Copeland Scroll™

ZB Large Refrigeration Scroll Compressor

Product catalogue

COPELAND™

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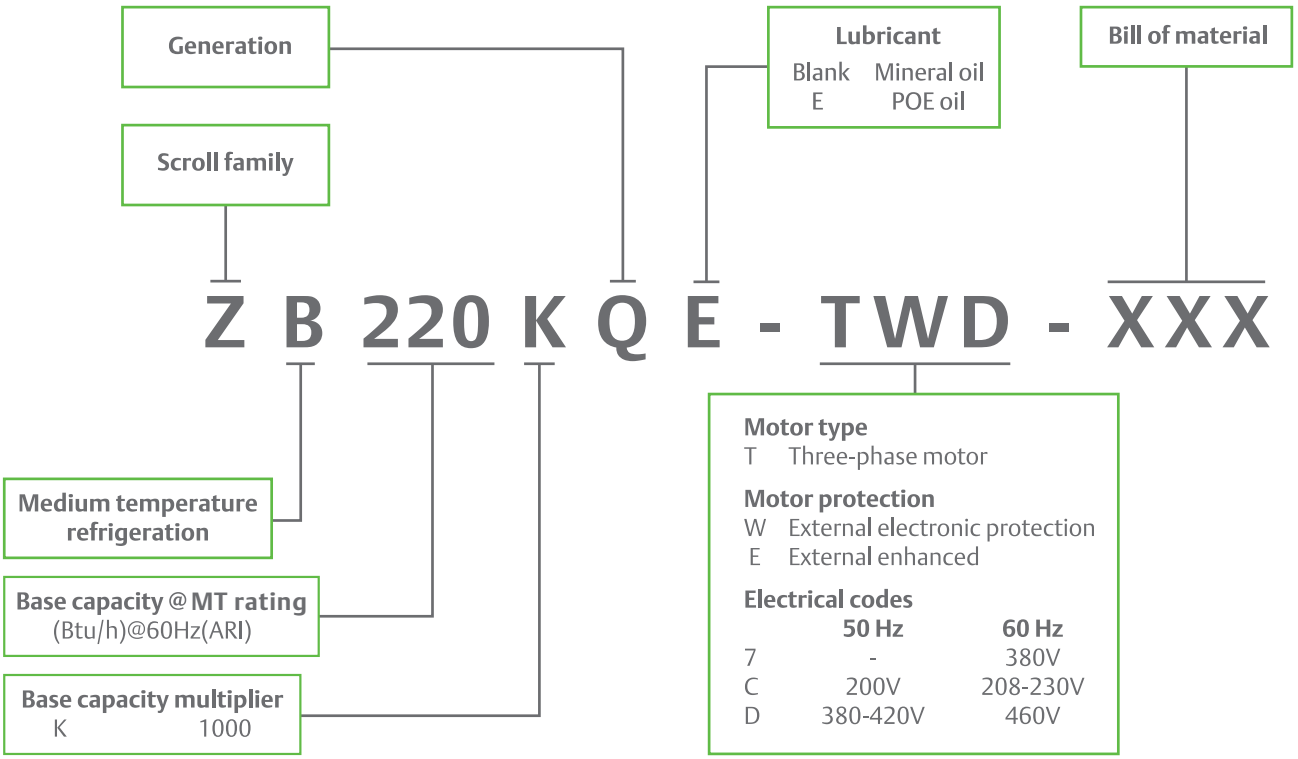
Emerson is the world's leading compressor manufacturer and is committed to maximizing system efficiency and protecting the environment. We offer a wide range of solutions for commercial refrigeration applications. The Copeland Scroll™ ZB Compressor is widely recognized in the refrigeration market for its reliability and low running cost in high and medium temperature applications. The newly released ZB large refrigeration scroll compressor expands the current ZB product line to 30 HP and is optimized for medium temperature applications for best-in-class seasonal energy efficiency. ZB large refrigeration scrolls offer customers an excellent solution to replacing traditional semi-hermetic compressors and lead the transition to scroll technology.

Features and benefits

- Copeland Scroll axial and radial compliance for superior reliability and efficiency
- Wide operating range from -20°C to 10°C covering a minimum condensing limit of 10°C
- Advanced scroll and motor temperature protection through external module for higher reliability
- Qualified for multiple refrigerants including R404A, R22, R134a, R407A/C/F
- Low vibration, reducing refrigerant leaks in the system
- Compact design and lightweight, up to 20% weight reduction compared to equivalent semi-hermetic compressors
- High seasonal efficiency as scrolls and motors are optimized for medium temperature applications, offering the best life cycle cost solution to end users

Nomenclature

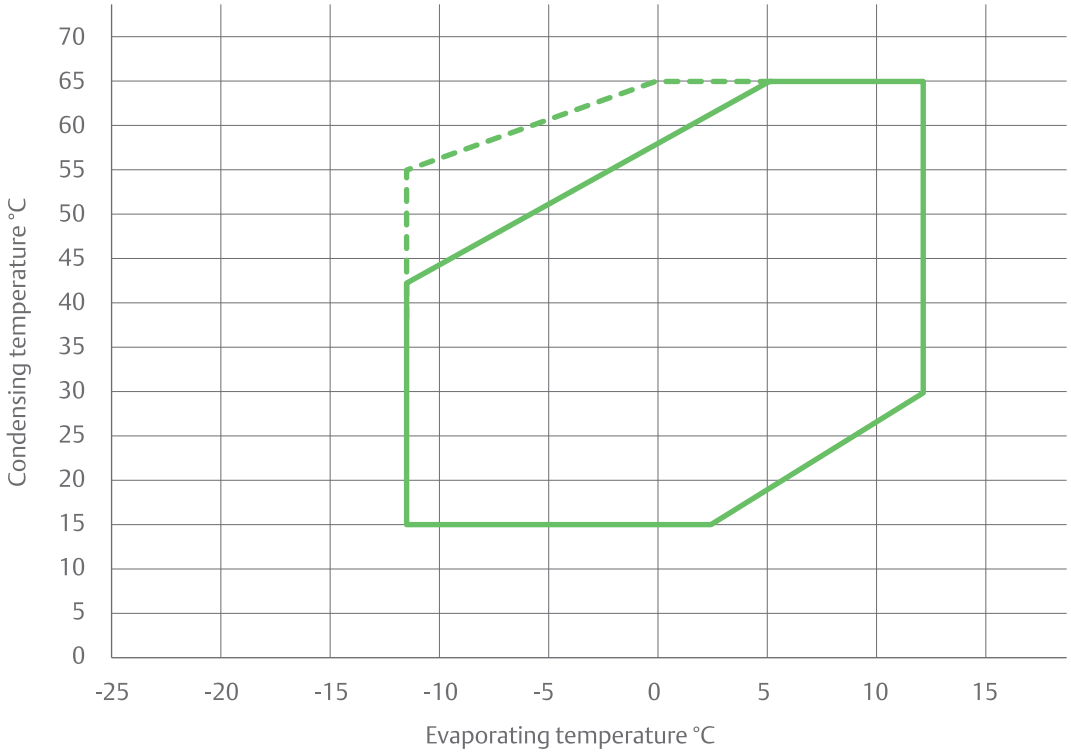


Bill of material

Compressor model	Motor code	BOM number	Stub tube connection	Rotalock connection	Oil sight glass	Schrader valve
ZB130KQ/E	TED, TE7, TEC	550	✓		✓	✓
		551		✓	✓	✓
ZB150KQ/E ZB190KQ/E ZB220KQ/E	TWD,TW7,TWC	522	✓		✓	✓
		523		✓	✓	✓

