



Air-cooled QUANTUM chillers with integrated free cooling

QUANTUM A with free cooling for all situations

A cooling solution that pays off:

- Highly economical due to especially long use of integrated free cooling during the transition period
- Low operating costs through high efficiency in part-load mode
- Individually configurable and scalable
- Fail-safe and with super-fast restart function

Functionality

The chiller with integrated free cooling registers has three operating modes:

- Free cooling mode (FC mode)
 - > Compression mode is deactivated
 - > Free cooling mode is active - fans in operation
- Combined mode (compression and free cooling mode)
 - > Compressors are in operation
 - > Flow through free cooling registers
- Compression mode (CM mode)
 - > Only compressors are in operation
 - > Free cooling mode is deactivated

Features and advantages

- **Integrated free cooling**

- > Lower energy costs in refrigeration and combination mode
- > High refrigeration capacity with minimal footprint

- **Maximal free cooling registers**

- > Early switchover of compressor runtime to combined and free cooling mode
- > Micro-channel registers for optimum heat transfer

- **High efficiency through free cooling in combined mode**

- > Individual V-modules can be switched off in compression mode – with simultaneous 100% free cooling (100% fan mode)
- > Large working ranges through early activation of free cooling

- **Efficient re-coolers**

- > Low condensation temperatures for minimised energy consumption
- > Optimal heat transfer at low refrigerant filling capacity

- **Low-noise chiller operation**

- **Speed-controlled EC fans**
 - > Low-noise and maintenance-free motors in IP 54
 - > Fan speeds adapted to cooling requirements

- **Low-noise compressor technology**
- **Additional sound insulation measures optionally available**

- **Open-flash economizer**

- > Higher performance density, lower energy costs

- **Two-stage oil-free turbo compressor**

- > Magnetic bearing drive shaft
- > High efficiency even in part load behaviour
- > Low maintenance costs due to oil-free operation of compressors
- > Low sound power level

- **Generously dimensioned evaporator**

- > Maximum efficiencies due to minimum temperature differences during heat transfer
- > Low pressure loss
- > Low refrigerant filling capacities

- **Electronic expansion valve**

- > Continuous adjustment to cooling needs



Integrated pump modules



Open-flash economizer



Compressor

Control & regulation

- **Regulation based on outside temperatures**

- Free cooling, combined mode and compressor mode are selected automatically in dependence on the outside temperature or set according to the customer's needs – for the greatest possible efficiency

- **For integration into existing systems**

- Simple and uncomplicated to connect to a variety of systems
- Optimal regulation through building control system

Advantages

- **High-quality design and components**

- Innovative system configurations, tailored to individual customer requirements for optimum reliability
- High redundancy
- High level of parts availability

- **Made in Germany**

- Developed and manufactured in Germany

Solutions for ...



