, it will be requested to enter that password before the safety can be reset. Default the user password (1234) is needed to reset the errors.

Screen 1a

Line n°	Display	Description
1a	UNIT WARNING UNIT SAFETY CIRCUIT SAFETY NETWORK SAFETY CIRCUIT WARNING	Indicates if you have a unit, circuit or network safety or warning (Not possible to reset, safety is still present)
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.

Screen 1b

When the error is solved the key starts blinking and it is possible to reset the safety by pressing the key.

Line n°	Display	Description
1b	RESET UNIT WARNING RESET UNIT SAFETY RESET CIRCUIT SAFETY RESET NETW SAFETY RESET CIRC WARNING	After solving the problem, the alarm key starts blinking and the display indicates that resetting is possible.(possible to reset)
2	XXX:XXXXXXXXXXXX	Indicates the safety code and its description.

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?

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.

3

Overview

This chapter contains the following topics:

1.2 What happens in the Event of an Alarm?

The units are equipped with three kinds of safety devices.

	Unit alarm	Circuit alarm	Network alarm	Warnings
Function	Protects the unit in general	Protects the individual circuit	Is activated when a communication problem occurs	Dual pump safety
Description	➤ All compressors are shut down. ➤ The red LED inside the ⓐ key lights up	➤ The compressor of the corresponding circuit is shut down. ➤ The red LED inside the ⓐ key lights up	➤ The units of the network will operate as standalone. ➤ The red LED inside the ⓐ key lights up	➤ No action is taken, the units keep operating. ➤ The red LED inside the ⓐ key lights up
Action to take	Press ⓐ to acknowledge the alarm	Press ⓐ to acknowledge the alarm	Press ⓐ to acknowledge the alarm	Press ⓐ to acknowledge the alarm
Display example	OAE:FLOW HAS STOPPED OU1:REVERESE PHASE PR	1CA:OUT E SENSOR ERR 1EO:GENERAL SAFETY 1A4:FREEZE -UP PROT.	0U4:PCB COMM.PROBLEM	0AE:FLOW HAS STOPPED

1.3 What to do in the Event of an Alarm?

In event of an alarm or a warning, the following must be done:

Step	Action	Result
1	Press to acknowledge the alarm.	➤ The 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	The cause of the alarm was found and corrected.	The LED starts blinking. Now it is possible to reset
4	Press to reset the alarm.	➤ The LED goes out and the alarm screen is deactivated. ➤ The main menu screen is displayed automatically. <u>Remark:</u> if in the service menu the option "password needed to reset safeties" is activated, you will be asked to enter the correct password to reset the safety. <u>Remark:</u> After resetting the alarm it is possible consult the safety information by using the history menu.
5	If all circuits were shutdown, switch the unit on by pressing .	The unit starts again.

3

1.4 Overview of Unit Safeties

Unit safeties	Code&display UNIT SAFETY	Description	Safety possible if unit is off?
1. Emergency stop	0F0: EMERGENCY STOP	Emergency stop button is pushed	Y
2. Flow stopped	0AE: FLOW HAS STOPPED (this safety becomes circuit safety when unit type is ww, double circuit and stepless.)	Safety is activated if the digital input is open for more then 5 seconds	N
3. Freeze-up safety	0A4: FREEZE-UP	Safety is activated if outlet water temp is too low (outletwatertemp < MOW-1.5)	Y
4. Inlet evaporator sensor error	0C9: INL E SENSOR ERR	Sensor out of range (broken, bad contact, short circuit,...) read-out for sensor (AI4) is +Er/-Er	Y
5. Outlet Evapora-tor sensor error	0CA: OUT E SENSOR ERR	Sensor out of range (broken, bad contact, short circuit,...) read-out for sensor (AI5) is +Er/-Er	Y
6. Ambient sensor	0H9: AMB SENSOR ERR	Sensor out of range (broken, bad contact, short circuit,...) read-out for sensor is +Er/-Er (only for air-cooled units)	Y
7. Inlet Condenser sensor error	0HC: INL C SENSOR ERR	Sensor out of range (broken, bad contact, short circuit,...) read-out for sensor is +Er/-Er (only for water-cooled units)	Y
8. Heat recovery inlet sensor error (only on HR units)	0HC: HR INL C SENSOR	Sensor out of range (broken, bad contact, short circuit,...) read-out for sensor is +Er/-Er (only if Changeable AI= HR water cond inlet is selected)	Y
9. PCOE expansion board error	0U4: PCB EXP COMM.ERR	No communication with PCOE basically: for units with 2 circuits and stepless compressors then PCOE should be present. This safety is only enabled if the error is present for 120 sec. (default)	Y
10. ERAP Thermostat sensor error	0CJ: THERM SENSOR ERR	Sensor out of range read-out for sensor is +ER/-Er (only for ERAP units) (broken, bad contact, short circuit,...)	

1.5 Overview of Circuit Safeties

Circuit safeties	Code&display *CIRCUIT 1 SAFETY* *Or* *CIRCUIT 2 SAFETY*	Description	Safety possible if unit is off?
1. Reverse phase protector	1/2 U1: REV PHASE PROT	Safety is activated if digital input is closed	Y
2. High pressure switch	1/2 E3: HIGH PRESSURE SW	Safety is activated if digital input is closed Also manual reset, blue button, on the highpressure switch activation at 25 bar	Y
3. Compressor therm protection	1/2 E5: COMPR THERM PROT	Safety is activated if digital input is closed activation at 115°C and possible to reset at 95°C	Y
4. Overcurrent	1/2 E6: OVERCURRENT	Safety is activated if digital input is closed	Y
5. Discharge therm. Protector	1/2 F3: DISCH THERM PROT	Safety is activated if digital input is closed activation at 135°C	Y
6. Low pressure	1/2 E4: LOW PRESSURE	➤ If low pressure ≤ LP setpoint ➤ Bypassed in startup A) If unit probe is present: use unit probe B) If EEV probe is present: use EEV probe After a power ON there is a delay of 10 sec. for this alarm (because controller must receive LP value of EEV through pLAN network Possible to reset if LOW pressure > LP setpoint +0.2	Y
7. Freeze-up safety	1/2 A4: FREEZE-UP	Safety is activated if outlet water temp is to low activation if evaporator leaving water is below MOW -1.5°C and after allowed freeze up in specified time	Y
8. High pressure transmitter	1/2 JA: HP TRANSM ERR	Safety if transmitter does not work anymore +Er / -Er readout by sensor range 0...30 bar (broken, bad contact, short circuit,...)	Y
9. Low pressure transmitter	1/2 JC: LP TRANSM ERR	Safety if transmitter does not work anymore +Er / -Er readout by sensor range R407c 0...18 bar R134a -0.8 ... 7 bar (broken, bad contact, short circuit,...)	Y
10. Outlet Evaporator sensor error	1/2 CA: OUT E SENSOR ERR	Sensor out of range +Er / -Er read-out by sensor (broken, bad contact, short circuit,...)	Y
11-1. EEV probe error	1/2 A9: EEV PROBE ERR	Sensor out of range (LP probe or NTC sensor) (broken, bad contact, short circuit,...) ➤ Readout menu of LP: > 7.0b (> 7.0 instead of + ER) ➤ Digital output open of EEV (only if EEV 1/2 is present in that circuit,...)	N

Circuit safeties	Code&display ***CIRCUIT 1 SAFETY*** ***Or*** ***CIRCUIT 2 SAFETY***	Description	Safety possible if unit is off?
11-2. EEV step motor error	1/2 A9: EEV ST.MOTOR ERR	Step motor problem (only if EEV1/2 is present in that circuit) EEV alarm led is high (= red)	Y
11-3. EEV EEP-ROM error	1/2 A9: EEV EEPROM ERR	EEPROM problem (only if EEV1/2 is present in that circuit) EEV alarm led is high (= red)	Y
11-4. EEV superheat error	1/2 A9: EEV SUPERHEAT ER	➤ Only possible if the compressor is running (only if EEV 1/2 is present in that circuit) ➤ 120 sec. (fixed delay before error is active) ERROR condictions: ➤ OR superheat is to low EEV superheat $\leq$ 3°C ➤ OR superheat is to high EEV superheat $\geq$ 15°C ➤ OR suction inlet comparison EEV suction temp $\geq$ evaporator inlet temp + suction inlet diff (default 2°) Possible to reset: If superheat $\geq$ 3.3°C ➤ EEV alarm is not high	N
11-5. EEV valve not closed during stop (power failure)	1/2 A9: EEV NOT CLOSED	Valve did not close during stop (power failure) ➤ possible that liquid is in compressor ➤ only possible to reset after maintenance check ➤ Status is indicated in service menu This can be: ➤ NO WARNING ➤ VALVE OPEN (during last blackout the value has not been completely closed) ➤ BATTERY CHARGED ➤ EEPROM ERROR EEV alarm led is blinking	
11-6. EEV driver not detected	1/2 A9: EEV DRIVER ERR	EEV driver is not found Or wrong address or no power to EEV. This error is the result of a PCB commun problem. Therefore this error will be always present as well.	Y
12. Control motor not reacting	1/2 93: Contr. Motor ERR	If pot min > 55 Ω or if pot min < 5 Ω or if (pot min 12 + pot 88) < 80 Ω Remark: When this error happens, pot min and pot 88 are loaded with default values $\Rightarrow$ reset safety possible. (for more info about these parameters refer to the corresponding chapter 2–19)	N

Circuit safeties	Code&display *CIRCUIT 1 SAFETY* *Or* *CIRCUIT 2 SAFETY*	Description	Safety possible if unit is off?
13. Control motorreverse	1/2 94: Contr. Motor REV	➤ If loadup is executed and the value of compressor feedback goes down with 4.0 Ω ➤ If loadup down is executed and the value of compressor feedback goes up with 4.0 Ω	N
14. Flow stopped	1/2 AE: Flow has stopped (only for stepless units with 2nd flowswitch)	Safety is active if the digital input is longer open then 5 sec.	N
15. Fan inverter error	1/2 53: FAN INV error	Safety is activated if the digital input for inverter error of a circuit is open for more than 90 sec.	Y

3

3

1.6 Overview of Network Safeties

Network safeties	Code&display NETWORK SAFETY	Description	Safety possible if unit is off?
1. PCB Commun. Problem	0U4: PCB COMM.PROB-LEM	**1** Only if MSOptionSetting = yes! **2** On every unit for which the status of the pLAN is not OK. **3** On master: If not all slaves are found (also possible if MSOptionSetting =no on a slave) **4** On slaves: If no master unit is found. **5** On slaves: If slave is not integrated in Master (ex nr of slaves 1 then error on slave 2) This safety is only enabled if the error is pressent for 120 sec. (default) (Only possible if a network of different control-lers exists)	Y
2. Outlet Evapora-tor sensor error	0CA: OUT E SENSOR ERR	**1** Only if MSOptionSetting = yes! **2** Only on master Sensor out of range, broken, bad contact,... read-out for sensor (AI3) is +Er / -Er (Only if ChaAI1=MS mixed outlet sensor)	Y
3. Inlet evaporator sensor error	0C9: INL E SENSOR ERR	**1** Only if MSOptionSetting = yes! **2** Only on master Sensor out of range, broken, bad contact,... read-out for sensor (AI4) is +Er / -Er	Y

1.7 Overview of Warnings

In case of a warning, the unit can startup

Warning	Code&display	Description	Safety possible if unit is off?
1.Flow stopped (Dual pump safety)	UNIT WARNING 0AE: FLOW HAS STOPPED	Safety is activated if the digital input is open for more then 5 second	N
2. EEV battery error C1	C1 WARNING 1A9: EEV BATTERY ERR	Battery problem if: ➤ Disconnected ➤ High internal resistance ➤ Down	Y
3. EEV battery error C2	C2 WARNING 2A9: EEV BATTERY ERR	Same as for EEV battery error C1	Y

Remark: when a warning is activated, the unit keeps operating.

3

3

2 Checking the Digital Inputs and Outputs

2.1 What Is in This Chapter?

Introduction

This chapter gives information on how to check the digital inputs, outputs.

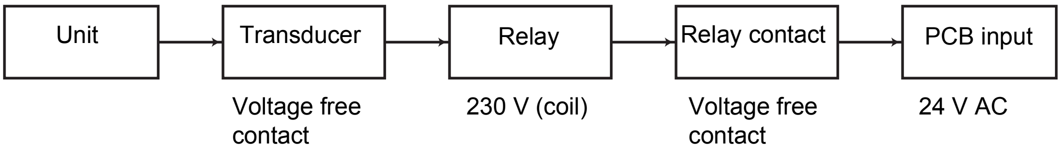
Overview

This chapter contains the following topics:

3

2.2 Input Route

In the following block diagram the digital input route from the transducer (e.g. thermostat, pressostat, reverse phase, etc.) to the controller input is shown.



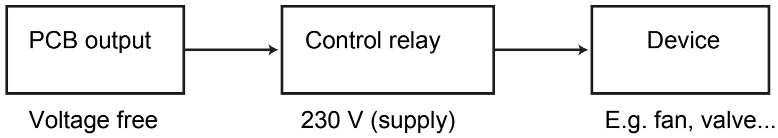
2.3 Troubleshooting

In most cases a malfunction occurs in the unit itself and not in the control circuit of the unit. If, however, a problem in the control circuit occurs, the schematic input route shown on previous page should be used to measure the relevant signals.

2.4 Output Route

The output is generated by the controller. If a device doesn't operate, the diagram below can be used to check the relevant output signal(s) in order to decide whether the controller must be replaced.

The block diagram below shows the output route.



3 Troubleshooting of Inverter with the Status Display Panel

3.1 What Is in This Chapter?

Introduction

This chapter gives information on how to check the digital inputs, outputs.

Overview

This chapter contains the following topics:

3.2 Troubleshooting of Inverter with the Status Display Panel

Warning: only a licensed electrician is allowed to carry out an inspection on the status display panel as this inspection requires the switch box to be opened.

The operating status of the inverter is indicated by the green and yellow LEDs on the Status Display Panel. These LEDs indicate the following warnings and fault states.

1 Green LED
2 Yellow LED

Green LED	Yellow LED	Priority display	Drive status definitions
OFF	OFF	1	Mains not present
OFF	ON	8	Inverter fault - other than the ones listed below
ON	OFF	13	Inverter running
ON	ON	14	Ready to run - standby
OFF	Flashing -R1	4	Fault overcurrent
Flashing -R1	OFF	5	Fault overcurrent
Flashing -R1	ON	7	Fault motor overtemperature
ON	Flashing -R1	8	Fault inverter overtemperature
Flashing -R1	Flashing -R1	9	Warning current limit - Both LEDs are flashing at the same time
Flashing -R1	Flashing -R1	11	Other warnings - Both LEDs are flashing alternately
Flashing -R1	Flashing -R2	6/10	Undervoltage trip/undervoltage warning
Flashing -R2	Flashing -R1	12	Drive is not ready - Display state > 0
Flashing -R2	Flashing -R2	2	ROM failure - Both LEDs are flashing at the same time
Flashing -R2	Flashing -R2	3	RAM failure - Both LEDs are flashing alternately

Remark: R1 - on time 900 m sec
R2 - on time 300 m sec

4 Procedure for software upload/download

4.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

4.2 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 3–21/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 3–21/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.

4.3 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.

