

ENGINEERING
TOMORROW

Danfoss

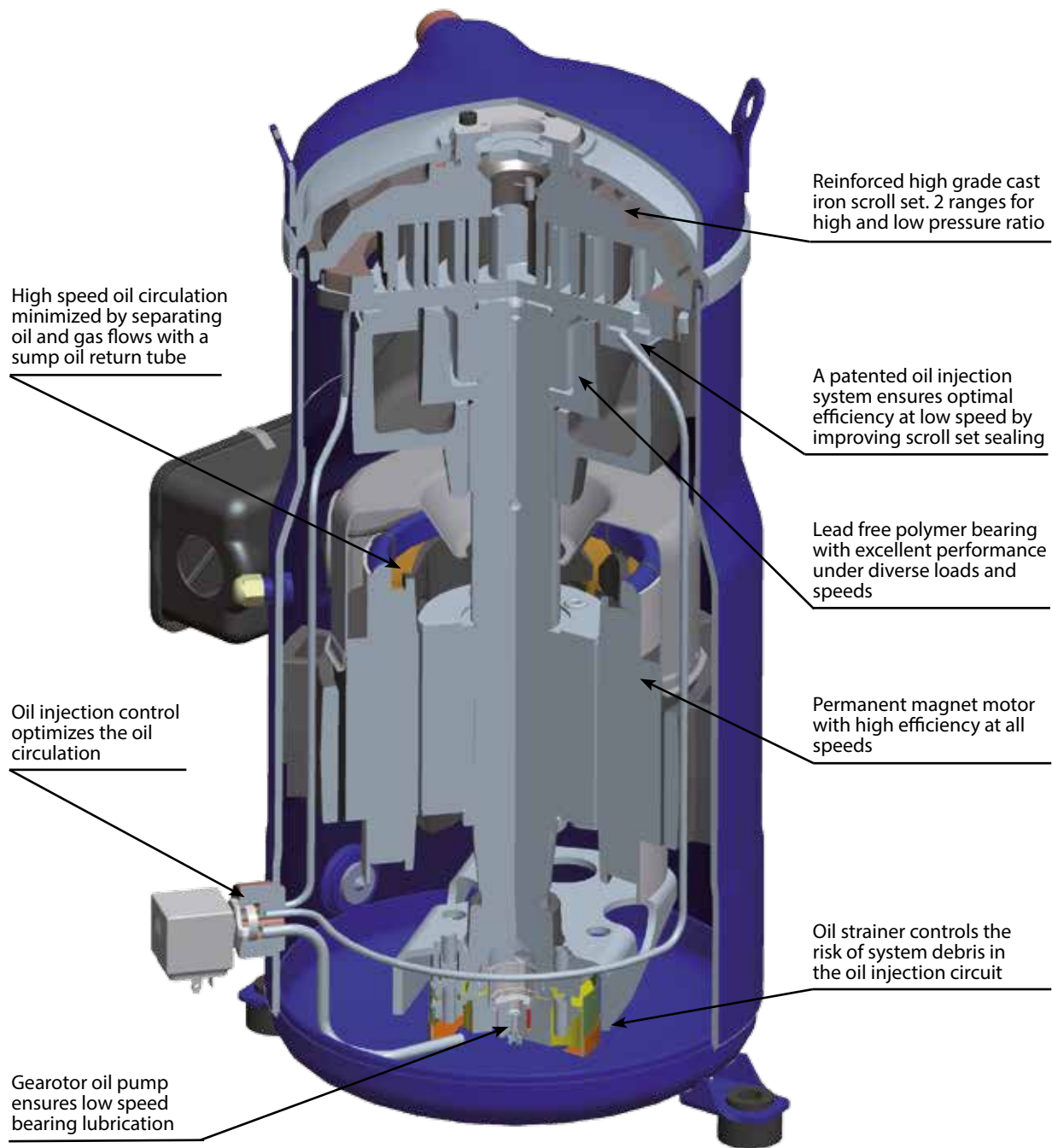
Application guidelines

Inverter scroll compressors **VZH088-117-170** single and manifold

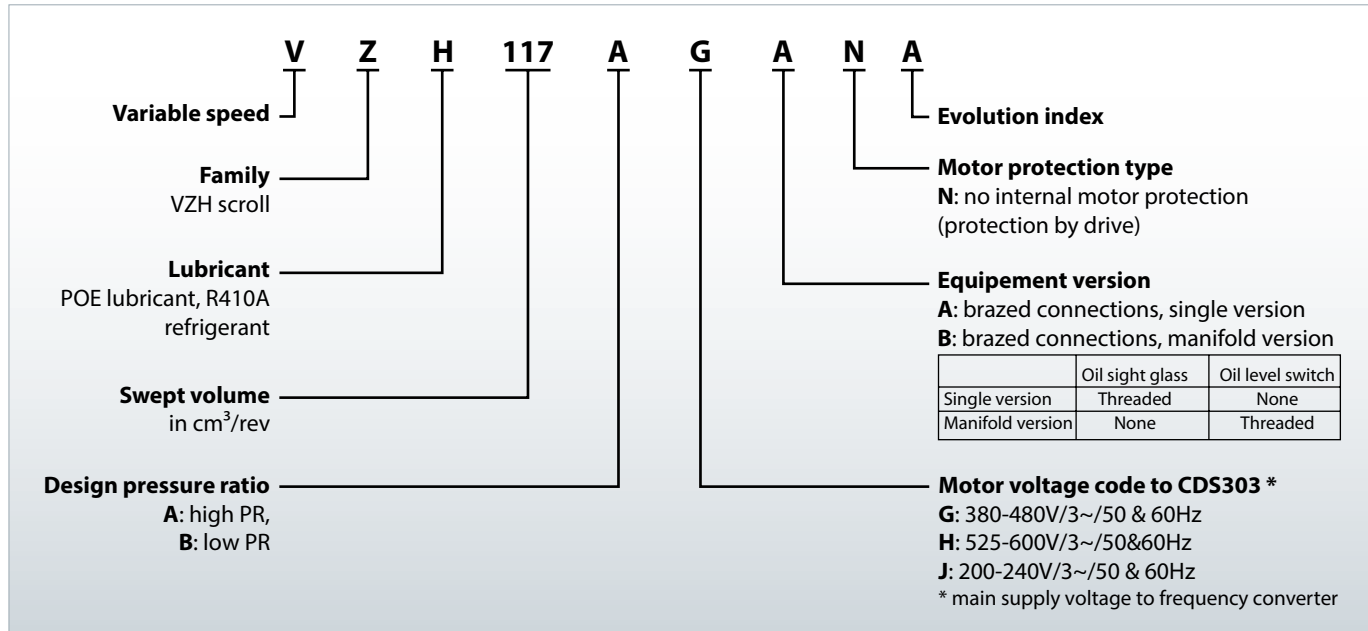
R410A



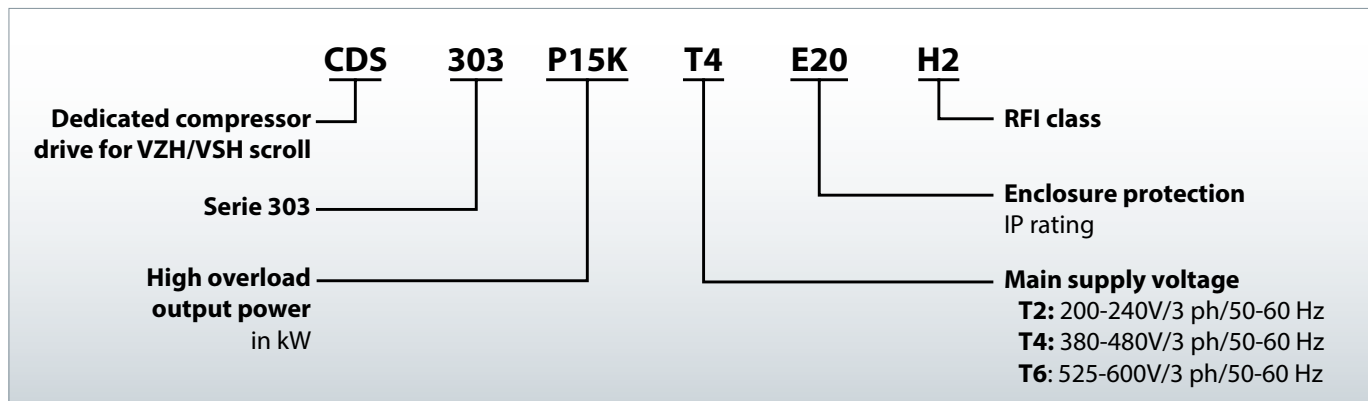
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Compressor nomenclature



Frequency converter nomenclature



Note:

High overload output power: output power @160% Torque

Normal overload: output power @110% torque, it is the power printed in the nameplate.

For example:

T/C: CDS303P15KT4E20H2-P15K high overload output power, take the reference of drive nomenclature

18.5kW(400V)-normal overload power, power printed in the nameplate.

Please note in this guideline, only drive power use high overload power; all the other data, such as fuses/circuit breaker, etc. is reference to Normal overload power.

