



DAS HERZ DER FRISCHE

SEMI-HERMETIC

COMPACT SCREW COMPRESSORS

50 Hz // SP-170-7 EN



WITH IQ MODULE



CSH // CSW



CSVH // CSVW



AIR
CONDITIONING



PROCESS
COOLING



HEAT
PUMPS

BITZER Innovation Targets

Products for refrigerants with low global warming potential (GWP)

- // For naturally appearing substances
- // For new refrigerants like R1234yf, R1234ze(E) and low-GWP blends

These refrigerants reduce the direct contribution of refrigeration systems to global warming.

Products with high efficiency at full and part load

- // Efficiency improvements of motor and mechanics
- // High system efficiency in part load operation
 - by optimised mechanical capacity regulation
 - by specially developed frequency inverters

This reduces the indirect contribution to global warming by saving energy.

Simple handling and serviceability with advanced electronic modules

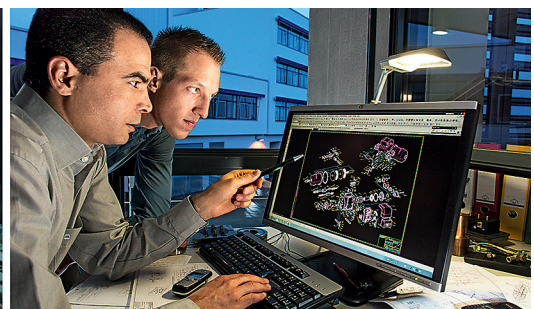
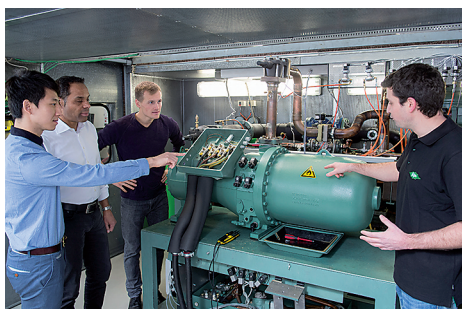
- // Electronic components for
 - data logging
 - capacity regulation
 - actuation of accessories
- // Unified user software for simple configuration. Choose compressor or condensing unit and refrigerant. Ready.

This makes it simple to fully utilize the efficiency potential of our products and optimise operation.

Semi-hermetic Compact Screw Compressors

Series: CSH // CSW // CSVH // CSVW

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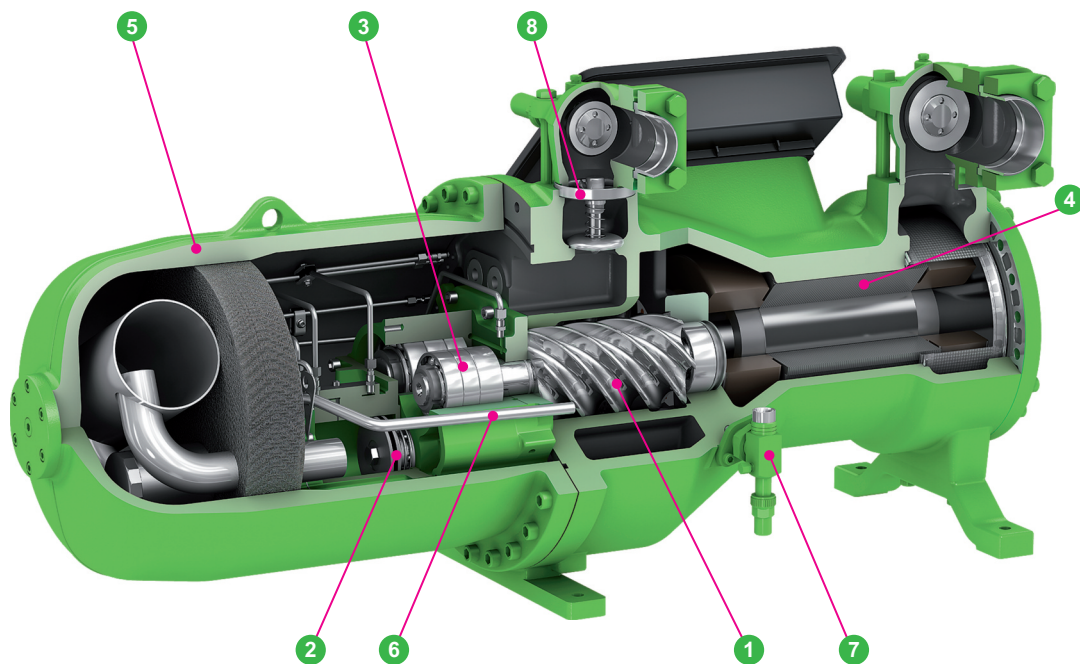


The CSH, CSW, CSVH and CSVW compact screw compressors

The semi-hermetic compact compressors of the CS. series are screw compressors which have been developed for the application in compact refrigeration systems, in liquid chillers for air conditioning and process cooling, and in heat pumps. Many functions are integrated, such as oil separator, slider capacity control, check valve in discharge gas outlet and Economiser operation (ECO) and, depending on design, connections for oil cooling, liquid injection (LI) or oil return. With CSV. even the frequency inverter is integrated. These compact refrigeration systems flexibly adapt to the various needs of the application.

Special features

- // Energy efficient
 - high efficiency profile
 - stepless or closely stepped capacity control
- // Compact
 - shortest fitting length in its performance class
- // Flexible
 - CS. Series: dual capacity control: changeable between 4-step or stepless capacity control – without modifying the compressor
 - suction and discharge gas connections can be rotated in 90° increments



- ① high efficiency profile
- ② control slider: Part load down to 25% of full load
- ③ long-life bearings with pressure unloading
- ④ specially adapted built-in motor
- ⑤ integrated oil separator
- ⑥ optimized oil management
- ⑦ economiser (ECO)
- ⑧ integrated check valve

High energy efficiency at full and part load

- // CS. series: suitable for operation with external frequency inverter (FI)
 - within the full application range
 - control range depending on operating conditions
- // CSV. series: integrated frequency inverter for systems with particularly high demands
 - on wide control ranges
 - on high control quality
 - on high part load efficiency

One basic structure – application-optimised specialists

CSW

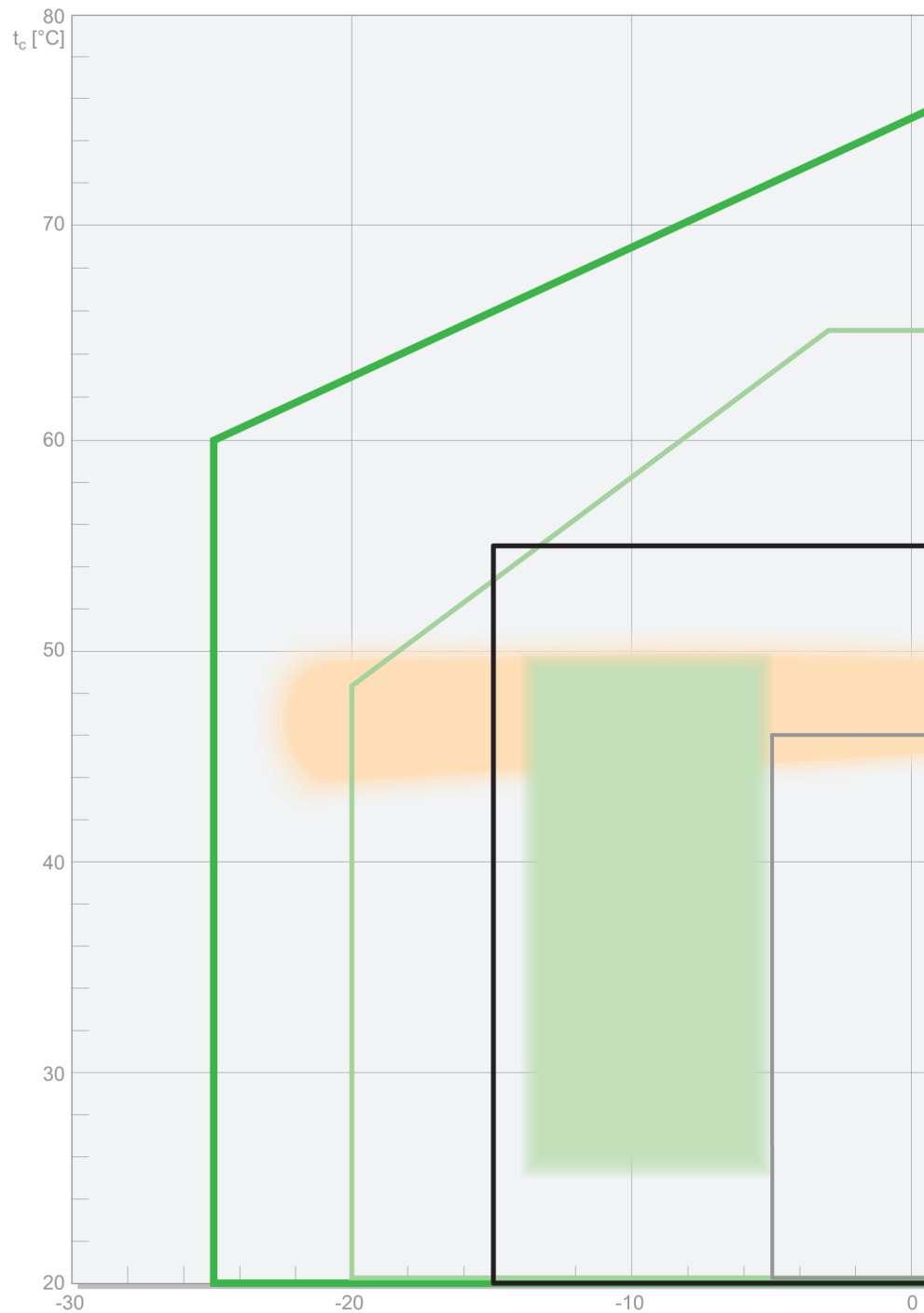
This version is designed for lower condensing temperatures, i. e. for air cooled liquid chillers in cooler regions, or for water cooled liquid chillers in general. It provides a high efficiency at these typical operating points and still has some reserves towards lower evaporating temperatures needed in medium temperature process cooling, for example.

