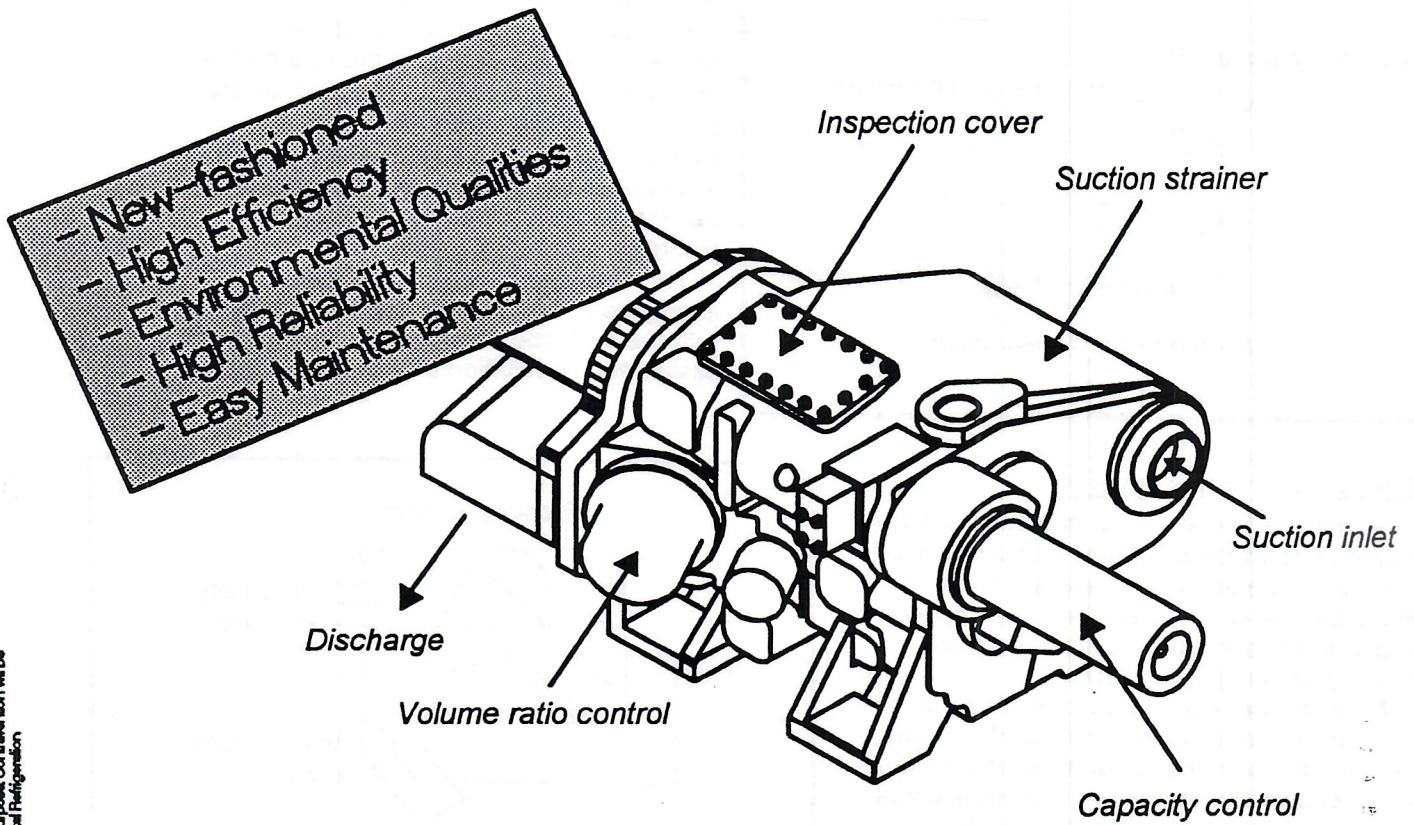


SCREW COMPRESSORS TYPE S80



This document must not be copied without our written permission and the contents thereof must not be imparted to a third party nor be used for any unauthorized purposes. Contribution will be prosecuted. ABB Stal Refrigeration

The S80 series of Stal-Maxi screw compressors incorporates benefits based on more than 30 years of experience in designing, manufacturing and operating screw compressors. Besides the new and different appearance, there are a number of properties contributing to high efficiency, environmental qualities, high reliability and easy maintenance. The series consists of five different sizes, each individually optimized in terms of rotor dimensions, thereby ensuring the best efficiency possible.