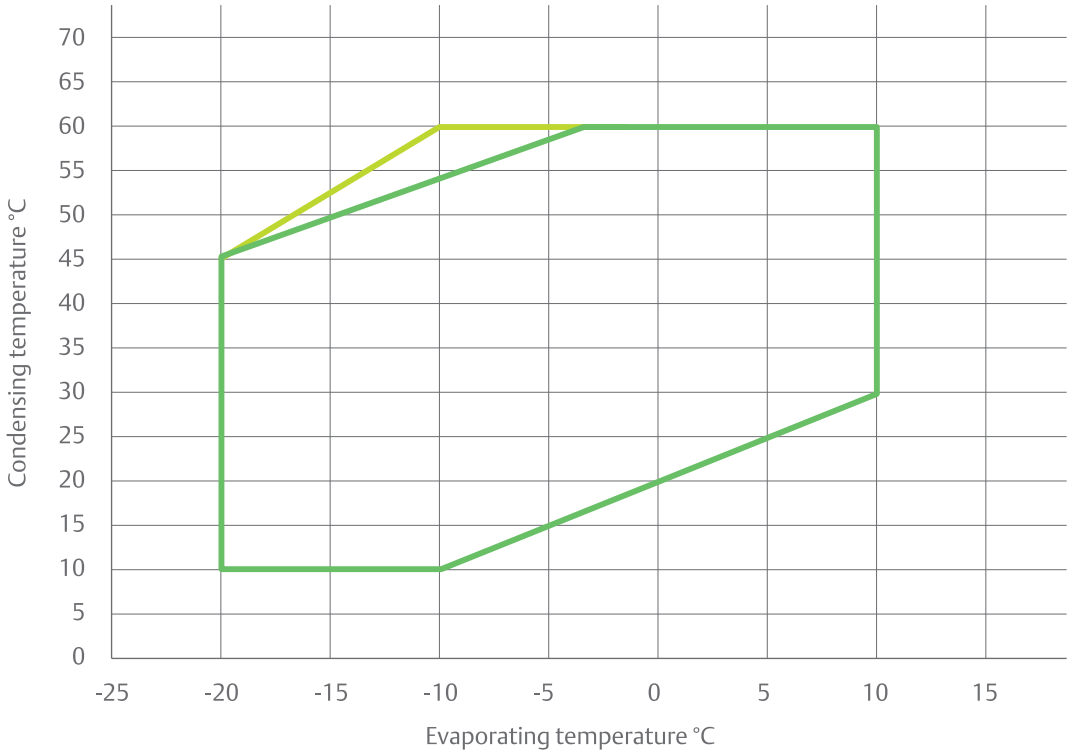
Operating envelope

ZB130 - ZB220KQ **R22**



Notes: 20°C Return gas
11K Suction superheat

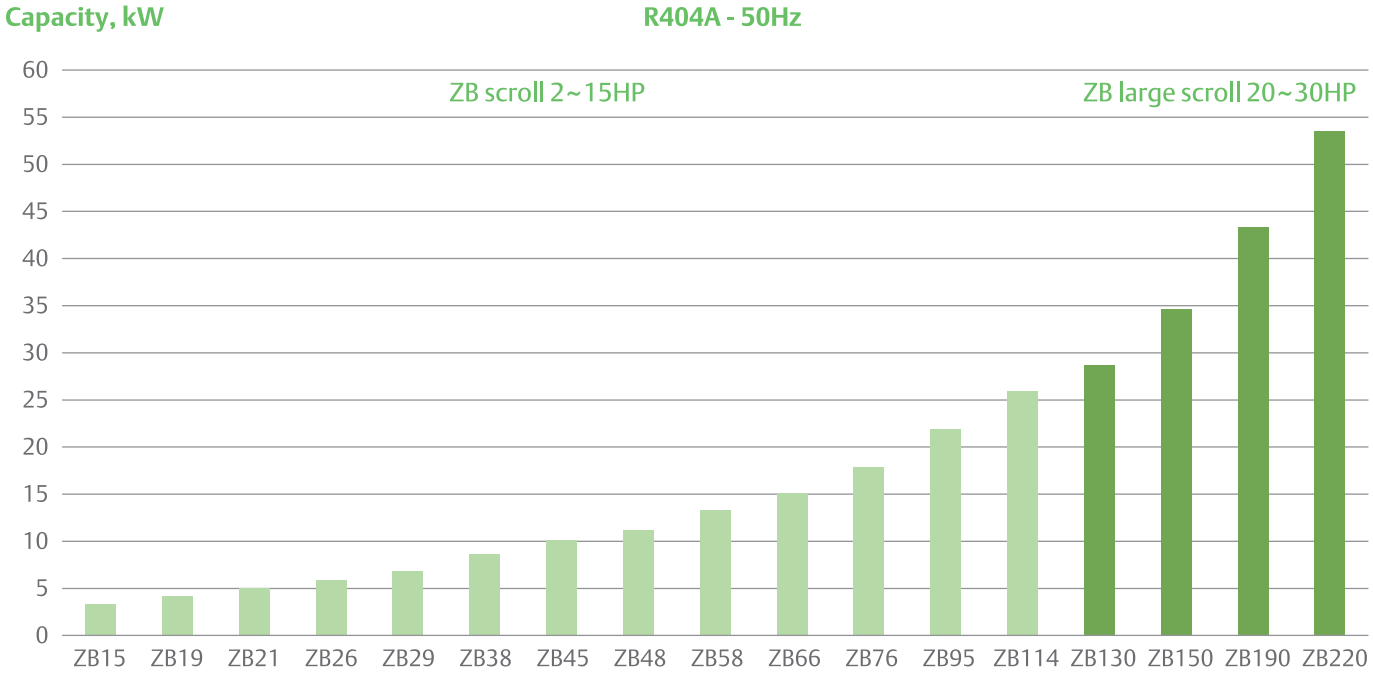
ZB130 - ZB220KQE **R404A**

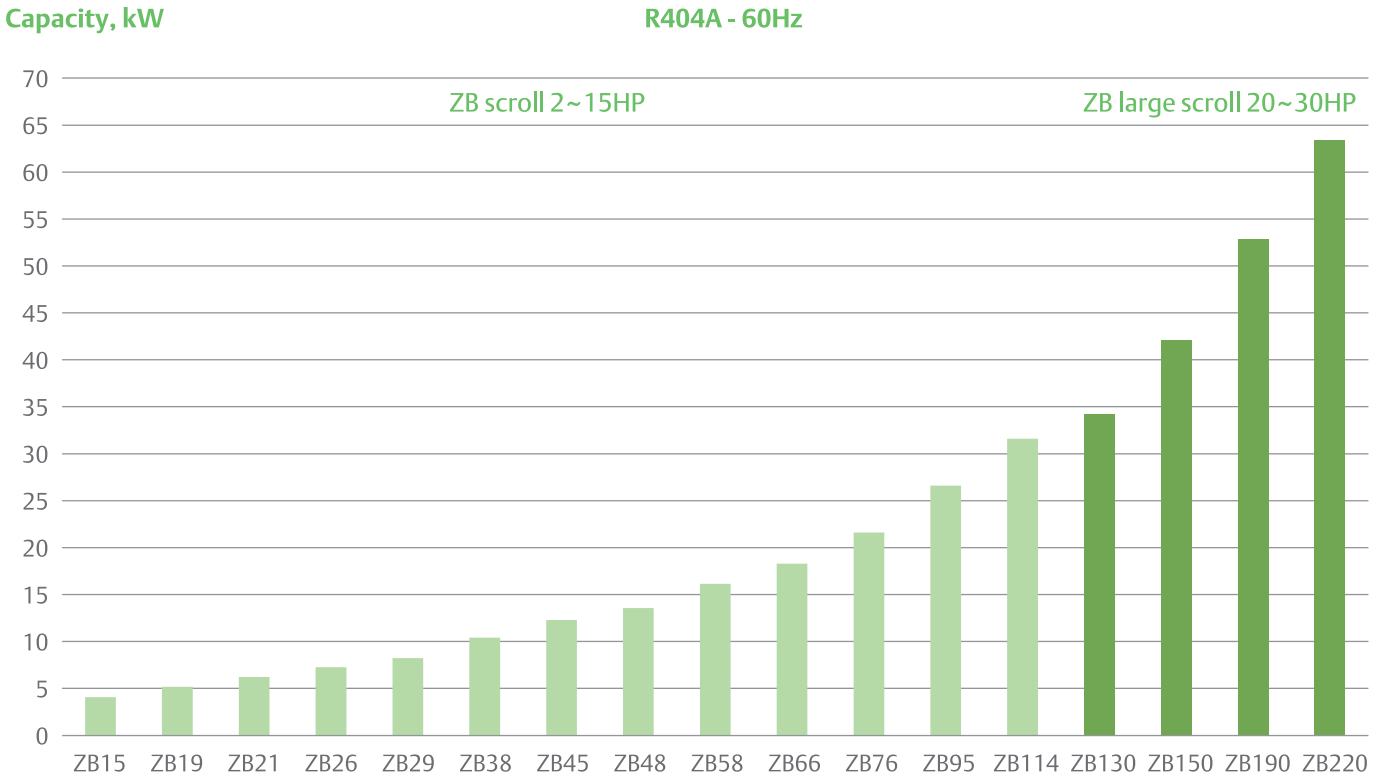


Notes: ZB130KQE, 20°C Return gas
ZB150-220KQE, 20°C Return gas

This catalogue only provides product specification for R22 and R404A, please visit Selection Software Asia for more product information.

Product line-up





Notes: Based on medium temperature cold room conditions: -10°C evaporating, 45°C condensing, 20°C return gas, 0K sub-cooling

Performance table

TED/TWD: 380-420V; 3-Phase, 50Hz

TEC/TWC: 200V; 3-Phase 50Hz

R22

Model			Cond. temp. °C	Evap. temp.°C						
				-12	-10	-5	0	5	10	12
ZB130KQ	TED TEC	Q	65				28.73	36.02	43.47	46.60
			60			25.40	32.26	39.70	47.47	50.75
			55	19.31	21.84	28.38	35.50	42.96	51.07	54.51
			50	21.89	24.40	31.10	38.16	45.88	54.34	57.95
			45	24.11	26.61	33.29	40.53	48.53	57.35	61.14
			40	26.06	28.54	35.24	42.68	50.97	60.17	64.14
			35	27.69	30.20	37.02	44.68	53.27	62.87	67.02
			30	29.21	31.75	38.70	46.59	55.50	65.51	69.85
			25	30.68	33.25	40.36	48.49	57.73		
			20	32.16	34.78	42.05	50.44	60.03		
			15	33.74	36.40	43.85	52.51			
		P	65				17.32	17.49	17.65	17.71
			60			15.46	15.64	15.81	15.97	16.03
			55	13.72	13.79	13.96	14.13	14.31	14.47	14.54
			50	12.39	12.46	12.62	12.79	12.97	13.14	13.21
			45	11.20	11.26	11.42	11.59	11.77	11.95	12.03
			40	10.13	10.19	10.34	10.50	10.69	10.89	10.97
			35	9.15	9.20	9.35	9.52	9.71	9.92	10.01
			30	8.24	8.29	8.43	8.60	8.80	9.03	9.13
			25	7.39	7.43	7.57	7.75	7.96		
			20	6.57	6.61	6.75	6.93	7.14		
			15	5.75	5.79	5.93	6.12			
ZB150KQ	TWD TWC	Q	65				34.71	43.60	52.89	56.91
			60			30.65	38.68	47.50	57.00	61.13
			55	23.69	26.62	34.09	42.25	50.91	60.69	64.98
			50	26.80	29.63	37.16	45.06	53.94	64.10	68.58
			45	29.33	32.10	39.49	47.56	56.75	67.36	72.07
			40	31.48	34.21	41.55	49.86	59.45	70.62	75.59
			35	33.19	35.95	43.47	52.12	62.19	73.99	79.26
			30	34.77	37.59	45.39	54.46	65.10	77.62	83.22
			25	36.35	39.28	47.43	57.01	68.31		
			20	38.08	41.14	49.74	59.91	71.96		
			15	40.08	43.31	52.44	63.30			
		P	65				22.23	22.31	22.37	22.40
			60			19.76	19.85	19.94	20.03	20.07
			55	17.52	17.57	17.68	17.79	17.90	18.01	18.06
			50	15.71	15.76	15.88	16.00	16.13	16.27	16.33
			45	14.13	14.18	14.31	14.45	14.60	14.76	14.84
			40	12.74	12.79	12.93	13.09	13.26	13.45	13.54
			35	11.49	11.55	11.70	11.88	12.08	12.30	12.39
			30	10.36	10.42	10.59	10.78	11.00	11.25	11.36
			25	9.29	9.35	9.54	9.75	10.00		
			20	8.24	8.31	8.51	8.75	9.02		
			15	7.18	7.25	7.47	7.73			