Compressor specifications

Compressor model	Swept volume (cu.in/rev)	Displacement				Oil charge (oz)	Net weight (lbs)
		25 rps (cu.ft/h)	50 rps (cu.ft/h)	60 rps (cu.ft/h)	100 rps (cu.ft/h)		
VZH088	5.39	272	544	657	1088	112	121
VZH117	7.13	357	717	869	1434	122	134
VZH170	10.39	523	1045	1261	1914	228	247

Frequency converter specifications

Mains supply voltage	T2: 200 - 240 V +/-10% (3-phase)
	T4: 380 - 480 V +/-10% (3-phase)
	T6: 525 - 600 V +/-10% (3-phase)
Supply frequency	50 / 60 Hz
Output voltage	0 - 100 % of supply voltage
Inputs	6 digital (0 - 24 V), 2 analogue (0 / ±10 V or 4 - 20 mA, scalable)
Programmable outputs	2 digital (0- 24 V), 1 analogue (0-24 V), 2 relay
Protection functions	Over-current protection, low / high current handling
Compressor functions	Discharge gas temperature protection, pressostat / thermostat function, short cycle protection, oil return management

Oil injection control

VZH compressors are equipped with an oil injection system that makes the compression pockets more tight thus improving the isotropic efficiency of the compressor as well as controls the oil circulation ratio, at all running speeds. The frequency converter via an oil injection valve controls this system. The oil injection valve is a normally closed valve. At low speed, the valve is closed and the oil is injected to the scroll set suction ports.

The compressors are delivered with no coils. 208V-240V or 24V coils are available as accessory (refer to "Accessories" section). The coil must be installed for oil injection control.

Control parameters are factory preset but accessible on the parameter list as read only values.

Bearings lubrication

Optimal bearings lubrication is ensured by a gearotor oil pump at all compressor speeds.

Capacity at EN12900 rating conditions - High pressure ratio - VZH088AG - VZH117AG - VZH170AG