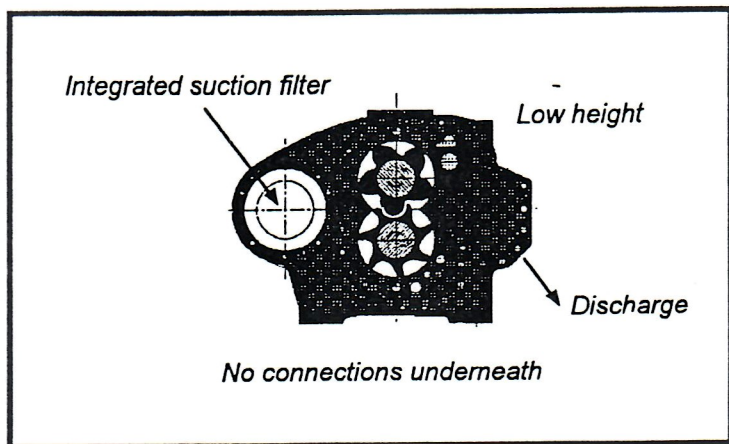
Swept volumes

Compressor Size	Swept Volume 2950 rpm (m ³ /h)	Swept Volume 3540 rpm (m ³ /h)	Rotor Diameter (mm)	L/D-ratio (-)	Weight (kg)
S81	961	1153	193	1.7	875
S83	1313	1576	212	1.7	1230
S85	1809	2171	237	1.7	details on request
S87	2604	3125	267	1.7	details on request
S89	3801	4561	304	1.7	details on request

Other data

Rotor lobe combination 5+7
Male rotor drive, rotation clockwise
Angular contact ball bearings (thrust)
Cylindrical roller bearings (radial)

Self-shifting volume ratio, 2.6 and 4.8
Max permissible suction pressure: 10 bar abs.
Max permissible discharge pressure: 26 bar abs.
Integrated suction filter: 60µ



New and different

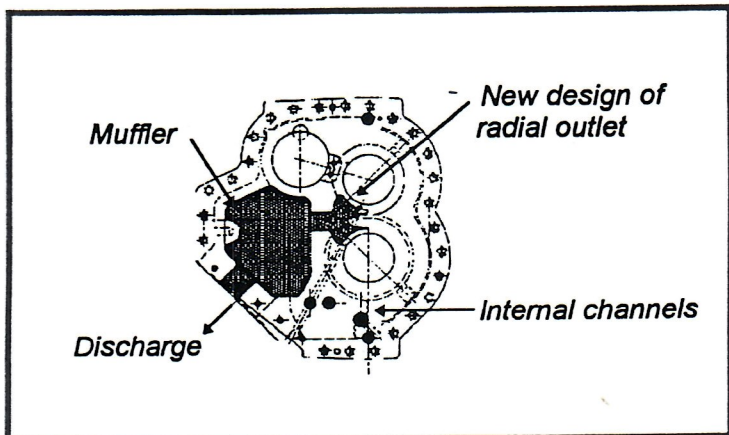
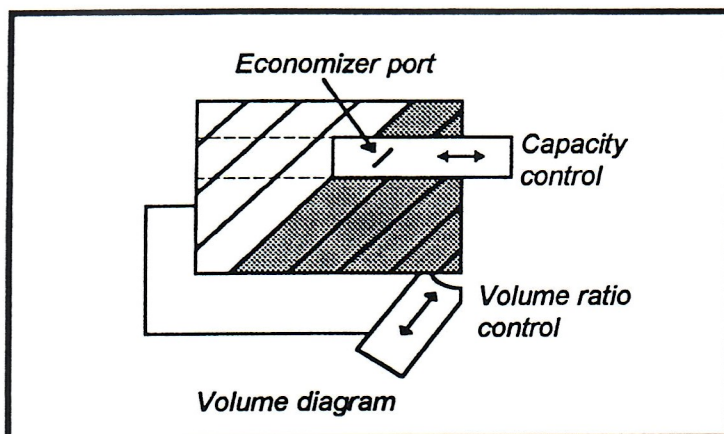
Compared to conventional screw compressors, the design of the S80 compressor is very different, as is shown by the orientation of the rotors, the integrated suction filter and the absence of connections under the compressor. This means benefits when it comes to installation, reliability and maintenance.