Notes:

1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K
3. Max suction superheat is 11K

Performance table

TED/TWD: 380-420V; 3-Phase, 50Hz
TEC/TWC: 200V; 3-Phase 50Hz

R22

Model			Cond. temp. °C	Evap. temp.°C						
				-12	-10	-5	0	5	10	12
ZB190KQ	TWD TWC	Q	65				43.69	54.11	65.61	70.70
			60			38.50	47.72	58.61	70.75	76.10
			55	30.51	33.52	41.88	51.87	62.91	75.65	81.25
			50	33.19	36.35	45.42	55.43	67.00	80.28	86.11
			45	35.76	39.07	48.35	58.80	70.84	84.63	90.67
			40	38.34	41.73	51.11	61.96	74.42	88.68	94.92
			35	40.48	43.98	53.68	64.88	77.72	92.40	98.81
			30	42.48	46.07	56.04	67.54	80.73	95.78	102.35
			25	44.30	47.97	58.17	69.92	83.41		
			20	45.93	49.67	60.04	72.01	85.75		
			15	47.35	51.13	61.64	73.79			
		P	65				27.62	27.66	27.84	27.96
			60			24.81	24.77	24.86	25.09	25.23
			55	22.36	22.30	22.20	22.20	22.33	22.62	22.79
			50	19.97	19.92	19.85	19.89	20.08	20.44	20.64
			45	17.81	17.77	17.74	17.83	18.08	18.52	18.75
			40	15.86	15.83	15.85	16.01	16.33	16.85	17.12
			35	14.11	14.11	14.19	14.41	14.82	15.43	15.74
			30	12.56	12.58	12.72	13.02	13.52	14.23	14.58
			25	11.18	11.23	11.45	11.83	12.43		
			20	9.97	10.05	10.35	10.83	11.53		
			15	8.92	9.02	9.41	10.00			
ZB220KQ	TWD TWC	Q	65				55.41	68.29	81.73	87.50
			60			48.75	60.55	73.60	87.52	93.54
			55	37.94	42.21	53.30	65.55	78.51	92.96	99.22
			50	42.05	46.28	57.69	69.70	83.06	98.06	104.58
			45	45.67	49.89	61.20	73.50	87.29	102.87	109.67
			40	48.92	53.11	64.36	76.96	91.22	107.41	114.50
			35	51.53	55.75	67.19	80.13	94.88	111.72	119.11
			30	53.80	58.06	69.72	83.04	98.32	115.84	123.54
			25	55.76	60.09	72.00	85.73	101.56		
			20	57.46	61.85	74.05	88.21	104.64		
			15	58.91	63.39	75.90	90.54			
		P	65				32.42	32.94	33.46	33.68
			60			28.94	29.39	29.84	30.32	30.53
			55	25.63	25.81	26.22	26.61	27.01	27.48	27.69
			50	23.25	23.39	23.73	24.07	24.45	24.93	25.15
			45	21.04	21.16	21.44	21.76	22.15	22.66	22.90
			40	19.00	19.10	19.36	19.68	20.10	20.67	20.94
			35	17.13	17.22	17.48	17.83	18.31	18.95	19.27
			30	15.42	15.52	15.80	16.20	16.76	17.51	17.88
			25	13.87	13.98	14.31	14.79	15.45		
			20	12.48	12.60	13.01	13.59	14.37		
			15	11.23	11.38	11.89	12.59			

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K
3. Max suction superheat is 11K

Performance table

TED/TWD: 460V; 3-Phase, 60Hz
TEC/TWC: 208-230V; 3-Phase, 60Hz
TE7/TW7: 380V; 3 Phase 60Hz

R22

Model			Cond. temp. °C	Evap. temp.°C						
				-12	-10	-5	0	5	10	12
ZB130KQ	TED TEC TE7	Q	65				34.20	43.29	52.23	55.99
			60			30.07	38.47	47.69	57.02	60.96
			55	22.59	25.68	33.68	42.65	51.60	61.34	65.47
			50	25.72	28.79	37.37	45.84	55.10	65.26	69.60
			45	28.43	31.49	39.98	48.68	58.27	68.87	73.41
			40	31.31	34.29	42.32	51.25	61.20	72.25	77.01
			35	33.27	36.28	44.46	53.65	63.96	75.49	80.47
			30	35.08	38.13	46.48	55.94	66.64	78.66	83.86
			25	36.84	39.93	48.46	58.22	69.32		
			20	38.62	41.76	50.49	60.56	72.07		
			15	40.51	43.70	52.65	63.05			
		P	65				20.78	20.99	21.18	21.25
			60			18.55	18.76	18.97	19.16	19.24
			55	16.46	16.54	16.75	16.96	17.17	17.37	17.45
			50	14.87	14.95	15.14	15.35	15.56	15.77	15.86
			45	13.44	13.52	13.70	13.91	14.12	14.34	14.44
			40	12.16	12.22	12.40	12.60.	12.83	13.06	13.17
			35	10.98	11.04	11.22	11.42	11.65	11.90	12.01
			30	9.89	9.95	10.12	10.33	10.56	10.83	10.95
			25	8.87	8.92	9.09	9.30	9.55		
			20	7.88	7.93	8.10	8.31	8.57		
			15	6.90	6.95	7.12	7.34			
ZB150KQ	TWD TWC TW7	Q	65				44.61	54.69	65.62	70.44
			60			39.19	48.29	58.65	70.13	75.21
			55	30.66	33.90	42.36	51.92	62.38	74.44	79.79
			50	33.46	36.69	45.49	55.00	65.91	78.58	84.22
			45	35.99	39.24	48.06	57.91	69.30	82.60	88.54
			40	38.35	41.60	50.47	60.68	72.59	86.55	92.80
			35	40.36	43.67	52.78	63.37	75.82	90.48	97.04
			30	42.26	45.63	55.01	66.02	79.04	94.42	101.32
			25	44.10	47.54	57.21	68.68	82.29		
			20	45.91	49.45	59.44	71.38	85.62		
			15	47.76	51.39	61.73	74.17			
		P	65				26.46	26.60	26.91	27.07
			60			23.82	23.80	24.02	24.36	24.51
			55	21.80	21.62	21.43	21.52	21.80	22.16	22.30
			50	19.55	19.43	19.38	19.56	19.88	20.24	20.37
			45	17.58	17.53	17.59	17.84	18.19	18.54	18.65
			40	15.85	15.85	16.01	16.32	16.68	16.99	17.08
			35	14.27	14.31	14.56	14.91	15.27	15.53	15.59
			30	12.78	12.87	13.19	13.56	13.89	14.09	14.11
			25	11.33	11.45	11.82	12.20	12.50		
			20	9.84	9.98	10.39	10.76	11.00		
			15	8.24	8.41	8.83	9.18			

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K
3. Max suction superheat is 11K

Performance table

TED/TWD: 460V; 3-Phase, 60Hz
TEC/TWC: 208-230V; 3-Phase, 60Hz
TE7/TW7: 380V; 3-Phase 60Hz

