Dampening solution circulator beta.d 40-150 Rel.04, R513A

1 Product data

1.1 General view

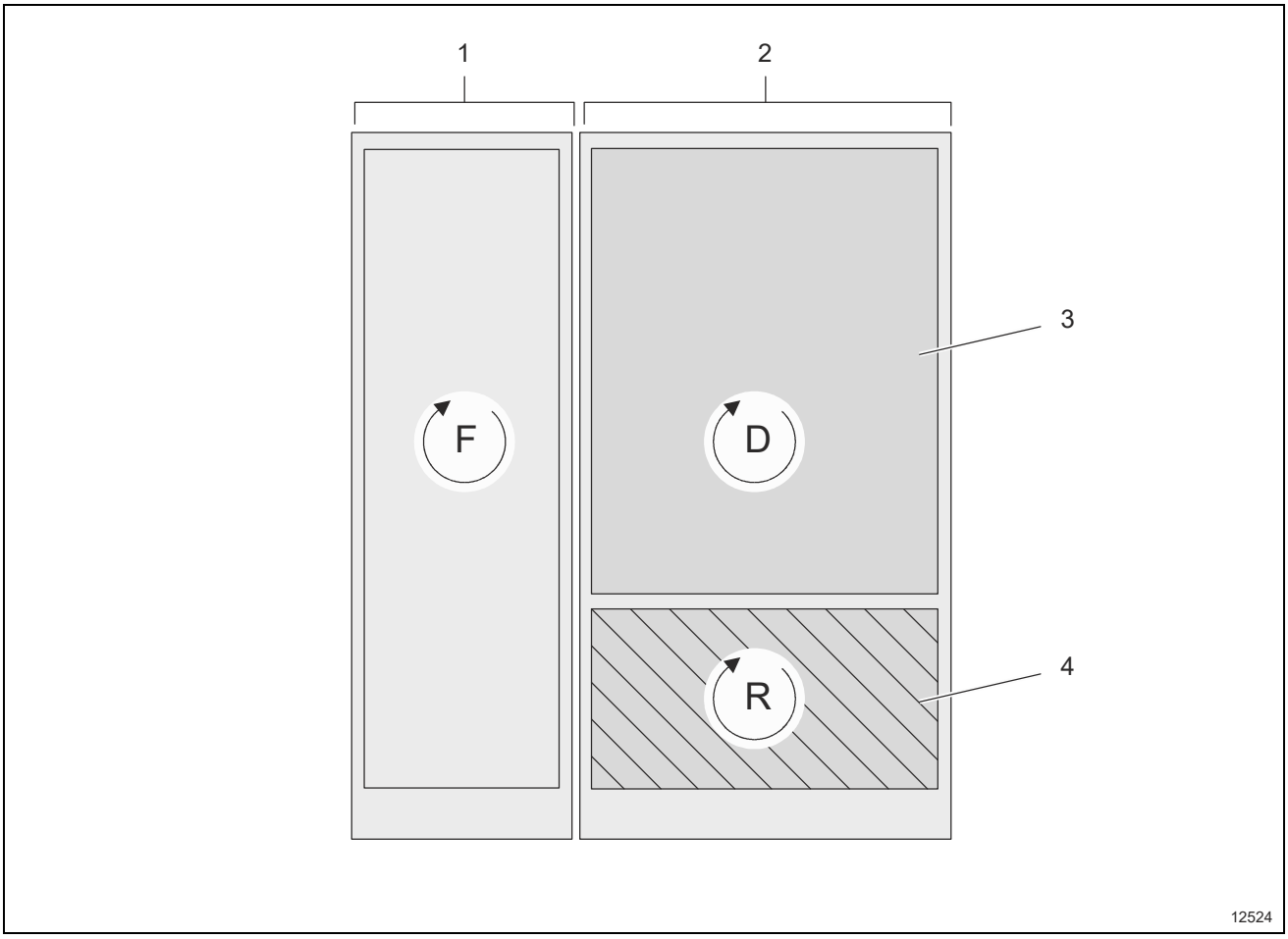

Fig. 1: Overview of the cabinet modules

1	Filter system (Option) *)	3	Dampening solution circuit (D-circuit)
2	Dampening solution circulator	4	Refrigeration circuit (R-circuit)

NOTE

*) Please refer to the separate instruction manual.

