A two-stage variant based on the Bock HG semi-hermetic 6 cylinder range is available for extended use in the domain of deep-freezing.

The two stage system consists of:
- Liquid subcooler
- Reinjection valve
- Solenoid valve
- Sight glass
- Filter drier

Special features:

- 6 cylinder design
- LP/HP stage ratio 2:1
- 2 stage operation with liquid subcooler
- Reinjection valve adapted to refrigerant and application
- Extremely reliable and economic compressor design

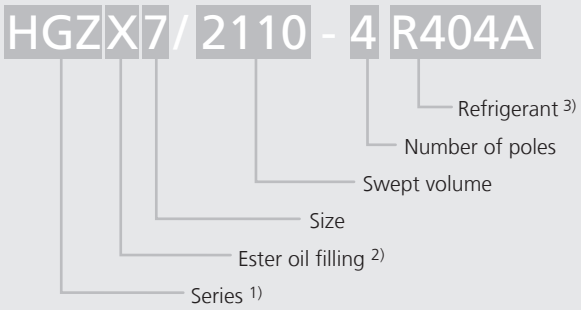
Further information on the HG7 basic compressor see chapter "Single-stage semi-hermetic Bock compressors" from page 18.

Available models

for refrigerants R404A, R410A, R507, R22

Type	Displacement (50 Hz) LP / HP
HGZX7/1620-4 R404A/R507 HGZX7/1620-4 R410A HGZ7/1620-4 R22	93,70 m³/h / 46,90 m³/h
HGZX7/1860-4 R404A/R507 HGZX7/1860-4 R410A HGZ7/1860-4 R22	107,60 m³/h / 53,80 m³/h
HGZX7/2110-4 R404A/R507 HGZX7/2110-4 R410A HGZ7/2110-4 R22	122,40 m³/h / 61,20 m³/h

Type key

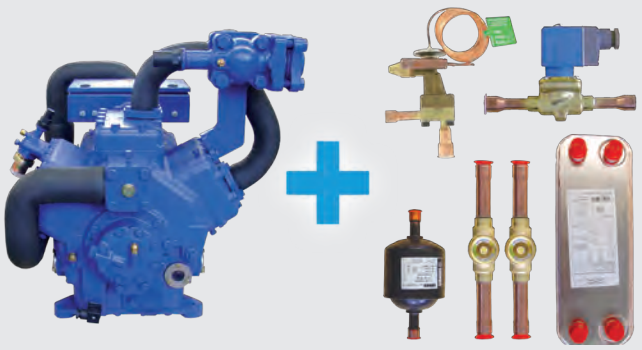


1) HGZ = Hermetic Gas-Cooled (suction gas-cooled), two-stage
2) X = Ester oil filling (HFC refrigerants R404A,R410A)
3) Possible refrigerants are R404A, R410A, R22

The two possible designs of the HGZ7:

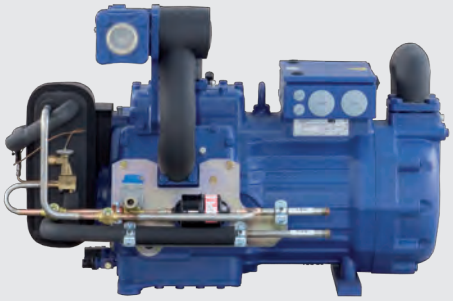
Standard

Medium-pressure mixed line mounted on the compressor and insulated, liquid subcooler, expansion valve, solenoid valve, two sight glasses, filter drier everything enclosed separately for individual, external mounting



Option

Liquid subcooler, expansion valve, solenoid valve, two sight glasses, filter dryer mounted directly to the compressor, lined and insulated