Models	rpm	To	-13		-10		0		10		20		30		40		50		59		
		Tc	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	
VZH088AG	1500 rpm	70	-	-	-	-	19900	1.55	25000	1.63	31100	1.70	38200	1.72	46500	1.62	-	-	-	-	-
		90	-	-	-	-	17600	2.17	22500	2.14	28200	2.17	34800	2.21	42400	2.21	51100	2.10	60000	1.88	-
		110	-	-	-	-	15200	3.16	19600	2.97	24800	2.90	30800	2.90	37600	2.92	45400	2.91	53300	2.83	-
		130	-	-	-	-	-	-	-	-	20700	3.96	25800	3.87	31700	3.86	38500	3.89	45300	3.90	-
		140	-	-	-	-	-	-	-	-	-	-	22900	4.49	28300	4.45	34400	4.47	40600	4.50	-
	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3600 rpm	70	37800	4.28	40500	4.30	50700	4.38	63000	4.47	77800	4.58	95200	4.71	115500	4.86	-	-	-	-	-
		90	32400	5.27	34900	5.29	44500	5.36	55900	5.44	69500	5.54	85400	5.65	104000	5.78	125500	5.95	147500	6.12	-
		110	-	-	-	-	38600	6.69	48800	6.75	61000	6.82	75200	6.91	91700	7.01	110900	7.14	130600	7.28	-
		130	-	-	-	-	-	-	-	-	51400	8.62	63600	8.67	77900	8.73	94500	8.82	111600	8.91	-
		140	-	-	-	-	-	-	-	-	-	-	57100	9.79	70100	9.83	85400	9.89	101100	9.96	-
	145	-	-	-	-	-	-	-	-	-	-	-	-	61700	11.12	75500	11.16	89800	11.20	-	-
	6000 rpm	70	-	-	-	-	82900	7.92	103100	8.27	127300	8.69	155900	9.17	189500	9.75	-	-	-	-	-
		90	-	-	-	-	74100	9.50	92900	9.77	115300	10.08	141600	10.45	172300	10.89	207800	11.41	244100	11.97	-
		110	-	-	-	-	65100	11.64	82000	11.81	101900	12.01	125300	12.26	152600	12.56	184200	12.92	216700	13.33	-
130		-	-	-	-	-	-	-	-	86300	14.75	106200	14.85	129500	15.00	156600	15.21	184600	15.45	-	
140		-	-	-	-	-	-	-	-	-	-	95300	16.53	116300	16.60	141000	16.72	166500	16.87	-	
145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VZH117AG	1500 rpm	70	-	-	-	-	26700	2.03	33600	2.14	41700	2.24	51300	2.26	62400	2.13	-	-	-	-	-
		90	-	-	-	-	23700	2.85	30200	2.81	37800	2.86	46700	2.91	56900	2.90	68600	2.76	80500	2.47	-
		110	-	-	-	-	20300	4.15	26400	3.90	33300	3.81	41300	3.81	50500	3.84	60900	3.82	71500	3.72	-
		130	-	-	-	-	-	-	-	-	27700	5.20	34700	5.08	42600	5.07	51600	5.11	60800	5.12	-
		140	-	-	-	-	-	-	-	-	-	-	30700	5.90	38000	5.84	46200	5.87	54600	5.92	-
	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3600 rpm	70	50800	5.62	54400	5.65	68000	5.75	84600	5.87	104400	6.01	127800	6.18	155000	6.39	-	-	-	-	-
		90	43500	6.92	46900	6.94	59700	7.04	75100	7.15	93300	7.27	114700	7.42	139600	7.60	168500	7.81	198000	8.04	-
		110	-	-	-	-	51800	8.78	65600	8.86	81800	8.96	100900	9.07	123100	9.21	148900	9.38	175300	9.56	-
		130	-	-	-	-	-	-	-	-	69000	11.31	85400	11.38	104500	11.47	126800	11.58	149900	11.71	-
		140	-	-	-	-	-	-	-	-	-	-	76700	12.86	94100	12.91	114600	12.99	135800	13.09	-
	145	-	-	-	-	-	-	-	-	-	-	-	-	82900	14.61	101300	14.65	120600	14.71	-	-
	6000 rpm	70	-	-	-	-	111300	10.40	138400	10.87	170900	11.41	209300	12.05	254300	12.80	-	-	-	-	-
		90	-	-	-	-	99400	12.48	124700	12.83	154700	13.24	190100	13.72	231300	14.30	278900	14.99	327700	15.72	-
		110	-	-	-	-	87400	15.29	110000	15.51	136800	15.78	168200	16.10	204900	16.49	247300	16.97	290800	17.50	-
130		-	-	-	-	-	-	-	-	115900	19.37	142600	19.51	173800	19.70	210200	19.97	247700	20.29	-	
140		-	-	-	-	-	-	-	-	-	-	127900	21.71	156200	21.80	189200	21.95	223500	22.16	-	
145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VZH170AG	1500 rpm	70	-	-	-	-	41100	3.18	51000	3.16	62900	3.11	76900	3.00	93200	2.78	-	-	-	-	-
		90	-	-	-	-	36000	4.22	45300	4.17	56300	4.17	69300	4.17	84400	4.12	101800	3.98	119600	3.74	-
		110	-	-	-	-	30400	5.70	38700	5.51	48600	5.43	60100	5.43	73600	5.44	89200	5.44	105100	5.38	-
		130	-	-	-	-	-	-	-	-	39400	7.18	49300	7.06	60800	7.03	74100	7.04	87900	7.06	-
		140	-	-	-	-	-	-	-	-	-	-	43200	8.10	53500	8.01	65700	7.99	78300	8.01	-
	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3600 rpm	70	77000	7.64	81800	7.70	100500	7.89	123600	8.09	151700	8.26	185300	8.38	224900	8.40	-	-	-	-	-
		90	67000	9.88	71600	9.90	89400	10.00	111000	10.16	136900	10.34	167800	10.51	204200	10.64	246600	10.69	290300	10.65	-
		110	-	-	-	-	78600	12.79	97900	12.83	121000	12.95	148400	13.10	180700	13.26	218400	13.39	257400	13.46	-
		130	-	-	-	-	-	-	-	-	102300	16.26	125400	16.32	152900	16.43	185200	16.57	218800	16.69	-
		140	-	-	-	-	-	-	-	-	-	-	112200	18.23	137000	18.29	166200	18.40	196900	18.51	-
	145	-	-	-	-	-	-	-	-	-	-	-	-	119400	20.35	145500	20.42	173100	20.51	-	-
	6000 rpm	70	-	-	-	-	165700	13.85	205700	14.52	254000	15.28	311200	16.21	378300	17.36	-	-	-	-	-
		90	-	-	-	-	145700	17.27	182800	17.88	227000	18.48	279000	19.13	339800	19.90	410200	20.85	482400	21.91	-
		110	-	-	-	-	128700	21.47	162100	22.12	201500	22.65	247700	23.13	301500	23.62	363800	24.18	427800	24.80	-
130		-	-	-	-	-	-	-	-	173200	28.04	212800	28.45	259000	28.75	312500	29.03	367700	29.30	-	
140		-	-	-	-	-	-	-	-	-	-	192700	31.67	234800	31.92	283600	32.09	334200	32.23	-	
145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