R22

Model			Cond. temp. °C	Evap. temp.°C						
				-12	-10	-5	0	5	10	12
ZB190KQ	TWD TWC TW7	Q	65				47.95	63.58	78.38	84.44
			60			42.09	56.26	71.59	86.60	92.81
			55	31.00	35.91	48.87	63.58	77.95	93.27	99.65
			50	36.79	41.48	55.12	68.45	83.00	98.72	105.33
			45	41.19	45.71	58.88	72.27	87.09	103.30	110.17
			40	45.70	49.96	61.82	75.37	90.56	107.36	114.51
			35	48.19	52.41	64.30	78.09	93.75	111.22	118.70
			30	50.43	54.63	66.64	80.78	96.99	115.22	123.07
			25	52.74	56.97	69.20	83.76	100.62		
			20	55.47	59.76	72.30	87.39	104.99		
			15	58.96	63.35	76.30	92.00			
		P	65				32.73	33.11	33.58	33.81
			60			29.53	29.74	30.05	30.49	30.71
			55	26.66	26.68	26.76	26.92	27.20	27.64	27.87
			50	24.11	24.10	24.14	24.30	24.60	25.08	25.34
			45	21.69	21.68	21.73	21.91	22.27	22.84	23.14
			40	19.45	19.45	19.54	19.80	20.26	20.96	21.32
			35	17.42	17.45	17.63	18.01	18.61	19.48	19.91
			30	15.64	15.71	16.03	16.56	17.35	18.42	18.94
			25	14.15	14.28	14.77	15.50	16.51		
			20	12.98	13.19	13.89	14.86	16.14		
			15	12.17	12.47	13.43	14.68			
ZB220KQ	TWD TWC TW7	Q	65				66.62	83.04	99.69	106.96
			60			57.91	72.80	89.26	106.41	113.97
			55	43.17	49.07	63.52	79.30	94.95	112.70	120.57
			50	48.58	54.29	69.64	84.15	100.22	118.65	126.87
			45	53.32	58.89	73.86	88.60	105.17	124.38	132.99
			40	58.61	63.93	77.69	92.74	109.90	129.98	139.01
			35	62.05	67.35	81.24	96.69	114.53	135.56	145.05
			30	65.18	70.49	84.60	100.55	119.16	141.23	151.21
			25	68.12	73.47	87.89	104.42	123.89		
			20	70.95	76.39	91.21	108.42	128.82		
			15	73.80	79.36	94.66	112.62			
		P	65				40.08	40.12	40.33	40.34
			60			36.24	35.98	36.30	36.64	36.65
			55	34.02	33.27	32.39	32.51	33.03	33.42	33.40
			50	30.07	29.55	29.14	29.55	30.21	30.55	30.48
			45	26.71	26.39	26.36	26.99	27.70	27.93	27.76
			40	23.84	23.68	23.96	24.72	25.40	25.43	25.13
			35	21.33	21.31	21.80	22.62	23.19	22.94	22.48
			30	19.07	19.15	19.79	20.58	20.95	20.34	19.70
			25	16.94	17.10	17.79	18.48	18.58		
			20	14.84	15.00	15.71	16.21	15.95		
			15	12.64	12.84	13.42	13.65			

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K
3. ▭ Max suction superheat is 11K

Performance table

TED/TWD: 380-420V; 3-Phase, 50Hz
TEC/TWC: 200V; 3-Phase 50Hz

R404A

Model			Cond. temp. °C	Evap. temp.°C						
				-20	-15	-10	-5	0	5	10
ZB130KQE	TED TEC	Q	60			20.92	25.32	30.18	35.60	41.73
			55			23.76	28.61	34.01	40.09	46.97
			50		21.57	26.32	31.61	37.56	44.28	51.91
			45	19.01	23.58	28.66	34.38	40.87	48.23	56.60
			40	20.64	25.42	30.83	36.98	44.00	52.00	61.11
			35	22.17	27.17	32.89	39.47	47.01	55.64	65.48
			30	23.66	28.87	34.90	41.90	49.96	59.22	69.79
			25	25.17	30.58	36.93	44.33	52.91	62.79	
			20	26.76	32.36	39.01	46.82	55.91		
			15	28.48	34.28	41.22	49.43			
			10	30.40	36.38	43.62				
		P	60			17.48	17.55	17.62	17.66	17.67
			55			15.69	15.79	15.88	15.96	15.99
			50		14.00	14.12	14.24	14.35	14.45	14.50
			45	12.49	12.60	12.73	12.87	13.00	13.10	13.17
			40	11.24	11.36	11.50	11.65	11.79	11.90	11.97
			35	10.12	10.25	10.40	10.55	10.69	10.80	10.87
			30	9.12	9.24	9.38	9.53	9.67	9.78	9.84
			25	8.19	8.30	8.44	8.58	8.70	8.80	
			20	7.30	7.40	7.52	7.64	7.75		
			15	6.43	6.51	6.61	6.71			
			10	5.54	5.59	5.66				
ZB150KQE	TWD TWC	Q	60					36.79	43.62	51.54
			55				34.50	41.04	48.61	57.34
			50			31.77	37.99	45.20	53.51	63.02
			45	23.71	28.74	34.60	41.42	49.28	58.30	68.57
			40	25.52	31.00	37.39	44.78	53.27	62.98	74.00
			35	27.31	33.23	40.11	48.06	57.17	67.54	79.29
			30	29.08	35.42	42.78	51.25	60.96	71.98	84.43
			25	30.83	37.56	45.37	54.36	64.63	76.29	
			20	32.54	39.65	47.89	57.37	68.20		
			15	34.21	41.67	50.33	60.28			
			10	35.84	43.63	52.68				
		P	60					22.72	22.90	23.11
			55				20.26	20.42	20.61	20.87
			50			18.06	18.22	18.38	18.60	18.96
			45	15.86	16.11	16.26	16.40	16.59	16.89	17.36
			40	14.36	14.53	14.65	14.81	15.05	15.46	16.09
			35	12.98	13.10	13.23	13.43	13.77	14.32	15.13
			30	11.72	11.83	11.99	12.27	12.74	13.45	14.48
			25	10.57	10.70	10.93	11.33	11.95	12.87	
			20	9.54	9.73	10.06	10.60	11.41		
			15	8.63	8.90	9.36	10.08			
			10	7.82	8.21	8.84				

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K

Performance table

TED/TWD: 380-420V; 3-Phase, 50Hz
TEC/TWC: 200V; 3-Phase, 50Hz

R404A

Model			Cond. temp. °C	Evap. temp.°C						
				-20	-15	-10	-5	0	5	10
ZB190KQE	TWD TWC	Q	60					46.06	54.61	64.53
			55				43.19	51.37	60.86	71.78
			50			39.78	47.56	56.59	66.99	78.89
			45	29.68	35.98	43.32	51.85	61.70	72.99	85.85
			40	31.95	38.81	46.81	56.06	66.70	78.85	92.64
			35	34.19	41.60	50.22	60.16	71.57	84.56	99.26
			30	36.41	44.34	53.55	64.17	76.31	90.11	105.70
			25	38.59	47.02	56.80	68.06	80.92	95.51	
			20	40.74	49.63	59.96	71.83	85.38		
			15	42.83	52.17	63.01	75.47			
			10	44.86	54.62	65.95				
		P	60					28.57	28.79	29.06
			55				25.48	25.68	25.91	26.25
			50			22.72	22.91	23.11	23.39	23.84
			45	19.95	20.25	20.45	20.63	20.86	21.24	21.84
			40	18.06	18.27	18.43	18.62	18.93	19.44	20.23
			35	16.32	16.48	16.64	16.89	17.32	18.00	19.02
			30	14.74	14.87	15.08	15.43	16.02	16.92	18.21
			25	13.29	13.46	13.75	14.25	15.03	16.19	
			20	12.00	12.23	12.65	13.33	14.35		
			15	10.85	11.19	11.77	12.67			
			10	9.84	10.33	11.12				
ZB220KQE	TWD TWC	Q	60					56.87	67.42	79.66
			55				53.32	63.42	75.13	88.62
			50			49.11	58.72	69.86	82.70	97.40
			45	36.64	44.41	53.48	64.02	76.17	90.11	105.99
			40	39.44	47.91	57.78	69.21	82.34	97.34	114.37
			35	42.21	51.36	62.00	74.28	88.36	104.39	122.54
			30	44.95	54.74	66.11	79.22	94.21	111.25	130.49
			25	47.64	58.05	70.13	84.02	99.90	117.91	
			20	50.29	61.28	74.02	88.68	105.40		
			15	52.87	64.41	77.79	93.17			
			10	55.39	67.43	81.42				
		P	60					34.43	34.69	35.02
			55				30.70	30.94	31.22	31.63
			50			27.37	27.61	27.85	28.19	28.73
			45	24.04	24.40	24.64	24.85	25.14	25.59	26.31
			40	21.76	22.01	22.20	22.44	22.81	23.42	24.37
			35	19.67	19.85	20.04	20.35	20.87	21.69	22.92
			30	17.75	17.92	18.17	18.59	19.30	20.38	21.94
			25	16.02	16.22	16.56	17.16	18.11	19.50	
			20	14.46	14.74	15.24	16.06	17.29		
			15	13.07	13.48	14.18	15.27			
			10	11.85	12.44	13.39				

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K

Performance table

TED/TWD: 460V; 3-Phase, 60Hz
TEC/TWC: 208-230V; 3-Phase, 60Hz
TE7/TW7: 380V; 3-Phase, 60Hz

R404A

Model			Cond. temp. °C	Evap. temp.°C						
				-20	-15	-10	-5	0	5	10
ZB130KQE	TED TEC TE7	Q	60			25.13	30.43	36.25	42.76	50.10
			55			28.58	34.41	40.88	48.17	56.42
			50		25.94	31.66	38.01	45.14	53.20	62.35
			45	22.84	28.35	34.46	41.33	49.10	57.93	67.98
			40	24.79	30.55	37.05	44.43	52.84	62.44	73.38
			35	26.61	32.63	39.51	47.39	56.45	66.81	78.64
			30	28.40	34.67	41.92	50.31	59.99	71.11	83.83
			25	30.23	36.74	44.36	53.25	63.56	75.43	
			20	32.18	38.92	46.91	56.29	67.22		
			15	34.32	41.30	49.65	59.52			
			10	36.74	43.95	52.65				
		P	60			20.96	21.12	21.19	21.19	21.14
			55			19.03	19.17	19.25	19.27	19.25
			50		16.98	17.20	17.34	17.42	17.47	17.49
			45	15.00	15.28	15.49	15.63	15.73	15.80	15.86
			40	13.47	13.73	13.92	14.06	14.17	14.28	14.38
			35	12.09	12.32	12.50	12.65	12.78	12.92	13.07
			30	10.87	11.08	11.26	11.41	11.58	11.74	11.95
			25	9.83	10.02	10.20	10.37	10.55	10.76	
			20	8.99	9.17	9.34	9.53	9.74		
			15	8.35	8.53	8.71	8.91			
			10	7.95	8.12	8.30				
ZB150KQE	TWD TWC TW7	Q	60					46.34	53.85	62.91
			55				43.27	50.64	59.46	69.84
			50			39.53	46.71	55.23	65.22	76.79
			45	29.50	35.32	42.25	50.43	59.97	71.00	83.63
			40	30.85	37.47	45.25	54.28	64.71	76.65	90.22
			35	32.59	39.90	48.38	58.15	69.33	82.06	96.43
			30	34.60	42.45	51.51	61.88	73.70	87.07	102.12
			25	36.73	45.01	54.51	65.36	77.67	91.57	
			20	38.86	47.43	57.25	68.44	81.12		
			15	40.86	49.58	59.59	70.99			
			10	42.58	51.34	61.40				
		P	60					26.13	27.10	28.13
			55				23.81	24.50	25.12	25.97
			50			21.67	22.24	22.58	23.00	23.84
			45	18.33	19.61	20.20	20.40	20.53	20.92	21.89
			40	17.54	18.27	18.47	18.45	18.54	19.06	20.31
			35	16.35	16.69	16.66	16.59	16.79	17.58	19.28
			30	14.95	15.05	14.95	14.97	15.44	16.66	18.97
			25	13.51	13.53	13.51	13.79	14.67	16.49	
			20	12.21	12.29	12.52	13.20	14.66		
			15	11.21	11.52	12.15	13.39			
			10	10.70	11.40	12.57				