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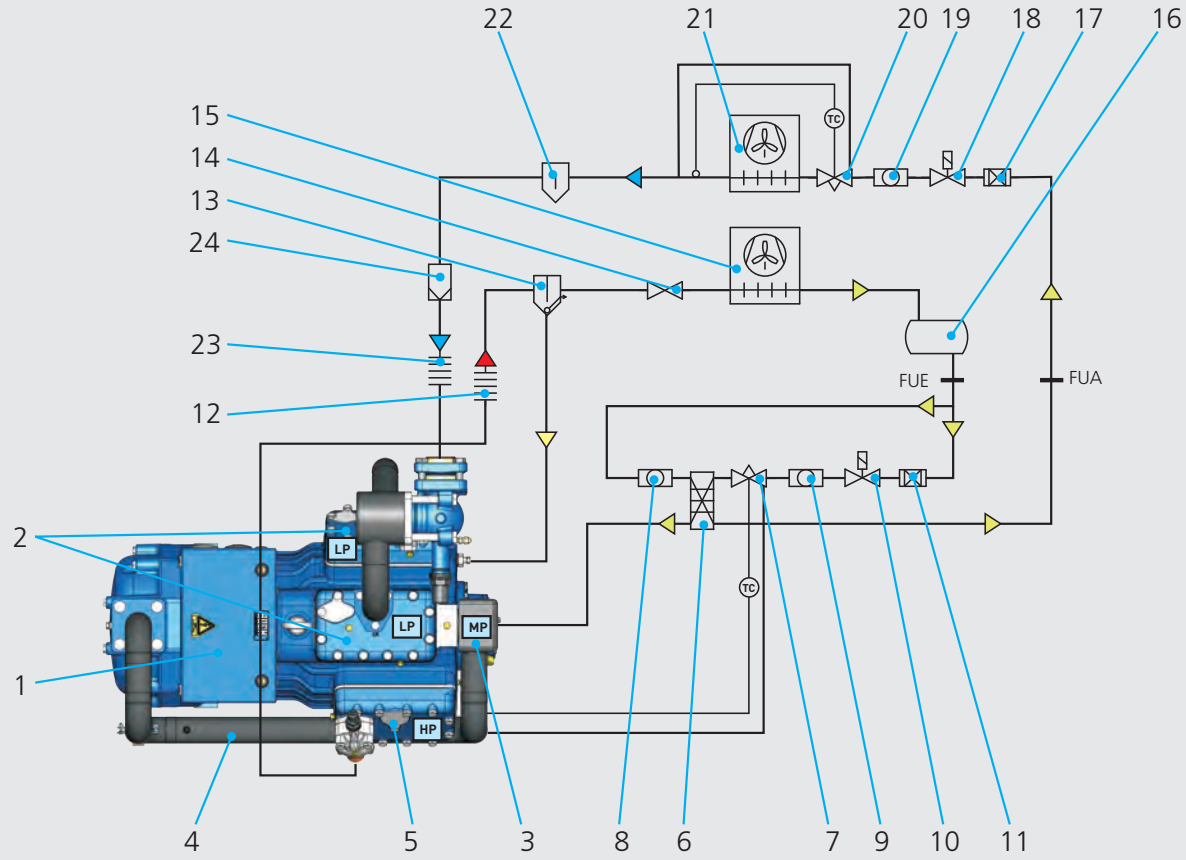
Refrigeration circuit and two-stage compressor
Schematic diagram



Explanations

1 Compressor
2 Cylinder LP-stage
3 Intermediate pressure chamber MP
4 Intermediate pressure line MP
5 Cylinder HP-stage
6 Subcooler*
7 Reinjection valve*
8 Sight glass 1*
9 Sight glass 2*
10 Solenoid valve*
11 Filter drier*
12 Vibration damper, pressure line
13 Oil separator
14 Non-return valve
15 Condenser
16 Refrigerant receiver
17 Filter drier
18 Solenoid valve
19 Sight glass
20 Expansion valve (evaporator)
21 Evaporator
22 Liquid separator
23 Vibration damper, suction line
24 Filter suction line

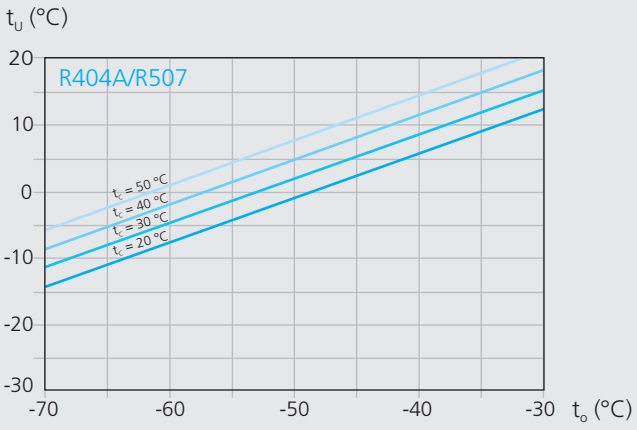
LP = Low pressure
MP = Medium pressure
HP = High pressure
FUE = Liquid subcooler, inlet
FUA = Liquid subcooler, outlet