Vehicle manufacturers and automotive supply industry



Chemicals and pharmaceuticals industry



Manufacturing industry



Hospitals and clinics



Food and drink industry



Computing centres and IT sector



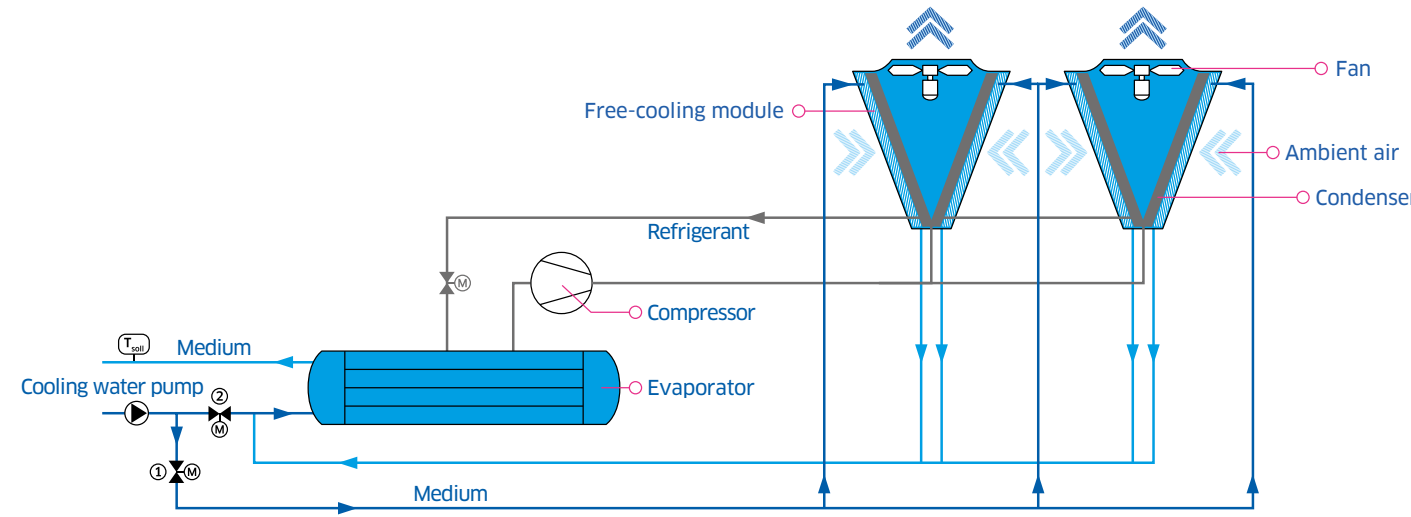
Building services



Diagram of the QUANTUM A with integrated free cooling

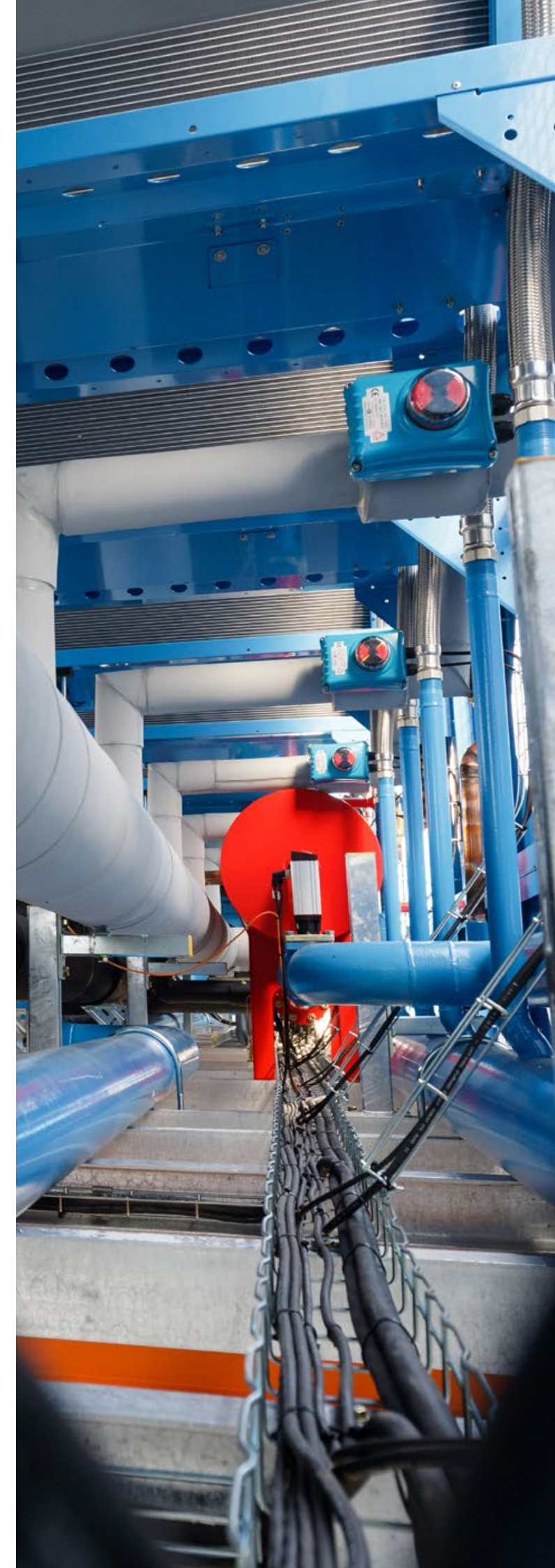
The system hydraulics enable free cooling mode (valve 1 open, valve 2 closed), normal compression mode (valve 2 open, valve 1 closed) and combined mode (valve 1 open, valve 2 closed). In combined mode there is a flow through the free cooling modules while the refrigeration components