The S80 also incorporates other examples of new design, such as rotors with the 5+7 lobe combination and a novel design and installation of the slide valve.

Excellent efficiency

A notable feature is the *movable economizer port*, which maintains a true intermediate pressure at partial loads and thus increases the COP. In addition, the capacity and volume ratio controls are separated, thereby eliminating conflicts.

Furthermore, each size in the series is *individually optimized* in terms of the ratio between the length and diameter of the rotors, which ensures better overall efficiency and a broader operating range compared to conventional series, consisting of "long" and "short" machines.



Environmental qualities

Because of *numerous internal channels* and the *integrated oil pump*, almost all external pipes for distribution of oil and control are eliminated. Thus, the potential leakage risks are reduced to a minimum.

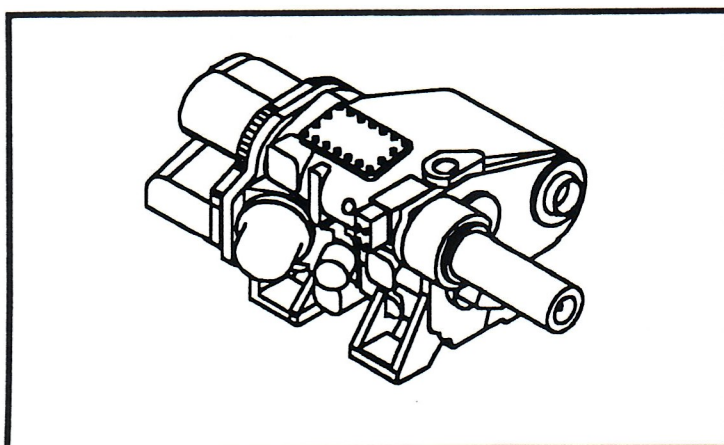
Also important to the local environment is the *low sound level* of the S80 compressors. Contributing features are the generously dimensioned castings, the 5+7 rotor lobe combination in connection with a new rotor profile, a novel design of the discharge port and a muffler in the rotor housing.

Reliability and maintenance

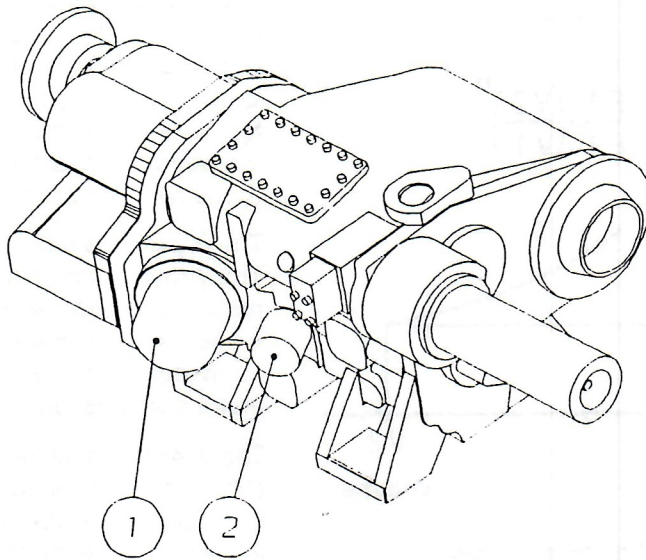
Reliability and maintenance have been two very important keywords in development of the S80 compressor.

For example, with normal running conditions with ammonia the life expectancy of the *anti-friction bearing system* is 100 000 hours of operation.