To: Evaporating temperature in °F
Tc: Condensing temperature in °F
Qo: Cooling capacity in Btu

Superheat = 10 K
Subcooling = 0 K
Pe: Power input in kW

Presented data are for models with motor voltage code G

Capacity at ARI rating conditions - High pressure ratio - VZH088AG - VZH117AG - VZH170AG

Models	rpm	To		-13		-10		0		10		20		30		40		50		59			
		Tc		Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe	Qo	Pe		
VZH088AG	1500 rpm	70	-	-	-	-	21300	1.55	26700	1.63	33100	1.70	40700	1.72	49500	1.62	-	-	-	-	-	-	
		90	-	-	-	-	19100	2.17	24300	2.14	30400	2.17	37500	2.21	45700	2.21	55000	2.10	64500	1.88	-	-	
		110	-	-	-	-	16700	3.16	21600	2.97	27200	2.90	33700	2.90	41100	2.92	49600	2.91	58100	2.83	-	-	
		130	-	-	-	-	-	-	-	-	-	23300	3.96	29100	3.87	35700	3.86	43100	3.89	50700	3.90	-	-
		140	-	-	-	-	-	-	-	-	-	-	-	26400	4.49	32500	4.45	39500	4.47	46600	4.50	-	-
		145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3600 rpm	70	40500	4.28	43300	4.30	54200	4.38	67300	4.47	83000	4.58	101400	4.71	123000	4.86	-	-	-	-	-	-	
		90	35100	5.27	37800	5.29	48100	5.36	60400	5.44	75000	5.54	92100	5.65	112000	5.78	135000	5.95	158600	6.12	-	-	
		110	-	-	-	-	42400	6.69	53600	6.75	66800	6.82	82300	6.91	100300	7.01	121200	7.14	142600	7.28	-	-	
		130	-	-	-	-	-	-	-	-	-	58000	8.62	71600	8.67	87500	8.73	106000	8.82	125100	8.91	-	-
		140	-	-	-	-	-	-	-	-	-	-	-	65800	9.79	80700	9.83	97900	9.89	115900	9.96	-	-
		145	-	-	-	-	-	-	-	-	-	-	-	-	-	74000	11.12	90200	11.16	107100	11.20	-	-
	6000 rpm	70	-	-	-	-	88600	7.92	110100	8.27	135800	8.69	166200	9.17	201800	9.75	-	-	-	-	-	-	
		90	-	-	-	-	80100	9.50	100300	9.77	124300	10.08	152600	10.45	185500	10.89	223500	11.41	262400	11.97	-	-	
		110	-	-	-	-	71600	11.64	90000	11.81	111800	12.01	137300	12.26	167000	12.56	201300	12.92	236500	13.33	-	-	
130		-	-	-	-	-	-	-	-	-	97300	14.75	119500	14.85	145500	15.00	175600	15.21	206700	15.45	-	-	
140		-	-	-	-	-	-	-	-	-	-	-	109800	16.53	133800	16.60	161700	16.72	190700	16.87	-	-	
145		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VZH117AG	1500 rpm	70	-	-	-	-	28600	2.03	35800	2.14	44500	2.24	54700	2.26	66500	2.13	-	-	-	-	-	-	
		90	-	-	-	-	25600	2.85	32600	2.81	40800	2.86	50300	2.91	61300	2.90	73800	2.76	86500	2.47	-	-	
		110	-	-	-	-	22400	4.15	29000	3.90	36500	3.81	45300	3.81	55200	3.84	66600	3.82	78000	3.72	-	-	
		130	-	-	-	-	-	-	-	-	-	31300	5.20	39000	5.08	47900	5.07	57900	5.11	68100	5.12	-	-
		140	-	-	-	-	-	-	-	-	-	-	-	35400	5.90	43700	5.84	53000	5.87	62500	5.92	-	-
		145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3600 rpm	70	54300	5.62	58200	5.65	72700	5.75	90300	5.87	111400	6.01	136200	6.18	165100	6.39	-	-	-	-	-	-	