generate output. QUANTUM control is used to switch between free cooling mode, combined mode and compression mode; the required output temperature of the chilled medium is made available regardless of the operating mode. Integration of an optional pump in base frame is prepared.



QUANTUM model		A035-E1C-H3-FK	A045-E1E-H4-FK	A070-E2C-H5-FK	A090-E2E-H6-FK	A105-E3C-H7-FK	A135-E3E-H8-FK	A135-E3E-H10-FK	
Cold water temperatures 26°C/20°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature								
	Nominal refrigeration capacity	kW	350	450	700	900	1050	1350	1350
	(Antifrogen N 30 %)*	kW	71.5	88.6	147.6	190.7	225.1	293.2	269.7
	Current input	A	115	147	235	312	358	478	443
	EER		4.90	5.08	4.74	4.72	4.66	4.60	5.01
	Maximum refrigeration capacity	kW	430	630	824	1116	1210	1488	1778
	Free cooling mode								
	Free cooling output 20°C air temperature	kW	128	171	213	256	299	341	427
	Free cooling output 15°C air temperature	kW	236	315	393	472	551	629	787
	Free cooling output 10°C air temperature	kW	346	461	577	692	807	923	1153
Temperature for 100 % nominal rating	°C	9.8	10.4	6.6	5.2	5.2	2.6	7.3	
Temperature for 100 % maximum rating	°C	6.1	4.2	3.2	0.3	2.1	0.3	1.4	
Cold water temperatures 19°C/13°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature								
	Nominal refrigeration capacity	kW	350	450	700	900	1049	1350	1350
	Power consumption	kW	89.7	111.4	185.4	238.7	284.3	367.1	337.0
	Current input	A	143	182	293	386	448	593	546
	EER		3.90	4.04	3.78	3.77	3.69	3.68	4.01
	Maximum refrigeration capacity	kW	368	534	710	990	1049	1440	1552
	Free cooling mode								
	Free cooling output 15°C air temperature	kW	85	113	142	170	198	227	283
	Free cooling output 10°C air temperature	kW	194	259	323	388	453	517	647
	Free cooling output 5°C air temperature	kW	304	405	507	608	709	811	1013
Temperature for 100 % nominal rating	°C	2.9	3.4	-0.3	-1.7	-1.7	-4.3	0.4	
Temperature for 100 % maximum rating	°C	2.0	0.6	-0.6	-3.8	-1.7	-5.8	-2.4	
Cold water temperatures 15°C/10°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature								
	Nominal refrigeration capacity	kW	346	450	666	900	982	1344	1350
	Power consumption	kW	97.3	105.1	190.7	268.6	282.8	421.4	373.7
	Current input	A	155	198	301	433	446	678	603
	EER		3.56	4.28	3.49	3.35	3.47	3.19	3.61
	Maximum refrigeration capacity	kW	346	500	666	928	982	1344	1454
	Free cooling mode								