Maintenance is simplified due to few outside connections and no connections under the compressor. It is possible to inspect the rotors without disassembling the compressor and all bearing clearances are final and factory set.



VARIABLE BUILT-IN VOLUME RATIO



- 1. ϑ_i -piston
- 2. Control valve

Fig. 1 Type S80 Stal-Maxi screw compressor

This document must not be copied without our written permission, and the contents thereof must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted. ABB Stal Refrigeration

HOW A SCREW COMPRESSOR OPERATES

The screw compressor operates with distinct working phases and built-in volume ratio. For optimum efficiency, the built-in volume ratio ϑ_i must have a fixed relationship to the actual volume ratio, namely:

$$P1/P2 = (V2/V1)^n. \text{ See Fig. 2.}$$

This means that the pressure in the interlobe space, PK, at the instant when it opens to the discharge port, must be the same as the compressor's discharge pressure.

Any deviation from the optimum ratio causes losses in the compressor either in the form of overcompression (see Fig. 3) or reverse flow (see Fig. 4).

In the past, requirements calling for a wide working range (and thus widely varying pressure ratios) were met by providing different fixed pressure ratios (ϑ_i). Usually three fixed pressure ratios were provided, and this required three different versions of a compressor.

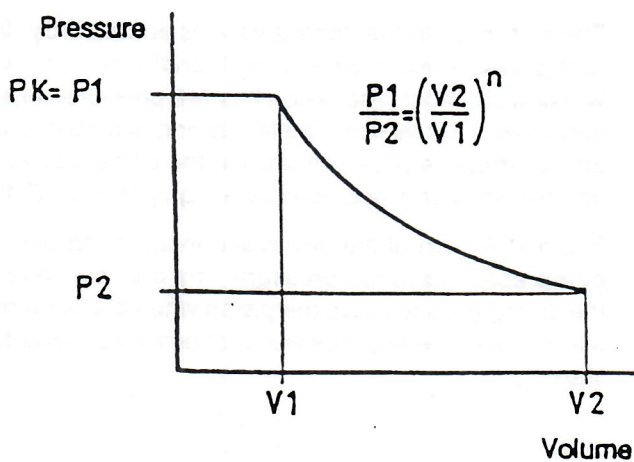


Fig. 2 Optimum operating ratio

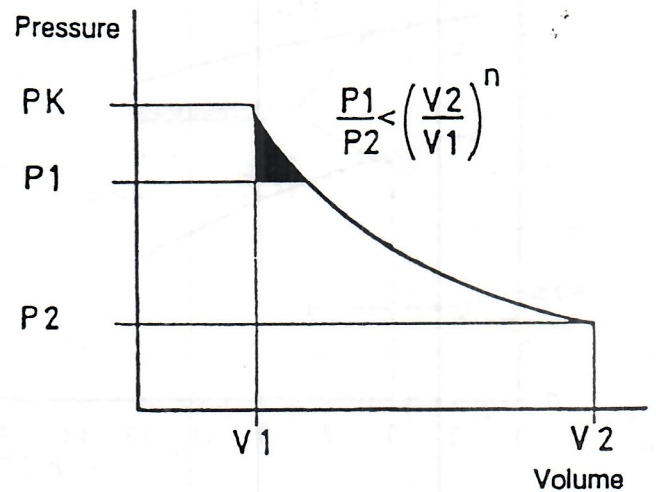
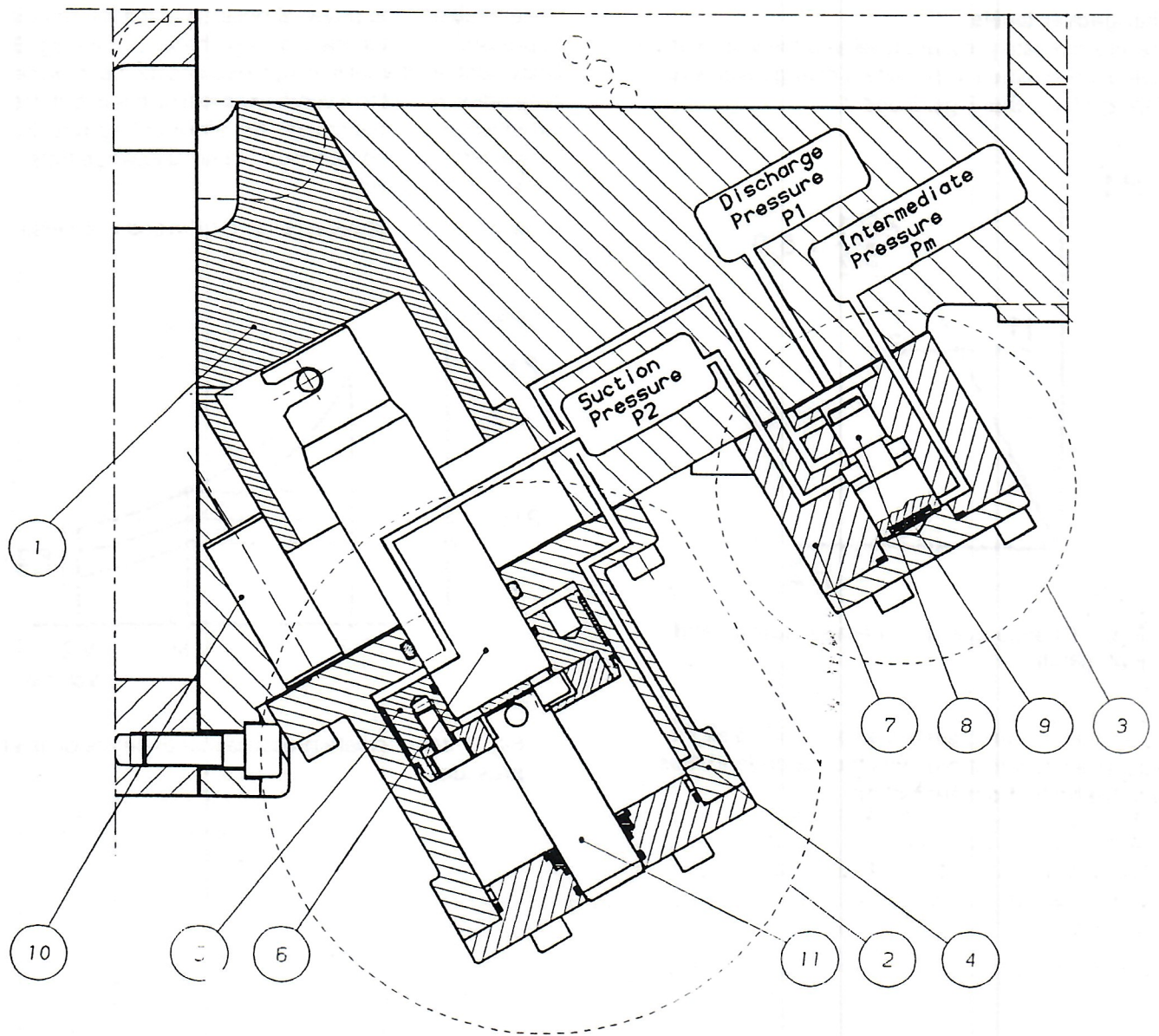


Fig. 3 Loss caused by overcompression



- | | |
|------------------------|---------------|
| 1. ∂ i-piston | 7. Cylinder |
| 2. Hydraulic unit | 8. Piston |
| 3. Control valve | 9. Spring |
| 4. Cylinder | 10. Guide pin |
| 5. Piston | 11. Indicator |
| 6. Piston rod | |