1.2 Dimensions

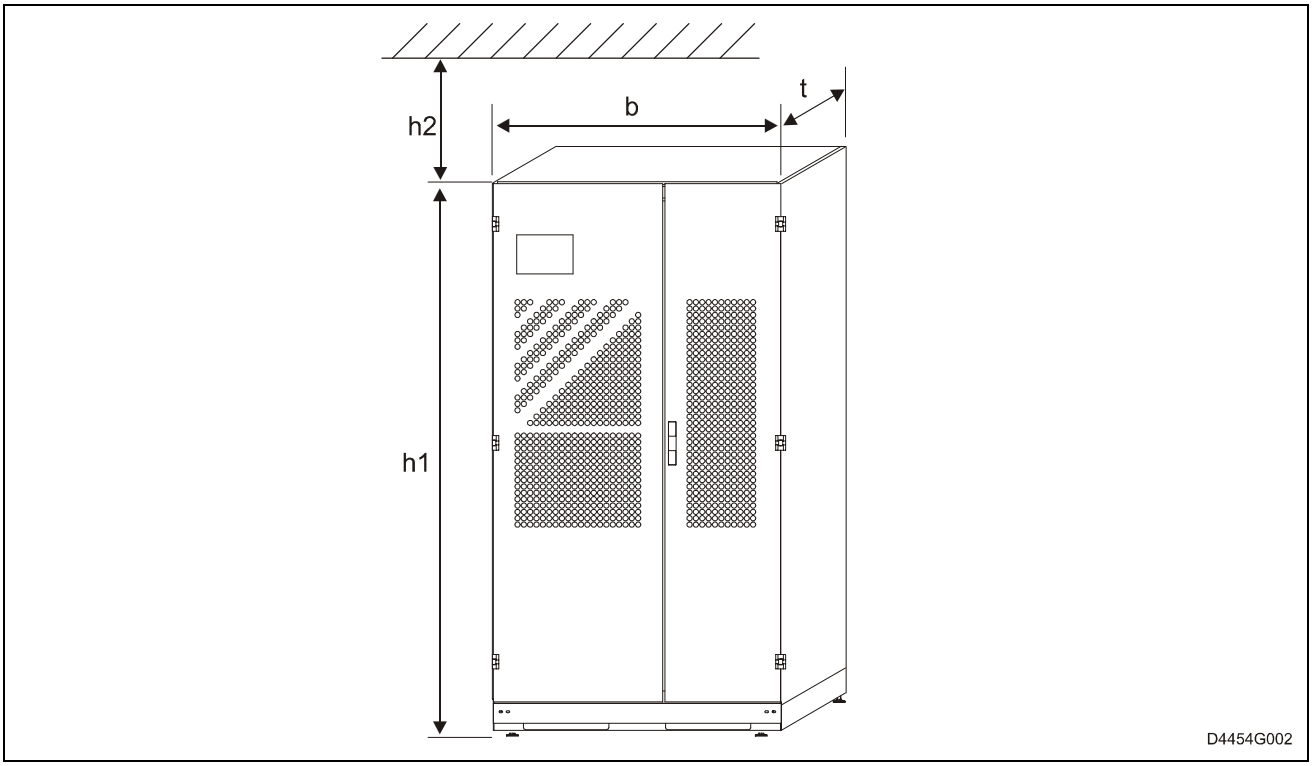

Fig. 2: Unit cabinet, example beta.d 100

Width		**b**	
beta.d 40 ... 100	2-türig	mm inch	600 + 400 = 1000 23.6 + 15.7 = 39.4
beta.d 120 ... 150	3-türig	mm inch	600 + 400 + 400 = 1400 23.6 + 15.7 + 15.7= 55.1