		90	47100	6.92	50700	6.94	64600	7.04	81100	7.15	100600	7.27	123600	7.42	150300	7.60	181200	7.81	212800	8.04	-	-	
		110	-	-	-	-	57000	8.78	72000	8.86	89700	8.96	110500	9.07	134700	9.21	162700	9.38	191400	9.56	-	-	
		130	-	-	-	-	-	-	-	-	-	77800	11.31	96100	11.38	117400	11.47	142300	11.58	167900	11.71	-	-
		140	-	-	-	-	-	-	-	-	-	-	-	88400	12.86	108300	12.91	131500	12.99	155500	13.09	-	-
		145	-	-	-	-	-	-	-	-	-	-	-	-	-	99300	14.61	121000	14.65	143700	14.71	-	-
	6000 rpm	70	-	-	-	-	119000	10.40	147700	10.87	182300	11.41	223100	12.05	270800	12.80	-	-	-	-	-	-	
		90	-	-	-	-	107500	12.48	134600	12.83	166900	13.24	204800	13.72	249000	14.30	300000	14.99	352200	15.72	-	-	
		110	-	-	-	-	96100	15.29	120800	15.51	150000	15.78	184300	16.10	224100	16.49	270200	16.97	317400	17.50	-	-	
130		-	-	-	-	-	-	-	-	-	130700	19.37	160500	19.51	195300	19.70	235800	19.97	277500	20.29	-	-	
140		-	-	-	-	-	-	-	-	-	-	-	147400	21.71	179600	21.80	217100	21.95	256000	22.16	-	-	
145		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
VZH170AG	1500 rpm	70	-	-	-	-	43900	3.18	54500	3.16	67100	3.11	82000	3.00	99300	2.78	-	-	-	-	-	-	
		90	-	-	-	-	38900	4.22	48900	4.17	60800	4.17	74700	4.17	90800	4.12	109500	3.98	128600	3.74	-	-	
		110	-	-	-	-	33400	5.70	42500	5.51	53300	5.43	65900	5.43	80500	5.44	97400	5.44	114700	5.38	-	-	
		130	-	-	-	-	-	-	-	-	-	44500	7.18	55400	7.06	68300	7.03	83100	7.04	98500	7.06	-	-
		140	-	-	-	-	-	-	-	-	-	-	-	49700	8.10	61500	8.01	75400	7.99	89700	8.01	-	-
		145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3600 rpm	70	82400	7.64	87500	7.70	107400	7.89	132000	8.09	161800	8.26	197500	8.38	239500	8.40	-	-	-	-	-	-	
		90	72500	9.88	77500	9.90	96700	10.00	119900	10.16	147700	10.34	180900	10.51	219800	10.64	265200	10.69	312000	10.65	-	-	
		110	-	-	-	-	86400	12.79	107500	12.83	132700	12.95	162500	13.10	197600	13.26	238600	13.39	281000	13.46	-	-	
		130	-	-	-	-	-	-	-	-	-	115300	16.26	141200	16.32	171800	16.43	207700	16.57	245100	16.69	-	-
		140	-	-	-	-	-	-	-	-	-	-	-	129300	18.23	157500	18.29	190800	18.40	225600	18.51	-	-
		145	-	-	-	-	-	-	-	-	-	-	-	-	-	143100	20.35	173800	20.42	206300	20.51	-	-
	6000 rpm	70	-	-	-	-	177000	13.85	219700	14.52	270900	15.28	331700	16.21	402900	17.36	-	-	-	-	-	-	
		90	-	-	-	-	157600	17.27	197500	17.88	244900	18.48	300700	19.13	365800	19.90	441200	20.85	518500	21.91	-	-	
		110	-	-	-	-	141500	21.47	178100	22.12	221000	22.65	271200	23.13	329800	23.62	397400	24.18	466900	24.80	-	-	
130		-	-	-	-	-	-	-	-	-	195300	28.04	239500	28.45	290900	28.75	350500	29.03	411900	29.30	-	-	
140		-	-	-	-	-	-	-	-	-	-	-	222100	31.67	269900	31.92	325500	32.09	382900	32.23	-	-	
145		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