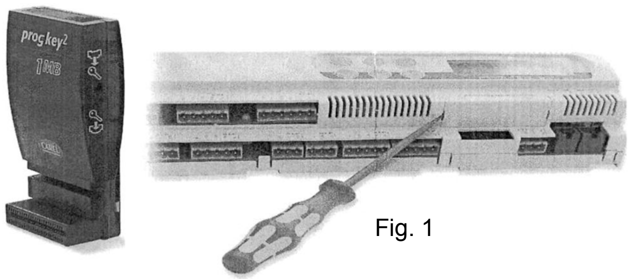


Fig. 1

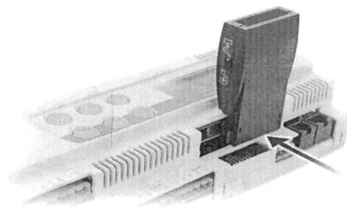


Fig. 2

4.4 Installation of Winload32 on the PC and Programming a Controller

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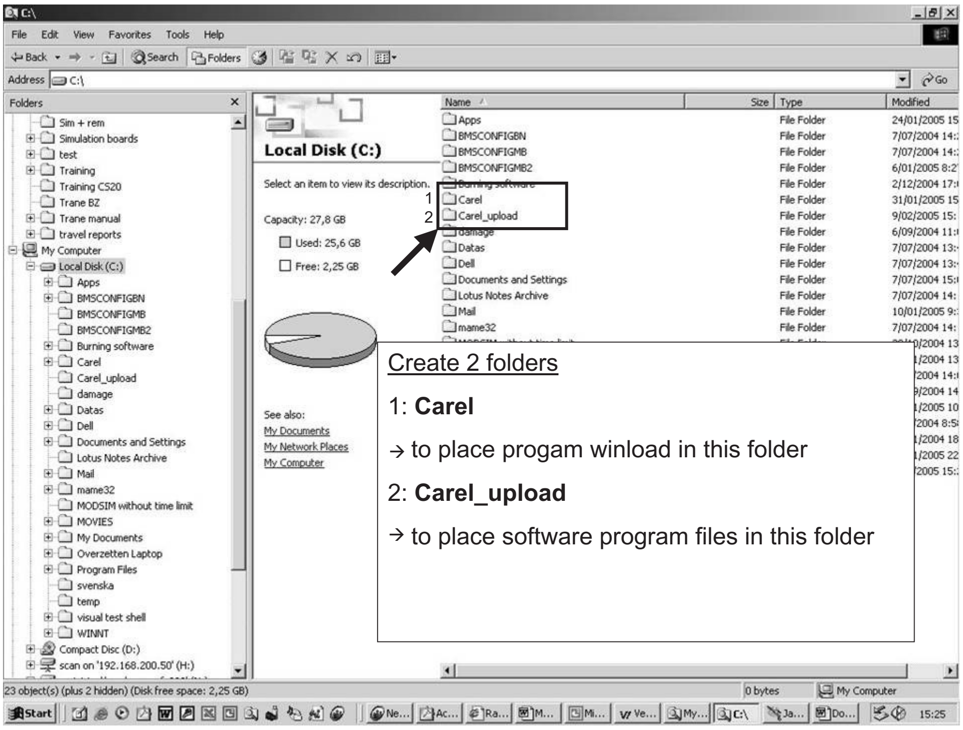
<tr><td>1</td><td>
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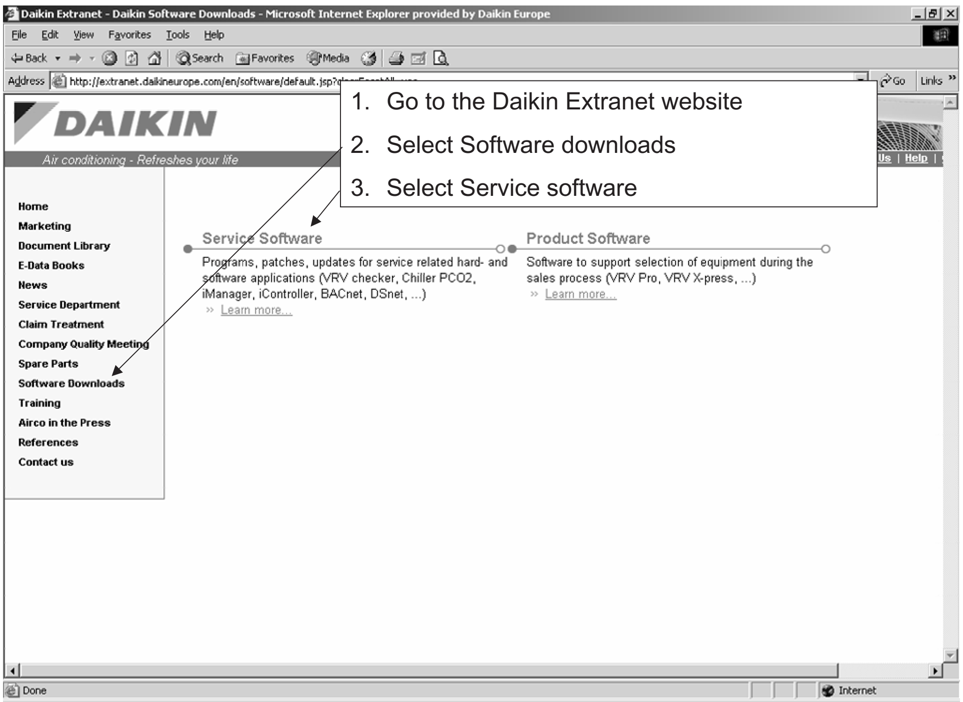
<tr><td>2</td><td>
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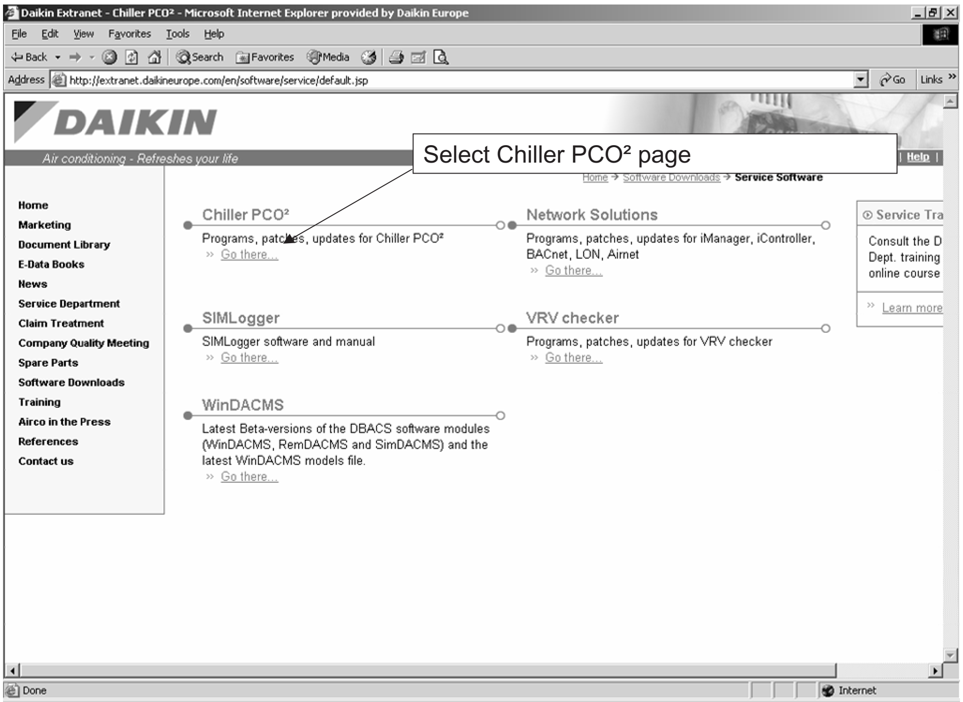

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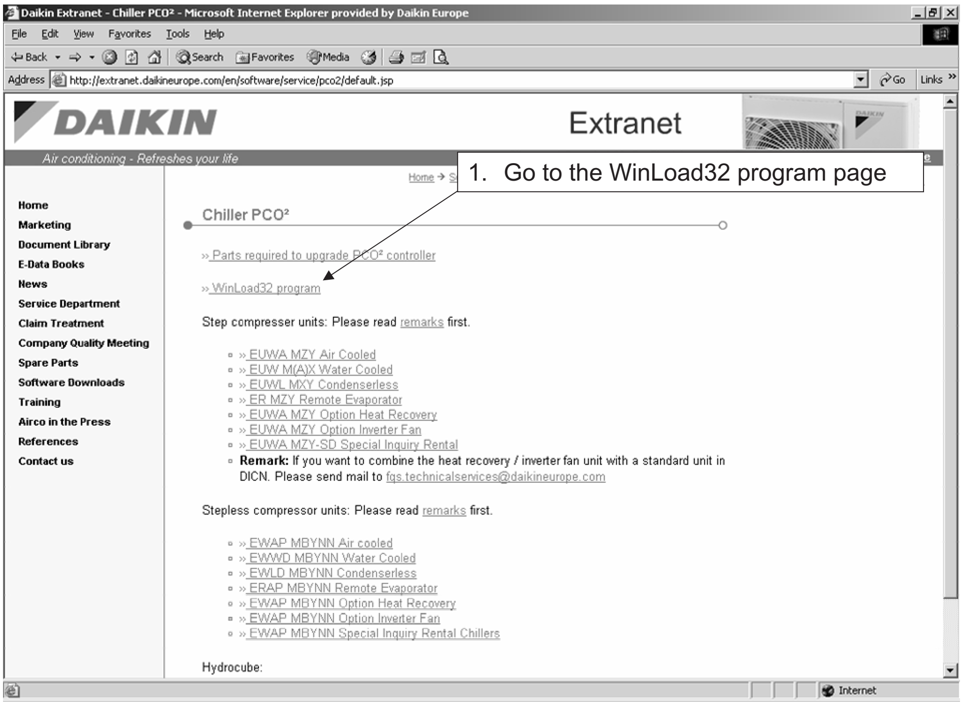

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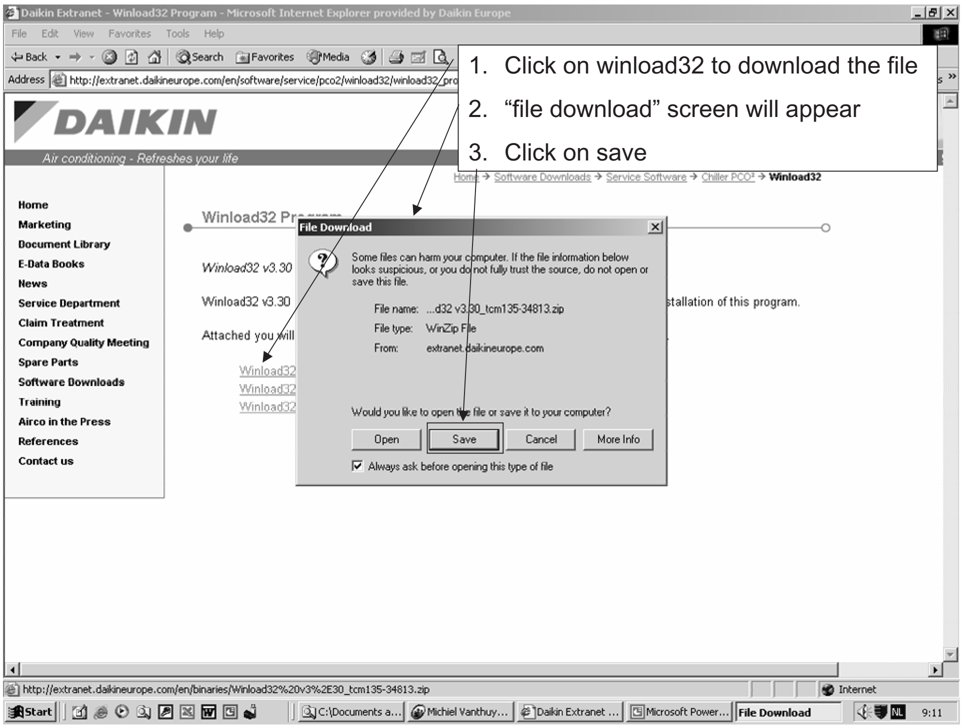
<tr><td>5</td><td>
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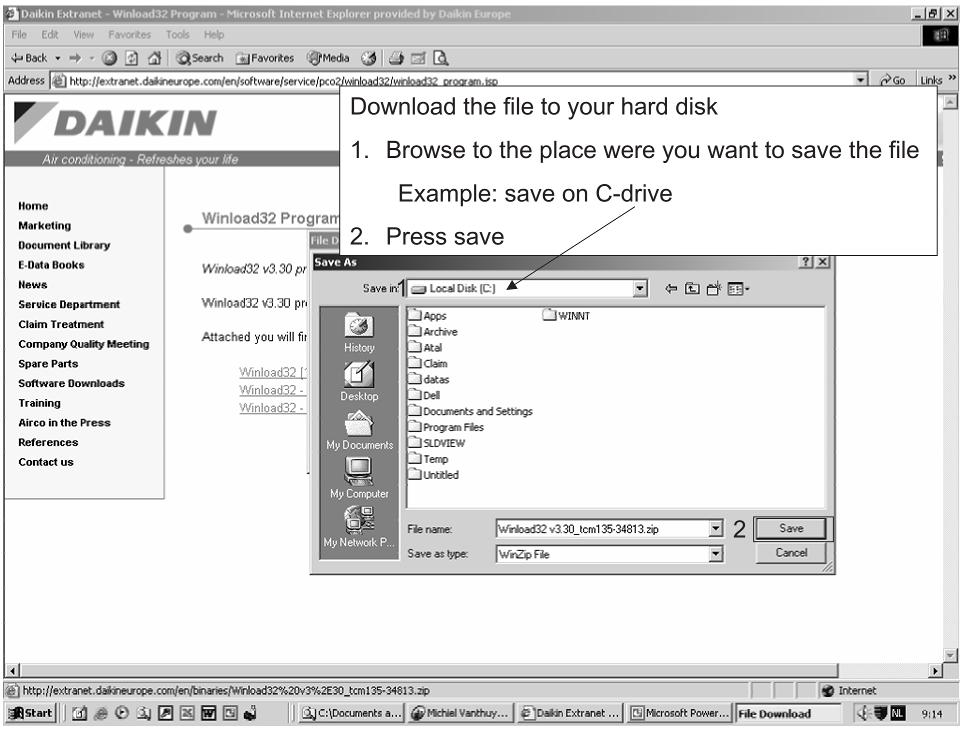
<tr><td>6</td><td>
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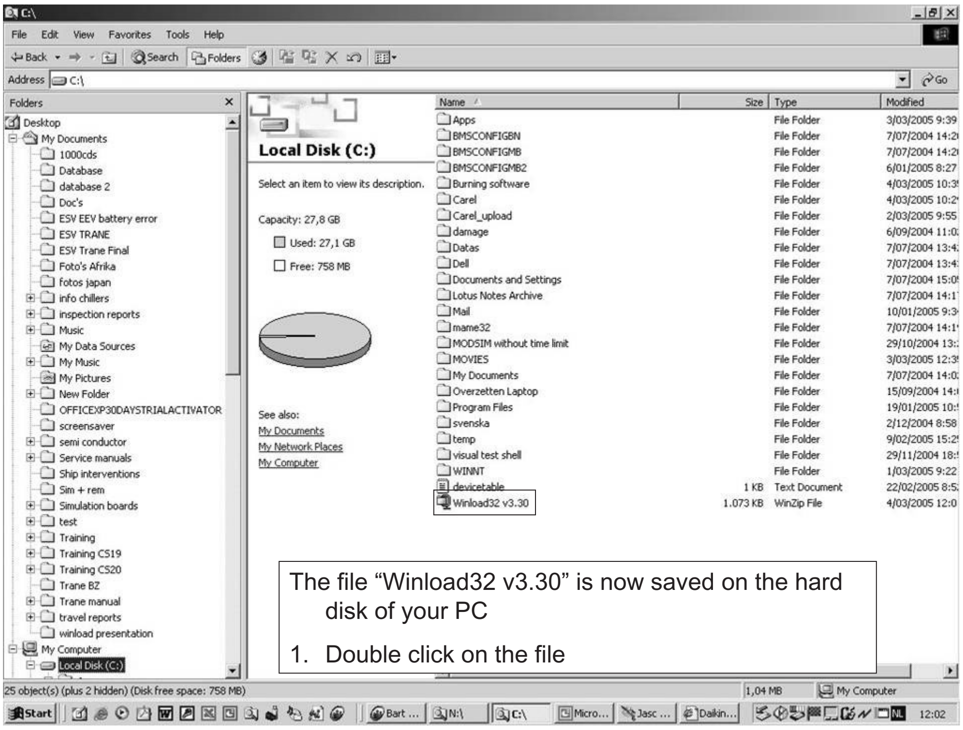
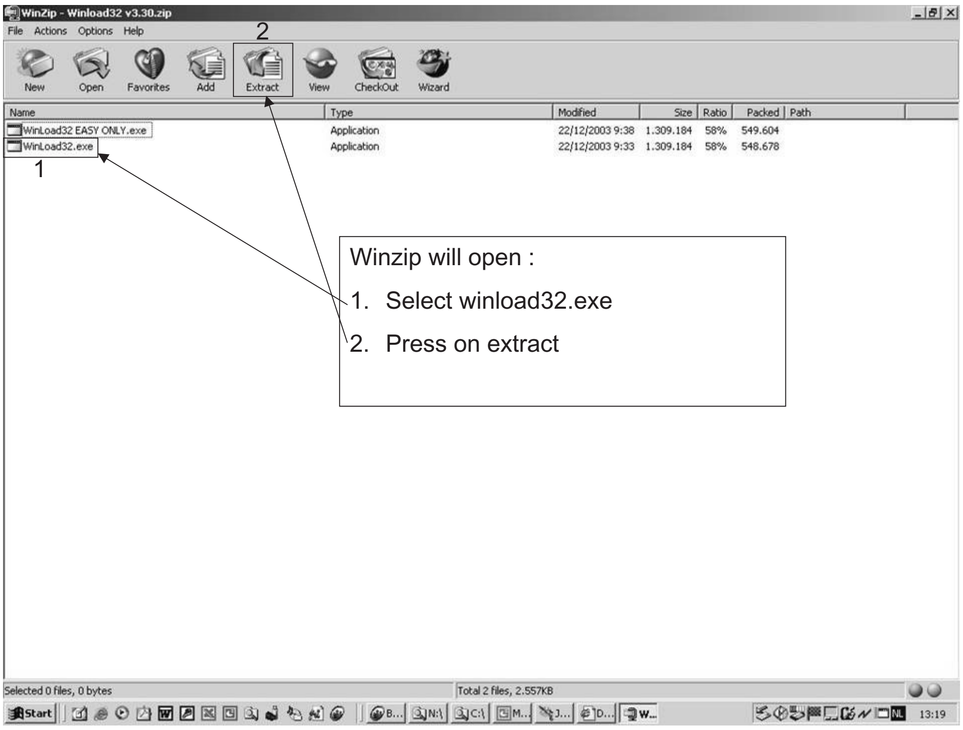
7	
8	