CSW with motor 4

This version is optimised for highly efficient water cooled liquid chillers, where it can fully exploit its energy saving potential.

CSWW

This version is designed for slightly lower condensing temperatures and shows its advantages whenever the combination of high efficiency with fine control is required in liquid chillers for air conditioning and process cooling



Exemplary applications

- Heat pump operation air conditioning liquid chillers
- Medium temperature process application
- Building air conditioning



CSH.5

This universal version has the largest application range. Motor 1 is designed for data center cooling and for air conditioning by means of air cooled liquid chillers in hot countries, like Middle East. The CSH.5 manages heat pump operation with high condensing temperatures as well as low evaporating temperatures.

CSH.6

This design aims at air cooled liquid chillers in temperate and cold regions, where it achieves an even better efficiency. The application limits fit to moderate data center cooling and typical heat pump operation of liquid chillers for air conditioning.

CSVH

Similar to the CSH.6, this design is tailored to air cooled liquid chillers, but with extended application limits in order to provide multiple possibilities for hot regions and data center cooling. The speed control with integrated frequency inverter (FI) over a wide control range provides excellent part load and seasonal efficiency.

CSW with motor 4

Application

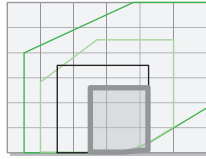
// water cooled liquid chillers which also meet the globally most demanding efficiency regulations: the Chinese GB19577:2015

Technical details

- // adaptation to low pressure ratios
 - particularly low friction losses
 - optimised lubrication system
- // motor with low energy consumption
- // economiser (ECO) at full load
- // connection for oil and gas return from flooded evaporator
- // optimised for refrigerants with low pressure, also A2L

Refrigerants

// R134a // R1234yf
 // R450A // R1234ze(E)
 // R513A



CSW

Applications

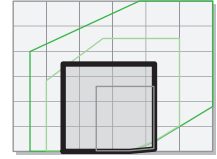
- // applications with low condensing temperatures
- // systems with flooded evaporator
- // water cooled liquid chillers
- // air cooled liquid chillers in cooler countries
- // medium temperature process cooling

Technical details

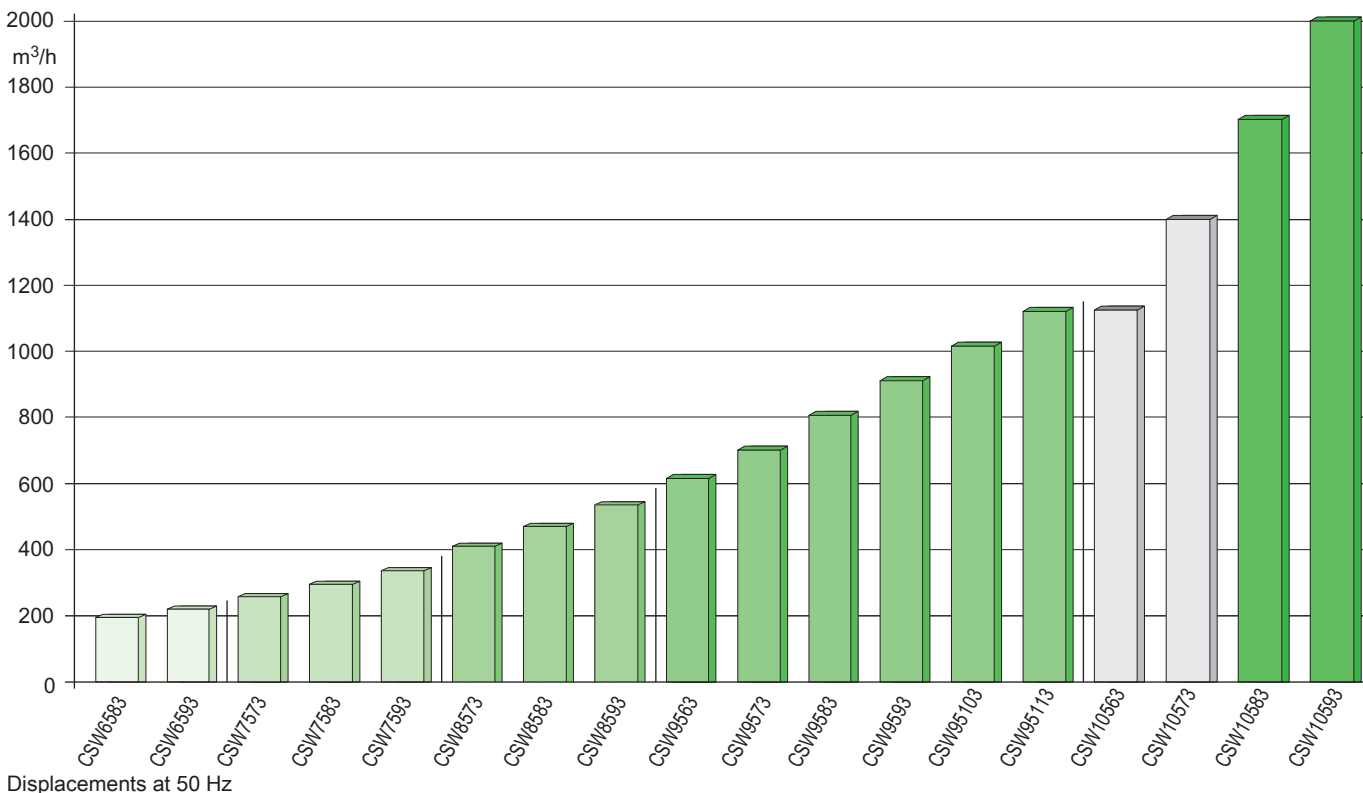
- // optimised for low pressure ratios
- // economiser (ECO) at full load
- // connection for oil and gas return
- // 2 motor sizes can be selected
- // extended refrigerant selection, also A2L

Refrigerants

// R134a // R1234ze(E)
 // R450A // R407C with CSW65 to CSW95
 // R513A // R22 with CSW65 to CSW95
 // R1234yf

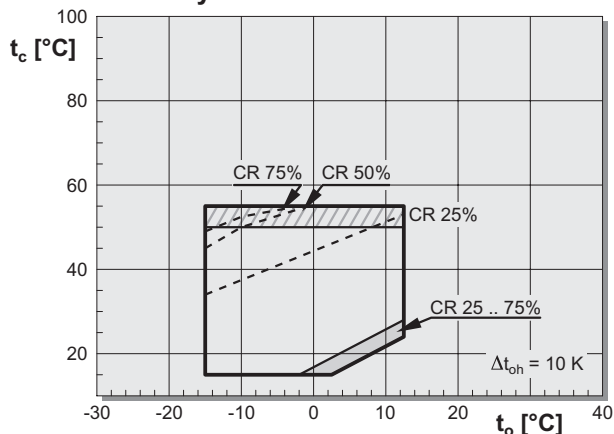


The CSW capacity range

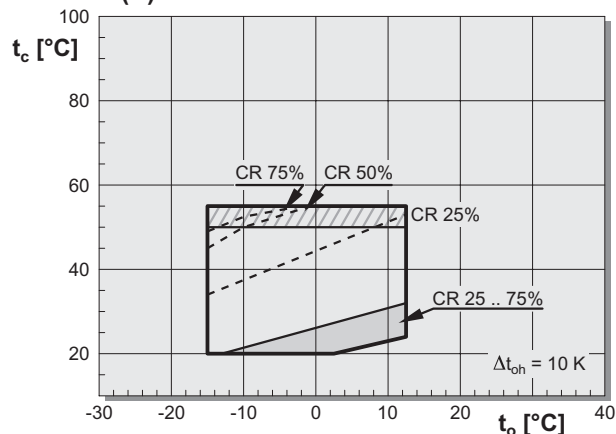


Application limits for CSW

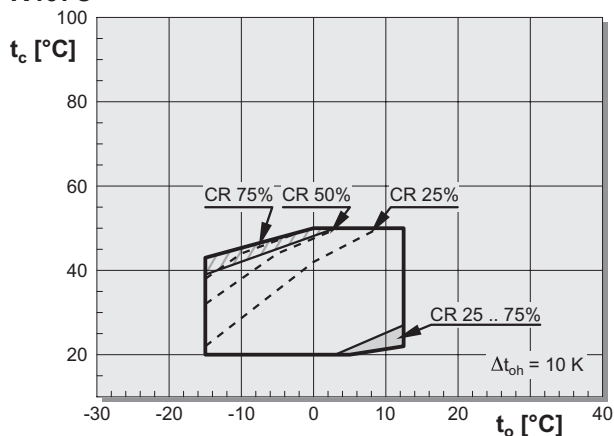
R134a ■ R1234yf ■ R450A ■ R513A



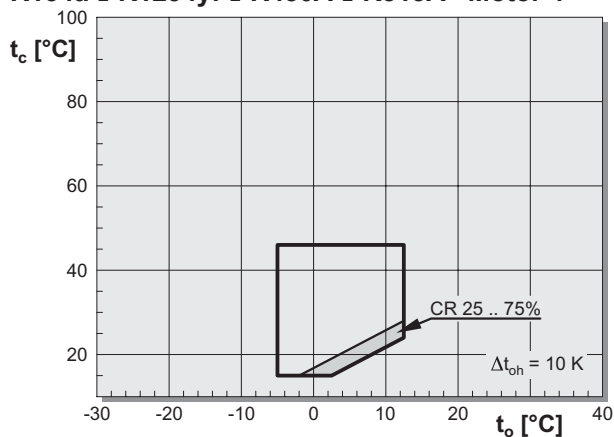
R1234ze(E)