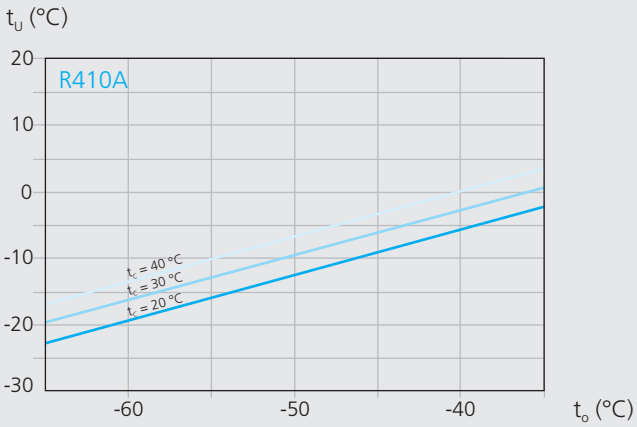
* Components for subcooling system as standard

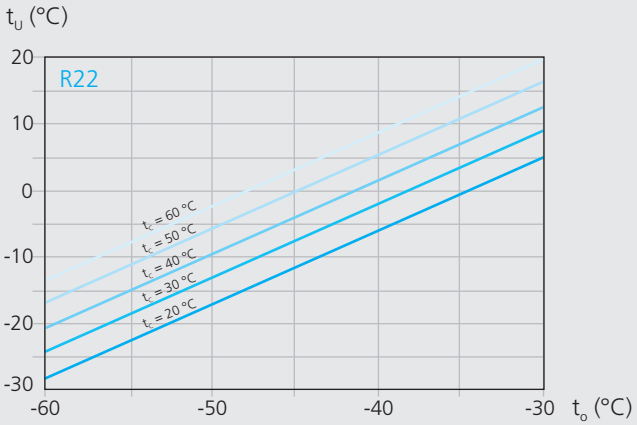
Subcooling temperature

The design of the expansion valve on the compressor can be defined with the help of the diagram by approximately calculating the subcooling temperature arising in the relevant operating conditions (to/tc).

Subcooling temperature calculation diagram for the intermediate cooler outlet





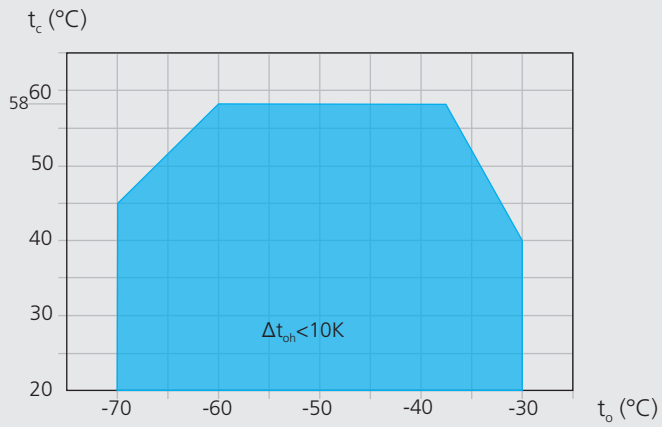


t_U = Subcooling temperature at the intermediate cooler outlet (FUA)