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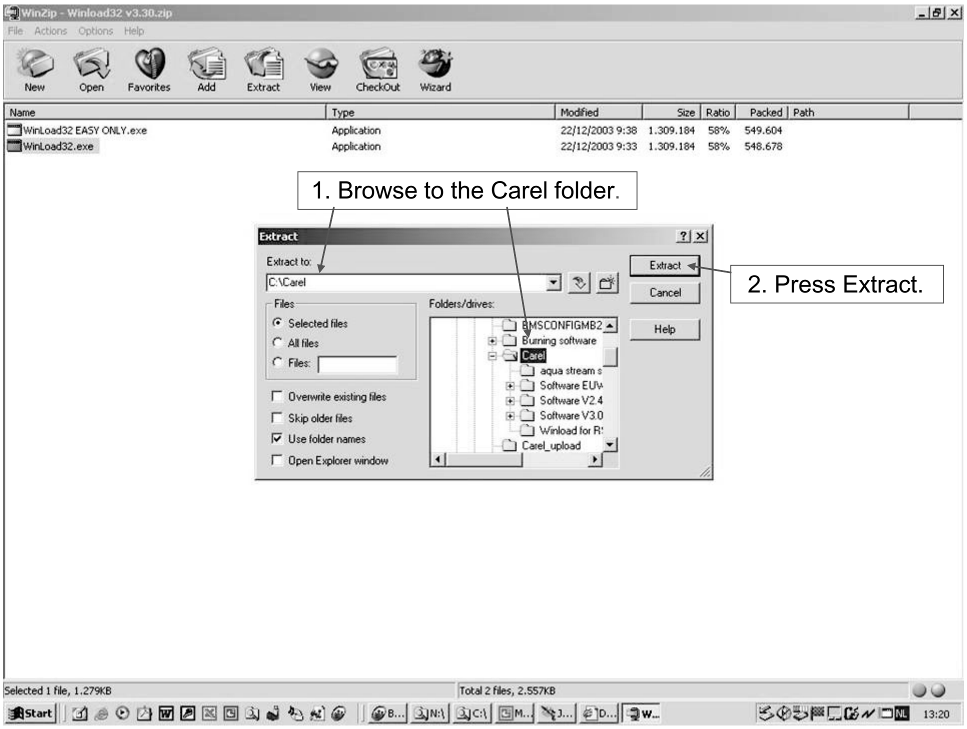
<tr><td>9</td><td>
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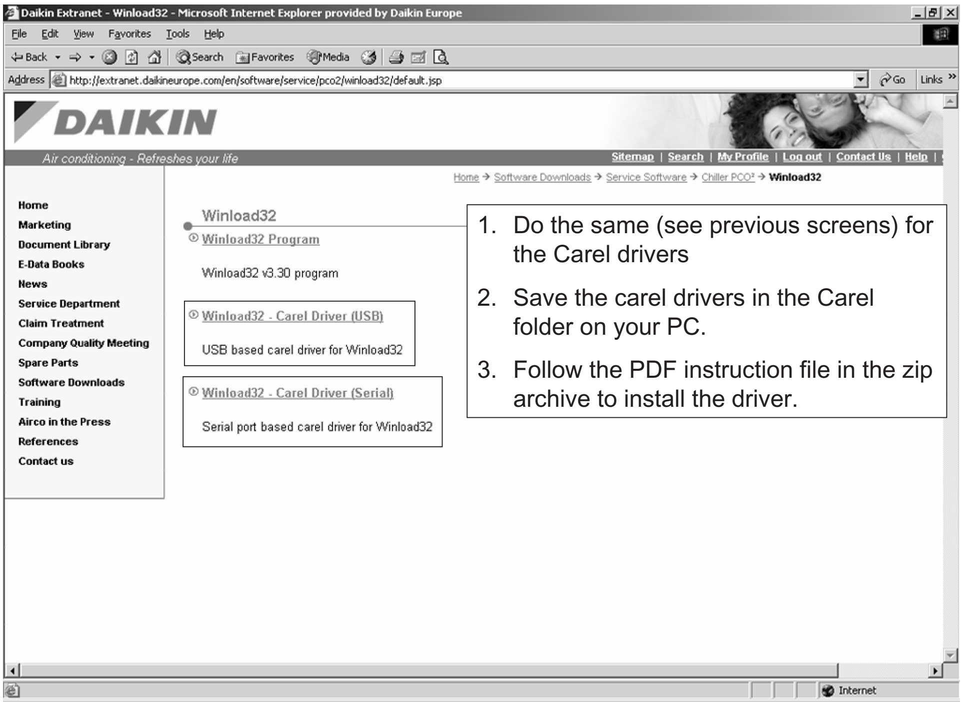
<tr><td>10</td><td>
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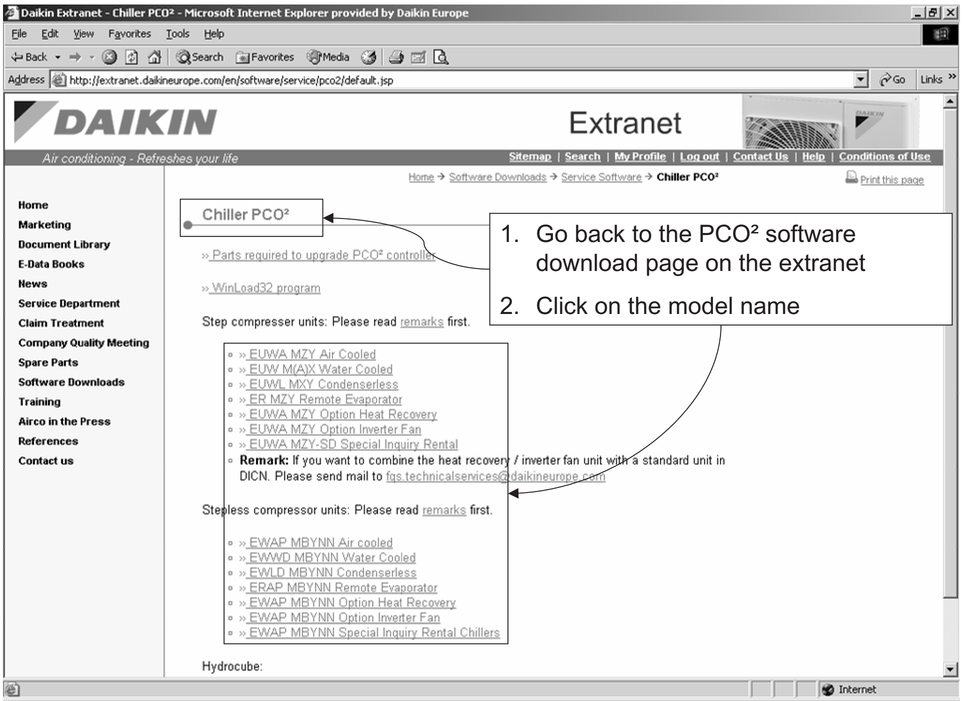
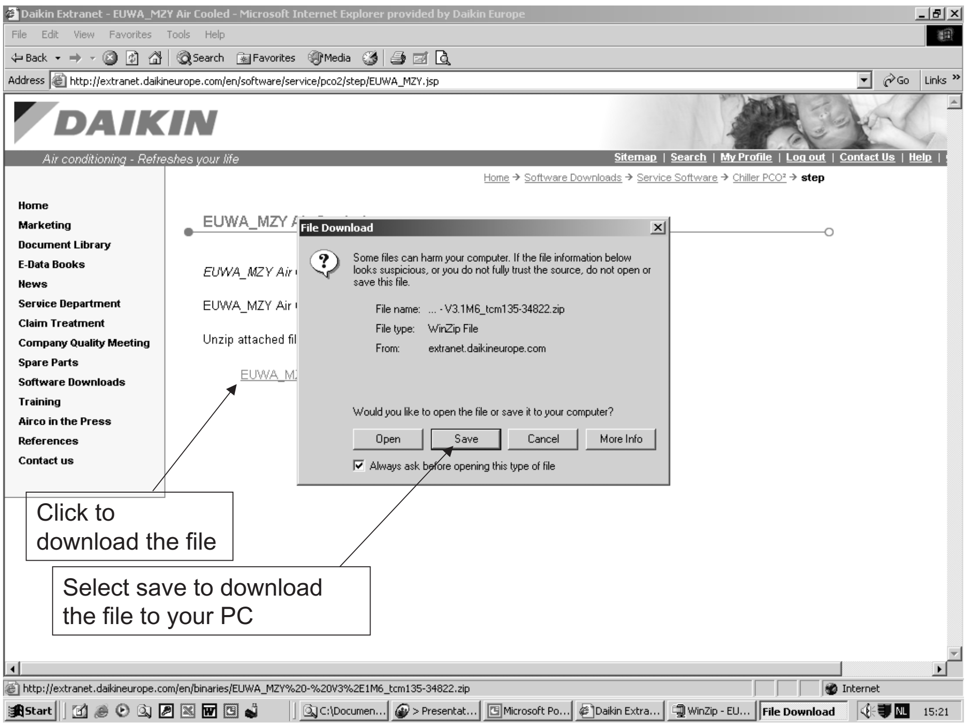
11	
12	

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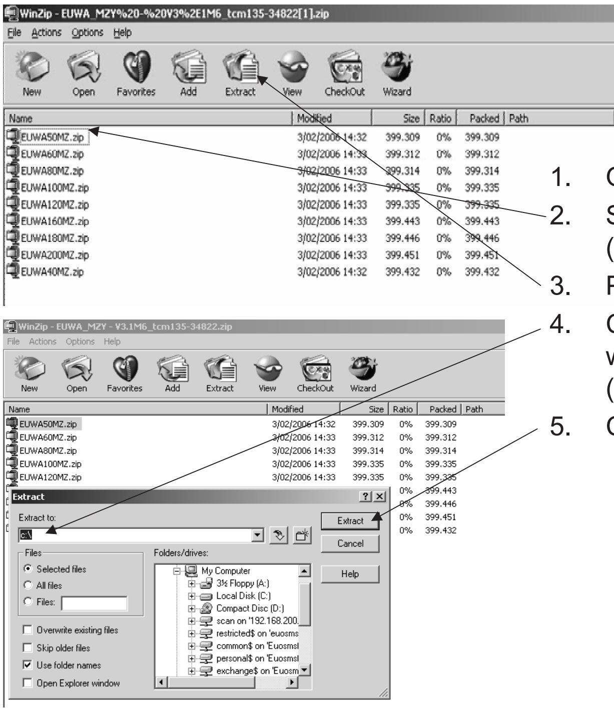
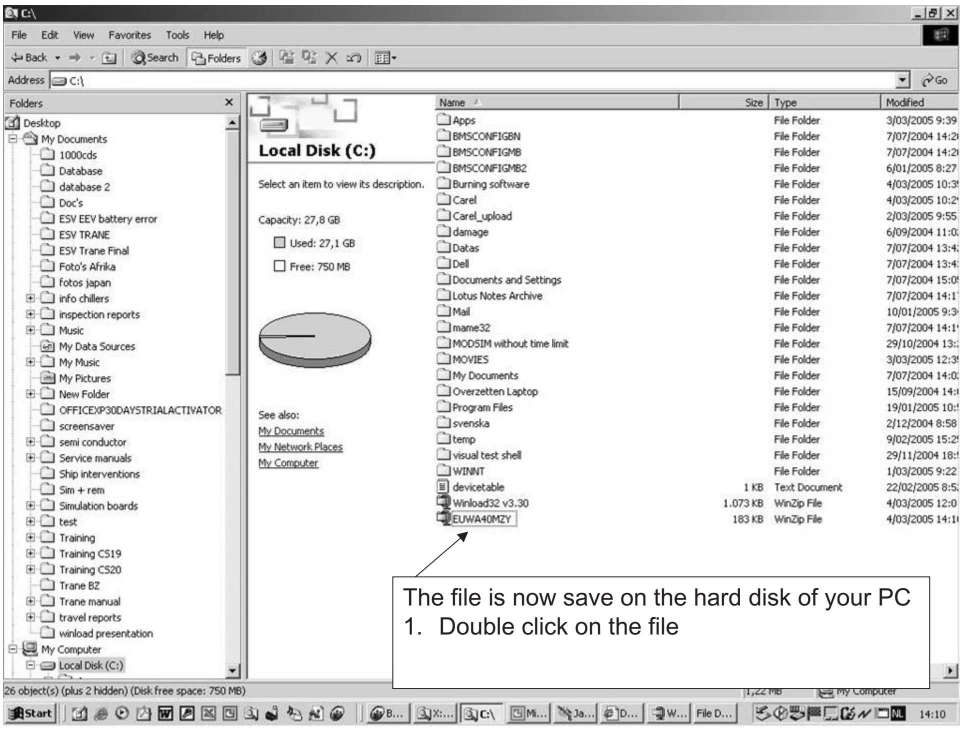
Step	Action
13	 1. Open the saved zip file 2. Select the file for the unit (capacity 3. Press extract 4. Choose a location where you want to save the file (example: C-drive) 5. Click extract
14	 The file is now save on the hard disk of your PC 1. Double click on the file

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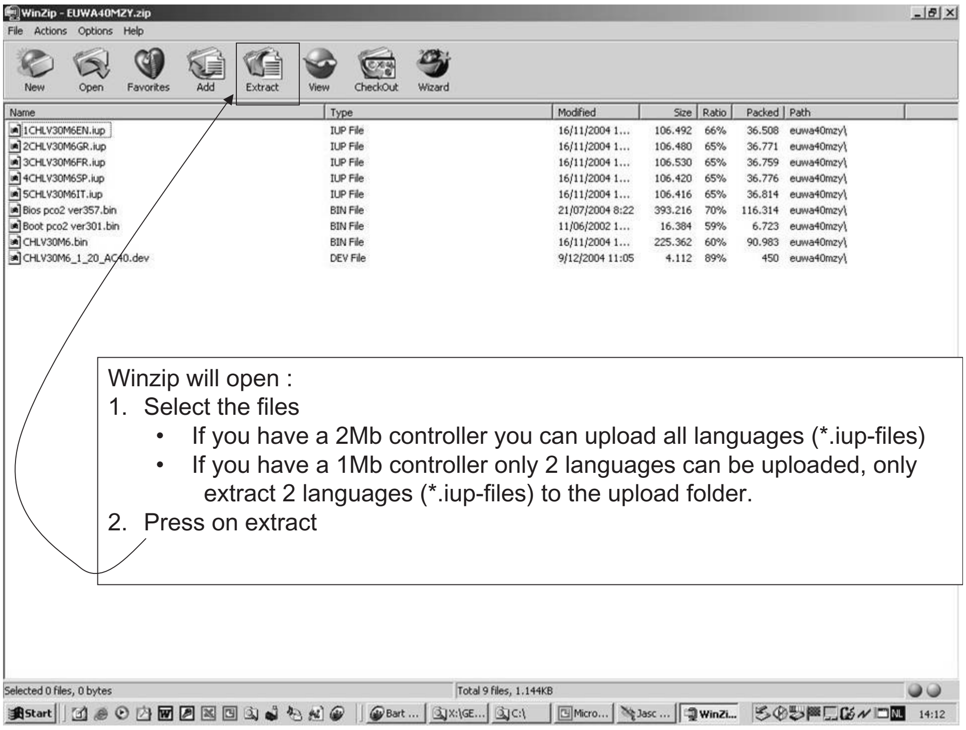
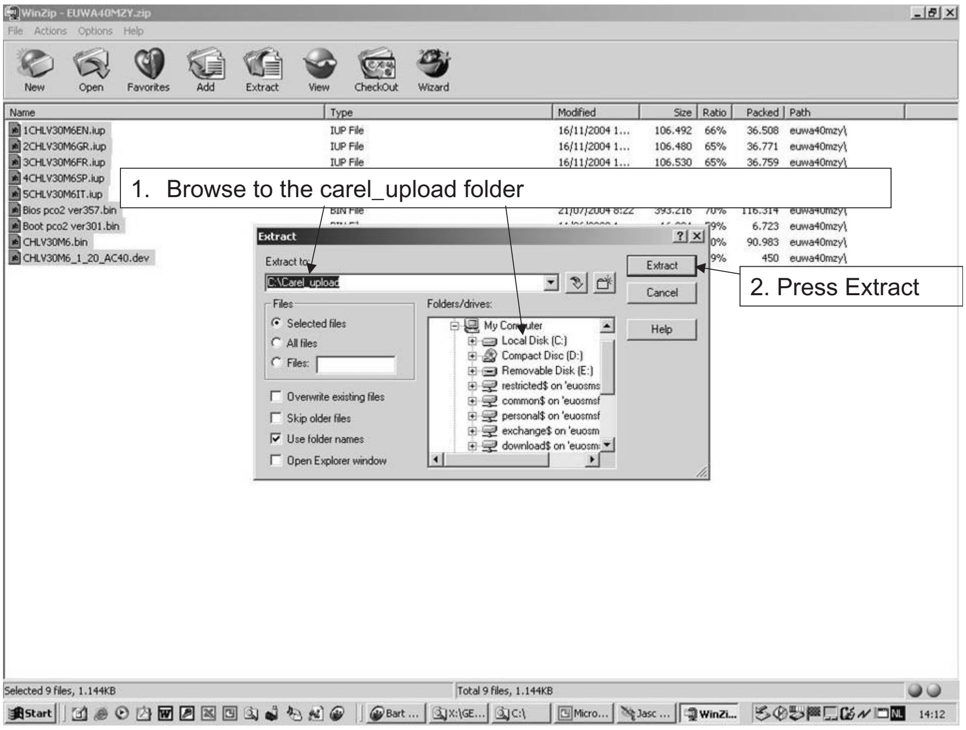
15	
16	