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K

Performance table

TED/TWD: 460V; 3-Phase, 60Hz
TEC/TWC: 208-230V; 3-Phase, 60Hz
TE7/TW7: 380V; 3-Phase 60Hz

R404A

Model			Cond. temp. °C	Evap. temp.°C						
				-20	-15	-10	-5	0	5	10
ZB190KQE	TWD TWC TW7	Q	60					56.58	66.65	77.39
			55				52.63	62.45	73.79	86.01
			50			49.09	57.60	68.47	81.06	94.72
			45	44.93	47.17	53.29	62.62	74.52	88.33	103.39
			40	48.07	50.71	57.44	67.57	80.45	95.44	111.89
			35	51.09	54.11	61.40	72.30	86.14	102.29	120.08
			30	53.86	57.22	65.05	76.68	91.45	108.72	127.83
			25	56.25	59.92	68.26	80.59	96.26	114.61	
			20	58.12	62.08	70.89	83.89	100.42		
			15	59.34	63.55	72.81	86.45			
			10	59.79	64.22	73.90				
		P	60					31.21	32.52	35.08
			55				29.24	29.99	31.29	33.84
			50			26.96	27.69	28.27	29.41	31.80
			45	21.28	24.10	25.36	25.77	26.03	26.85	28.94
			40	20.40	22.72	23.50	23.43	23.23	23.59	25.23
			35	19.53	21.22	21.36	20.67	19.85	19.61	20.65
			30	18.64	19.55	18.92	17.46	15.88	14.88	15.17
			25	17.73	17.70	16.14	13.77	11.27	9.37	
			20	16.75	15.65	13.02	9.57	6.02		
			15	15.70	13.36	9.51	4.85			
			10	14.53	10.81	5.59				
ZB220KQE	TWD TWC TW7	Q	60					71.51	82.45	95.71
			55				66.37	77.33	90.66	106.20
			50			60.25	70.95	84.07	99.45	116.93
			45	46.20	53.72	63.87	76.50	91.44	108.53	127.63
			40	47.34	56.66	68.51	82.72	99.14	117.62	137.98
			35	49.89	60.66	73.86	89.33	106.90	126.41	147.71
			30	53.54	65.44	79.65	96.03	114.41	134.63	156.54
			25	58.01	70.69	85.58	102.54	121.40	141.99	
			20	63.01	76.14	91.38	108.58	127.57		
			15	68.26	81.49	96.74	113.84			
			10	73.47	86.47	101.39				
		P	60					38.87	40.52	42..04
			55				35.18	36.41	37.42	38.49
			50			32.11	33.05	33.70	34.32	35.17
			45	27.99	29.39	30.18	30.60	30.92	31.39	32.26
			40	26.74	27.51	27.85	28.00	28.23	28.78	29.93
			35	24.78	25.16	25.29	25.42	25.80	26.69	28.34
			30	22.27	22.52	22.68	23.02	23.80	25.26	27.68
			25	19.40	19.73	20.18	20.99	22.40	24.69	
			20	16.33	17.01	17.97	19.48	21.77		
			15	13.22	14.49	16.22	18.67			
			10	10.26	12.35	15.09				

Notes:
1. Q for capacity; P for power. Units in kW
2. All ZB values are rated at return gas temperature: 20°C and subcooling: 0 K

Technical data

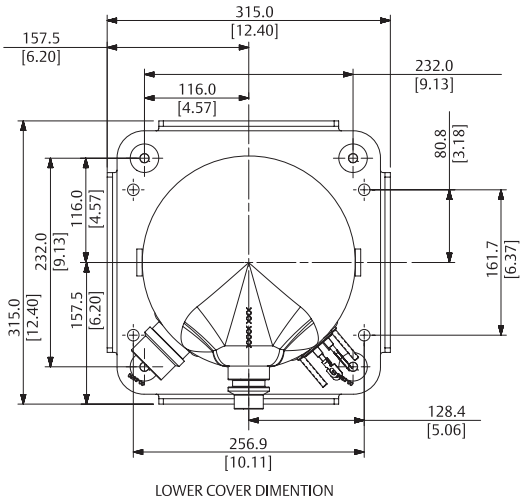
Compressor model				ZB large refrigeration scroll							
				ZB130KQ	ZB130KQE	ZB150KQ	ZB150KQE	ZB190KQ	ZB190KQE	ZB220KQ	ZB220KQE
Nominal horsepower		HP		20		22		25		30	
Displacement	50Hz	m^3/hr		45.7		56.6		71.4		87.5	
	60Hz	m^3/hr		55.2		68.3		86.2		105.5	
Motor type	50Hz	380-420V-3ph		TED	TED	TWD	TWD	TWD	TWD	TWD	TWD
		200V-3ph		TEC	TEC	TWC	TWC	TWC	TWC	TWC	TWC
	60Hz	460V-3ph		TED	TED	TWD	TWD	TWD	TWD	TWD	TWD
		208-230V-3ph		TEC	TEC	TWC	TWC	TWC	TWC	TWC	TWC
		380V-3ph		TE7	TE7	TW7	TW7	TW7	TW7	TW7	TW7
Refrigerant				R22	R404A	R22	R404A	R22	R404A	R22	R404A
Locked rotor current (LRA)	50Hz	T*D	Amps	288		225		272		310	
		T*C		*		505		610		599	
	60Hz	T*D	Amps	281		225		272		310	
		T*C		*		505		610		599	
		T*7		*		290		353		358	
Maximum operating current (MOC)	50Hz	T*D	Amps	33.3	33.1	38.0	38.3	48.3	49.1	58.9	60.0
		T*C		*	*	84.8	85.4	107.7	109.5	131.4	153.9
	60Hz	T*D	Amps	34.2	32.4	39.0	41.0	50.0	50.8	60.3	70.6
		T*C		*	*	87.0	91.5	111.5	113.4	122.0	142.9
		T*7		*	*	48.0	50.5	63.0	64.0	72.3	84.7
Maximum continuous current (MCC)	50Hz	T*D	Amps	52.3	59.6	47.0	44.0	58.0	58.0	76.0	90.0
		T*C		*	*	114.0	106.7	140.7	140.7	184.3	218.3
	60Hz	T*D	Amps	56.9	64.7	47.0	44.0	58.0	58.0	76.0	90.0
		T*C		*	*	114.0	106.7	140.7	140.7	156.0	184.7
		T*7		*	*	59.0	55.2	78.0	78.0	88.4	104.7
Connection size				Rotalock connection							
	Suction		in	2-1/4 x 12UN							
	Discharge			1-3/4 x 12UN							
				Brazing connection							
	Suction		in	1-5/8							
	Discharge			1-1/8		1-3/8					
Outline dimension	Length		mm	315		432		448		448	
	Width			315		376		392		392	
	Height			662		717		715		715	
Sight glass fitting thread			in	1-3/4" x 12 UNF							
Oil type				Mineral	POE	Mineral	POE	Mineral	POE	Mineral	POE
Oil quantity (initial)			L	4.4		4.7		6.8		6.3	
Oil quantity (re-charge)			L	4.2		4.4		6.5		6	
Net weight			kg	91.7		140		160		177	
Terminal box IP grade				IP54		IP56		IP56		IP56	
Crankcase heater power			W	90		120		150		150	
Mounting parts installation size (hole size)			mm	232.0X232.0 (Ø22.6)		266.7 x 266.7 (Ø22.6)					

Notes: Please refer to Selection Asia software for more information
*ZB130KQ/KQE-TEC/TE7 data is not available

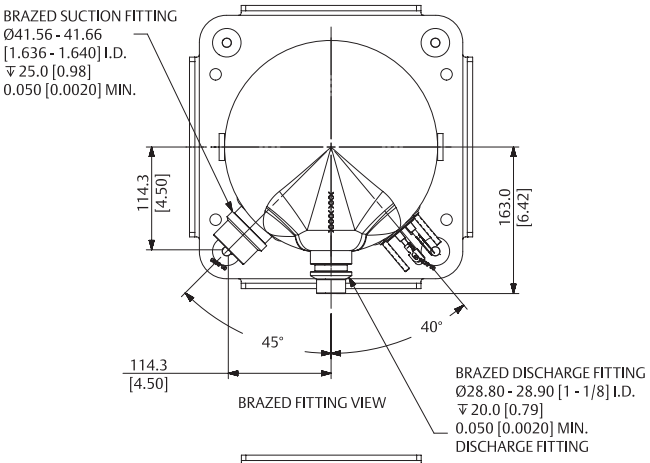
Dimensional drawings

ZB130KQ/KQE

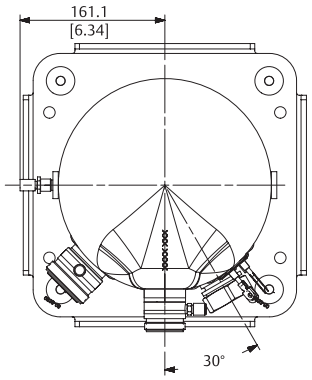
Brazing(BOM 550), Rotalock(BOM 551)