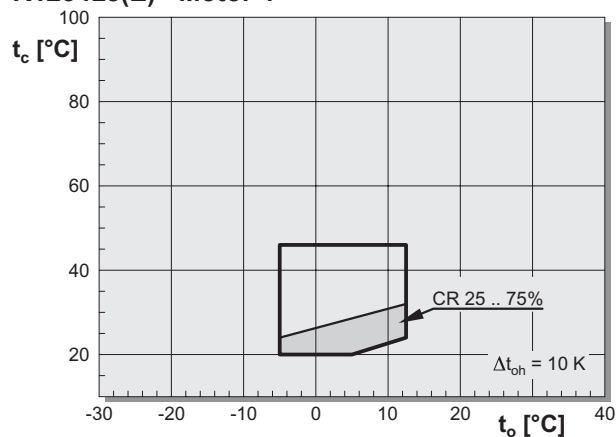
R407C



R134a ■ R1234yf ■ R450A ■ R513A Motor 4



R1234ze(E) Motor 4



Legend

t_o Evaporation temperature (°C)

t_c Condensing temperature (°C)

Δt_{oh} Suction gas superheat (K)

Suction gas superheat max. 5 K

Capacity control CR 25% .. max. CR 75%

Capacity control (CR)

Thermal limits for capacity control (CR) depend on compressor model. The maximum condensing temperature can be restricted with individual models.

Application limits for economiser operation (ECO)

See BITZER SOFTWARE.

CSH.6

Applications

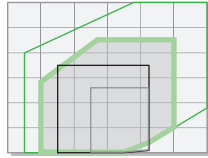
- // air cooled liquid chillers in temperate and cold climate zones
- // data center cooling
- // typical heat pump operation of liquid chillers for air conditioning
- // liquid chillers with high efficiency requirements

Technical details

- // economiser (ECO) at full load
- // optimised for refrigerants with low pressure, also A2L

Refrigerants

- // R134a // R1234yf
- // R450A // R1234ze(E)
- // R513A



CSH.5

Applications for CSH.5 with the most powerful motor

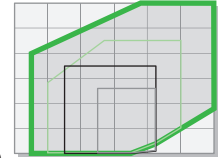
- // very broad and flexible application range
- // data center cooling
- // air cooled liquid chillers for air conditioning for all climate zones
- // heat pumps with high condensing temperatures or low evaporation temperatures
- // process cooling

Technical details

- // economiser (ECO) at full and part load
- // liquid injection (LI)
- // oil cooler connection
- // 2 motor sizes can be selected
- // wide refrigerant selection, also A2L

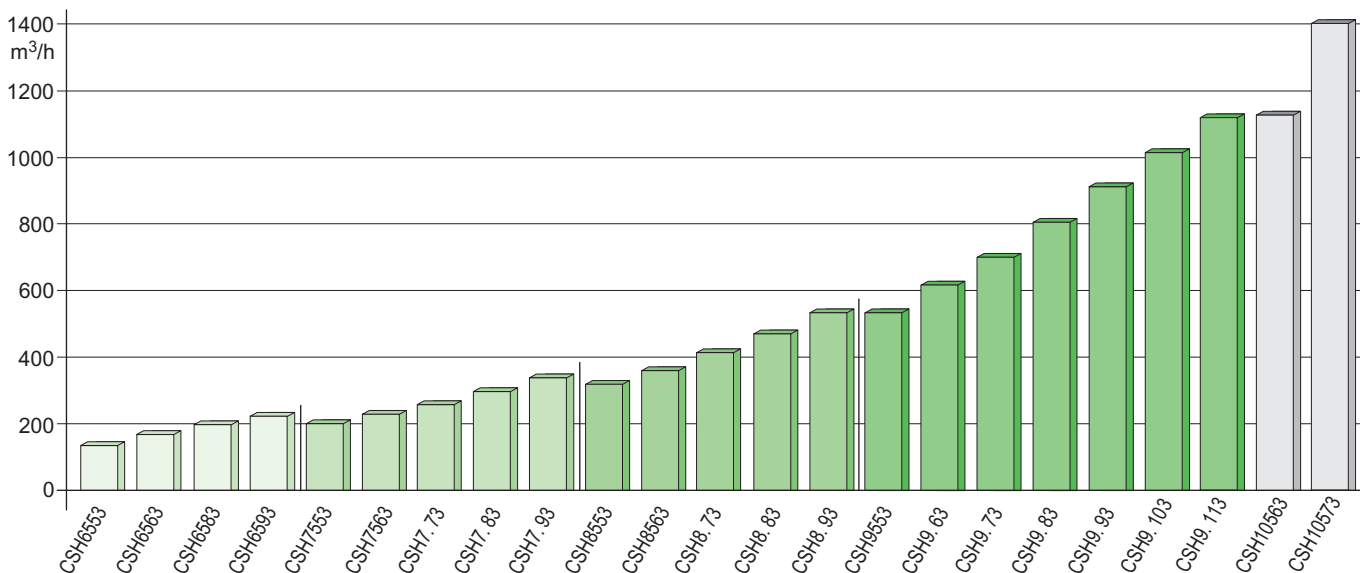
Refrigerants

- // R134a // R407C
- // R450A // R407F
- // R513A // R22
- // R1234yf // R245fa
- // R1234ze(E) // R290: special design CSHP
- // R407A



ATEX

The CSH capacity range

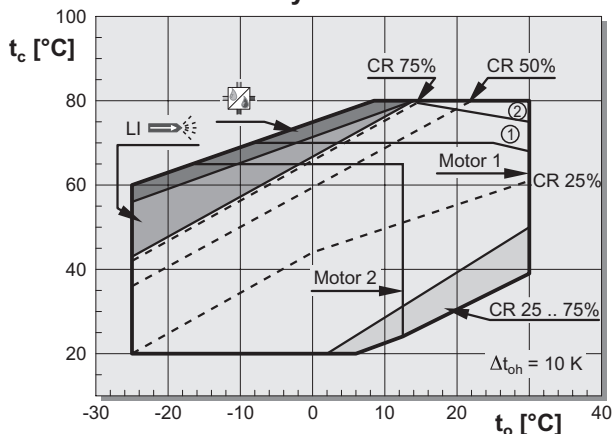


Displacements at 50 Hz

For the operation in ATEX zone 1 and 2 a special design of each CSH.5 compressor is available.

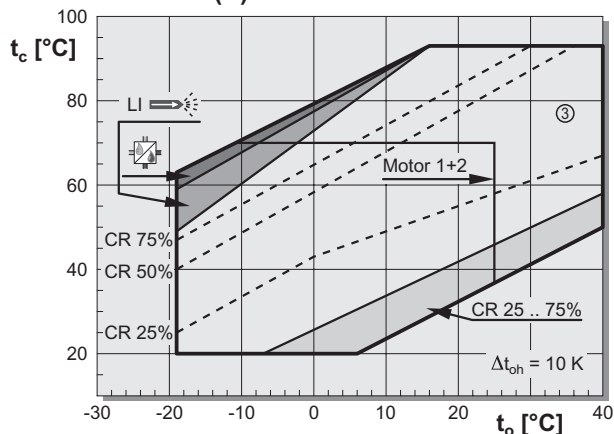
Application limits for CSH

CSH.5: R134a ■ R1234yf ■ R450A ■ R513A

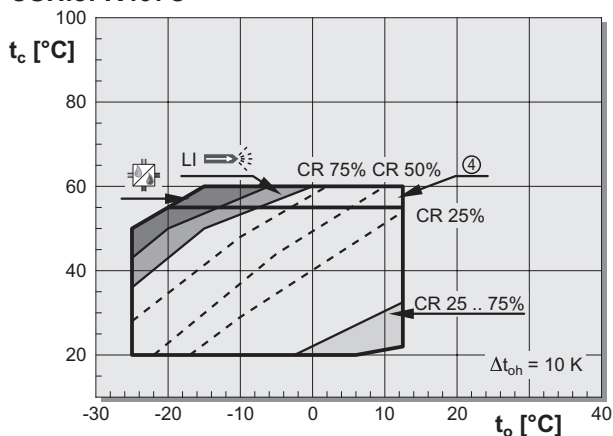


R450A: minimum evaporation temperature: -22°C

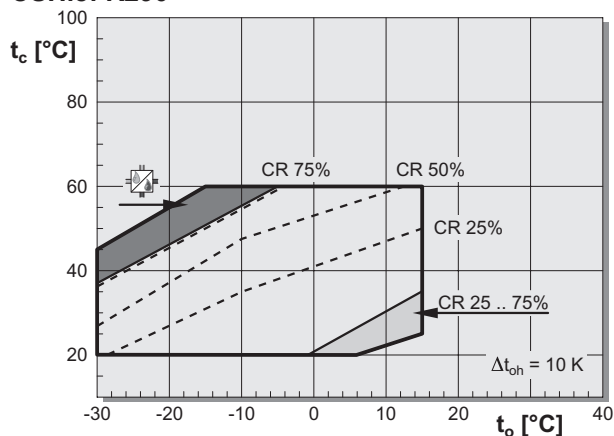
CSH.5: R1234ze(E)