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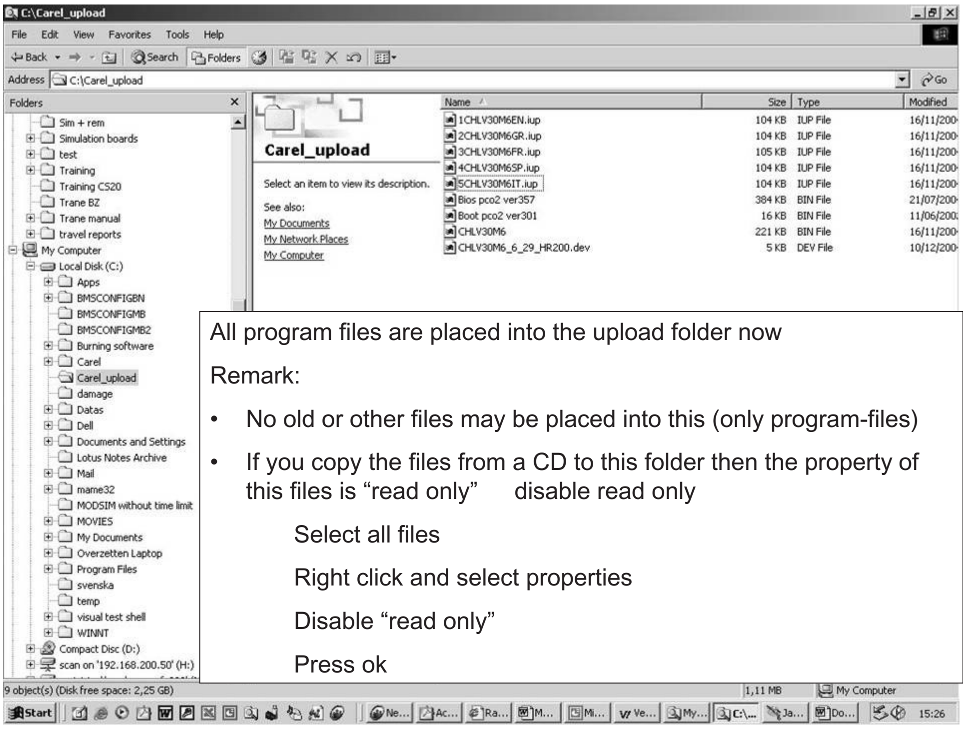
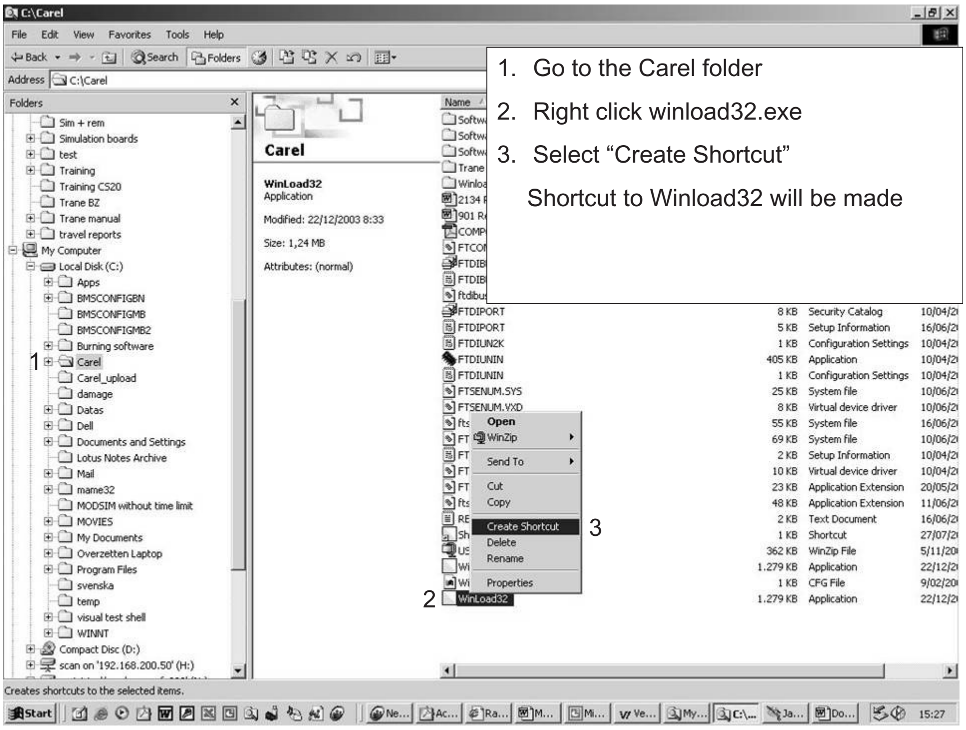
17	
18	

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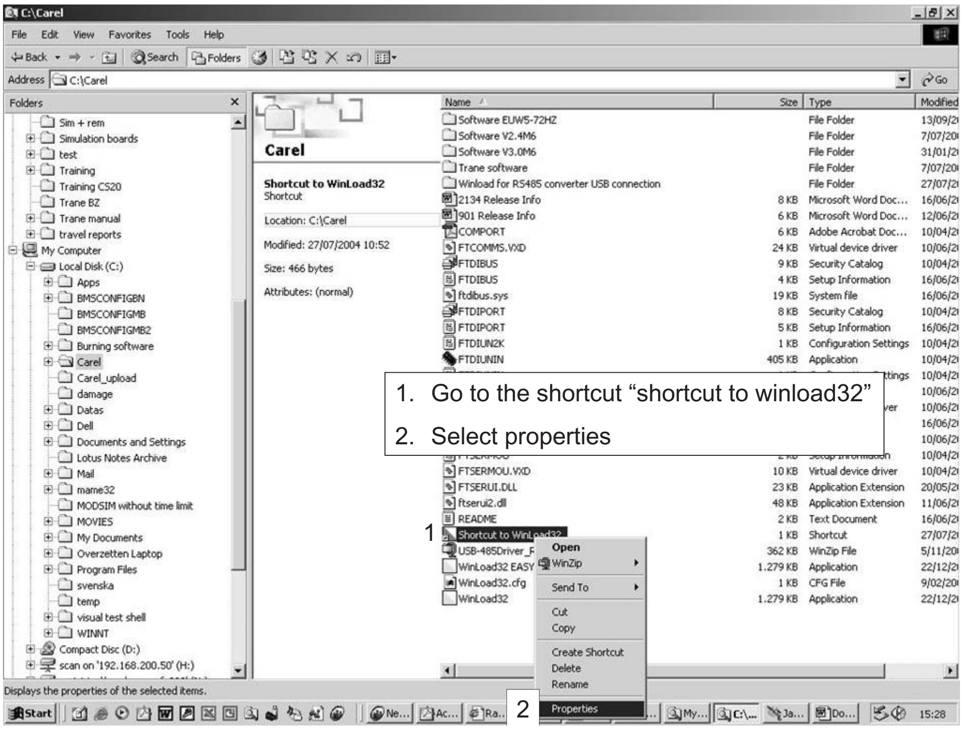
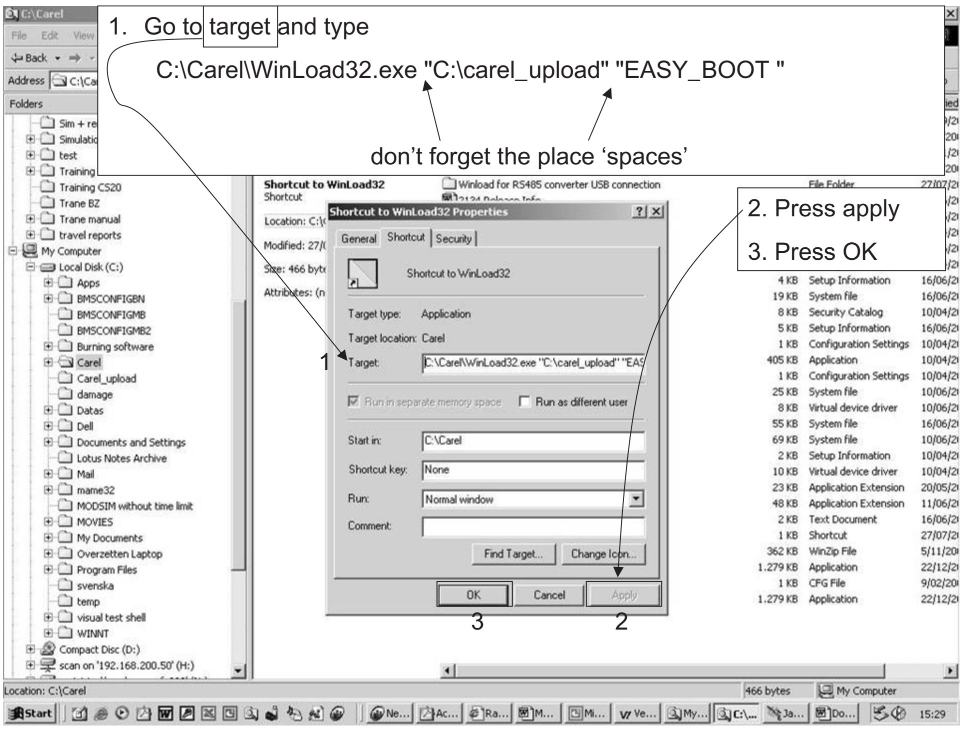
19	
20	

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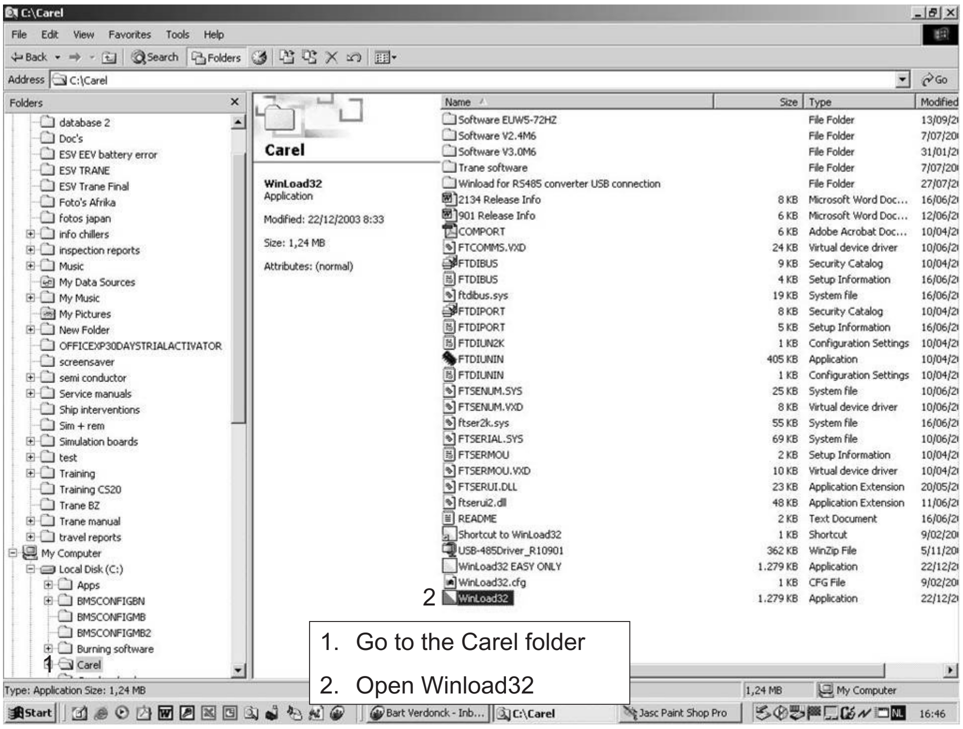
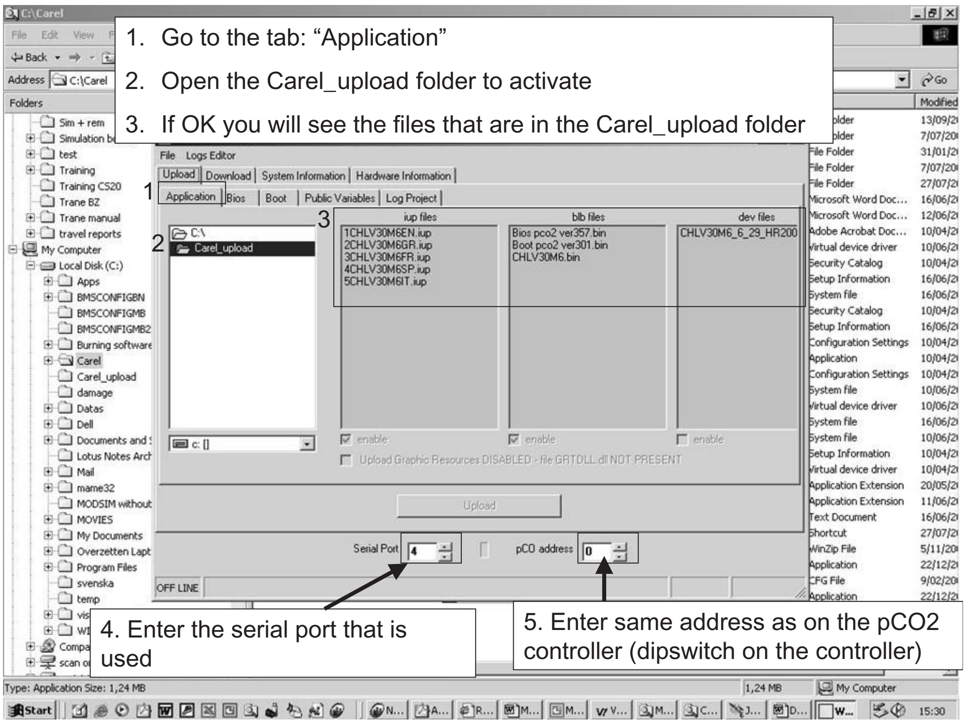
21	
22	

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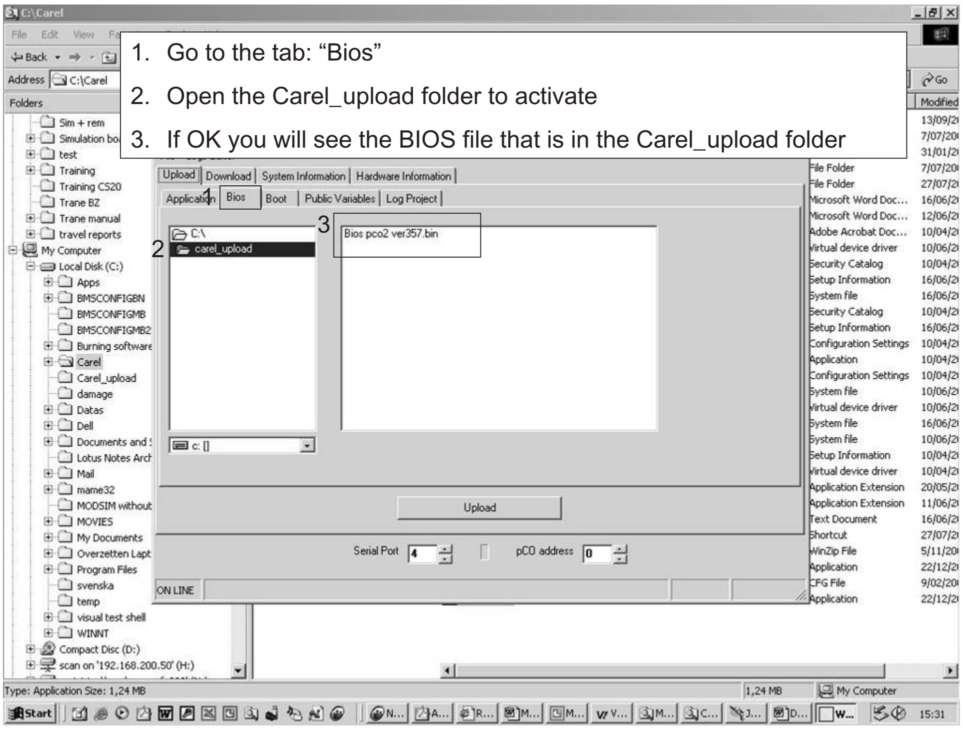
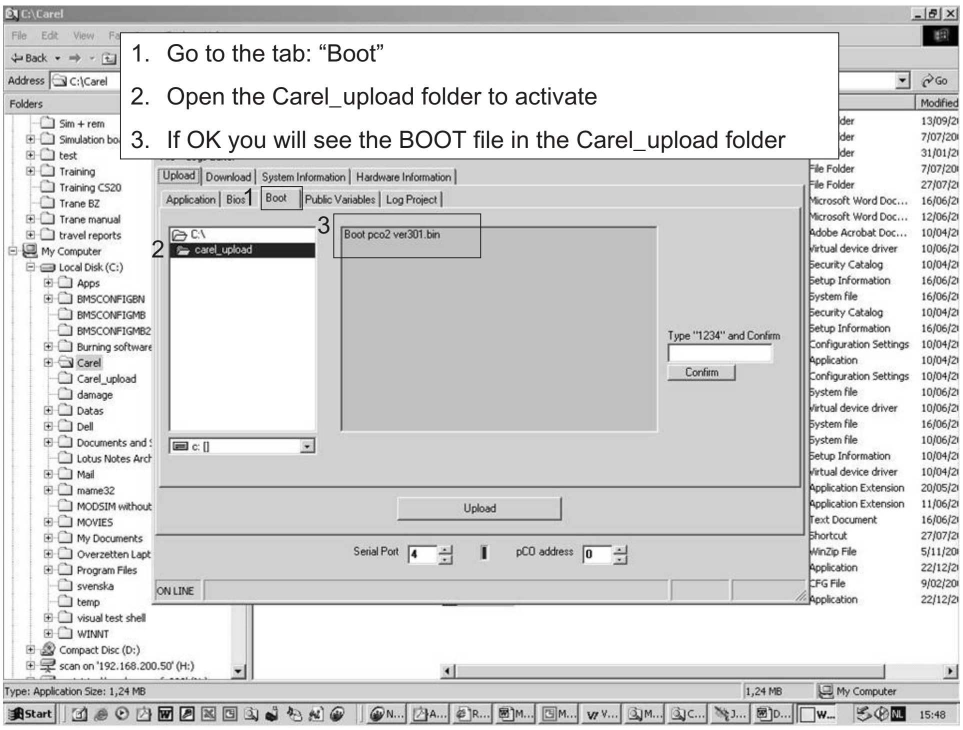
23	
24	