Height	**h1**	**(incl. base)**	**h2**	**Spacing with regard to the ceiling *)**
beta.d 40 ...100	mm inch	1900 (2100) 74.8 (82.7)	mm inch	1000 39.4
beta.d 120, 150			mm inch	1500 59.1

Depth	**t1**	
beta.d 40 ...150	mm inch	700 27.6

*) only air-cooled version

1.3 Connections

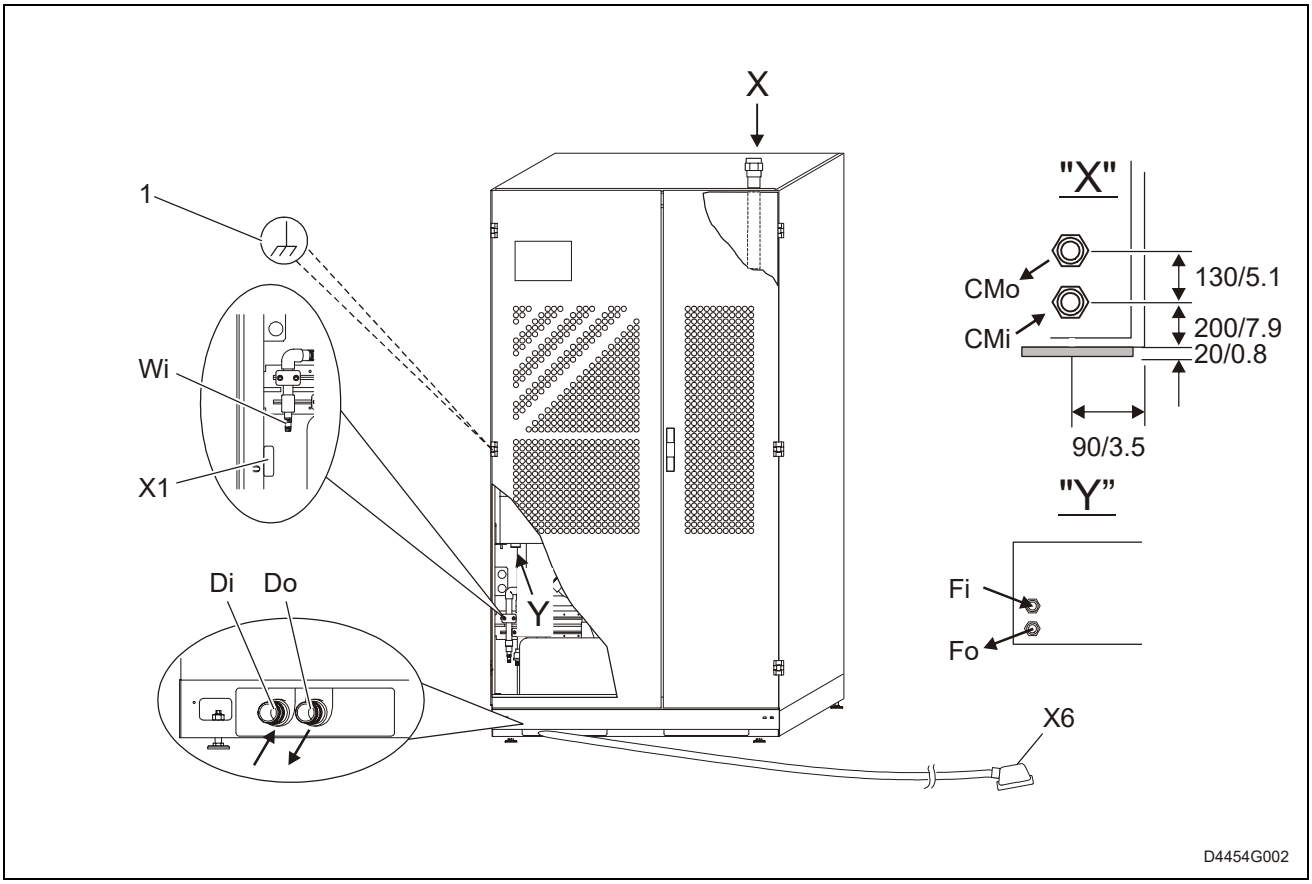

Fig. 3: Unit connections, example beta.d 100G

CMi	Chilling medium inlet (glycol-cooled version only)
CMo	Chilling medium outlet (glycol-cooled version only)
Di	Dampening solution inlet
Do	Dampening solution outlet
Fi	Inlet from filtration unit
Fo	Outlet to filtration unit
Wi	Fresh water connection
X1	Electrical supply connection
X6	Electrical supply connection of the intermediate tank

NOTE

The unit interface is located at the control cabinet housing.
Follow the instructions given in the circuit diagram.

NOTE

The dampening solution connectors can be rotated. Depending on the requirement, the connection lines can be led out of the unit at the sides, front, or back.

1.4 Mechanical connection

		beta.d 40	beta.d 60	beta.d100	beta.d120	beta.d150
Dampening solution outlet Do,	∅ mm	25	25	32	32	32
Dampening solution inlet Di [1)]	∅ inch	1	1	1¼	1¼	1¼
Fresh water connection	∅ mm	12	12	12	12	12
- Hose connector	∅ inch	½	½	½	½	½
Cooling medium inlet CMi,	∅ mm	20	20	20	25	25
Cooling medium outlet CMo (internal thread) [2)]	∅ inch	¾	¾	¾	1	1
Filtration unit connection	∅ mm	25	25	25	25	25
(Fi/Fo) [*)]	∅ inch	1	1	1	1	1

NOTE

*) option

1) other connection sizes available on request:
- Dampening solution circuit: 20 mm – 40 mm / ¾“ - 1½“