	Free cooling output 10°C air temperature	kW	113	151	189	226	264	302	378
	Free cooling output 5°C air temperature	kW	228	304	381	457	533	609	761
	Free cooling output 0°C air temperature	kW	344	459	574	689	804	919	1149
Temperature for 100 % performance	°C	-0.1	0.3	-2.4	-4.6	-3.3	-6.9	-2.7	
Temperature for 100 % maximum rating	°C	-0.1	-1.4	-2.4	-5.2	-3.3	-6.9	-4.0	
Cold water temperatures 12°C/6°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature								
	Maximum refrigeration capacity	kW	306	436	593	816	880	1192	1304
	Power consumption	kW	95.8	146.1	188.4	282.8	282.3	421.3	428.3
	Current input	A	152	236	298	456	446	678	689
	EER		3.19	2.98	3.15	2.89	3.12	2.83	3.04
	Free cooling mode								
	Free cooling output 10°C air temperature	kW	42	59	70	84	89	112	140
	Free cooling output 5°C air temperature	kW	148	198	248	297	347	396	495
	Free cooling output 0°C air temperature	kW	257	342	428	514	599	685	856
	Temperature for 100 % maximum rating	°C	-2.2	-3.1	-4.3	-6.6	-5.3	-8.3	-5.9
Machine data	Oil-free turbo compressor (continuous) with magnet bearing	no.	1	1	2	2	3	3	3
	Power supply		400 V/50 Hz (other voltages upon request)						
	Start-up current per compressor	A	< 5						
	Economizer		Open-flash type						
	Fans	no.	6	8	10	12	14	16	20
Sound data	Sound power	dB(A)	94	96	96	98	98	100	100
	Sound pressure at 10 m distance	dB(A)	62	64	64	66	66	68	68
	Sound power with sound insulation	dB(A)	91	92	93	94	95	95	96
	Sound pressure at 10 m distance with sound insulation	dB(A)	60	61	61	62	63	63	64
	Water connections on evaporator (Victaulic) Ø	DN	100	125	125	150	150	200	200
Dimensions and weights	Length	mm	4829	5732	6351	8474	10005	10723	13099
	Width	mm	2375	2375	2375	2375	2375	2375	2399
	Height	mm	2735	2735	2735	2735	2735	2980	2980
	Transport weight	kg	3110	3890	4418	5244	7010	10205	11970
	Operational weight	kg	3620	4715	5498	6844	9000	11761	13629
	Refrigerant filling capacity (R-134a)	kg	105	135	180	230	335	440	515
	Water connections on evaporator (Victaulic) Ø	DN	100	125	125	150	150	200	200
GWP and CO ₂ equivalent	GWP as per IPCC (AR4) and F-Gas Regulation (EC) 517/2014	-	1430	1430	1430	1430	1430	1430	1430
	CO ₂ equivalent	1000 kg	150.15	193.05	257.40	328.90	479.05	629.20	736.45
	GWP as per IPCC (AR5)	-	1300	1300	1300	1300	1300	1300	1300
	CO ₂ equivalent	1000 kg	136.50	175.50	234.00	299.00	435.50	572.00	669.50