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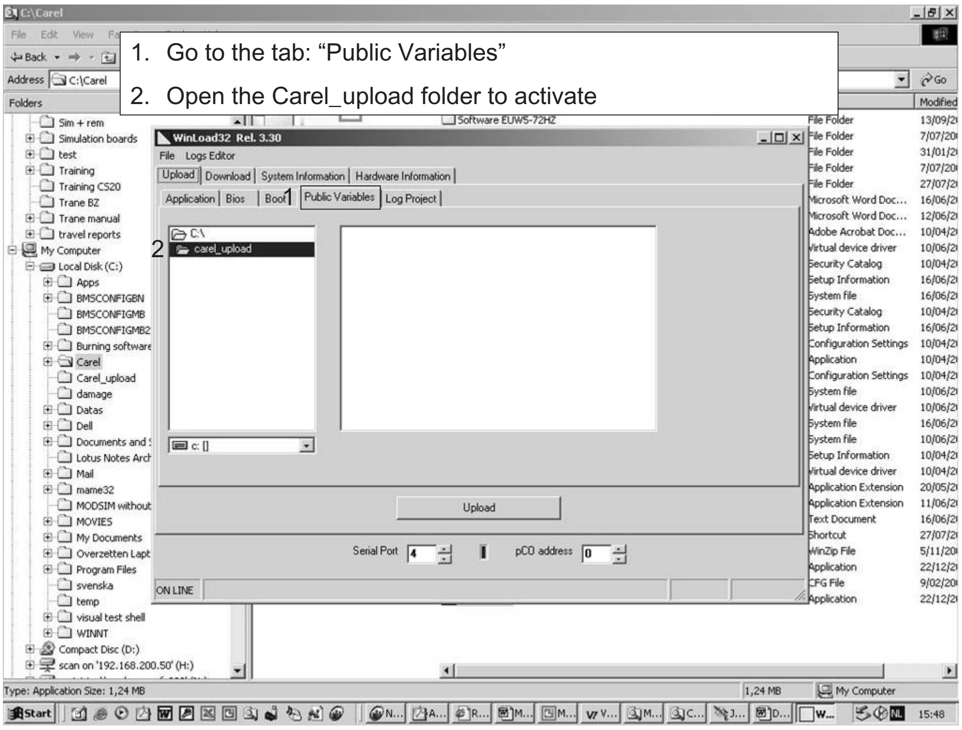
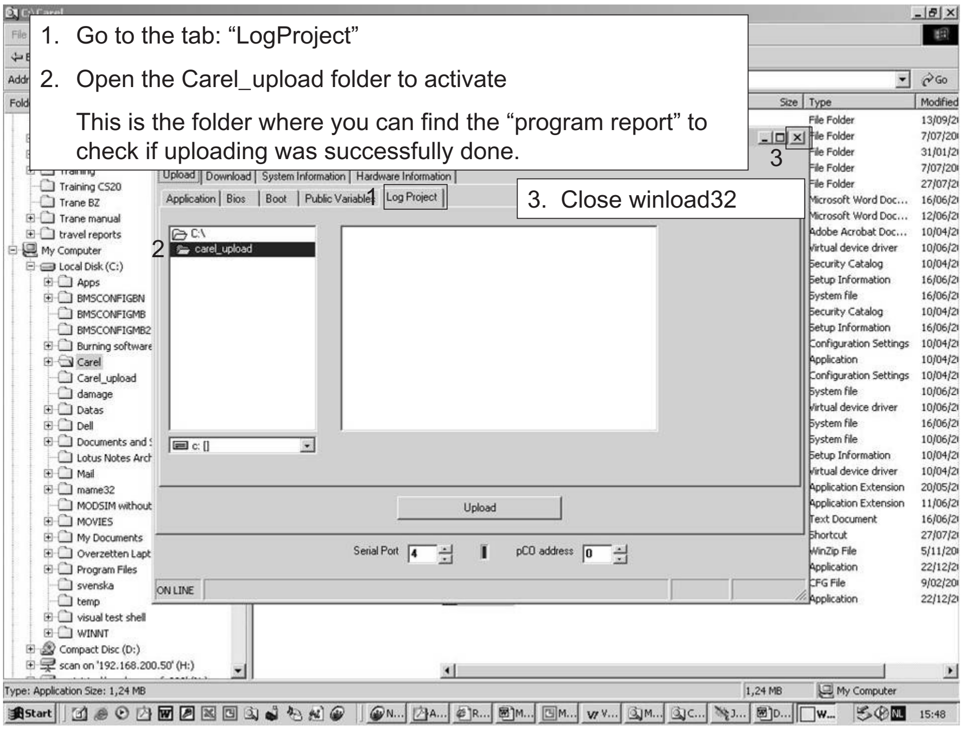
25	
26	

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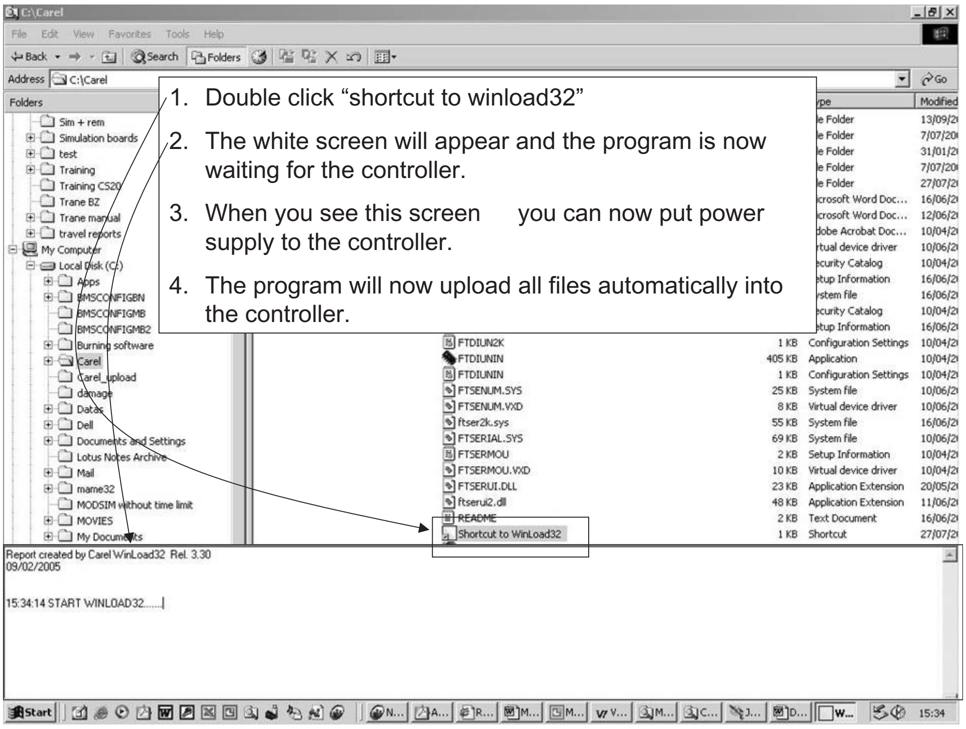

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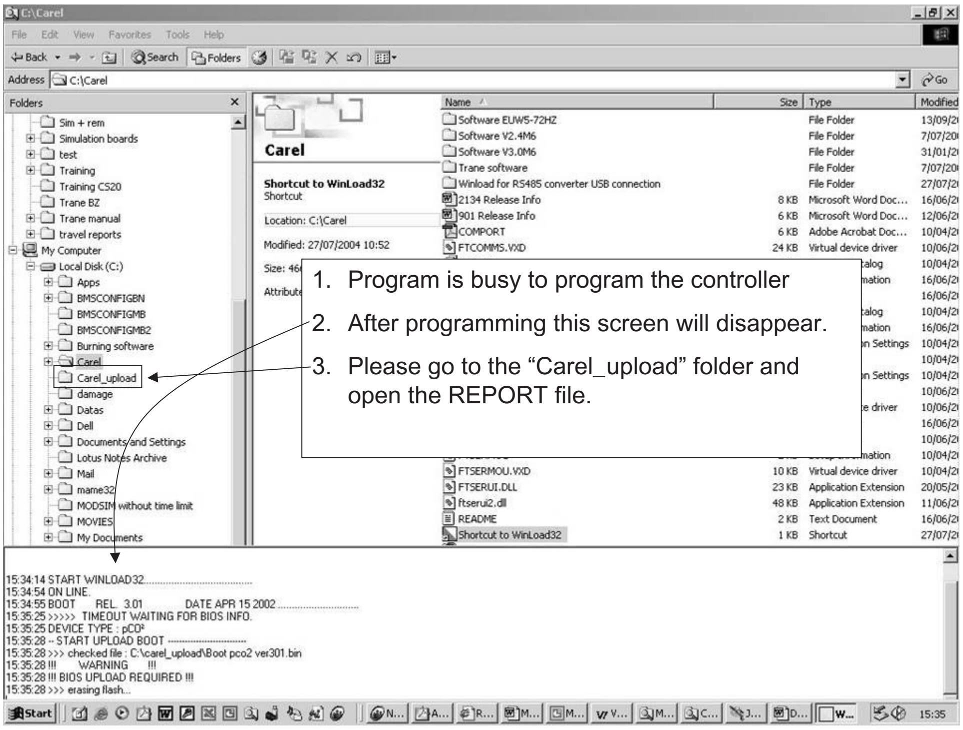

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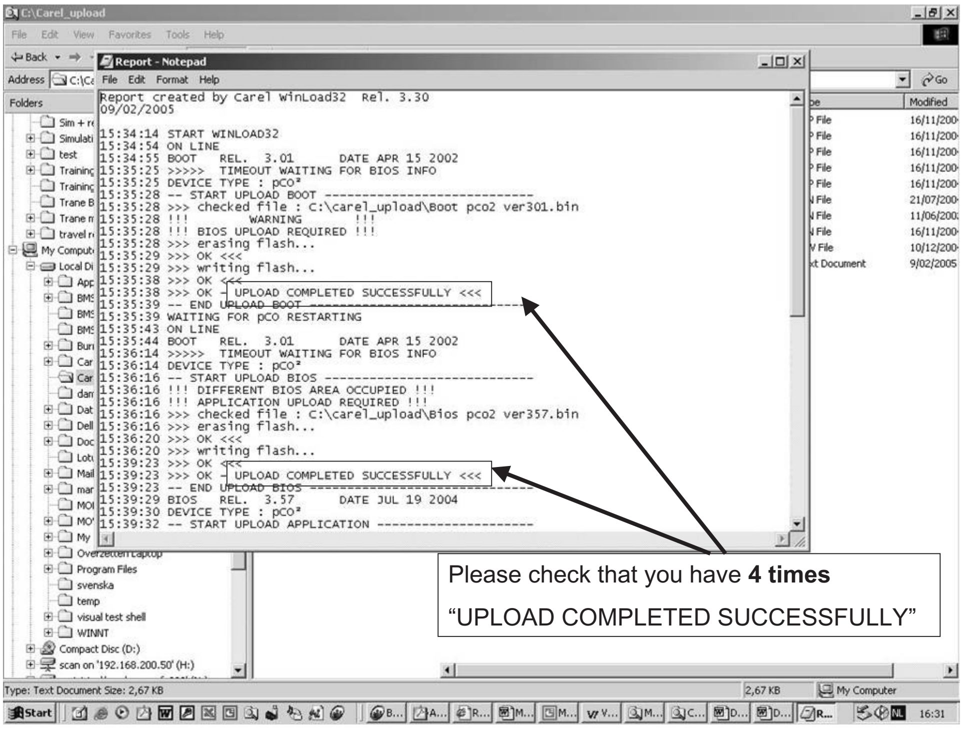
29	

4.5 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 3–21/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 3–21/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

5 Procedure to Protect Compressor in Case of Frozen Evaporator

5.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

3

5.2 Procedure to Protect Compressor in Case of Frozen Evaporator

If water is detected in the compressor after a evaporator damage, the following procedure should be executed within the first days.

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 de oilplugs on the discharge and suction side 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 stays clear.
10. If the vacuum oil remains clear fill the compressor with the necessary compressor oil.
11. Charge the compressor with nitrogen.

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

6.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

3

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

If water is detected in the refrigerant circuit after a 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: ➤ Expansion valve element ➤ Sight glass ➤ Drier filter element by high density filter ➤ Compressor oil Actions: ➤ Drill a hole in 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 trough all the pipes. ➤ Drain compressor oil ➤ Vacuum the whole installation: Check on a regular base 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/407C. ➤ 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 reoccurence in the future.

7 Manual Upload or Download Control Motor Test Procedure

7.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

3

7.2 Manual Upload or Download Control Motor Test Procedure

This manual upload or download may only be executed. When the unit is switched off, and to test the function of the control motor.

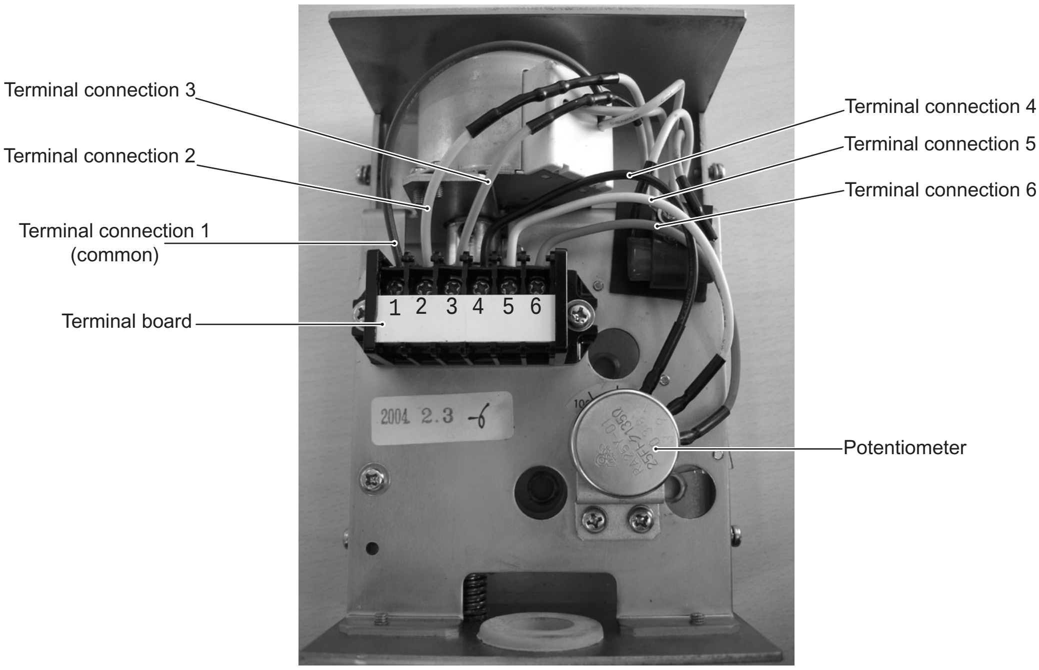


Fig: Top view control motor

Procedure:

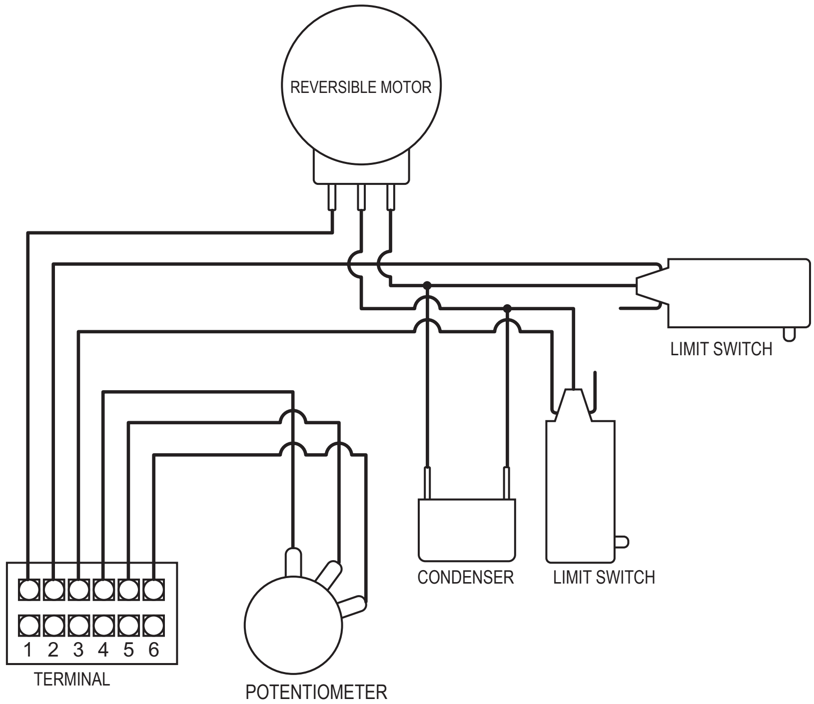
1. Switch off the unit.
2. Disconnect wires I, II, III from the terminal.
3. Use a 220V AC power supply to the control motor

		Wiring for ZH3G, ZH5G	Wiring for ZH7G, ZH9G
How to energies	Load up	Between 1 and 2 terminal	Between 1 and 3 terminal
	Load Down	Between 1 and 3 terminal	Between 1 and 2 terminal
Potentiometer (Position detector)		Between red and white terminal	Between black and white terminal

Remark: terminal 1 is common.