Fig. 6

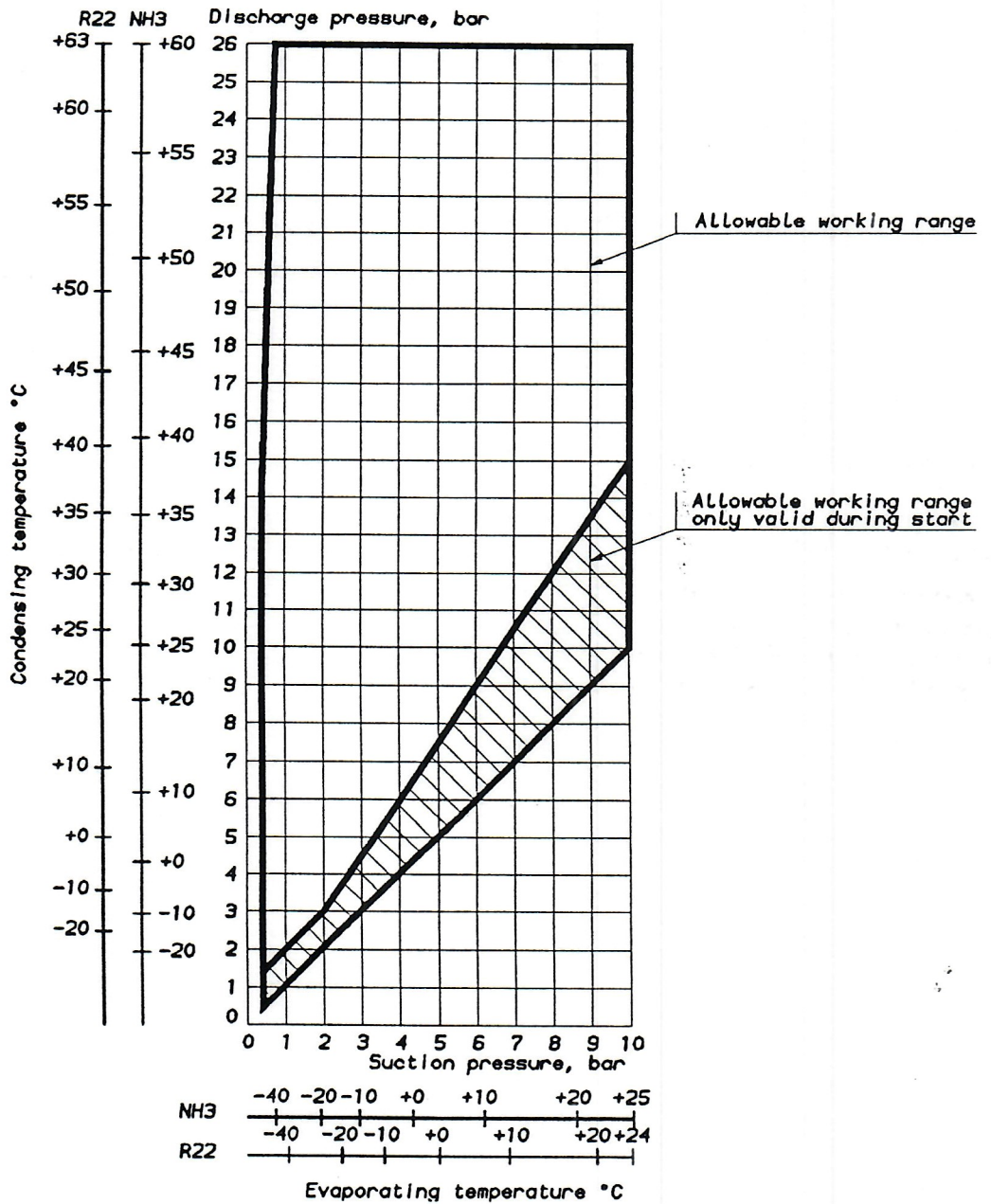
WORKING RANGE

Refrigerant: NH₃, R22

The allowable working range of the compressor series S80 is described in the diagram below.

Always consult the Group Sales Department before using a compressor with operating conditions outside the specified working range.

This document must not be copied without our written permission, and the contents thereof must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted. ABB Stal Refrigeration



- Max permissible discharge pressure 26 bar (a)
- Max permissible suction pressure 10 bar (a)
- Max permissible pressure ratio = 35
- Min permissible pressure ratio 1,5 (1,0 during startup)
- Min permissible pressure difference 1,0 bar
- Min permissible suction pressure 0,4 bar (a)