2) only for units cooled with cooling medium

1.5 Electrical connection

1.5.1 General information

Electrical supply	50Hz	V, Ph	400 ± 10 %, 3
	60Hz	V, Ph	460 ± 10 %, 3
Frequency tolerance	permanent	%	±1,0
	short-term	%	±2,0
Control voltage		V	24 DC ± 10%
Rated current of control voltage	max.	A	6
Power supply connection	X1	HAN K4/0 4-pin type + PE, male connector	
Data interface connection	Ethernet	RJ45	
	RS422	D-SUB 9-pin socket	
	CANopen	D-SUB 9-pin type, plug/socket	
	MAVO	D-SUB 25-pin	
Electrical supply connection of the intermediate tank	X6	10-pin bushing	

Connection cable for the web-enabled interface	(not included in scope of supply)
• Standard	RJ45, Ethernet Cat.5e
• Recommended by technotrans	RJ45, Ethernet Cat.6a

1.5.2 Air-cooled version

			beta.d 40	beta.d 60	beta.d 100	beta.d 120	beta.d 150
Fuses provided by customer	50 Hz	A	16	16	20	20	25
	60 Hz	A	16	16	20	20	25
Power consumption	50 Hz	kW	4,3	5,2	6,9	8,1	9,0
	60 Hz	kW	5,1	6,2	8,3	9,8	10,9
Current consumption	50 Hz	A	10,2	13,3	14,7	17,4	19,5
	60 Hz	A	10,5	13,6	15,2	18,2	20,4

1.5.3 Glycol-cooled version

			beta.d 40	beta.d 60	beta.d 100	beta.d 120	beta.d 150
Fuses provided by customer	50 Hz	A	16	16	20	20	25
	60 Hz	A	16	16	20	20	25
Power consumption	50 Hz	kW	3,8	4,8	6,5	7,2	8,1
	60 Hz	kW	4,4	5,5	7,6	8,4	9,5
Current consumption	50 Hz	A	9,4	12,4	13,9	15,7	17,8
	60 Hz	A	9,5	12,6	14,2	16,1	18,3

1.6 More powerful dampening solution pump (option)

Dampening solution circulators with intermediate tanks and ejectors can be equipped with more powerful dampening solution pumps if required.