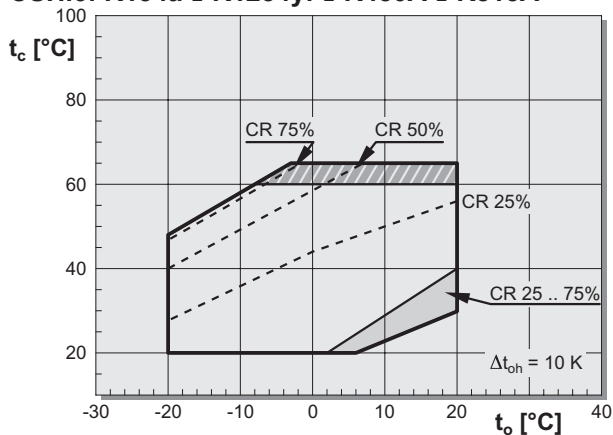
CSH.5: R407C



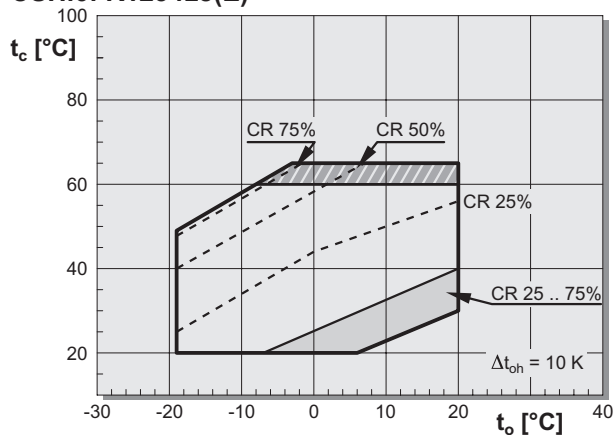
CSH.5: R290



CSH.6: R134a ■ R1234yf ■ R450A ■ R513A



CSH.6: R1234ze(E)



Legend

t_o Evaporation temperature (°C)

t_c Condensing temperature (°C)

Δt_{oh} Suction gas superheat (K)

■ Liquid injection or external oil cooling required.
For part load operation the respective application limits (CR 75%, CR 50% and CR 25%) can be lifted by 5 K condensing temperature through liquid injection (up to the full load limits).

■ External oil cooling required

■ Capacity control CR 25% .. max. CR 75%

■ Operation only possible with BSE170

Further explanations see next page.

Thermal limits:

Thermal limits for capacity control (CR) and additional cooling (liquid injection and external oil cooling) depend on compressor model. The maximum condensing temperature can be restricted with individual models. Individual application limits see BITZER SOFTWARE.

Application limits for economiser operation (ECO)

See BITZER SOFTWARE.

Extended application limits

In the BITZER SOFTWARE not all extended application limits are available. Performance data in these ranges upon request.

Extended ranges for individual compressors

- ① 400 V network operation at 50 Hz for the compressors CSH6553-50Y, CSH6563-60Y, CSH7553-70Y, CSH7563-80Y, CSH7573-90Y, CSH7583-100Y, CSH8553-110Y, CSH8563-125Y, CSH8573-140Y, CSH8593-180Y, CSH9553-180Y, CSH9563-210Y, CSH9573-240Y and CSH9583-280Y
- ② 400 V network operation at 50 Hz for the compressors ① with R450A only
- ③ CSH7553-70Y, CSH7563-80Y, CSH7573-90Y, CSH7583-100Y, CSH8553-110Y, CSH8563-125Y, CSH8573-140Y, CSH8593-180Y, CSH9553-180Y, CSH9563-210Y, CSH9573-240Y and CSH9583-280Y
For operation above 80°C condensing temperature the compressor protection device SE-i1 is required.
- ④ Maximum condensing temperature 55°C for CSH8583, CSH8593, CSH9593 and CSH95103

Application limits for special explosion-proof design

See Operating Instructions SB-179.

Capacity control (CR) and V_i

Capacity control (CR)

- // efficient capacity control by shifting the suction port
- // CSH6 to CSH9 and CSW6 to CSW9
 - easy activation via flanged-on solenoid valves
 - stepless (CR100% $\Leftrightarrow$ CR25%)
 - multistep in three steps (CR100% $\Leftrightarrow$ CR75% $\Leftrightarrow$ CR50% $\Leftrightarrow$ CR25%)
 - alternative operation mode due to different control logics – without modifying the compressor
- // CSW105
 - intelligent compressor module with extended protection concept and slider operation
 - efficient stepless capacity and V_i control due to optimised slider concept (CR100% $\Leftrightarrow$ CR25%)
 - automatic V_i control
 - high efficiency in extended application limits

Automatic start unloading

Operation with external frequency inverter (FI)

- // for complete CS. series
- // with all appropriately sized FI models, vendor independent
- // standard control range 25 .. 60 Hz
- // extended control range also by combining FI+CR in coordination with BITZER
- // Further information see Technical Information ST-420 (online documentation).

CSVH and CSVW

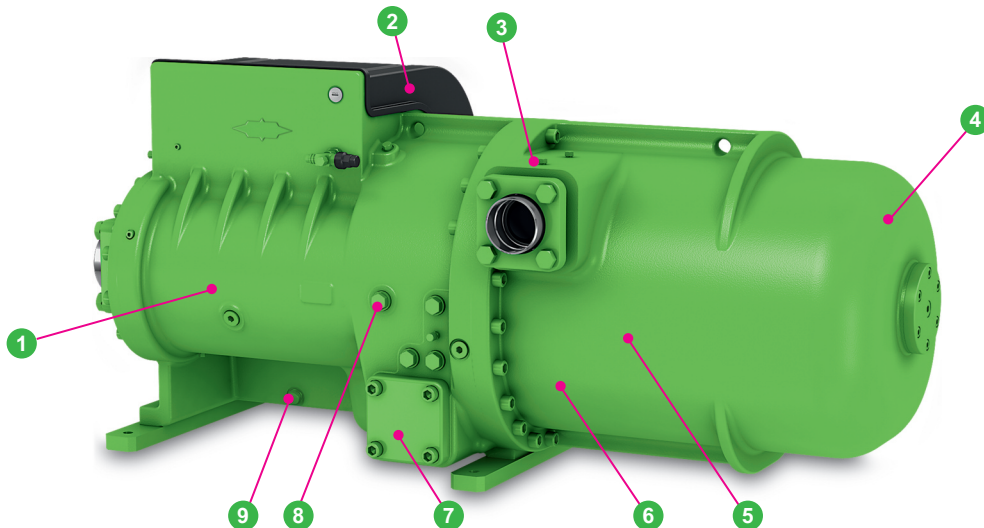
Semi-hermetic compact screw compressors with integrated frequency inverter (FI)

The CSV. compressor series significantly simplifies the installation and stable operation of high efficient variable speed controlled compressors significantly by a pre-wired package with integrated FI, peripheral devices and sensors for compressor protection and monitoring.



The highlights

- // Energy efficient
 - automatic V_i control
 - high efficiency rotor profiles: broad cross sections for high volume flow
 - 3rd generation internal oil management
 - infinite capacity modulation by FI
- // Compact and low weight
 - short length
 - low weight
 - integrated FI
 - low weight per capacity



- 1 Special motors for high speed FI operation
- 2 Integrated FI, specially designed and refrigerant cooled
 - // Enhanced operation monitoring and protection functions
 - // Modbus communication to system controller
- 3 Integrated check valve
- 4 3-stage oil separator, designed for low oil carry over rate
- 5 V_i slider, automatically adopting to operating conditions
- 6 Discharge gas pulsation muffler
- 7 Oil filter
- 8 Economiser connection (ECO)
- 9 Gas permeable plug for A2L use

Easy installation

- // FI, motor, sensors and peripheral devices are pre-wired
- // external wiring minimised
 - only 3 wire power connection cables
 - single phase auxiliary voltage
- // Modbus communication

Applications

- // systems with high part load proportion that meet highest efficiency demands
- // compressor for variable base load

CSVW

optimised for low condensing temperatures:

- // water cooled liquid chillers
- // systems with flooded evaporator

CSVH

optimised for large temperature differences between evaporation and condensation:

- // air cooled liquid chillers
- // process cooling
- // heat pump applications

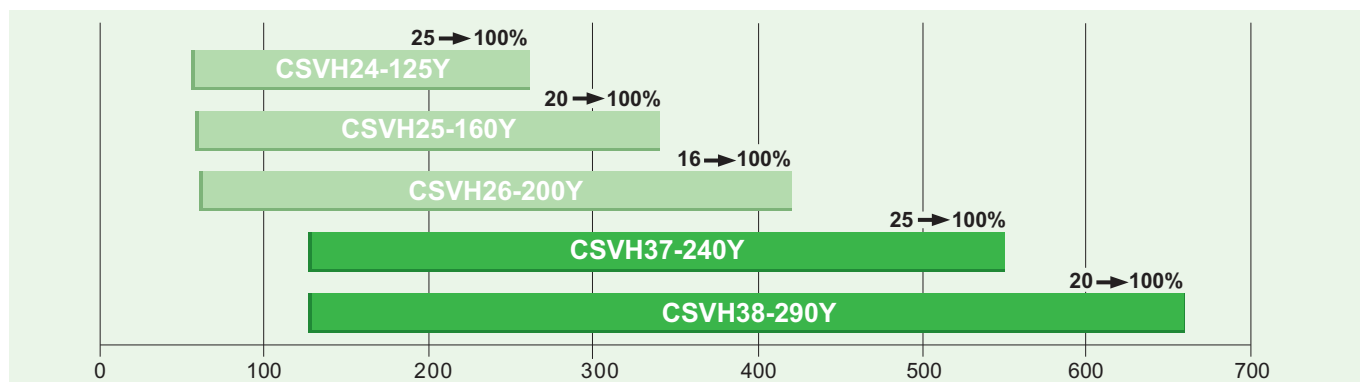
Technical details

- // especially designed V_i for the application
- // important design features adapted from CS. developments
- // control range: down to 16% of full load with automatic V_i adaptation
- // increased compressor availability
 - enhanced operation monitoring
 - improved controllability due to a multilevel alarm system
 - user settings for system adaptation / optimisation

Refrigerants

- // R134a // R1234yf (A2L)
- // R450A // R1234ze(E) (A2L)
- // R513A

The CSVH capacity range



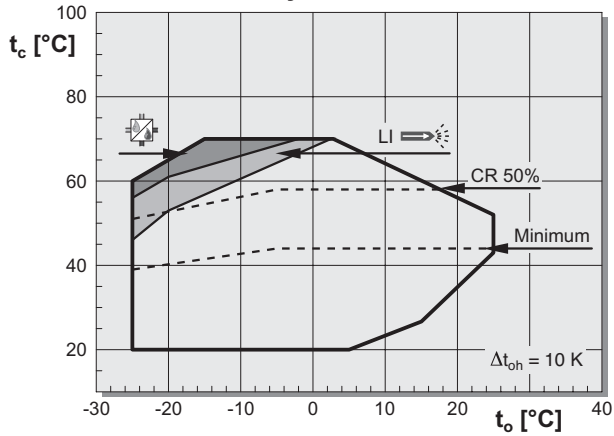
Cooling capacity at typical operating conditions of liquid chillers (to = 5°C) with R134aa

Simple handling and serviceability

- // Pre-wired package
 - integrated FI
 - cooling controls for FI
 - V_i slider control valves
 - low and high pressure transmitters
 - oil temperature sensor
 - oil heater
 - oil level monitoring
- // Simple serviceability
 - suction gas filter with large surface and fine mesh
 - oil sight glass
 - oil valve for maintenance
 - exchangeable oil filter

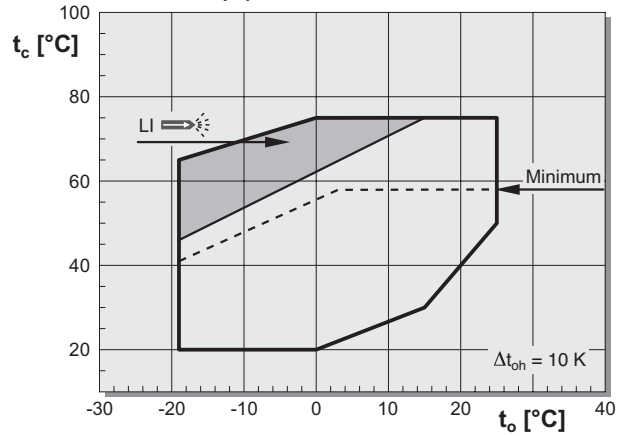
Application limits for CSV.

CSVH: R134a ■ R1234yf ■ R450A ■ R513A

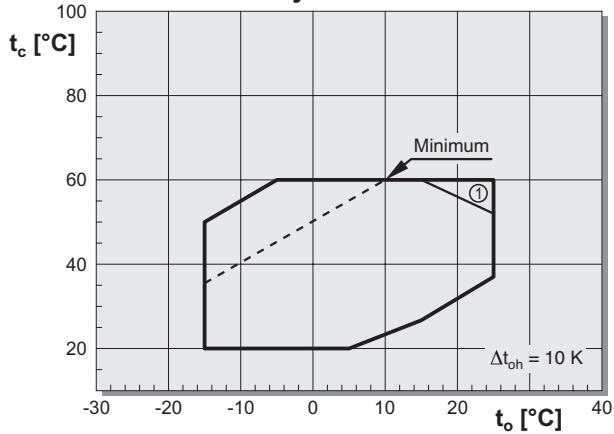


R450A: minimum evaporation temperature: -22°C

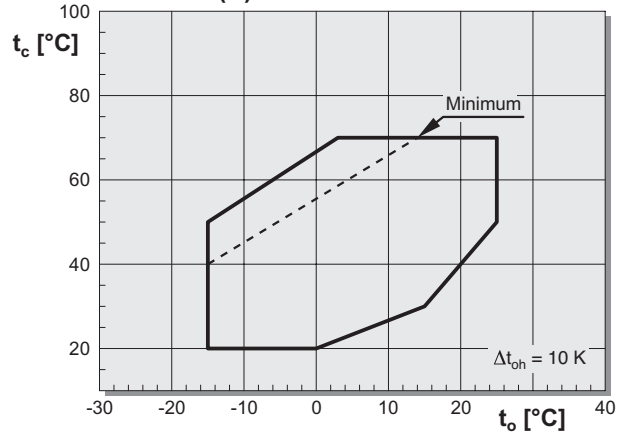
CSVH: R1234ze(E)



CSVW: R134a ■ R1234yf ■ R450A ■ R513A



CSVW: R1234ze(E)



Legend

t_o Evaporation temperature (°C)

t_c Condensing temperature (°C)

Δt_{oh} Suction gas superheat (K)

■ Liquid injection or external oil cooling required

■ External oil cooling required

Extended ranges for individual compressors

① Operation in this range only possible with CSVW2.

Thermal limits

CSVH: Thermal limits for capacity control (CR) and additional cooling (liquid injection and external oil cooling) can be higher depending on compressor.

CSVW: In part load the maximum condensing temperature is restricted, depending on compressor.

Individual application limits see BITZER SOFTWARE.

Application limits for economiser operation (ECO)

See BITZER SOFTWARE.

CSV.: Tuned-in electrics

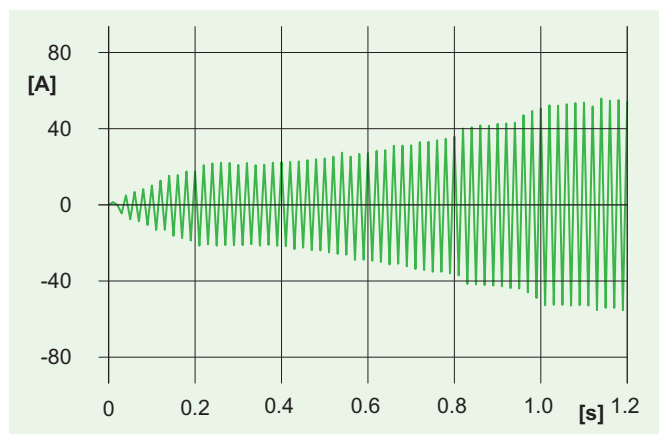
Motor

- // designed for high speed FI operation
- // extra large speed range – up to more than 1 : 6
- // suction gas cooled
- // temperature monitored by FI control

Frequency inverter (FI)

- // designed specifically for CSV. series
 - small size
 - cooling plate with evaporating refrigerant
- // all components designed for full lifetime – no special maintenance required
- // integrated monitoring with warning and alarm functions
- // ready wired monitoring and operating components
- // wide voltage range: nominal 380 .. 480 V at 50 and 60 Hz
- // Bluetooth communication with FI control
- // Modbus communication port to system controller
- // STO function: safe torque off, motor contactor is not necessary
- // softstart function – continuous current rise to operating current without usual inrush peak

Softstart characteristics



Current consumption at compressor start



Optional electrical accessories

- // Line reactor
- // Radio frequency interference filter
- // BEST Interface Converter

Line reactor (L1)

For operation of the compressor, a line reactor is absolutely necessary. It reduces the harmonics which are transmitted to the power supply system by the FI.

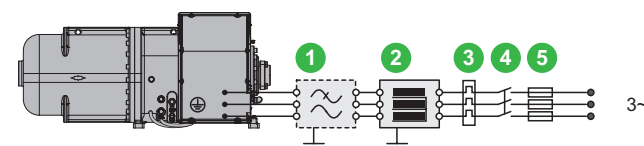
Only with a matching line reactor, the CSV. compressors comply with the category C3 according to EN61800-3:2005. In this case CSV. compressor may be operated at an industrial low voltage network that is separated from the public power supply network by means of a transformer (industrial environment).