To: Evaporating temperature in °F
Tc: Condensing temperature in °F
Qo: Cooling capacity in Btu

Superheat = 11.1 K
Subcooling = 8.3 K
Pe: Power input in kW

Presented data are for models with motor voltage code G

Capacity at EN12900 rating conditions - High pressure ratio - VZH088AH - VZH117AH - VZH170AH

Models	rpm	To	-13	-10	0	10	20	30	40	50	59
		Tc	Qo	Qo	Qo	Qo	Qo	Qo	Qo	Qo	Qo
VZH088AG	1500 rpm	70	-	-	19900	25000	31100	38200	46500	-	-
		90	-	-	17600	22500	28200	34800	42400	51100	60000
		110	-	-	15200	19600	24800	30800	37600	45400	53300
		130	-	-	-	-	20700	25800	31700	38500	45300
		140	-	-	-	-	-	22900	28300	34400	40600
		145	-	-	-	-	-	-	-	-	-
	3600 rpm	70	37800	40500	50700	63000	77800	95200	115500	-	-
		90	32400	34900	44500	55900	69500	85400	104000	125500	147500
		110	-	-	38600	48800	61000	75200	91700	110900	130600
		130	-	-	-	-	51400	63600	77900	94500	111600
		140	-	-	-	-	-	57100	70100	85400	101100
		145	-	-	-	-	-	-	61700	75500	89800
	6000 rpm	70	-	-	82900	103100	127300	155900	189500	-	-
		90	-	-	74100	92900	115300	141600	172300	207800	244100
		110	-	-	65100	82000	101900	125300	152600	184200	216700
		130	-	-	-	-	86300	106200	129500	156600	184600
		140	-	-	-	-	-	95300	116300	141000	166500
		145	-	-	-	-	-	-	-	-	-
VZH117AG	1500 rpm	70	-	-	26700	33600	41700	51300	62400	-	-
		90	-	-	23700	30200	37800	46700	56900	68600	80500
		110	-	-	20300	26400	33300	41300	50500	60900	71500
		130	-	-	-	-	27700	34700	42600	51600	60800
		140	-	-	-	-	-	30700	38000	46200	54600
		145	-	-	-	-	-	-	-	-	-
	3600 rpm	70	50800	54400	68000	84600	104400	127800	155000	-	-
		90	43500	46900	59700	75100	93300	114700	139600	168500	198000
		110	-	-	51800	65600	81800	100900	123100	148900	175300
		130	-	-	-	-	69000	85400	104500	126800	149900
		140	-	-	-	-	-	76700	94100	114600	135800
		145	-	-	-	-	-	-	82900	101300	120600
	6000 rpm	70	-	-	111300	138400	170900	209300	254300	-	-
		90	-	-	99400	124700	154700	190100	231300	278900	327700
		110	-	-	87400	110000	136800	168200	204900	247300	290800
		130	-	-	-	-	115900	142600	173800	210200	247700
		140	-	-	-	-	-	127900	156200	189200	223500
		145	-	-	-	-	-	-	-	-	-
VZH170AG	1500 rpm	70	-	-	41100	51000	62900	76900	93200	-	-
		90	-	-	36000	45300	56300	69300	84400	101800	119600
		110	-	-	30400	38700	48600	60100	73600	89200	105100
		130	-	-	-	-	39400	49300	60800	74100	87900
		140	-	-	-	-	-	43200	53500	65700	78300
		145	-	-	-	-	-	-	-	-	-
	3600 rpm	70	77000	81800	100500	123600	151700	185300	224900	-	-
		90	67000	71600	89400	111000	136900	167800	204200	246600	290300
		110	-	-	78600	97900	121000	148400	180700	218400	257400
		130	-	-	-	-	102300	125400	152900	185200	218800
		140	-	-	-	-	-	112200	137000	166200	196900
		145	-	-	-	-	-	-	119400	145500	173100
	6000 rpm	70	-	-	165700	205700	254000	311200	378300	-	-
		90	-	-	145700	182800	227000	279000	339800	410200	482400
		110	-	-	128700	162100	201500	247700	301500	363800	427800
		130	-	-	-	-	173200	212800	259000	312500	367700
		140	-	-	-	-	-	192700	234800	283600	334200
		145	-	-	-	-	-	-	-	-	-