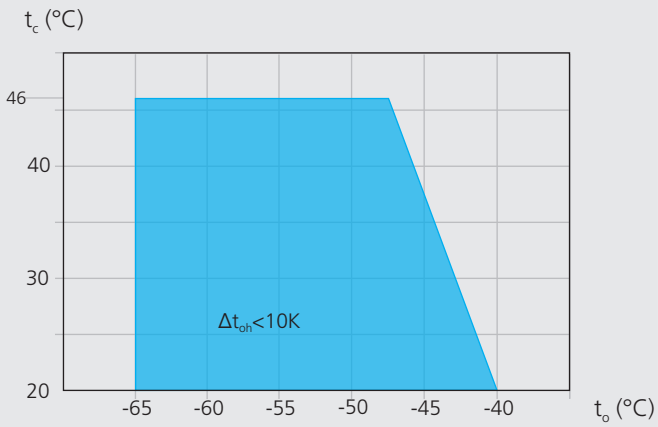
t_O = Evaporation temperature

Operating limits

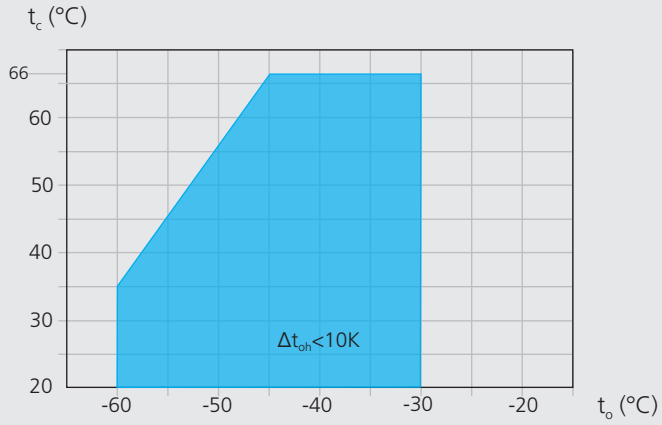
R404A/R507



R410A



R22



Application range

t_O Evaporating temperature (°C)
t_C Condensing temperature (°C)
Δt_{Oh} Suction gas superheat (K)

Max. permissible operating pressure (LP/MP/HP)[1]: 19/19/28 bar

[1] LP = low pressure MP = meduim pressure HP = high pressure

Notes

Operating limits

Compressor operation is possible within the limits shown on the application diagrams. Please note the coloured areas. Compressor application limits should not be chosen for design purposes or continuous operation.

Performance data

The stated performance values are based on **10 K suction gas superheat with liquid subcooling, operating at 50 Hz.**

Performance data were compiled for R404A and R507.
The base values are the data for R404A.

Conversion factor für 60 Hz = 1,2

Performance data for other operating points, see GEA Bock software

R404A/R507 — Performance data — 50 Hz

Type	Cond. temp. °C		Cooling capacity $\dot{Q}_o$ [W] Evaporating temperature °C								Power consumption P_e [kW] Evaporating temperature °C		
			-30	-35	-40	-45	-50	-55	-60	-65	-70
HGZX7/1620-4	30	Q	34869	28471	23098	18628	14936	11899	9394	7296	5482
		P	21,17	19,41	17,63	15,84	14,05	12,31	10,61	8,99	7,46
	40	Q	33437	27315	22181	17910	14380	11467	9047	6997	5192
		P	23,42	21,42	19,40	17,39	15,41	13,48	11,61	9,84	8,17
	50	Q		25860	20950	16866	13484	10680	8332	6315	
		P		23,49	21,24	19,02	16,84	14,72	12,68	10,75	
HGZX7/1860-4	30	Q	40042	32694	26525	21391	17152	13665	10787	8378	6294
		P	24,31	22,29	20,24	18,18	16,14	14,13	12,19	10,32	8,56
	40	Q	38397	31367	25471	20567	16514	13169	10390	8035	5962
		P	26,90	24,60	22,28	19,97	17,70	15,48	13,34	11,30	9,38
	50	Q		29696	24057	19367	15484	12265	9568	7252	
		P		26,98	24,39	21,84	19,33	16,90	14,56	12,35	
HGZX7/2110-4	30	Q	45550	37191	30173	24334	19511	15544	12271	9530	7160
		P	27,66	25,36	23,03	20,69	18,36	16,08	13,86	11,74	9,74
	40	Q	43679	35681	28974	23396	18785	14980	11819	9140	6782
		P	30,60	27,98	25,34	22,72	20,13	17,61	15,17	12,85	10,67
	50	Q		33780	27366	22031	17614	13952	10884	8249	
		P		30,69	27,75	24,84	21,99	19,23	16,57	14,04	

R410A — Performance data — 50 Hz

Type	Cond. temp. °C		Cooling capacity $\dot{Q}_o$ [W] Evaporating temperature °C						Power consumption P_e [kW] Evaporating temperature °C		
			-35	-40	-45	-50	-55	-60	-65		
HGZX7/1620-4	30	Q			25354	19967	15285	11396	8385		
		P			22,89	20,80	18,67	16,43	14,00		
	50	Q				19131	14630	10868	7930		
		P				22,87	20,63	18,25	15,68		
HGZX7/1860-4	30	Q			29182	22859	17530	13136	9614		
		P			26,28	23,89	21,44	18,87	16,08		
	50	Q				21959	16774	12508	9101		
		P				26,26	23,68	20,96	18,00		
HGZX7/2110-4	30	Q			33195	26003	19941	14943	10937		
		P			29,90	27,17	24,39	21,46	18,29		
	50	Q				24980	19082	14229	10352		
		P				29,87	26,94	23,84	20,48		