RFI filter (Z1)

An RFI filter eliminates the interference waves in the radio frequency range which are emitted by the FI to the power network and which can be radiated by the electric lines. The emitted interference of the FI can be reduced using a line reactor and an RFI filter to such an extent that the compressor can be installed also in residential areas. In this constellation the CSV. compressor has the category C2 according to EN61800-3:2005.

Detailed description see Technical Information ST-160.

Connection of power voltage



- 1 RFI filter
Not necessary in all cases.
- 2 line reactor
- 3 overload protective device
- 4 compressor contactor
Not necessary if STO is used.
- 5 compressor fuse

CSH, CSW, CSVH and CSVW: Accessories overview

Intelligent compressor protection and application limits monitoring

A new generation of intelligent electronics operates, monitors and protects screw compressors beyond the standard requirements and communicates with the superior system controller. Sensors and actors are factory wired and preconfigured by BITZER. This enables quick diagnosis and maintenance.

// communication with system controller

- via RS485 Modbus RTU
- early warning system reports critical system conditions
- warning levels communication close to application limits enables corrective measures by system controller

// monitoring at PC/mobile device via BEST SOFTWARE

- RS485 Modbus RTU with BEST interface converter
- Bluetooth / BEST SOFTWARE communication simplifies maintenance

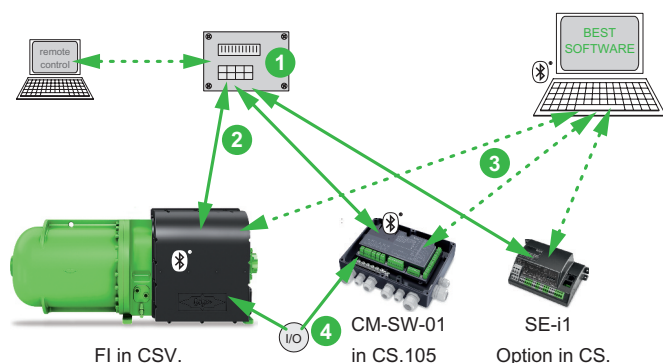
// direct compressor actuation via digital and analogue inputs and outputs

// data logging

- runtime and load statistics
- history of alarm and warning messages

Intelligent compressor control improves system efficiency.

Communication



- 1 System controller
- 2 RS485 Modbus RTU and optional remote control
- 3 RS485 and BEST interface converter or Bluetooth
- 4 Digital and analogue signal inputs and outputs

Compressor monitoring and communication

Compressor protection	SE-E1	SE-E3	SE-i1	CM-SW FU -01	FU
suitable for	CS.6	CS.6	CS.6	CS.105	CSV.
or	CS.7	CS.7	CS.7		
integrated func-tion	CS.8	CS.8	CS.8		
	CS.9	CS.9	CS.9		
motor voltage	200 .. 600 V	600 .. 690 V	200 .. 690 V	83 .. 690 V	
motor frequency	50 / 60 Hz	50 / 60 Hz	FU	FU	
allowable ambient temperature	-30 .. +60°C	-30 .. +60°C	-30 .. +60°C	-30 .. +70°C	-20 .. +55°C
thermal motor monitoring	✓	✓	✓	✓	✓
thermal FI monitoring					✓
suitable for FI operation			✓	✓	integrated
start unloading control				✓	✓
capacity control				✓	✓
V _i -control				✓	✓
oil temperature monitoring	✓	✓	✓	✓	✓
minimum oil level monitoring	✓	✓	✓	✓	✓
oil heater control depending on demand				✓	✓
rotation direction monitoring	✓	✓	✓	✓	safe
Phase failure monitoring	✓	✓	✓	✓	safe
monitoring of overvoltage and undervoltage					✓
overcurrent monitoring					✓
restart delay	✓	✓		✓	✓
cycling rate monitoring			✓	✓	✓
application limits monitoring			✓	✓	✓
low pressure cutout			✓	✓	✓
high pressure switch			✓	✓	✓
status LEDs				✓	
data log			✓	✓	✓
warning level communication close to the application limits			✓	✓	✓
Bluetooth communication				✓	✓
BEST/Modbus communication			✓	✓	✓
CE	✓	✓	✓	✓	✓
UL	✓		✓	✓	✓

Indicate refrigerant when ordering a CSVH, CSVW, CS.105 or a compressor with SE-i1.

Proven accessories

For the CS. and CSV. series, BITZER offers a comprehensive equipment and accessory range.

Equipment and accessories	CSH.5	CSH.6	CSW	CSW105	CSVH	CSVW
suction gas bushing	✓	✓	✓	✓	✓	✓
suction gas valve ①	○	○	○	○	○	○
discharge gas bushing	✓	✓	✓	✓	✓	✓
discharge gas valve ①	○	○	○	○	○	○
check valve discharge gas outlet	✓	✓	✓	✓	✓	✓
muffler for discharge gas line	○	○	○		○	○
compressor protection device SE-E1	✓	✓	✓			
compressor protection device SE-E3	○	○	○			
compressor protection device SE-i1	○	○	○			
compressor module CM-SW-01				✓		
FI					✓	✓
BEST interface converter	○	○	○	○	○	○
line reactor					○	○
RFI filter					○	○
coils for capacity control ②	✓	✓	✓	✓		
coils for V _f -control ②				✓	✓	✓
switch for minimum oil level	○	○	○	✓	✓	✓
switch for maximum oil level	○	○	○	○	○	○
economiser valve ③	○	○	○ ④	○	○	○
adaptor for liquid injection (LI)	○				○	
adaptor for oil cooling	○				○	
adaptor for oil and gas return			○	○		○
oil heater ⑤	✓	✓	✓	✓	✓	✓
terminal box cover heater	○	○	○			
vibration dampers	○	○	○	○	○	○
bridges for direct-on-line start ⑥	S	○	○			
sound insulation hood	○	○	○	○	○	○
sectional sound insulation hood ⑦					○	○
oil charge	✓	✓	✓	✓	✓	✓

✓ mounted equipment, included in standard scope of delivery

S included in standard scope of delivery

○ optional accessory

① up to DN125

② for 230 V 50/60 Hz

③ CSH: with pulsation muffler

④ not with motor 2 and R22 or R407C

⑤ 200 .. 230 V

⑥ not for CS.95103 and CS.95113

⑦ CSV.3 only

Refrigeration oils

The miscibility of the refrigerant in the oil and the change of lubricity at different temperatures are significant for the selection of the suitable refrigeration compressor oil for the respective application.

Series	Standard	Alternative with R22	with R290
CSH.5 Motor 1	BSE170	B320SH	SHC230
CSH.5 Motor 2	BSE170		
CSH.6	BSE170L	BSE170	
CSW Motor 2	BSE170L	BSE170	B320SH
CSW Motor 3	BSE170L	BSE170	
CSW Motor 4	BSE55	BSE170L	
CSVH	BSE170		
CSVW	BSE170L		

The alternative oil is predominantly designated for applications with higher temperatures.

Oil charge code

Final letter in the model designation

// Y: BSE oils

// P: SHC230

// without final letter: B320SH

Oil heater

ensures the lubricity of the oil even after long standstill periods. It prevents increased refrigerant dilution in the oil and therefore a reduction of viscosity. The oil heater must be used during standstill in case of

// outdoor installation of the compressor

// long shut-off periods

// high refrigerant charge

// risk of refrigerant condensation into the compressor

The CM-SW-01 of CSW105 and the FI control of the CSV. series switches the oil heater on and off if required.

The heating capacity depends on the compressor series:

// CSH65 and CSW65: 200 W

// CSH75, CSH76 and CSW75: 200 W

// CSH85, CSH86 and CSW85: 300 W

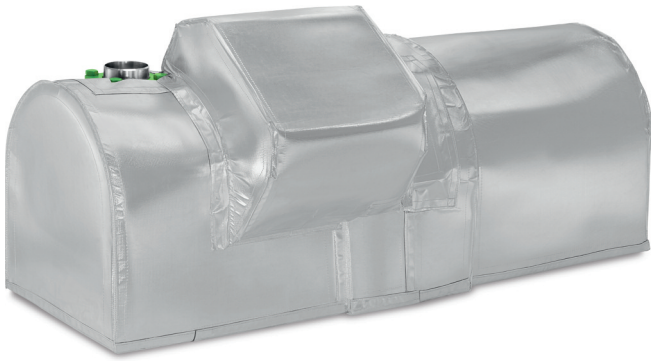
// CSH95, CSH96 and CSW95: 300 W

// CSW105: 300 W

// CSVH2 and CSVW2: 200 W

// CSVH3 and CSVW3: 300 W

Sound insulation hoods



Series	Sound reduction	Weight	Part number
CSH6/CSW6	.. 10 dB(A)	40 kg	37790705
CSH7/CSW7	.. 10 dB(A)	45 kg	37790704
CSH8/CSW8	.. 10 dB(A)	50 kg	37790702
CSH9/CSW9	.. 8 dB(A)	60 kg	37790701
CSVH2/CSVW2	.. 12 dB(A)	45 kg	37790703
CSVH3/CSVW3	.. 10 dB(A)	50 kg	37790801
CSVH3/CSVW3 Sectional sound insulation hood	.. 4 dB(A)	30 kg	37790802

// Efficient sound reduction

- depending on compressor model and mounting situation, up to 12 dB(A)
- effective over the whole frequency range

// Easy to mount and to retrofit

- flexible material
- fastening with Velcro straps
- adapted for every housing series

// Easy to maintain

- Easy access to the oil sight glass and to all connections.
- Pipes and cables can be put through at any place.