NOTE

- The values stated for the standard units must be increased by the values stated in the following table for units with more powerful dampening solution pumps.

  In order to determine the data for units with more power dampening solution pumps, the values given must be added to the standard values.
- Follow the instructions given in the circuit diagram.

1.6.1 Air-cooled version

beta.d			40 L	60 L	100 L	120 L	150 L
Power consumption	kW	50Hz	0.51	0.51	-	-	-
		60Hz	-	-	-	-	-
Current consumption	A	50Hz	0.85	0.85	-	-	-
		60Hz	-	-	-	-	-

1.6.2 Glycol-cooled version

beta.d			40 G	60 G	100 G	120 G	150 G
Power consumption	kW	50Hz	0.51	0.51	0.45	0.45	0.45
		60Hz	-	-	0.45	0.45	0.45
Current consumption	A	50Hz	0.85	0.85	1.55	1.55	1.55
		60Hz	-	-	1.55	1.55	1.55

1.7 Weights

1.7.1 Air-cooled version

		beta.d 40	beta.d 60	beta.d100	beta.d120	beta.d150
Net weight	kg	320	325	355	395	450
	lb	705	716	782	871	992
Operating weight	kg	385	390	420	470	525
	lb	849	860	926	1036	1157

1.7.2 Glycol-cooled version

		beta.d 40	beta.d 60	beta.d100	beta.d120	beta.d150
Net weight	kg	305	310	340	375	430
	lb	672	683	750	827	948
Operating weight	kg	370	375	405	450	505
	lb	816	827	892	992	1113

1.8 General information

Ambient conditions	Temperature for transport and storage when completely empty	°C	(-25) - 60
		°F	(-13) - 140
	Temperature during operation	°C	10 - 40
		°F	50 - 104
Chilling medium temperature range [1)]		°C	10 - 43
		°F	50 - 109
Noise emission		dB (A)	≤ 73
Starting frequency	suitable for continuous operation	-	unlimited
Water quality	pH value	pH	6,5-7,5
	Hardness	°dH	7 - 15
		mmol/l	1,5-2,5
	Max. dirt particle size	µm	80
	Drinking water quality	-	-
	free from contaminants	-	-
Fresh water supply	External fresh water pressure	bar	1-5
		psi	14.5 - 72.5
	Maximum permissible fresh water temperature	°C	5 - 25
		°F	41 - 77
Dosing range	Dampening solution additives	%	1-5 %
	Accuracy	%	± 0,25
Dampening solution mixing rate	max., at 5 bar fresh water pressure	l/h	900
		gal/h	237.8
Max. hose lengths		m	10
		inch	393.7
Cable length to intermediate tank		m	20
		inch	787.4

[1)] only cooling-medium-cooled units

Certificates, external licences, test marks, and trademarks		
		DP23005
Control cabinet labeled according to UL508A (optional)		E307336
Control cabinet labeled according to UL698A (optional)		E329429

Installation altitude (above sea level) for air-cooled units:	•	up to 1,000 m:	unrestricted use
	•	1,000 - 2,000 m:	5 % reduced cooling power at a max. ambient temperature of 35°C / 95°F
	•	as of 2,000 m:	Please contact technotrans.

Installation altitude (above sea level) for glycol-cooled/water-cooled units:	•	up to 2,000 m:	unrestricted use
	•	as of 2,000 m:	Please contact technotrans.