Performance data

R22	Performance data							50 Hz
Type	Cond. temp. °C		Cooling capacity $\dot{Q}_o$ [W]					Power consumption P_e [kW]	
			Evaporating temperature °C						
			-30	-35	-40	-45	-50	-55	-60
HGZ7/1620-4	30	Q	29711	24214	19448	15365	11921	9070	6765
		P	18,26	16,81	15,40	14,03	12,70	11,41	10,16
	40	Q	29059	23630	18930	14914	11537	8753	
		P	20,23	18,52	16,86	15,23	13,64	12,10	
	50	Q	28355	22992	18360	14411	11100		
		P	22,30	20,33	18,41	16,53	14,69		
	60	Q	27598	22302	17736	13854			
		P	24,47	22,25	20,07	17,93			
HGZ7/1860-4	30	Q	30088	27881	22408	17669	13664	10393	7855
		P	20,97	19,31	17,69	16,11	14,58	13,10	11,67
	40	Q	33296	27181	21800	17153	13240	10061	
		P	23,23	21,27	19,36	17,49	15,67	13,89	
	50	Q	32434	26411	21122	16567	12746		
		P	25,60	23,35	21,14	18,98	16,68		
	60	Q	31503	25572	20375	15912			
		P	28,09	25,54	23,04	20,59			
HGZ7/2110-4	30	Q	38811	31632	25406	20072	15573	11848	8837
		P	23,86	21,96	20,12	18,33	16,59	14,91	13,27
	40	Q	37960	30868	24729	19483	15071	11433	
		P	26,43	24,20	22,02	19,89	17,82	15,80	
	50	Q	37040	30035	23984	18825	14500		
		P	29,13	26,56	24,05	21,59	19,18		
	60	Q	36050	29133	23169	18097			
		P	31,96	29,06	26,21	23,42			

Performance data 50 Hz relative to 10 K suction gas superheat with liquid subcooling

Technical data

HGZ Type	Number of cylinders	Displacement 50 Hz (1450/1740 rpm)	Displacement 60 Hz (1450/1740 rpm)	Electrical data Voltage ①	Electrical data Max. working current ②	Electrical data Max. power consumption ②	Electrical data Starting current (rotor locked) ②	Weight	Oil charge
		m³/h	m³/h		A	kW	A	kg	Ltr.
					* PW 1+2		* PW1 / PW 1+2		
HGZX7/1620-4 R404A HGZX7/1620-4 R410A HGZ7/1620-4 R22	6	93,70 / 46,90	112,50 / 56,20	③	50	27,0	185 / 278	294	4,5
HGZX7/1860-4 R404A HGZX7/1860-4 R410A HGZ7/1860-4 R22	6	107,60 / 53,80	129,10 / 64,60	③	55	30,0	185 / 278	291	4,5
HGZX7/2110-4 R404A HGZX7/2110-4 R410A HGZ7/2110-4 R22	6	122,40 / 61,20	146,90 / 73,50	③	65	36,0	191 / 286	289	4,5

* PW = Part Winding, motors for part winding start 1 = 1. part winding 2 = 2. part winding

LP = low pressure
HP = high pressure

Oil sump heater 230V -1- 50/60 Hz 140 W
Permanently set version, installation in immersion sleeve

Explanations:

① Tolerance (± 10%) relates to the mean value of the voltage range. Other voltages and current types on request.

② - The specifications for max. power consumption apply for 50 Hz operation. For 60 Hz operation, the specifications have to be multiplied by the factor 1.2. The max. working current remains unchanged.
- Take account of the max. operating current / max. power consumption when designing contactors, leads and fuses. Switches: Service category AC3

③ 380-420 V Δ/ YYY - 3 - 50 Hz PW
440-480 V Δ/ YYY - 3 - 60 Hz PW
PW = Part Winding, motors for part winding start (no start unloaders required)
Winding ratios: 60% / 40%