// Tested and proven combination of sound absorbing materials

- robust
- water-repellent
- difficult to ignite (class B1 according to DIN4201)
- released only for refrigerants of safety group A1

// Application range

- Within all application limits
- Depending on operating point, the thermal limits for capacity control or additional cooling may be at lower condensing temperatures.
- For an outdoor installation a weather protective housing or a roofing is required.

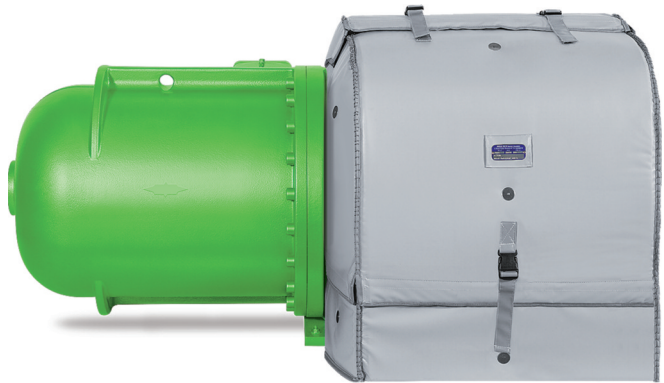
Mounting space

At the highest point and at the sides the sound insulation hood is approximately 40 mm thick.

The hood encloses the whole compressor. For the mounting, a free space of about 100 mm is recommended. The sound insulation hood can be retrofitted even in confined space conditions and if the pipes are already connected.

Sectional sound insulation hood

A sectional sound insulation hood is available for the CSVH3 and CSVW3. It covers the motor, the FI and the compressor side but not the oil separator side.

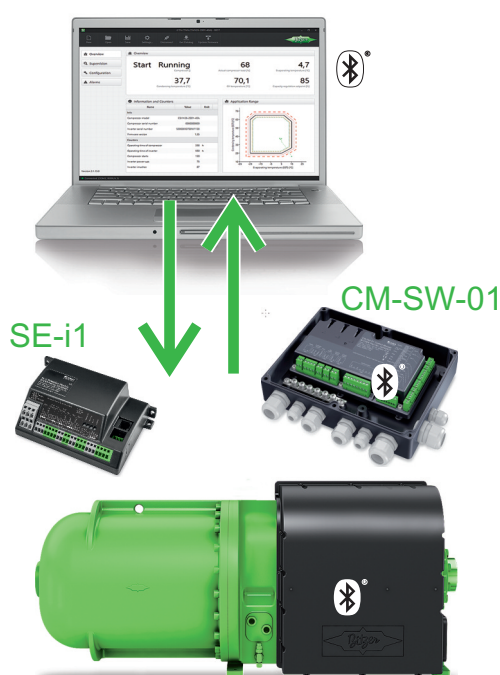


BEST SOFTWARE

Via PC, all BITZER IQ products may be monitored and configured with the BEST SOFTWARE. With its intuitive user interface it displays a complete operating status overview including data log for easy maintenance and service. This is completely in line with our innovation targets.

Communication

// via BEST interface converter or Bluetooth



Easy configuration

- // easy device parameterisation
- // storing and installing of device and compressor setups
- // safe and easy firmware update

Reliable online diagnosis

- // display of all connected sensors, e. g. pressure transmitters, temperature sensors, oil level switches, digital and analogue inputs and outputs
- // current operating point within the application limit
- // current capacity control status

Comfortable analysis

- // data log download and visualisation of all operating parameters
- // alarm list with integrated help function for easy maintenance and service
- // prepared for data analysis via the BITZER DIGITAL NETWORK

New refrigerants with low global warming potential

The semi-hermetic compact screw compressors can be used with new low global warming potential (GWP) refrigerants. These refrigerants are important tools to reach the emission reductions of the EU Regulation 517/2014 and similar scenarios decided worldwide. This application is part of our innovation targets.

The unsaturated fluorinated hydrocarbons (HFO) R1234yf and R1234ze(E), two variants of tetrafluoropropene, play a central role in this. They can be used as pure substance or as components of blends – see also the application limits.

The pure substances R1234yf and R1234ze(E) are classified as flammable in A2L according to ISO817. For the environmentally friendly refrigerant R290 propane, special compressor types CSHP.. are available. As R290 is classified flammable in A3, the compressor protection device is not mounted in the terminal box, but placed separately. For flammable refrigerants, a risk assessment for the system has to be made reflecting the flammability. The system must be constructed in accordance with national or local regulations. If the risk assessment classifies the installation area as an explosion protection zone, the standard CS compressors cannot be used. For installation in ATEX zone 1 and 2 the special explosion-proof compressor versions CSH.5..EXY and CSHP.5..EXP have been designed. Consultation with BITZER is absolutely necessary.

The CSV. compressors have a gas permeable plug in the lower section of the FI housing. In case of leakage, the refrigerant is channeled out at bottom and can be detected by an external gas warning sensor.

Blends such as R450A and R513A are close to R134a in characteristics and performance and are also not flammable. They can be used with the same safety measures as for systems with R134a.

Further information on these refrigerants can be found in Refrigerant Report A-501.

Performance data for the entire application range are available in the BITZER SOFTWARE.

For example, a current system designed for R134a can be converted to R513A at a later time (A1-Drop-In). Taking into account flammability, it will be possible to also use R1234yf for certain systems later.





Model designation

CSH- and CSW-Serie

Example

	CSW 7573 - 60 Y - 40P
Semi-hermetic compact screw compressor	CSW 7573 - 60 Y - 40P
Application range	CSW 7 573 - 60 Y - 40P
Housing size	CSW 75 7 3 - 60 Y - 40P
Compressor execution	CSW 757 3 - 60 Y - 40P
Displacement	CSW 757 3 - 60 Y - 40P
Compressor execution	CSW 7573 - 60 Y - 40P
Motor size	CSW 7573 - 60 Y - 40P
Oil charge: polyolester oil	CSW 7573 - 60 Y - 40P
Motor code	

CSVH- and CSVW-Serie

Example

	CSVW 25 - 160 M Y - 40M
Semi-hermetic compact screw compressor	CSVW 25 - 160 M Y - 40M
Speed controlled	CSVW 25 - 160 M Y - 40M
Application range	CSVW 2 5 - 160 M Y - 40M
Housing size	CSVW 2 5 - 160 M Y - 40M
Size of frequency inverter	CSVW 25 - 160 M Y - 40M
Motor size	CSVW 25 - 160 M Y - 40M
Permanent magnet motor	CSVW 25 - 160 M Y - 40M
Oil charge: polyolester oil	CSVW 25 - 160 M Y - 40M
Motor code	

Special versions

Example

	CSHP 8563 - 125 EX P - 40P
Semi-hermetic compact screw compressor	CSHP 8563 - 125 EX P - 40P
Application range	CSHP P 8563 - 125 EX P - 40P
Special version for R290	CSHP 8 563 - 125 EX P - 40P
Housing size	CSHP 8 5 63 - 125 EX P - 40P
Compressor execution	CSHP 85 6 3 - 125 EX P - 40P
Displacement	CSHP 856 3 - 125 EX P - 40P
Compressor execution	CSHP 8563 - 125 EX P - 40P
Motor size	CSHP 8563 - 125 EX P - 40P
Ex protection special version	CSHP 8563 - 125 EX P - 40P
Oil charge: SHC230	CSHP 8563 - 125 EX P - 40P
Motor code	

Performance data



The BITZER SOFTWARE is available in many languages as a download for Windows as well as a web-based version. It is compatible with any browser and always up to date. The program is also suitable for tablets and smartphones.

The BITZER SOFTWARE covers:

- // Performance data for all common refrigerants under freely selectable operating conditions
 - // All relevant technical data
 - // Application limits
 - // Calculation results and individually defined performance tables for compressors
 - // Seasonal calculation
 - // Dimensional drawings
 - // Parallel compounds
 - // Available accessories and their selection
 - // All relevant technical documents
 - // Further BITZER products
- bitzer-software.com

Reference points for evaporating and condensing pressures

Connection positions 1 (HP) and 3 (LP) on the compressor (see dimensional drawing). The pressure drop for shut-off valves and check valves has not been taken into consideration. This is the worldwide state of the art for compact screws, as in factory-produced chillers shut-off valves are often not used and the check valve can also be arranged as an external component in the discharge gas line. For the sake of the international comparability of performance data, this standard was also taken over for the compact screw compressors.