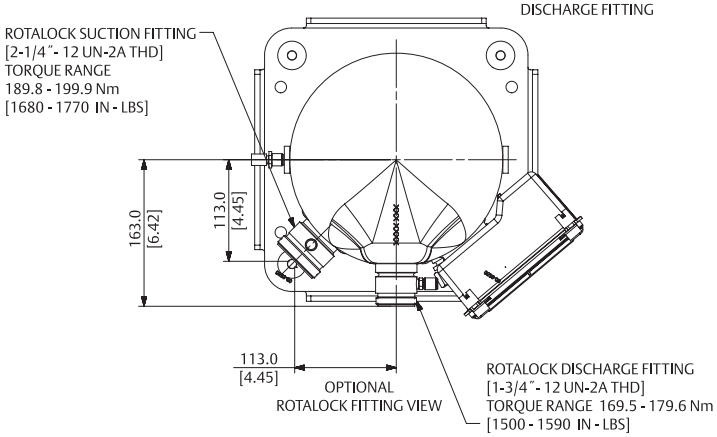
LOWER COVER DIMENTION

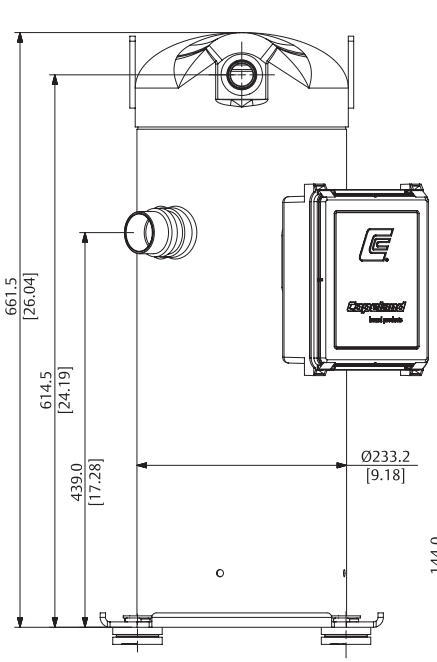


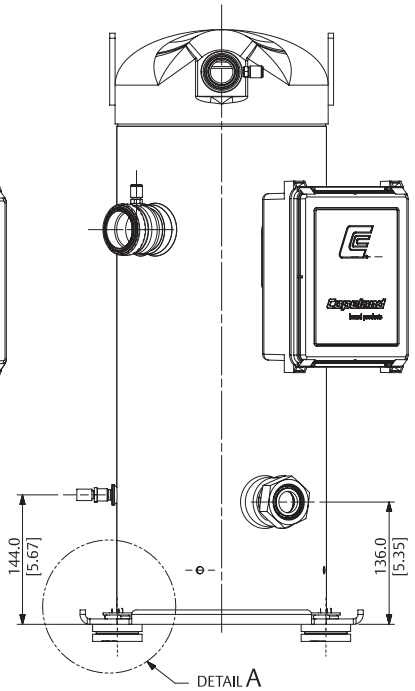
BRAZED FITTING VIEW

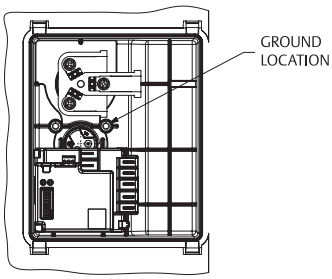


SIGHT GLASS VIEW

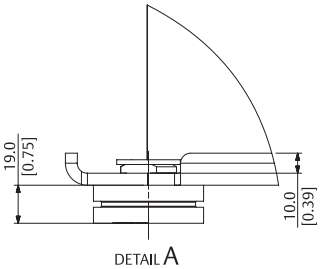








TERMINAL BOX LAYOUT STANDARD
SCALE 2:3



DETAIL A
SCALE 1:1

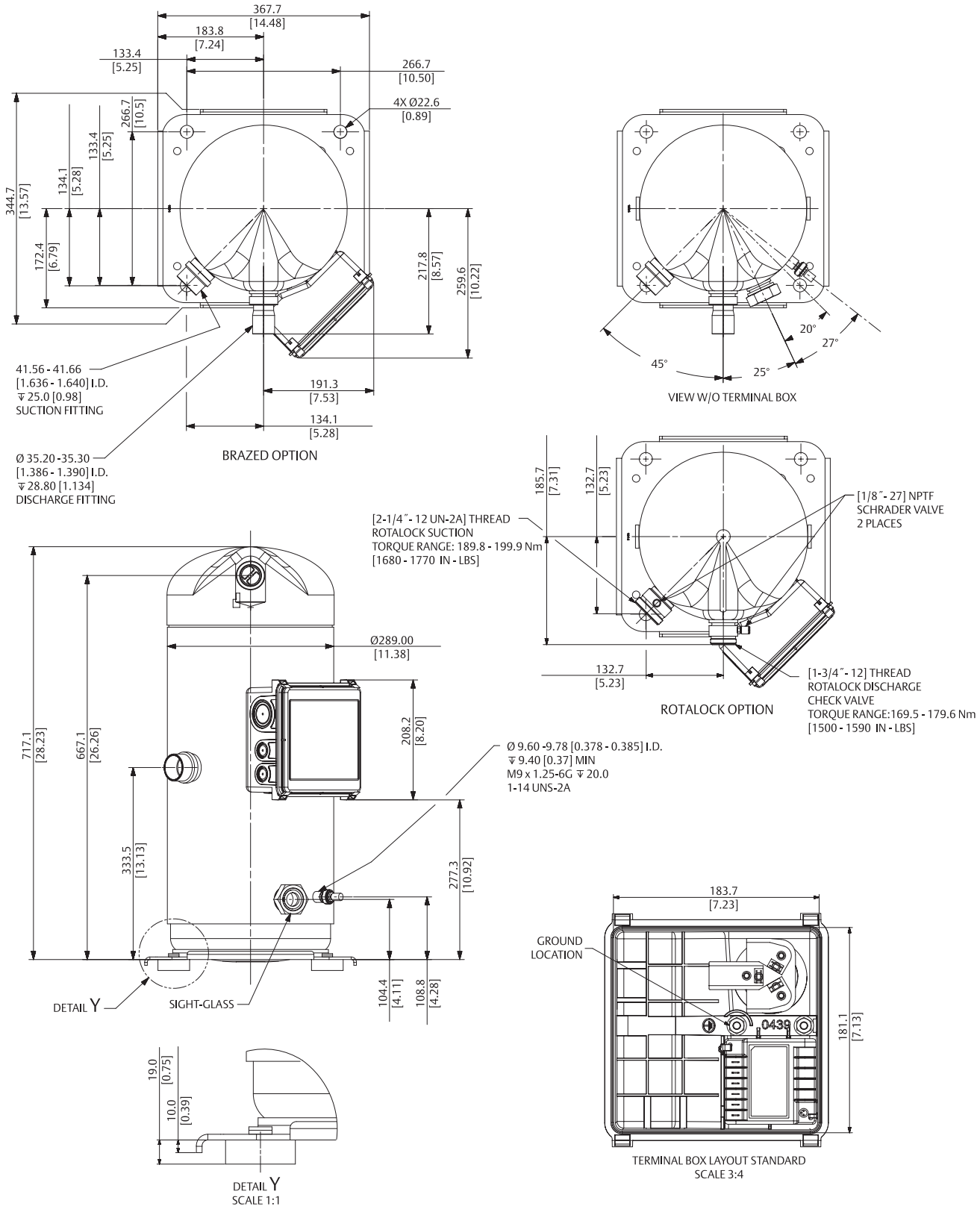
Notes:

1. All tolerances ± 1.5mm [0.06in] unless otherwise specified
2. Due to accumulated assembly tolerances, the listed components may vary from the mounting holes. All fittings: ± 3.0mm [0.12in]
3. Tube ends must be plugged
4. All units are in mm [inch]

Dimensional drawings

ZB150KQ/KQE

Brazing(BOM 522), Rotalock(BOM 523)

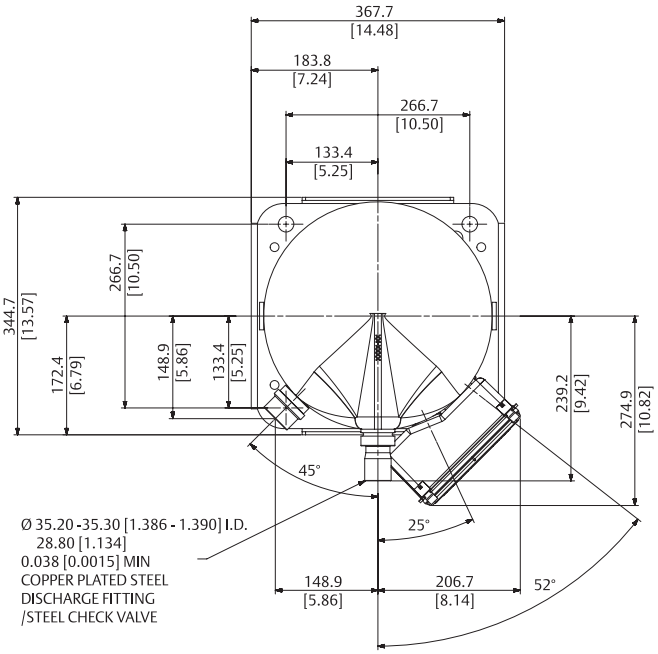


Notes:

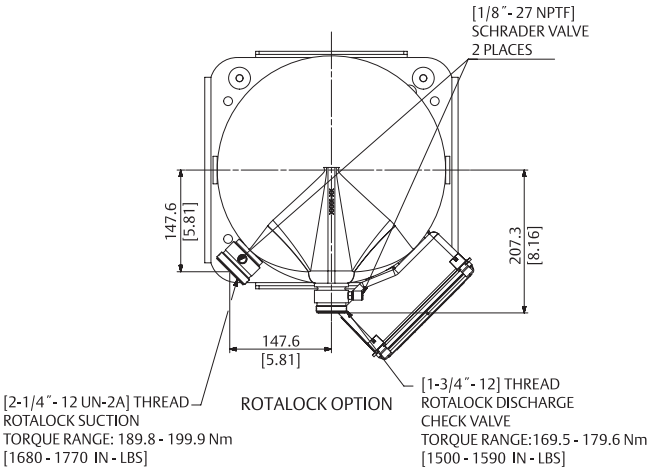
1. All tolerances ± 1.5mm [0.06in] unless otherwise specified
2. Due to accumulated assembly tolerances, the listed components may vary from the mounting holes. All fittings: ± 3.0mm [0.12in]
3. Tube ends must be plugged
4. All units are in mm [inch]

Dimensional drawings

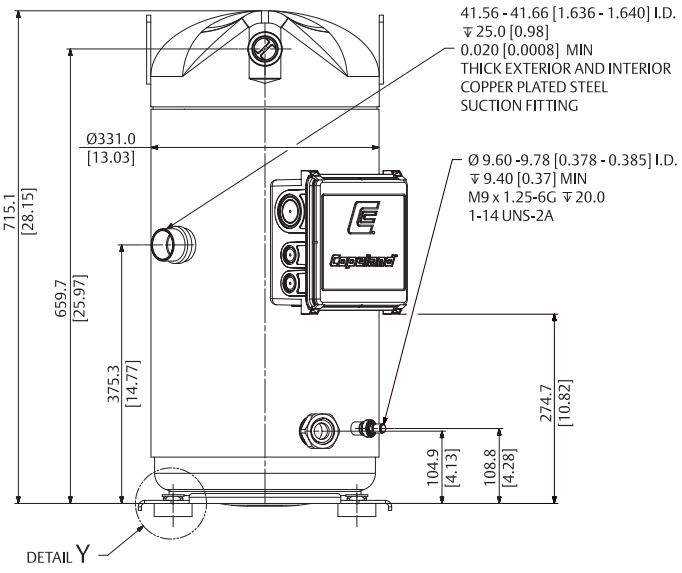
ZB190KQ/KQE, ZB220KQ/KQE
Brazing(BOM 522), Rotalock(BOM 523)

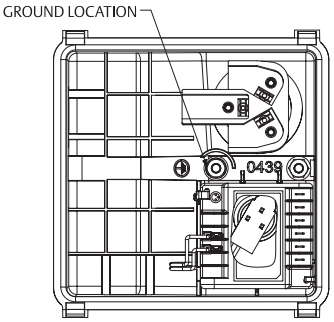


BRAZED OPTION

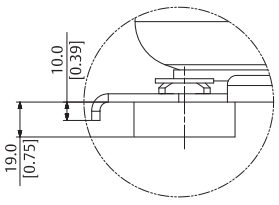


ROTALOCK OPTION





TERMINAL BOX LAYOUT STANDARD
SCALE 3:4



DETAIL Y
SCALE 1:1

Notes:
1. All tolerances ± 1.5mm [0.06in] unless otherwise specified
2. Due to accumulated assembly tolerances, the listed components may vary from the mounting holes. All fittings: ± 3.0mm [0.12in]
3. Tube ends must be plugged
4. All units are in mm [inch]

Quick application guide

External protection module introduction

The ZB130 scroll compressor is equipped with a CoreSense™ module. The module is installed in the compressor electrical box and provides advanced diagnostics, protection and communications that enhance compressor performance and reliability.

The CoreSense Communications Module has the following key features:

1. Motor temperature protection
2. Missing phase protection
3. Reverse phase protection
4. Low control circuit voltage protection
5. Short cycling detection and alert
6. Communication to system controller through RS485/Modbus
7. Storage of operational history, runtime information, and fault counters, etc.
8. Display of status, warning, and alert information via LEDs

CoreSense Communications provides compressor and system protection through its proprietary lockout feature. Depending on the severity and frequency of the fault that caused the trip condition, the CoreSense Communications module can lockout the compressor contactor to prevent damage to the compressor and system components. Less severe fault conditions resulting in an occasional trip will not result in a lockout condition.

Flashing red and green LEDs communicate **Status**, **Warning**, and **Alert** codes to the service technician and the master controller.

Emerson scroll compressors equipped with CoreSense Communications will have an “E” in the electrical code. An example, ZB130KQE-T**E**D.

CoreSense Communications module specifications:

Module Part Number	571-0064-06
T1-T2 Power Supply & Frequency	120-240 VAC, 60Hz
	115-230 VAC, 50 Hz
Allowable Voltage Range	85-265 VAC
T2/T1 Low Voltage Trip	85/170 VAC
T2/T1 Low Voltage Reset	95/185 VAC
Power Consumption	5 VA
M1-M2 Contact Rating	2.5A Max
Motor Temperature Trip Resistance	> 4.5KΩ ± 25%
Open Motor Thermistor Trip Resistance	>220KΩ
Shorted Motor Thermistor Trip Resistance	<40Ω
Motor Temperature Reset Resistance	< 2.75KΩ
Reset Time After Trip	30 minutes
Ambient temperature range	-40° to 65°C

An explanation of the terminal designations follows:

- **T2-T1:** Module power supply, 120-240 VAC 60Hz, 115-230 VAC, 50 HZ
- **L1-L2-L3:** Phase inputs corresponding to compressor input power L1-L2-L3.
- **M2-M1:** Normally open control circuit contacts; M2- M1 should be wired in series with the compressor contactor.
- **A (-), GND, B (+):** RS485 communications.
- **Temperature Plug:** the PTC and common connections.

DIP Switch Configuration of ZB130: DIP switch selection for the Modbus address, baud rate, parity, and other operating conditions simplify service and start-up procedures. The following table lists the purpose of each switch.

DIP Switch Purpose

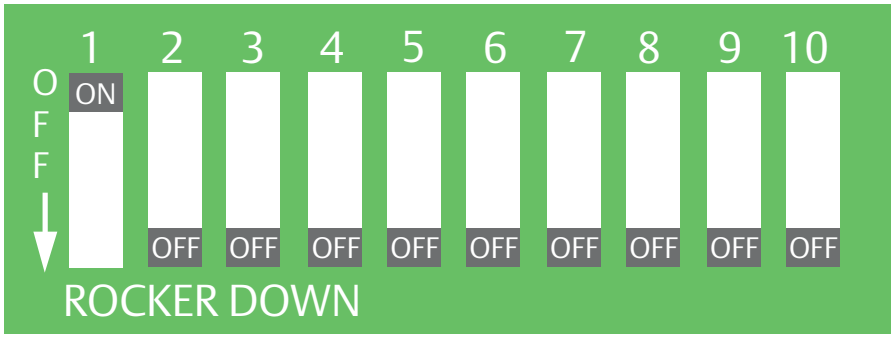
DIP Switch Number	On	Off
1 through 5	Modbus Module Address	
6	Baud Rate = 9600	Baud Rate = 19200
7	Even Parity	No Parity
8	Network Mode	Stand Alone
9[1]		PTC
10	Enable Short Cycle Protection	Disable Short Cycle Protection

[1] Thermistor configuration: = PTC only (2 wire connectors)
The module must be reset after changing any of the DIP switch settings for changes to take effect.

CoreSense Communications modules are shipped from the factory with the DIP switches set to default settings for standalone operation. Switch 1 is turned “on” as part of a quality control check to verify communications capability of the module before it leaves the compressor manufacturing plant. All other DIP switch default settings are in the “off” position.

If DIP switch settings are inadvertently changed, the compressor will operate, but could have some loss of protection. Scroll temperature protection and short cycle protection could be disabled.

Dip-switch Default factory setting



ZB150-ZB220 scroll compressor equipped with a Kriwan protection module. The electronic motor protection system used in all **TW*** motor code. This system utilizes the temperature-dependent resistance of the thermistors (also called PTC-resistance) to read the winding temperature. A chain of four thermistors connected in series is embedded in the motor windings so that the temperature of the thermistors can follow the winding temperature with little inertia. An electronic module INT69SCY2 is required to process the resistance values and trip a control depending on the thermistor resistance

Kriwan protection module specifications:

Module Part Number	071-0684-00
Type	Kriwan Diagnose INT69 SC2
Protection	Motor & Scroll Temperature Protection
T1- T2 Power Supply & Frequency	120-240 VAC, 60Hz
	115-230 VAC, 50Hz
Power Consumption	3 VA
M1-M2 Contact Rating	2.5A Max
Trip resistance	>4.5KΩ
Reset resistance	<2.75KΩ
Reset time After Trip	30 minutes
Ambient temperature range	-30°C to +70°C

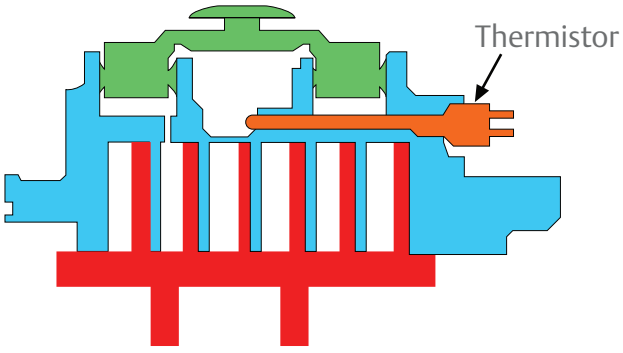
An explanation of the terminal designations follows:

- T2-T1: Module power supply, 120-240 VAC 60Hz, 115-230 VAC, 50 Hz
- S2-S1: Connect to motor and scroll PTC sensors
- M2-M1: Normally open control circuit contacts; M2- M1 should be wired in series with the compressor contactor.