4. After testing remove the external 220V power supply
5. Reconnect the wires I, II, III in the right way.

WIRING


REVERSIBLE MOTOR
LIMIT SWITCH
CONDENSER
LIMIT SWITCH
1 2 3 4 5 6
TERMINAL
POTENTIOMETER

3

3

8 EEV Driver Error List

8.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

3

8.2 EEV Driver Error List

For units with EEV drivers

A) present for units with 1 EEV driver
B) present for units with 2 EEV drivers — PCO2 controller

(Start) only if error is present during power on (or) pLAN LED can be on or flashing. — Display

Cause \ Symptom	Alarm menu No error message	Alarm menu CIRCUIT1/2 SAFETY 1/2E4: LOW PRESSURE	Alarm menu CIRCUIT1/2 SAFETY 1/2A9: EEV DRIVER ERR	Alarm menu CIRCUIT1/2 SAFETY 1/2A9: EEV NOT CLOSED	Alarm menu CIRCUIT1/2 SAFETY 1/2A9: EEV SUPERHEAT ER	Alarm menu CIRCUIT1/2 SAFETY 1/2A9: EEV EEPROM ERR	Alarm menu CIRCUIT1/2 SAFETY 1/2A9: EEV ST. MOTOR ERR	Alarm menu CIRCUIT1/2 SAFETY 1/2A9: EEV PROBE ERR	Alarm menu EEV1/2 SAFETY 1/2A9: EEV BATTERY ERR	Alarm menu NETWORK SAFETY 0U4: PCB COMM. PROBLEM	READOUTMENU ACT. PRESSURES C1/2 LP1/2: 00.0 b = 36.2 °C	READOUTMENU ACT. PRESSURES C1/2 LP1/2: -2.06 b = -ER °C	INFO MENU UNIT INFORMATION EEV1/2:000000	SERVICE MENU EEV1/2 DRIVER(03/04) NO WARNINGS	SERVICE MENU EEV1/2 DRIVER(03/04) SYSTEM WAITING FOR: VALVE OPEN GO AHEAD:NO	I/O STATUS MENU EEV1/2 IN/OUTPUTS BATTERY: DISCONNECTED
1) EEV driver circuit 1/2 has no power		(start)	X						(start)	X	(start)		(start)	X		(start)
2) pLAn (tx-/tx+) is not connected		(start)	X						(start)	X	(start)		(start)	X		(start)
3) pLAn (tx-/tx+) of this EVV driver is reversed connected		(start)	X						(start)	X	(start)		(start)	X		(start)
4) pLAn (tx-/tx+) of another EVV driver is reversed connected		(start)	X						(start)	X	(start)		(start)	X		(start)
5) pLAn address setting of driver is equal to address setting of pCO2 controller (ex pCO2=1 & EEV1 = 1)		(start)	X						(start)	X	(start)		(start)	X		(start)
6) pLAn address setting of driver is not correct and different from pCO2 controller (ex pCO2=1 & EEV1 = 4)		(start)	X						(start)	X	(start)		(start)	X		(start)
7) pLAn address setting of driver are equal and diff. from pCO2 controller (ex pCO2=1 & EEV1 = 3 & EEV2 = 3)		(start)	X						(start)	X	(start)		(start)	X		(start)
8) pLAN VG0(24V) EEV-driver is disconnected			X													
9) pLAN VG1(24V) EEV-driver is disconnected		(start)	X						X	X	X		X	X		X
10) EEV pressure probe not connected								X				X				
11) EEV pressure probe broken								X								
12) EEV NTC sensor not connected								X								
13) EEV NTC sensor broken								X								
14) EEV Eprom is broken						X										
15) EEV superheat to low					X											
16) Valve did not close during stop (for example during power off)		(start)		X							X				X	
17) EEV driver is new (has never been used before)		(start)		X							X				X	
18) EEV battery disconnected									X							

For units with EEV drivers															
A) present for units with 1 EEV driver B) present for units with 2 EEV drivers	PCO2 controller			EEV - driver											
(Start) only if error is present during power on (or) pLAN LED can be on or flashing.	Plan LEDS			LEDS											
Symptom / Cause	pLAN LEDS orange & green light up (normal operation) (= communication)	pLAN LEDS shortly flashes after power On of unit & then shut off (= no communication)	pLAN LEDS light up for 4 sec. (= communication) after this shut off for 4 sec (=no communication) this happens continue	Alarm LED: does not light up	Alarm LED: light up	Alarm LED: blinking	Valve opening LED: blinking	Valve closing LED: blinking	pLAN LED: light up (normal operation)	pLAN LED: does never light up	pLAN LED: shortly flashes (4/5 times) after power ON of unit & then shut off	pLAN LED: flashes (continue)	power LED: light up	power LED: blinking	power LED: off
1) EEV driver circuit 1/2 has no power	(B)	(A)(B)		X						X					X
2) pLAn (tx-/tx+) is not connected	(B)	(A)(B)		X						X			X		
3) pLAn (tx-/tx+) of this EVV driver is reversed connected		X		X							X		X		
4) pLAn (tx-/tx+) of another EVV driver is reversed connected		X		X							X		X		
5) pLAn address setting of driver is equal to address setting of pCO2 controller (ex pCO2=1 & EEV1 = 1)		X		X					(or)			(or)	X		
6) pLAn address setting of driver is not correct and different from pCO2 controller (ex pCO2=1 & EEV1 = 4)	(B)	(A)(B)		X					(or)			(or)	X		
7) pLAn address setting of driver are equal and diff. from pCO2 controller (ex pCO2=1 & EEV1 = 3 & EEV2 = 3)			X	X								X	X		
8) pLAN VG0(24V) EEV-driver is disconnected	X			X									X		
9) pLAN VG1(24V) EEV-driver is disconnected	(B)	(A)(B)	X							X			X		
10) EEV pressure probe not connected					X				X				X		
11) EEV pressure probe broken					X				X				X		
12) EEV NTC sensor not connected					X				X				X		
13) EEV NTC sensor broken					X				X				X		
14) EEV Eprom is broken					X				X				X		
15) EEV superheat to low				X					X				X		
16) Valve did not close during stop (for example during power off)						X	X	X	X				X		
17) EEV driver is new (has never been used before)						X	X	X	X				X		
18) EEV battery disconnected				X					X				X		

3

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

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 plate-heat exchanger. The plate-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**
EWAP110MBYNN	540 l	160 l/min	640 l/min	—	—
EWAP140MBYNN	700 l	205 l/min	825 l/min	—	—
EWAP160MBYNN	800 l	235 l/min	940 l/min	—	—
EWAP200MBYNN	970 l	285 l/min	1140 l/min	—	—
EWAP280MBYNN	1390 l	410 l/min	1640 l/min	—	—
EWAP340MBYNN	1710 l	500 l/min	2000 l/min	—	—
EWAP400MBYNN	970 l	565 l/min	2265 l/min	—	—
EWAP460MBYNN	1140 l	670 l/min	2680 l/min	—	—
EWAP540MBYNN	1320 l	775 l/min	3100 l/min	—	—
EWAD120MBYNN	590 l	150 l/min	490 l/min	—	—
EWAD150MBYNN	730 l	200 l/min	725 l/min	—	—
EWAD170MBYNN	840 l	200 l/min	725 l/min	—	—
EWAD240MBYNN	550 l	300 l/min	930 l/min	—	—

	Evaporator			Condenser	
EWAD300MBYNN	700 l	395 l/min	1165 l/min	__	__
EWAD340MBYNN	810 l	395 l/min	1165 l/min	__	__
EWWD120MBYNN	600 l	175 l/min	700 l/min	217 l/min	800 l/min
EWWD180MBYNN	890 l	265 l/min	1070 l/min	336 l/min	1050 l/min
EWWD240MBYNN	1220 l	350 l/min	1400 l/min	450 l/min	1230 l/min
EWWD280MBYNN	1330 l	400 l/min	1600 l/min	520 l/min	1370 l/min
EWWD360MBYNN	895 l	525 l/min	2100 l/min	670 l/min	2100 l/min
EWWD440MBYNN	1055 l	625 l/min	2500 l/min	790 l/min	2290 l/min
EWWD500MBYNN	12515 l	700 l/min	2800 l/min	900 l/min	2470 l/min
EWWD520MBYNN	1275 l	750 l/min	3000 l/min	970 l/min	2600 l/min
EWWD540MBYNN	1335 l	800 l/min	3200 l/min	1040 l/min	1730 l/min
EWLD120MBYNN	570 l	175 l/min	700 l/min	__	__
EWLD170MBYNN	830 l	265 l/min	1070 l/min	__	__
EWLD240MBYNN	1150 l	350 l/min	1400 l/min	__	__
EWLD260MBYNN	1300 l	400 l/min	1600 l/min	__	__
EWLD340MBYNN	830 l	525 l/min	2100 l/min	__	__
EWLD400MBYNN	990 l	625 l/min	2500 l/min	__	__
EWLD480MBYNN	1150 l	700 l/min	2800 l/min	__	__
EWLD500MBYNN	1220 l	750 l/min	3000 l/min	__	__
EWLD540MBYNN	1295 l	800 l/min	3200 l/min	__	__

The water pressure should not exceed the maximum working pressure of 10 bar.

Calculation of the minimum water volume

The calculation method below is based on the fact that the water volume in a chiller should be large enough to prevent the compressor from excessive cycling. Sufficient water volume gives a certain inertia to the system, so that:

- Water (or glycol) temperature does not drop too fast when the unit turns ON.
- Water (or glycol) temperature does not rise too fast when the unit turns OFF.

$$V = \frac{0,5 \times Q \times t}{2 \times \rho \times d \times C_W} \; [m^3]$$

with:

Notation	Dimension	Description	Default
V	[m³]	Required system volume	—
Q	[W]	Cooling capacity at the lowest capacity step of each chiller in the system	—
t	[s]	Minimum cycling time allowed by the compressor	240 s
ρ	[kg/m³]	Specific mass of the fluid	ρ_{water} = 1000 kg/m³
d	[K]	Thermostat step difference	$d_{inlet\ water\ control}$ = 3 K
C_w	[J/kgK]	Specific heat capacity of the fluid	$C_{w,\ water}$ = 4186 J/kgK

Water quality

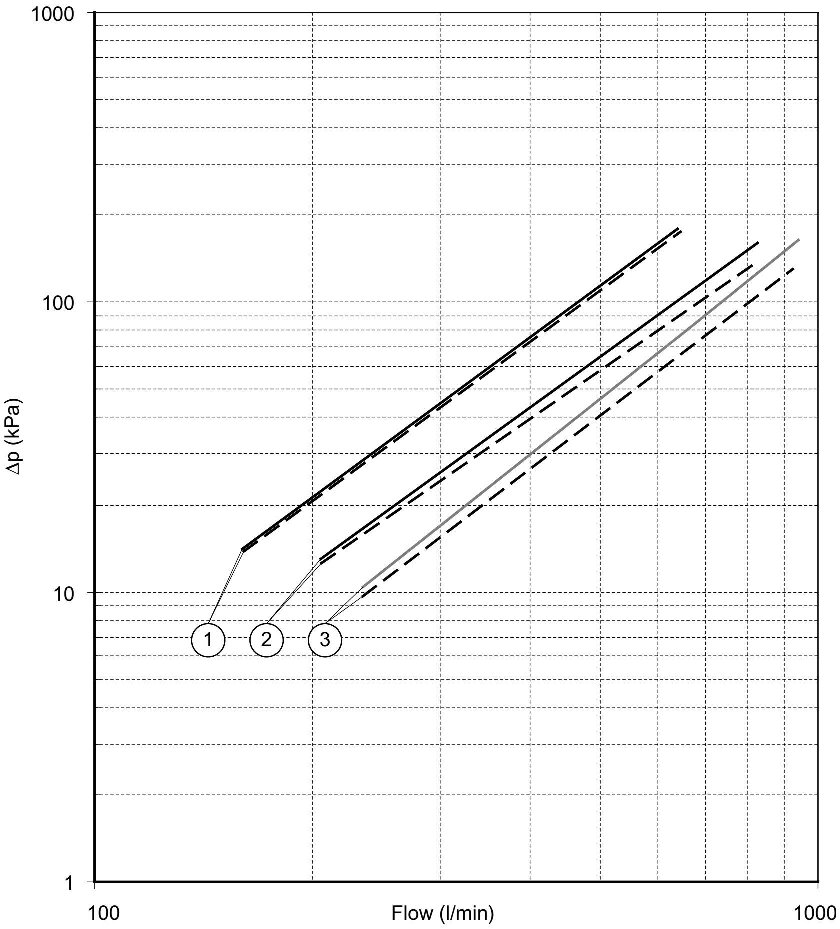
The table below contains the required water quality specifications.

		Evaporator water		Heated water (low temperature)		Tendency if out of criteria
		Circulating water (< 20°C)	Supply water	Circulating water (20°C-60°C)	Supply water	
Items to be checked						
pH	at 25°C	6.8~8.0	6.8~8.0	7.0~8.0	7.0~8.0	Corrosion + scale
Electrical conductivity	mS/m (at 25°C)	< 40	< 30	< 30	< 30	Corrosion + scale
Chloride ion	mg Cl^-/l	< 50	< 50	< 50	< 50	Corrosion
Sulphate ion	mg SO_4^{2-}/l	< 50	< 50	< 50	< 50	Corrosion
M-alkalinity (pH 4.8)	mg $CaCO_3$/l	< 50	< 50	< 50	< 50	Scale
Total hardness	mg $CaCO_3$/l	< 70	< 70	< 70	< 70	Scale
Calcium hardness	mg $CaCO_3$/l	< 50	< 50	< 50	< 50	Scale
Silica ion	mg SiO_2/l	< 30	< 30	< 30	< 30	Scale
Items to be referred to						
Iron	mg Fe/l	< 1.0	< 0.3	< 1.0	< 0.3	Corrosion + scale
Copper	mg Cu/l	< 1.0	< 0.1	< 1.0	< 0.1	Corrosion
Sulphide ion	mg S^{2-}/l	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
Ammonium ion	mg NH_4^+/l	< 1.0	< 0.1	< 0.3	< 0.1	Corrosion
Remaining chloride	mg Cl/l	< 0.3	< 0.3	< 0.25	< 0.3	Corrosion
Free carbide	mg CO_2/l	< 4.0	< 4.0	< 0.4	< 4.0	Corrosion
Stability index		–	–	–	–	Corrosion + scale

1.4 Water Pressure Drop through Evaporator: EWAP/EWTP110~160MBYNN

Water pressure drop

The illustration below shows the water pressure drop through evaporator for EWAP/EWTP110~160MBYNN.



– – – = Filter + evaporator

——— = evaporator

Symbols

The table below describes the symbols.