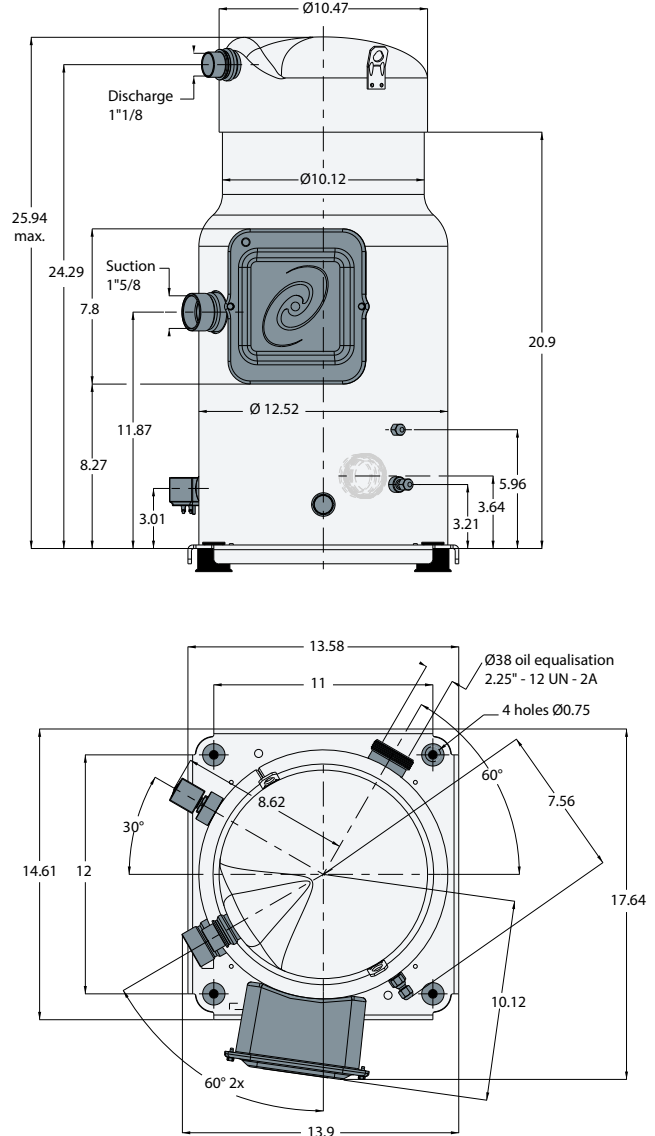
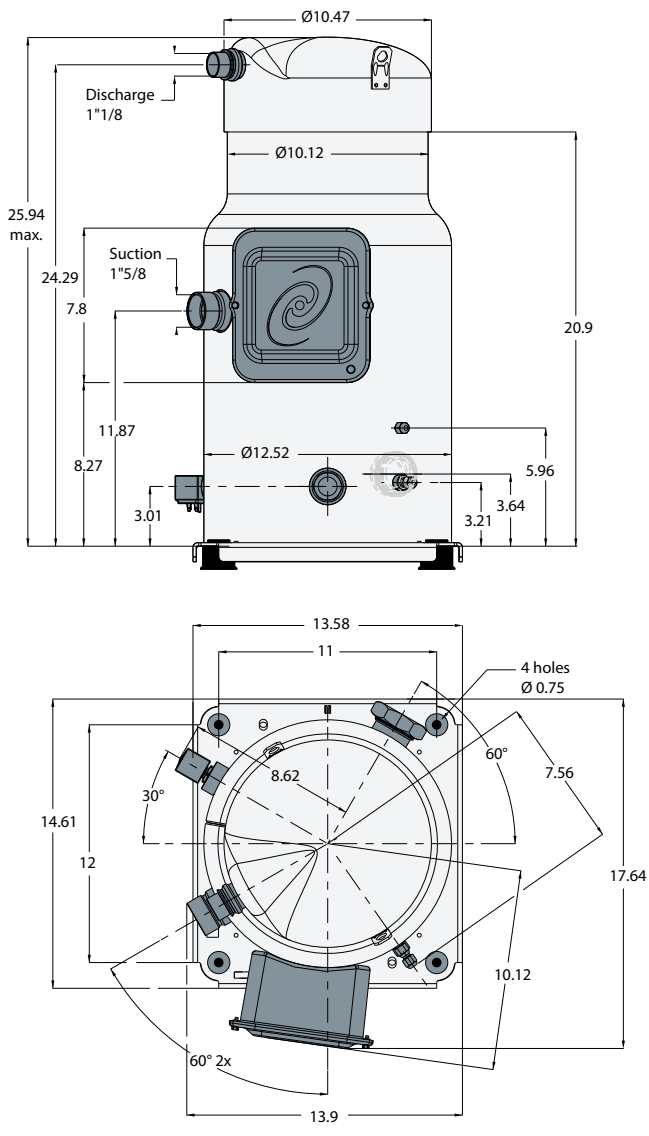
To: Evaporating temperature in °F
Tc: Condensing temperature in °F
Qo: Cooling capacity in Btu

Superheat = 10 K
Subcooling = 0 K
Pe: Power input in kW

Presented data are for models with motor voltage code G

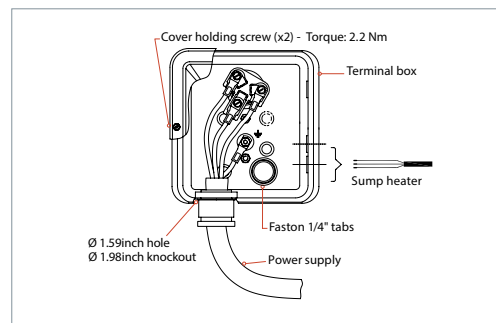
VZH170-G/H single version

VZH170-G/H manifolded version



All dimensions in inch

Electrical box



Grommet