Device category according to the Pressure Equipment Directive	beta.d 40-150	I
Conformity assessment procedure	beta.d 40-150	Modul A
Fluid group according to the Pressure Equipment Directive		2

Tolerance:		
Nominal refrigeration capacity (based on the Directive 2016/2281):	%	±5
Volume flow (based on DIN EN ISO 9906):	%	±9
Delivery head (based on DIN EN ISO 9906):	%	±7

1.9 Dampening solution circuit (D-circuit)

NOTE

Performance data applicable under the following conditions:

- Cooling medium temperature: 40°C/104 F (applies only to units using cooling media)
- Ambient temperature: 35°C/95 F (applies only to air-cooled units)
- Dampening solution temperature: 10°C/50 F

		beta.d 40	beta.d 60	beta.d 100
Temperature range	°C	8 - 25	8 - 25	8 - 25
	°F	46.4 - 77.0	46.4 - 77.0	46.4 - 77.0
Medium feed flow pressure (circulation circuit)	bar	0,7 - 1,2	0,7 - 1,2	0,7 - 1,2
	psi	10.2 - 17.4	10.2 - 17.4	10.2 - 17.4
Feed rate (maximum)	l/min	30	30	55
	US gal/min	7.92	7.92	14.5
at external differential pressure	bar	0,8	0,8	0,8
	psi	11.6	11.6	11.6
Nominal tank capacity	l	76	76	76
	US gal	20.07	20.07	20.07
Effective tank capacity	l	48	48	48
	US gal	12.68	12.68	12.68
Overflow reserve	l	49	49	49
	US gal	12.94	12.94	12.94

		beta.d 120	beta.d 150
Temperature range	°C	8 - 25	8 - 25
	°F	46.4 - 77.0	46.4 - 77.0
Medium feed flow pressure (circulation circuit)	bar	0,7 - 1,2	0,7 - 1,2
	psi	10.2 - 17.4	10.2 - 17.4
Feed rate (maximum)	l/min	55	55
	US gal/min	14.5	14.5
at external differential pressure	bar	0,8	0,8
	psi	11.6	11.6
Nominal tank capacity	l	107	107
	US gal	28.27	28.27
Effective tank capacity	l	61	61
	US gal	16.11	16.11
Overflow reserve	l	97	97
	US gal	25.62	25.62

1.10 Refrigerant circuit (R-circuit)

1.10.1 Glycol-cooled version

NOTE

Performance data applicable under the following conditions:

- Cooling medium temperature: 40 °C/104 F
- Dampening solution temperature: 10 °C/50 F
- Max. refrigeration capacity

			beta.d 40 G	beta.d 60 G	beta.d 100 G
Refrigerant			R513A		
Global warming potential (GWP) of the refrigerant *)			631		
Safety group according to EN 378			A1		
Refrigerant fill quantity	Weight	kg	1,3	1,8	2,8
		lb	2,87	3.97	6.17
	CO_2 equivalent	t	0,82	1,14	1,77
		lb	1808	2504	3895
Refrigeration capacity	50 Hz	kW	4	6	10
		BTU/h	13649	20472	34121
	60 Hz	kW	4,5	7,0	11,5
		BTU/h	15368	23906	39275
Waste heat capacity	50 Hz	kW	8	11	16
		BTU/h	27313	37555	54626
	60 Hz	kW	9	13	19
		BTU/h	30736	44397	64888

			beta.d 120 G	beta.d 150 G
Refrigerant			R513A	
Global warming potential (GWP) of the refrigerant *)			631	
Safety group according to EN 378			A1	
Refrigerant fill quantity	Weight	kg	3,0	3,5
		lb	6.6	7.7
	CO_2 equivalent	t	1,89	2,21
		lb	4173	4869
Refrigeration capacity	50 Hz	kW	12	15
		BTU/h	40945	51182
	60 Hz	kW	13,5	17,0
		BTU/h	46105	58058
Waste heat capacity	50 Hz	kW	18	21
		BTU/h	61454	71719
	60 Hz	kW	22	26
		BTU/h	75134	88795

*) The GWP value (Global Warming Potential) of CO_2, based on a period of 100 years, is set to one.