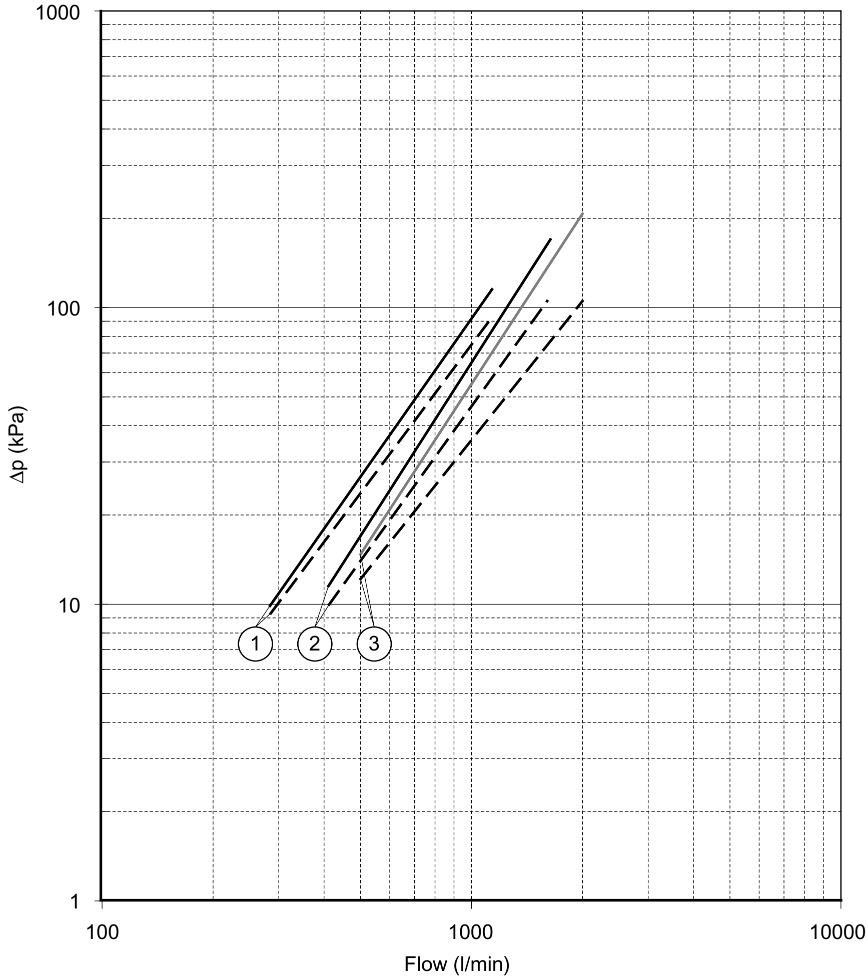
Symbol	Description
(1)	For EWAP/EWTP110MBYNN
(2)	For EWAP/EWTP140MBYNN
(3)	For EWAP/EWTP160MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Technical Specifications: EWAP110~540MBYNN" on page 1–4.

1.5 Water Pressure Drop through Evaporator: EWAP/EWTP200~340MBYNN

Water pressure drop

The illustration below shows the water pressure drop through evaporator for EWAP/EWTP200~340MBYNN.



– – – = Filter + evaporator

——— = evaporator

Symbols

The table below describes the symbols.

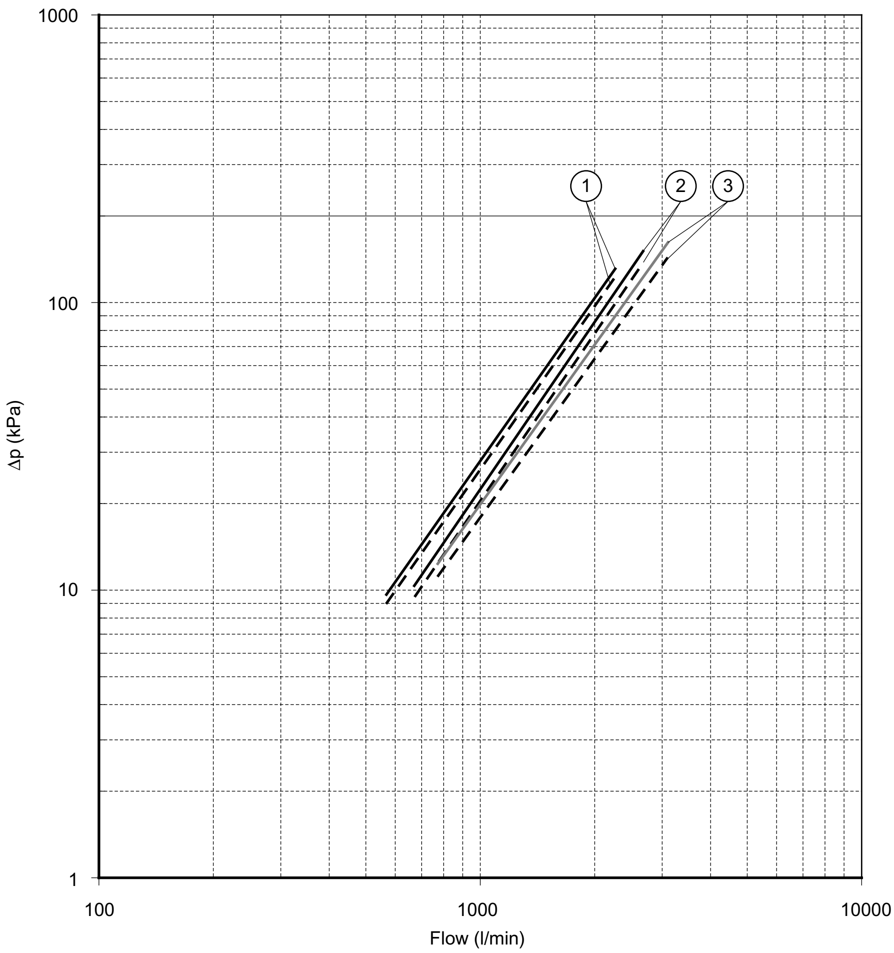
Symbol	Description
(1)	For EWAP/EWTP200MBYNN
(2)	For EWAP/EWTP280MBYNN
(3)	For EWAP/EWTP340MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Technical Specifications: EWAP110~540MBYNN" on page 1–4.

1.6 Water Pressure Drop through Evaporator: EWAP/EWTP400~540MBYNN

Water pressure drop

The illustration below shows the water pressure drop through evaporator for EWAP/EWTP400~540MBYNN.



— — — = Filter + evaporator

——— = evaporator

Symbols

The table below describes the symbols.

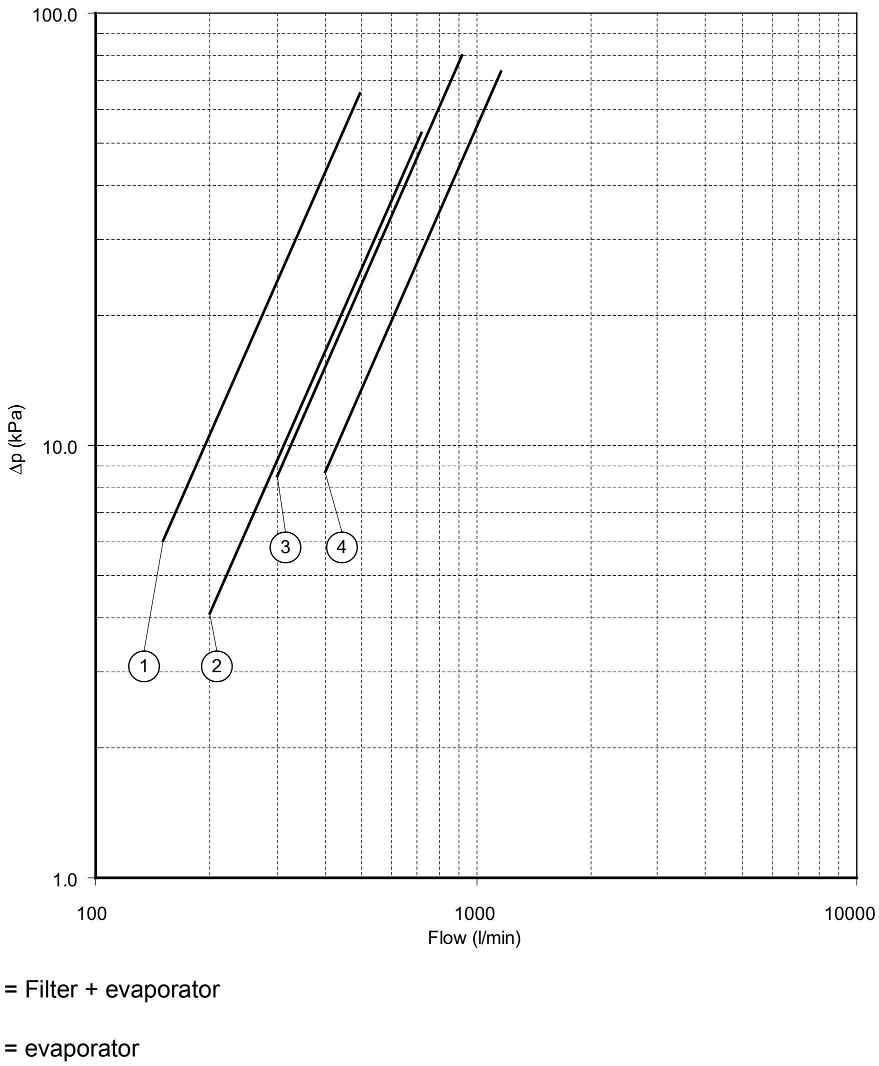
Symbol	Description
(1)	For EWAP/EWTP400MBYNN
(2)	For EWAP/EWTP460MBYNN
(3)	For EWAP/EWTP540MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Technical Specifications: EWAP110~540MBYNN" on page 1–4.

1.7 Water Pressure Drop through Evaporator: EWAD120~340MBYNN

Water pressure drop

The illustration below shows the water pressure drop through evaporator for EWAD120~340MBYNN.



Symbols

The table below describes the symbols.

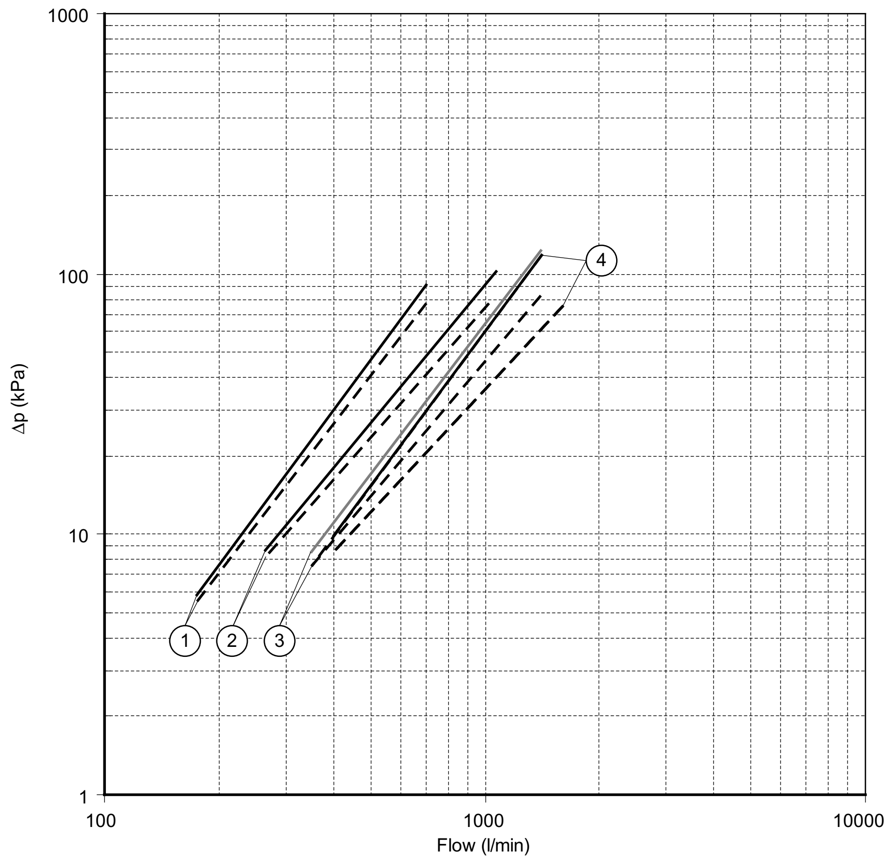
Symbol	Description
(1)	For EWAD120MBYNN
(2)	For EWAD150/170MBYNN
(3)	For EWAD240MBYNN
(4)	For EWAD300/340MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Technical Specifications: EWAD120~340MBYNN" on page 1–6.

1.8 Water Pressure Drop through Evaporator: EWLD/EWWD120~540MBYNN

Water pressure drop

The illustration below shows the water pressure drop through evaporator for EWLD/EWWD120~540MBYNN.



– – – = Filter + evaporator

——— = evaporator

Symbols

The table below describes the symbols.

Symbol	Description
(1)	For EWLD/EWWD120MBYNN
(2)	For EWLD170MBYNN and EWWD180MBYNN
(3)	For EWLD/EWWD240MBYNN
(4)	For EWLD260MBYNN and EWWD280MBYNN
(2+2)	For EWLD340MBYNN and EWWD360MBYNN
(2+3)	For EWLD400MBYNN and EWWD440MBYNN
(3+3)	For EWLD480MBYNN and EWWD500MBYNN
(3+4)	For EWLD500MBYNN and EWWD520MBYNN

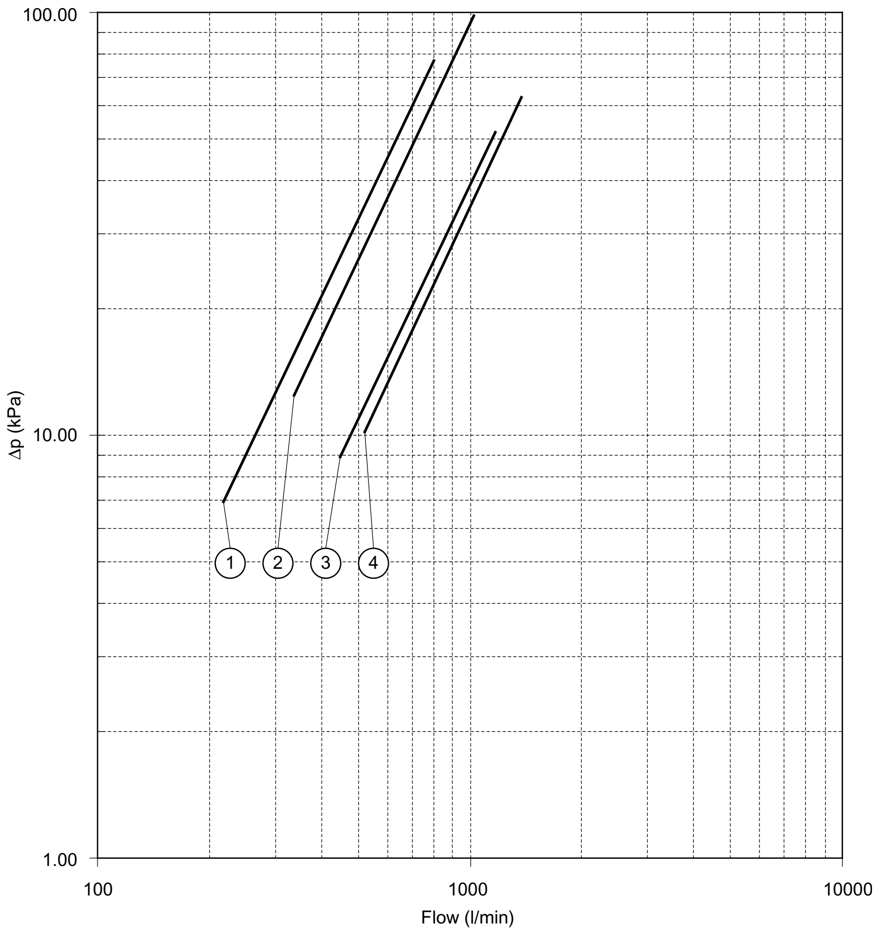
Symbol	Description
(4+4)	For EWLD/EWWD540MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Technical Specifications: EWLD120~540MBYNN" on page 1–10.

1.9 Water Pressure Drop through Condenser: EWWD120~540MBYNN

Water pressure drop

The illustration below shows the water pressure drop through condenser for EWWD120~540MBYNN.



Symbols

The table below describes the symbols.