Discharge Temperature Protection

ZB130 includes ASTP device for high temperature protection

ZB150~ZB220 high discharge temperature protection is provided by a thermistor probe in the discharge plenum of the scroll. Excessive discharge temperature will cause the electronic protector module to trip. The discharge gas thermistor is wired in series with the motor thermistor chain. Protection Temperature: 130°C



Internal discharge temperature sensor position

Internal Pressure Relief (IPR) Valve

ZB130~ZB220 Copeland Scroll™ compressors do not have internal pressure relief (IPR) valves. To avoid abnormally high operating pressures, a high pressure control must be used in all applications.

If any type of discharge line shut-off valve is used, the high pressure control must be installed between the compressor discharge fitting and the valve. Compressors with rotalock discharge fittings have a connection on the rotalock fitting for the high pressure cut-out switch connection.

High Pressure Control

A high pressure cut-out control must be used in all applications. The high pressure control should have a manual reset feature for the highest level of system protection.

The maximum, recommended low pressure cut-out switch settings are:

Refrigerants	High pressure cut out setting
R22	25.4 bar(g)
R404A	27.4 bar(g)
R134a	22.3 bar(g)
R407F	23.9 bar(g)

Low Pressure Control

A low pressure control is highly recommended for loss of charge protection and other system fault conditions that may result in very low evaporating temperatures. Even though these compressors have internal discharge temperature protection, loss of system charge will result in overheating and recycling of the motor overload protector. Prolonged operation in this manner could result in oil pump out and eventual bearing failure.

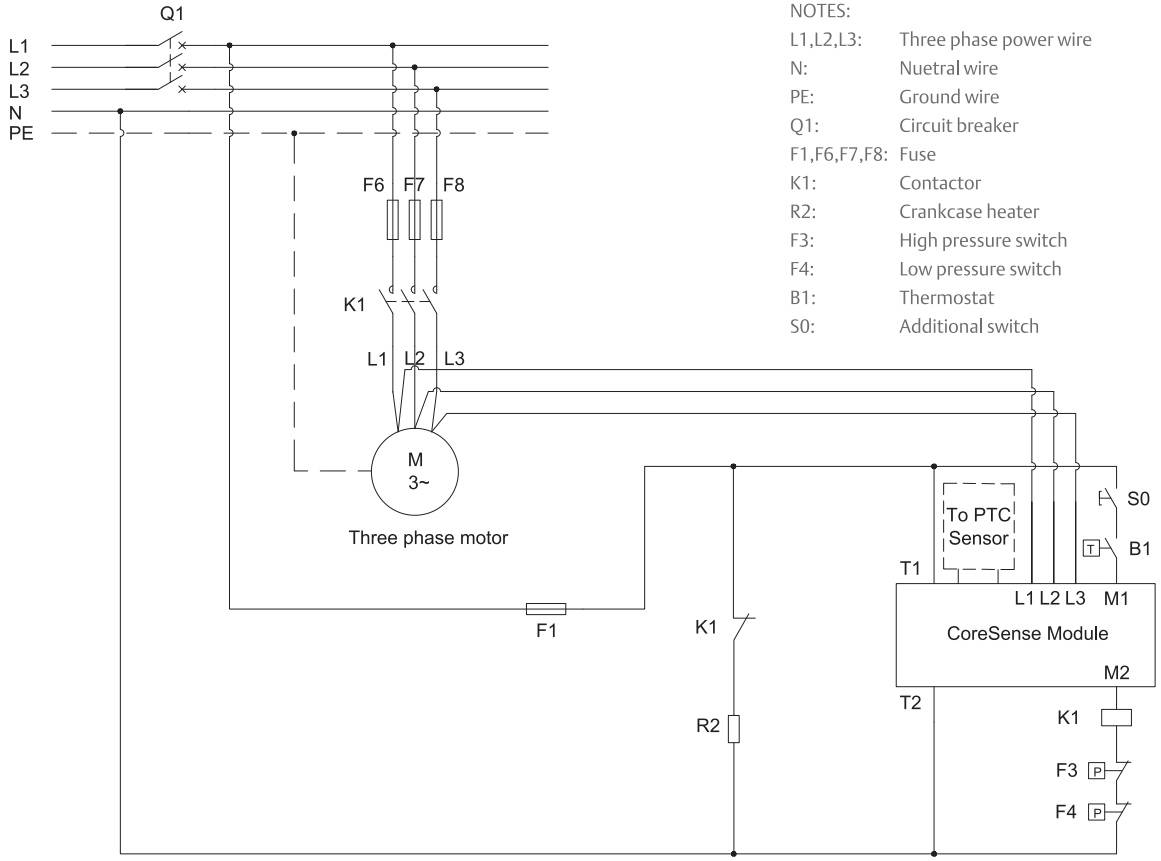
The low pressure cut-out setting will depend on the application type and minimum expected evaporating temperature. The low pressure cut-out should be selected to prevent compressor overheating and other system failure modes.

The maximum, recommended low pressure cut-out switch settings are:

Refrigerants	High pressure cut out setting
R22	2.3 bar(g)
R404A	2.0 bar(g)
R134a	0.6 bar(g)
R407F	1.5 bar(g)

Electrical Wiring Diagram

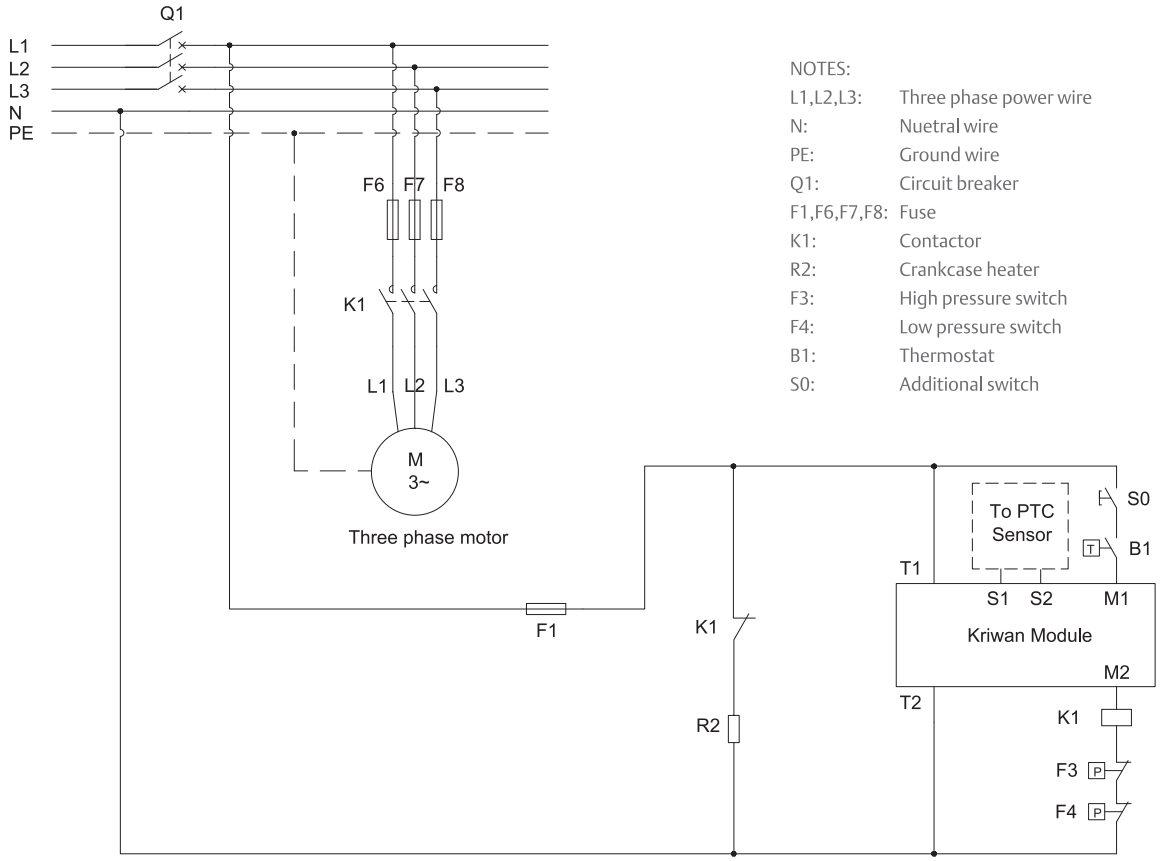
ZB130



NOTES:

L1,L2,L3:	Three phase power wire
N:	Nuetral wire
PE:	Ground wire
Q1:	Circuit breaker
F1,F6,F7,F8:	Fuse
K1:	Contactor
R2:	Crankcase heater
F3:	High pressure switch
F4:	Low pressure switch
B1:	Thermostat
S0:	Additional switch

ZB150 - ZB220



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