1.10.2 Chilling medium consumption (glycol-cooled version only)

NOTE

The cooling medium consists of water with a maximum of 35% of ethylene glycol. Observe the maximum cooling medium pressure of 10 bar.

		beta.d									
		40 G		60 G		100 G		120 G		150 G	
at ↓		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
10°C	m³/h	0,26	0,33	0,37	0,44	0,56	0,63	0,67	0,78	0,89	1,04
50°F	cu ft/m	0.15	0.19	0.22	0.26	0.33	0.37	0.39	0.46	0.52	0.61
Δp	bar	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
	psi	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
Δt	K	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
15°C	m³/h	0,32	0,41	0,45	0,55	0,68	0,77	0,82	0,95	1,09	1,27
59°F	cu ft/m	0.18	0.24	0.26	0.32	0.40	0.45	0.48	0.56	0.64	0.75
Δp	bar	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
	psi	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
Δt	K	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
20°C	m³/h	0,41	0,53	0,59	0,71	0,88	1,0	1,06	1,24	1,41	1,65
68°F	cu ft/m	0.24	0.31	0.35	0.42	0.52	0.59	0.62	0.73	0.83	0.97
Δp	bar	1,0	1,1	1,2	1,3	1,5	1,6	1,0	1,1	1,2	1,3
	psi	14.5	15.9	17.4	18.9	21.8	23.2	14.5	15.9	17.4	18.9
Δt	K	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
30°C	m³/h	1,0	1,29	1,43	1,71	2,14	2,43	2,57	3,0	3,43	4,0
86°F	cu ft/m	0.59	0.76	0.84	1.0	1.26	1.43	1.51	1.77	2.02	2.35
Δp	bar	2,1	2,2	2,2	2,4	2,5	2,6	1,6	1,8	2,2	2,4
	psi	30.5	31.9	31.9	34.8	36.3	37.7	23.2	26.1	31.9	34.8
Δt	K	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8
40°C	m³/h	1,0	1,29	1,43	1,71	2,14	2,43	2,57	3,0	3,43	4,0
104°F	cu ft/m	0.59	0.76	0.84	1.0	1.26	1.43	1.51	1.77	2.02	2.35
Δp	bar	2,1	2,2	2,2	2,4	2,5	2,6	1,6	1,8	2,2	2,4
	psi	30.5	31.9	31.9	34.8	36.3	37.7	23.2	26.1	31.9	34.8
Δt	K	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8
43°C	m³/h	1,0	1,29	1,43	1,71	2,14	2,43	2,57	3,0	3,43	4,0
109.4F	cu ft/m	0.59	0.76	0.84	1.0	1.26	1.43	1.51	1.77	2.02	2.35
Δp	bar	2,1	2,2	2,2	2,4	2,5	2,6	1,6	1,8	2,2	2,4
	psi	30.5	31.9	31.9	34.8	36.3	37.7	23.2	26.1	31.9	34.8
Δt	K	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8	> 8

1.10.3 Air-cooled version

NOTE

Performance data applicable under the following conditions:

- Ambient temperature: 35 °C/95 F
- Dampening solution temperature: 10 °C/50 F
- Max. refrigeration capacity

			beta.d 40 L	beta.d 60 L	beta.d 100 L
Refrigerant			R513A		
Global warming potential (GWP) of the refrigerant *)			631		
Safety group according to EN 378			A1		
Refrigerant fill quantity	Weight	kg	3	3	5
		lb	6.6	6.6	11.0
	CO_2 equivalent	t	1,89	1,89	3,16
		lb	4173	4173	6956
Refrigeration capacity	50 Hz	kW	4	6	10
		BTU/h	13649	20472	34121
	60 Hz	kW	4,5	7,0	11,5
		BTU/h	15368	23906	39275
Cooling air flow rate [2)]	50 Hz	m³/h	4000	4000	4200
		cu ft/h	141258	141258	148321
	60 Hz	m³/h	4500	4500	4800
		cu ft/h	158916	158916	169510
Waste heat capacity	50 Hz	kW	8	11	16
		BTU/h	27313	37555	54626
	60 Hz	kW	9	13	19
		BTU/h	30736	44397	64888