		GA025-E1M-H3-FK	GA035-E1K-H4-FK	GA050-E2M-H5-FK	GA070-E2K-H6-FK	GA105-E3K-H8-FK	
Cold water temperatures 26°C/20°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature						
	Nominal refrigeration capacity	kW	250	350	500	700	1050
	(Antifrogen N 30 %)*	kW	49.4	66.0	98.1	135.1	203.4
	Current input	A	83	112	162	228	342
	EER		5.06	5.30	5.10	5.18	5.16
	Maximum refrigeration capacity	kW	330	470	638	934	1376
	Free cooling mode						
	Free cooling output 20°C air temperature	kW	128	171	213	256	341
	Free cooling output 15°C air temperature	kW	236	315	393	472	629
	Free cooling output 10°C air temperature	kW	346	461	577	692	923
Temperature for 100 % nominal rating	°C	14.4	13.8	12.1	9.8	7.8	
Temperature for 100 % maximum rating	°C	10.7	9.6	8.3	4.4	2.2	
Cold water temperatures 19°C/13°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature						
	Nominal refrigeration capacity	kW	250	350	500	700	1050
	Power consumption	kW	62.0	83.7	124.6	172.7	257.5
	Current input	A	101	139	201	285	424
	EER		4.03	4.18	4.01	4.05	4.08
	Maximum refrigeration capacity	kW	278	402	540	778	1162
	Free cooling mode						
	Free cooling output 15°C air temperature	kW	85	113	142	189	227
	Free cooling output 10°C air temperature	kW	194	259	323	431	517
	Free cooling output 5°C air temperature	kW	304	405	507	676	811
Temperature for 100 % nominal rating	°C	7.4	6.9	5.1	2.9	0.9	
Temperature for 100 % maximum rating	°C	6.1	5.1	4.2	1.1	-1.1	
Cold water temperatures 15°C/10°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature						
	Nominal refrigeration capacity	kW	250	350	500	700	1050
	Power consumption	kW	68.7	93.7	138.4	194.6	291.0
	Current input	A	111	154	221	318	475
	EER		3.64	3.74	3.61	3.60	3.61
	Maximum refrigeration capacity	kW	258	370	504	728	1086
	Free cooling mode						
	Free cooling output 10°C air temperature	kW	113	151	189	226	302
	Free cooling output 5°C air temperature	kW	228	304	381	457	609
	Free cooling output 0°C air temperature	kW	344	459	574	689	919
Temperature for 100 % performance	°C	4.0	3.5	1.9	-0.3	-2.2	
Temperature for 100 % maximum rating	°C	3.7	2.9	1.8	-0.9	-2.8	
Cold water temperatures 12°C/6°C (Antifrogen N 30 %)	Compression mode at 35°C air temperature						
	Maximum refrigeration capacity	kW	222	306	428	572	950
	Power consumption	kW	70.5	98.1	136.4	188.4	307.6
	Current input	A	114	161	218	309	501
	EER		3.15	3.12	3.14	3.04	3.09
	Free cooling mode						
	Free cooling output 10°C air temperature	kW	42	59	70	84	112
	Free cooling output 5°C air temperature	kW	148	198	248	297	396
	Free cooling output 0°C air temperature	kW	257	342	428	514	685
	Temperature for 100 % maximum rating	°C	1.6	-2.3	0.0	-1.3	-4.4
Machine data	Oil-free turbo compressor (continuous) with magnet bearing	no.	1	1	2	2	3
	Power supply		400 V/50 Hz (other voltages upon request)				
	Start-up current per compressor	A	< 5				
	Economizer		Open-flash type				
	Fans	no.	6	8	10	12	16
Sound data	Sound power	dB(A)	94	95	97	97	98
	Sound pressure at 10 m distance	dB(A)	63	63	65	65	66
	Sound power with sound insulation	dB(A)	91	92	94	94	96
	Sound pressure at 10 m distance with sound insulation	dB(A)	60	61	62	63	64
	Water connections on evaporator (Victaulic) Ø	DN	100	125	125	150	200
Dimensions and weights	Length	mm	4900	6100	6400	8500	11000
	Width	mm	2375	2375	2375	2375	2375
	Height	mm	2735	2735	2735	2735	2980
	Transport weight	kg	3105	3885	5190	5230	10140
	Operational weight	kg	3600	4700	6150	6850	11700
	Refrigerant filling capacity (R-1234ze)	kg	105	135	190	230	440
	Water connections on evaporator (Victaulic) Ø	DN	100	125	125	150	200
GWP and CO ₂ equivalent	GWP as per IPCC (AR4) and F-Gas Regulation (EC) 517/2014	-	7	7	7	7	7
	CO ₂ equivalent	1000 kg	0.74	0.95	1.33	1.61	3.08
	GWP as per IPCC (AR5)	-	1	1	1	1	1
	CO ₂ equivalent	1000 kg	0.11	0.14	0.19	0.23	0.44



ENGIE Refrigeration supplies the right cooling for every process: from efficient chillers, environmentally friendly heat pumps and modular re-cooling systems to turnkey solutions such as refrigeration containers or modules. Efficiency, sustainability, cost effectiveness and first-class expertise in technical solutions are hallmarks of every ENGIE Refrigeration project. Our individualised advice and comprehensive services are centred around our customers and their requirements. As a member of the worldwide ENGIE Group, we have a global network of specialists at our disposal and can realise our refrigeration solutions both at home and abroad.

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Optimal use of energies.