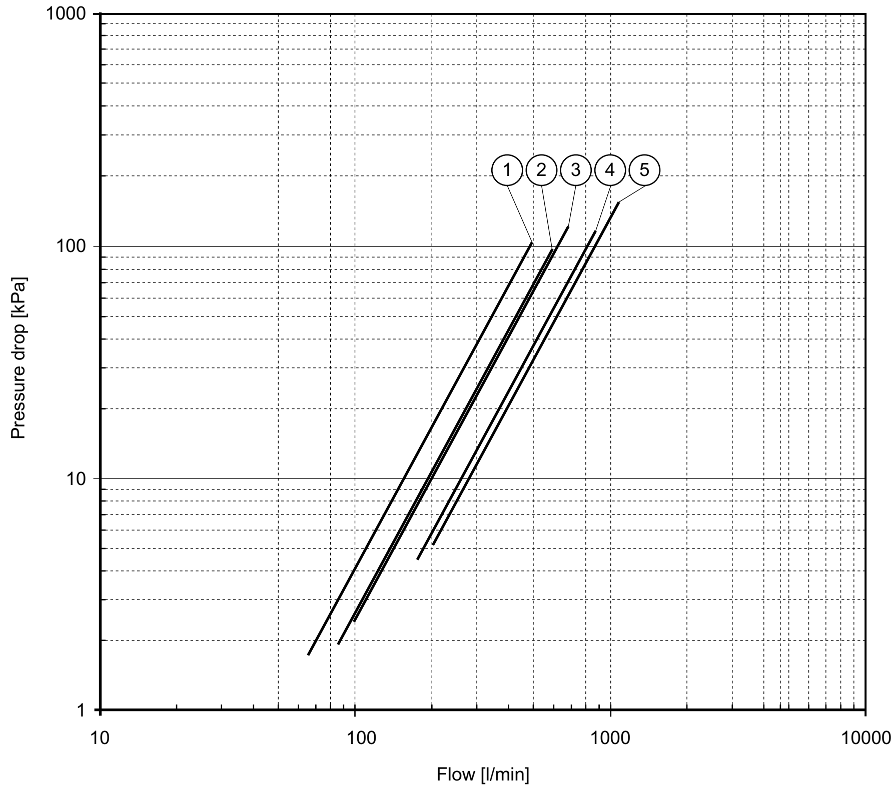
Symbol	Description
(1)	For EWWD120MBYNN
(2)	For EWWD180MBYNN
(3)	For EWWD240MBYNN
(4)	For EWWD280MBYNN
(2+2)	For EWWD360MBYNN
(2+3)	For EWWD440MBYNN
(3+3)	For EWWD500MBYNN
(3+4)	For EWWD520MBYNN
(4+4)	For EWWD540MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Technical Specifications: EWWD120~540MBYNN" on page 1–8.

1.10 Water Pressure Drop through Heat Recovery Condenser: EWTP110~540MBYNN

Water pressure drop

The illustration below shows the water pressure drop through heat recovery condenser for EWTP110~540MBYNN.



Symbols

The table below describes the symbols.

Symbol	Description
(1)	For EWTP110MBYNN
(2)	For EWTP140MBYNN
(3)	For EWTP160/EWTP200/EWTP400 (2x)/EWTP460 (2x)/EWTP540MBYNN (2x)
(4)	For EWTP280MBYNN
(5)	For EWTP340MBYNN

Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange. See "Outlook Drawing: EWTP110~160MBYNN" on page 1–52.

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.
6	The optional wiring for remote cool/heat is installed. Make sure that the controller is correctly programmed.

2 Test Run and Operation Data

2.1 What Is in This Chapter?

Introduction

The tables in this chapter contain an overview of the measurements that you can carry out. Use it as a guideline during commissioning.

For the location of the measurement points, refer to the piping and wiring diagrams in Part 1.

Overview

This chapter contains the following topics:

2.2 Test Run and Operation Data for EWAP110~540MBYNN

Pressures

The table below contains the measurable pressures.

Measurement	Value
Suction pressure	depending on working conditions
Discharge pressure	
Maximum water pressure	10 bar

Temperatures

The table below contains the measurable temperatures.

Measurement	Value
Leaving water temperature	➤ Standard: 4 – 16°C ➤ With glycol: -10 – 16°C
Outdoor temperature	-15 – 43°C
Temperature difference at the air side	10 – 15°C
Temperature difference at the water side	3 – 8°C
Discharge temperature	80 – 120°C
Approach temperature (evap leaving water temp - sat. temp)	5 – 8°C (for MOW of 4°C) for glycol units this can be > 8°C

Voltages

The table below contains the measurable voltages.

Measurement	Value
Power supply voltage	Within ± 10% of the rated voltage
Phase imbalance	Within ± 2% of the rated voltage
Control circuit voltage	230 V AC for main electromagnetic switches 24 V DC for the controllers

Currents

The table below contains the currents and used fuses.

Unit	Nominal current	Maximum current	Fuses
EWAP110MBYNN	70 A	95 A	3 x 125 gL A
EWAP140MBYNN	84 A	120 A	3 x 160 gL A
EWAP160MBYNN	104 A	135 A	
EWAP200MBYNN	128 A	168 A	3 x 200 gL A
EWAP280MBYNN	180 A	232 A	3 x 250 gL A
EWAP340MBYNN	226 A	288 A	3 x 355 gL A
EWAP400MBYNN	258 A	342 A	std: 6 x 250 gL A op52: 3 x 400 gL A

Unit	Nominal current	Maximum current	Fuses
EWAP460MBYNN	316 A	396 A	std: 6 x 250 gL A + (3 x 300) op52: 3 x 425 gL A
EWAP540MBYNN	373 A	452 A	std: 6 x 300 gL A op52: 3 x 500 gL A

Recommended fuses according to IEC standard 269-2: gL/gG (aM also admitted)
(F1U, F2U, F3U = gL/gG)

4

2.3 Test Run and Operation Data for EWAD120~340MBYNN

Pressures

The table below contains the measurable pressures.

Measurement	Value
Suction pressure	depending on working conditions
Discharge pressure	
Maximum water pressure	10 bar

Temperatures

The table below contains the measurable temperatures.

Measurement	Value
Leaving water temperature	➤ Standard: 4 – 16°C ➤ With glycol: -10 – 16°C
Outdoor temperature	-15 – 43°C
Temperature difference at the air side	10 – 15°C
Temperature difference at the water side	3 – 8°C
Discharge temperature	80 – 120°C
Approach temperature (evap leaving water temp - sat. temp)	5 – 8°C (for MOW of 4°C) for glycol units this can be > 8°C

Voltages

The table below contains the measurable voltages.

Measurement	Value
Power supply voltage	Within ± 10% of the rated voltage
Phase imbalance	Within ± 2% of the rated voltage
Control circuit voltage	230 V AC for main electromagnetic switches 24 V DC for the controllers

Currents

The table below contains the currents and used fuses.

Unit	Nominal current	Maximum current	Fuses
EWAD120MBYNN	60 A	76 A	Factory installed
EWAD150MBYNN	75 A	89 A	
EWAD170MBYNN	97 A	128 A	
EWAD240MBYNN	2 x 60 A	2 x 76 A	
EWAD300MBYNN	2 x 75 A	2 x 89 A	
EWAD340MBYNN	2 x 97 A	2 x 128 A	

Recommended fuses according to IEC standard 269-2: gL/gG (aM also admitted)
(F1U, F2U, F3U = gL/gG)

2.4 Test Run and Operation Data for EWWD120~540MBYNN

Pressures

The table below contains the measurable pressures.

Measurement	Value
Suction pressure	depending on working conditions
Discharge pressure	
Maximum water pressure	10 bar

Temperatures

The table below contains the measurable temperatures.

Measurement	Value
Leaving water temperature	➤ Standard: 4 – 16°C ➤ With glycol: -10 – 16°C ➤ Heating: 25 – (44 till 60°C) depending on the evaporator leaving water
Temperature difference at the air side	10 – 15°C
Temperature difference at the water side	3 – 8°C
Discharge temperature	80 – 120°C
Approach temperature (evap leaving water temp - sat. temp)	5 – 8°C (for MOW of 4°C) for glycol units this can be > 8°C

Voltages

The table below contains the measurable voltages.

Measurement	Value
Power supply voltage	Within ± 10% of the rated voltage
Phase imbalance	Within ± 2% of the rated voltage
Control circuit voltage	230 V AC for main electromagnetic switches 24 V DC for the controllers

Currents

The table below contains the currents and used fuses.

Unit	Nominal current	Maximum current	Fuses
EWWD120MBYNN	48 A	76 A	3 x 100 gL A
EWWD180MBYNN	78 A	120 A	3 x 160 gL A
EWWD240MBYNN	108 A	191 A	
EWWD280MBYNN	118 A	199 A	3 x 224 gL A
EWWD360MBYNN	156 A	240 A	3 x 200 gL A
EWWD440MBYNN	186 A	311 A	3 x 200 gL A + 3 x 250 gL A

Unit	Nominal current	Maximum current	Fuses
EWWD500MBYNN	216 A	382 A	5 x 250 gL A
EWWD520MBYNN	226 A	390 A	
EWWD540MBYNN	236 A	398 A	

Recommended fuses according to IEC standard 269-2: gL/gG (aM also admitted)
(F1U, F2U, F3U = gL/gG)

2.5 Test Run and Operation Data for EWLD120~540MBYNN

Pressures

The table below contains the measurable pressures.

Measurement	Value
Suction pressure	depending on working conditions
Discharge pressure	
Maximum water pressure	10 bar

Temperatures

The table below contains the measurable temperatures.

Measurement	Value
Leaving water temperature	➤ Standard: 4 – 16°C ➤ With glycol: -10 – 16°C ➤ Heating: 30 – (49 till 62°C) depending on the evaporator leaving water
Temperature difference at the air side	10 – 15°C
Temperature difference at the water side	3 – 8°C
Discharge temperature	80 – 120°C
Approach temperature (evap leaving water temp - sat. temp)	5 – 8°C (for MOW of 4°C) for glycol units this can be > 8°C

Voltages

The table below contains the measurable voltages.

Measurement	Value
Power supply voltage	Within ± 10% of the rated voltage
Phase imbalance	Within ± 2% of the rated voltage
Control circuit voltage	230 V AC for main electromagnetic switches 24 V DC for the controllers

Currents

The table below contains the currents and used fuses.

Unit	Nominal current	Maximum current	Fuses
EWLD120MBYNN	48 A	76 A	3 x 100 gL A
EWLD170MBYNN	78 A	120 A	3 x 160 gL A
EWLD240MBYNN	108 A	191 A	3 x 224 gL A
EWLD260MBYNN	118 A	199 A	
EWLD340MBYNN	156 A	240 A	5 x 200 gL A
EWLD400MBYNN	186 A	311 A	3 x 200 gL A + 3 x 250 gL A

Unit	Nominal current	Maximum current	Fuses
EWLD480MBYNN	216 A	382 A	5 x 250 gL A
EWLD500MBYNN	226 A	390 A	
EWLD540MBYNN	236 A	398 A	

Recommended fuses according to IEC standard 269-2: gL/gG (aM also admitted)
(F1U, F2U, F3U = gL/gG)

4

2.6 Test Run and Operation Data for ERAP110~170MBYNN

Pressures

The table below contains the measurable pressures.

Measurement	Value
Suction pressure	depending on working conditions
Discharge pressure	
Maximum water pressure	10 bar

Temperatures

The table below contains the measurable temperatures.

Measurement	Value
Evaporating temperature (suction dew point)	-15 – 11°C
Outdoor temperature	-15 – 43°C for standard unit
Temperature difference at the air side	10 – 15°C
Temperature difference at the water side	3 – 8°C
Discharge temperature	80 – 120°C

Voltages

The table below contains the measurable voltages.

Measurement	Value
Power supply voltage	Within ± 10% of the rated voltage
Phase imbalance	Within ± 2% of the rated voltage
Control circuit voltage	230 V AC for main electromagnetic switches 24 V DC for the controllers

Currents

The table below contains the currents and used fuses.

Unit	Nominal current	Maximum current	Fuses
ERAP110MBYNN	70 A	95 A	3 x 125 gL A
ERAP150MBYNN	84 A	120 A	3 x 160 gL A
ERAP170MBYNN	104 A	135 A	3 x 160 gL A

Recommended fuses according to IEC standard 269-2: gL/gG (aM also admitted)
(F1U, F2U, F3U = gL/gG)

2.7 Test Run and Operation Data for EWTP110~170MBYNN

Pressures

The table below contains the measurable pressures.

Measurement	Value
Suction pressure	depending on working conditions
Discharge pressure	
Maximum water pressure	10 bar

Temperatures

The table below contains the measurable temperatures.

Measurement	Value
Leaving water temperature evaporator	➤ Standard: 4 – 16°C ➤ With glycol: -10 – 16°C
Heat recovery inlet water temperature condenser	depending on heat recovery setpoint
Outdoor temperature	-15 – 43°C
Temperature difference at the air side	10 – 15°C
Temperature difference at the water side	3 – 8°C
Discharge temperature	80 – 120°C
Approach temperature evap. (evap leaving water temp - sat. temp)	5 – 8°C (for MOW of 4°C) for glycol units this can be > 8°C

Voltages

The table below contains the measurable voltages.

Measurement	Value
Power supply voltage	Within ± 10% of the rated voltage
Phase imbalance	Within ± 2% of the rated voltage
Control circuit voltage	230 V AC for main electromagnetic switches 24 V DC for the controllers

Currents

The table below contains the currents and used fuses.

Unit	Nominal current	Maximum current	Fuses
EWTP110MBYNN	70 A	95 A	3 x 125 gL A
EWTP140MBYNN	84 A	120 A	3 x 160 gL A
EWTP160MBYNN	104 A	135 A	
EWTP200MBYNN	128 A	168 A	3 x 200 gL A
EWTP280MBYNN	180 A	232 A	3 x 250 gL A
EWTP340MBYNN	226 A	288 A	3 x 355 gL A

Unit	Nominal current	Maximum current	Fuses
EWTP400MBYNN	258 A	342 A	std: 2 x (3 x 250 gl) A op52: 3 x 400 gl A
EWTP460MBYNN	316 A	396 A	std: (3 x 250 gl) + (3 x 300) gl A op52: 3 x 425 gl A
EWTP540MBYNN	373 A	452 A	std: 2 x (3 x 300 gl) A op52: 3 x 425 gl A

Recommended fuses according to IEC standard 269-2: gL/gG (aM also admitted)
(F1U, F2U, F3U = gL/gG)

4

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

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-407C may decompose into irritating and poisonous gas. Avoid skin and hand contact with the liquid refrigerant and protect your eyes against liquid splashes.

Overview

This chapter covers the following topics:

5

1.2 Maintenance of the Main Parts

Preventive maintenance

A program of scheduled maintenance should be set up and followed. The items mentioned are to be used as a guide and must be used in combination with sound electrical and refrigeration workmanship to ensure trouble free operation and performance.

Unit Casing

Follow the below instructions to check the unit casing.

Check if...	If not, then...
The paint of the unit casing is intact.	Touch-up with paint.
All plate work is screwed down in position.	Screw the plate work down in position.

Compressor

Follow the instructions below to check the compressor:

➤ Check crankcase heater operation. Switch of the compressor and carefully touch the crankcase heater area by hand.

No operation can cause compressor damage when the ambient temperature reaches a low temperature.

Evaporator and condenser

Follow the instructions below to check the evaporator and condenser:

➤ Inspect the water and condenser after the first operating season. This condition indicates the required frequency of cleaning and also whether water treatment is needed in the chilled water circuit.

➤ Check the air plugs and drain plugs to prevent or detect water leakage.

➤ Check pressure-drop and water flow.

➤ Record temperature difference between in / out and water out/ refrigerant temperature.

➤ Inspect evaporator insulation. If damaged, repair.

➤ Inspect water and refrigerant connections.

➤ If the evaporator heater-tape is installed, check operation by direct power connection and hand-touch.

➤ Brush cleaning. Abnormal high condensing-pressures are an indication for periodic cleaning.

Unit switchbox

Follow the instructions below to check the unit switchbox:

➤ Check all power connections for tightness.

➤ Check compressor motor terminals.

➤ Inspect wiring for any signs of overheating (discolouring).

➤ Remove all dust and debris from the switchbox. Replaced coils and components should not be left in the unit control panel.

➤ Check all field-wired terminals.

Expansion valve

The expansion valve will allow the correct amount of refrigerant to enter the evaporator to match the cooling load (by keeping a constant superheat). Follow the instructions below to check the expansion valve.

- ➤ Check the superheat setting.
- ➤ Inspect the bulb / power-head capillary connection (no chaffing).
- ➤ Inspect the equaliser line visually.
- ➤ Inspect the feeler bulb suction pipe connection / insulation.

Flow switch and pump interlock

Follow the instructions below to check the flow switch and the pump interlock.

- ➤ Check operation by ohmmeter after disconnecting the wires to the field terminals and simulating flow and no-flow conditions.
- ➤ Inspect the flow-switch for possible corrosion (glycol applications). Check electrical connections for shunts or bridges.

5

1.3 Maintenance of the Control Devices

Preventive maintenance

A program of scheduled maintenance should be set up and followed. The items mentioned are to be used as a guide and must be used in combination with sound electrical and refrigeration workmanship to ensure trouble free operation and performance.

5

1.4 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.	—

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.	—

5

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.	—

5

Part 6
Appendix

Introduction

History of the software

What is in this part?

This part contains the following chapters:

6

6

1 Appendix

1.1 What Is in This Chapter

Introduction

History of the software

Overview

This chapter covers the following topics:

6

1.2 History of the Software

Item	Software code software version & date	Content
1	FLDKNMCHLA V4.2M6 (27/10/05)	Integrate stepless compressor in all functions (thermostat, safety, safetypre-vention, limitation,...)
2	FLDKNMCHLA V4.3M6 (24/03/06)	Specification changes ➤ increase ERR REV default value to 4.0 Ohm. ➤ add insensitivity to fluctuations (< 2 Ohm) in the feedback evaluation function. ➤ change reset of feedback evaluation function when a circuit is at 100%. ➤ change reset function of feedback evaluation counter to include 1s loadup/down to reset function.

Index

B

C

D

E

F

N

O

P

R

S