			beta.d 120 L	beta.d 150 L
Refrigerant			R513A	
Global warming potential (GWP) of the refrigerant *)			631	
Safety group according to EN 378			A1	
Refrigerant fill quantity	Weight	kg	7	7
		lb	15.4	15.4
	CO_2 equivalent	t	4,42	4,42
		lb	9738	9738
Refrigeration capacity	50 Hz	kW	12	15
		BTU/h	40945	51182
	60 Hz	kW	13,5	17,0
		BTU/h	46105	58058
Cooling air flow rate [2)]	50 Hz	m³/h	7500	7500
		cu ft/h	264860	264860
	60 Hz	m³/h	8700	8700
		cu ft/h	307237	307237
Waste heat capacity	50 Hz	kW	18	21
		BTU/h	61454	71719
	60 Hz	kW	22	26
		BTU/h	75134	88795

*) The GWP value (Global Warming Potential) of CO_2, based on a period of 100 years, is set to one.

1.11 Options

Alcohol stabiliser

- Type: alcosmart

Measuring and control range for 2-propanol	%	0 - 15
Error of measurement ΔT < 2°C/min	%	± 0,5

- Type: alcocontrol

Measuring and control range for 2-propanol	%	3 - 15
Error of measurement at ΔT < 2°C/min	%	± 1,0

Intermediate tank

Type	FZT-C	35 *)	55 *)	100 *)	120 *)	190	290
Nominal tank capacity	l	20	30	60	60	100	110
	US gal	5.3	7.9	15.9	15.9	26.4	29.1
Overflow reserve	l	15	25	40	60	90	180
	US gal	4.0	6.6	10.6	15.9	23.8	47.6

*) also available with ejectors

Additive mixing system

- Type fluidos.c 5 (including empty status signal)
- Type: fluidos.c 5+5 (for additives and alcohol substitutes)

Mixing capacity	l/h	100 - 900
	US gal/min	26,4 - 237.8
Supply pressure – single operation (fluidos.c 5)	bar	1 - 5
	psi	14,5 - 72,5
Supply pressure – series operation (fluidos.c 5+5)	bar	1,5 - 5
	psi	21,6 - 72,5
Dosing range - fluidos 1-5	%	1 - 5
Dosing range - fluidos 2-12	%	2 - 12

Additive mixing systems plus process control

- Type: fluidos.c5 plus process control with the following features:
  - Empty status signal
  - Conductivity measurement in the fresh water inlet
  - Monitoring of the fresh water inlet pressure
  - Mixing tube and conductivity measurement downstream of the additive mixing point
  - Trend display of the conductivity values

- Type: fluidos.c 5+5 plus process control for additives and alcohol substitutes
  - Empty status signal
  - Conductivity measurement in the fresh water inlet
  - Monitoring of the fresh water inlet pressure
  - Mixing tube and conductivity measurement downstream of the additive mixing point
  - Trend display of the conductivity values

- Type: digidos.p 150 C for 1x additive incl. a downstream conductivity measuring system *)
- Type: digidos.p 250 RC for 2x additives incl. a downstream conductivity measuring system *)

*) optionally with an alcohol flow meter

pH measuring system with trend display
Inductive conductivity measuring system with trend display
Collective fault indicator
- sound signal - visual signal
Colour touchscreen
- Display
Software package (without touchscreen)
- Ethernet remote maintenance - External PC visualisation - Data logging
Control station connection
- CANopen, Ethernet, RS232, RS422
Data remote control
- uni.control Touch Display
Preparation for a connection to a central dampening solution supply unit (CDS)
Cabinet base for a total height of 2100/82.7 mm/inch
Exhaust air hood
Return suction system
Ring screws (1 set)