Performance data

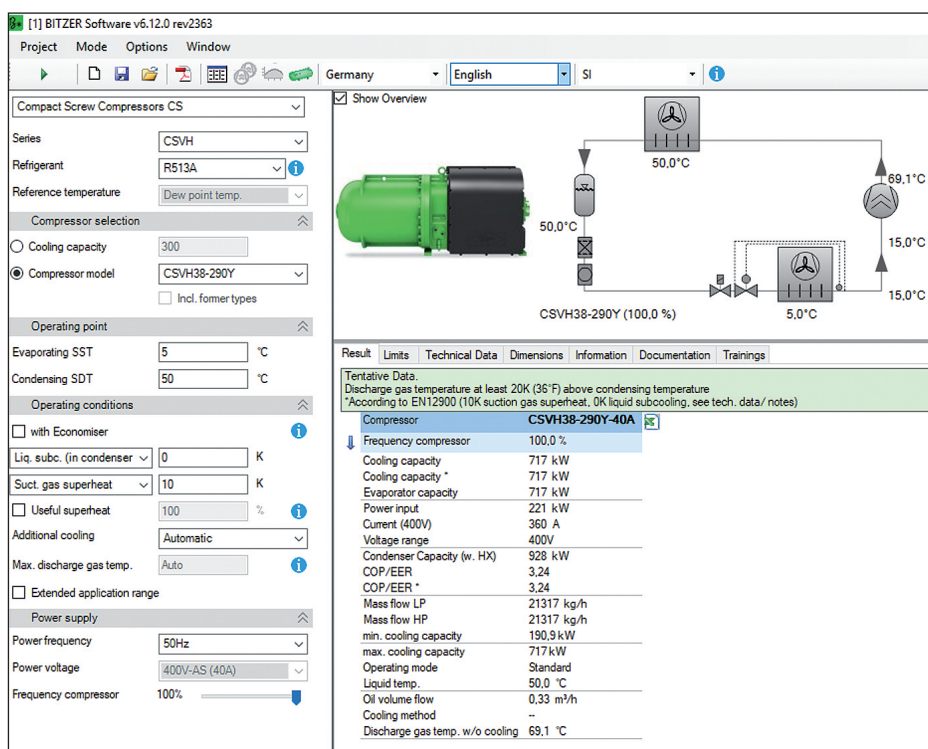
Performance data are based on the European Standard EN12900 and 50 Hz operation based on 10 K suction gas superheat, without liquid subcooling. Therefore the rated cooling capacity shows lower values in comparison to data based on 5 or 8.3 K of subcooling.

Evaporating and condensing temperatures correspond to "dew point values" (saturated vapor conditions).

The specified power consumption of the CSV. series includes the operation with frequency inverter and line reactor.

Individual operating points

For detailed compressor selection with the option of individual input data of all load conditions the BITZER SOFTWARE is available.



Result	Limits	Technical Data	Dimensions	Information	Documentation	Trainings
Tentative Data.						
Discharge gas temperature at least 20K (36 °F) above condensing temperature						
*According to EN12900 (10K suction gas superheat, 0K liquid subcooling, see tech. data/ notes)						
Compressor		CSVH38-290Y-40A				
Frequency compressor		100.0 %				
Cooling capacity		717 kW				
Cooling capacity *		717 kW				
Evaporator capacity		717 kW				
Power input		221 kW				
Current (400V)		360 A				
Voltage range		400V				
Condenser Capacity (w. HX)		928 kW				
COP/EER		3.24				
COP/EER *		3.24				
Mass flow LP		21317 kg/h				
Mass flow HP		21317 kg/h				
min. cooling capacity		190.9 kW				
max. cooling capacity		717 kW				
Operating mode		Standard				
Liquid temp.		50.0 °C				
Oil volume flow		0.33 m³/h				
Cooling method		-				
Discharge gas temp. w/o cooling		69.1 °C				

Technical data: CSH

Compressor model	Motor version	Displacement 50/60 Hz m ³ /h ^①	Refrigerating capacity Q ₀				Oil charge dm ³	Motor connection ②	Maximum operating current A	Maximum power consumption kW
			R134a R1234yf ^③ R513A ^③ t ₀ /t _c 5°C/50°C kW	R1234ze(E) t ₀ /t _c 5°C/50°C kW	R407C t ₀ /t _c 5°C/50°C kW	R290 t ₀ /t _c 5°C/50°C kW				
CSH6553-35Y	2	137/165	75.6	57.0	—	—	9.5	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ	58	34
CSH6553-50(Y)	1	137/165	75.1	56.6	106.4	—	9.5		86	52
CSHP6553-50P	1	137/165	—	—	—	97.6	9.5		86	52
CSH6563-40Y	2	170/205	94.3	71.3	—	—	9.5		66	41
CSH6563-60(Y)	1	170/205	94.3	71.3	133.7	—	9.5		108	65
CSHP6563-60P	1	170/205	—	—	—	122.5	9.5		108	65
CSH6583-50Y	2	195/236	108.8	82.1	—	—	9.5		86	51
CSH6593-60Y	2	220/266	122.8	92.6	—	—	9.5		108	56
CSH7553-50Y	2	197/238	106.7	80.7	—	—	15		79	52
CSH7553-70(Y)	1	197/238	108.4	82.0	155.0	—	15		128	78
CSHP7553-70P	1	197/238	—	—	—	140.9	15		128	78
CSH7563-60Y	2	227/274	125.8	95.1	—	—	15		98	65
CSH7563-80(Y)	1	227/274	125.0	94.5	175.4	—	15		144	88
CSHP7563-80P	1	227/274	—	—	—	162.5	15		144	88
CSH7673-70Y	2	258/311	150.2	114.5	—	—	15		123	73
CSH7573-70Y	2	258/311	144.6	109.4	—	—	15		124	78
CSH7573-90(Y)	1	258/311	145.0	109.7	204	—	15		162	96
CSHP7573-90P	1	258/311	—	—	—	188.5	15		162	96
CSH7683-80Y	2	295/356	174.9	131.7	—	—	15		140	83
CSH7583-80Y	2	295/356	168.6	127.2	—	—	15		144	88
CSH7583-100(Y)	1	295/356	169.1	127.6	238	—	15		170	102
CSHP7583-100P	1	295/356	—	—	—	220	15		170	102
CSH7693-90Y	2	336/406	199.2	150.6	—	—	15		160	96
CSH7593-90Y	2	336/406	192.0	144.9	—	—	15		162	93
CSH7593-110(Y)	1	336/406	192.5	145.3	270	—	15		180	112
CSHP7593-110P	1	336/406	—	—	—	250	15		180	112
CSH8553-80Y	2	315/380	177.5	134.0	—	—	22	400V(±10%) Δ/Δ-3-50Hz 460V(±10%) Δ/Δ-3-60Hz part winding	144	88
CSH8553-110(Y)	1	315/380	181.7	137.2	257	—	22		185	112
CSHP8553-110P	1	315/380	—	—	—	236	22		185	112
CSH8563-90Y	2	359/433	205	154.4	—	—	22		155	96
CSH8563-125(Y)	1	359/433	207	155.9	293	—	22		216	132
CSHP8563-125P	1	359/433	—	—	—	269	22		216	132
CSH8673-110Y	2	410/495	243	184.1	—	—	22		195	114
CSH8573-110Y	2	410/495	240	180.5	—	—	22		182	110
CSH8573-140(Y)	1	410/495	239	179.7	338	—	22		246	150
CSHP8573-140P	1	410/495	—	—	—	311	22		246	150
CSH8683-125Y	2	470/567	273	210	—	—	19		221	129
CSH8583-125Y	2	470/567	265	199.9	—	—	19		196	120
CSH8583-160(Y)	1	470/567	259	195.4	379	—	19		260	160
CSHP8583-160P	1	470/567	—	—	—	337	19		260	160
CSH8693-140Y	2	535/646	311	237	—	—	19		254	148
CSH8593-140Y	2	535/646	301	228	—	—	19		214	131
CSH8593-180(Y)	1	535/646	302	229	455	—	19		310	186
CSHP8593-180P	1	535/646	—	—	—	393	19		310	186
CSH9553-180(Y)	1	535/646	304	231	444	—	30	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ	330	205
CSHP9553-180P	1	535/646	—	—	—	395	30		330	205
CSH9663-160Y	2	615/742	361	276	—	—	30		291	173
CSH9563-160Y	2	615/742	357	264	—	—	30		280	155
CSH9563-210(Y)	1	615/742	354	262	505	—	30		370	246
CSHP9563-210P	1	615/742	—	—	—	461	30		370	246
CSH9673-180Y	2	700/845	420	316	—	—	30		333	200
CSH9573-180Y	2	700/845	417	310	—	—	30		310	175
CSH9573-240(Y)	1	700/845	409	304	601	—	30		420	255
CSHP9573-240P	1	700/845	—	—	—	532	30		420	255
CSH9683-210Y	2	805/972	486	366	—	—	30		383	226
CSH9583-210Y	2	805/972	480	358	—	—	30		320	204
CSH9583-280(Y)	1	805/972	472	352	689	—	30		450	280
CSHP9583-280P	1	805/972	—	—	—	613	30		450	280
CSH9693-240Y	2	910/1098	552	414	—	—	30		360	255
CSH9593-240Y	2	910/1098	546	407	—	—	30		360	222
CSH9593-300(Y)	1	910/1098	546	407	783	—	30		450	280
CSHP9593-300P	1	910/1098	—	—	—	710	30		450	280
CSH96103-280Y	2	1015/1225	594	454	—	—	32		456	271
CSH95103-280Y	2	1015/1225	588	440	—	—	32		413	254
CSH95103-320(Y)	1	1015/1225	588	440	868	—	32		566	332
CSHP95103-320P	1	1015/1225	—	—	—	765	32		566	332
CSH96113-320Y	2	1120/1351	651	507	—	—	32		510	301
CSH95113-320Y	2	1120/1351	644	481	—	—	32		447	277

Technical data: CSW

Compressor model	Motor version	Displacement 50/60 Hz m ³ /h ^①	Refrigerating capacity Q ₀			Oil charge dm ³	Motor connection ②	Maximum operating current A	Maximum power consumption kW
			R134a R1234yf ^③ R513A ^③ t ₀ /t _c 5°C/38°C kW	R1234ze(E) t ₀ /t _c 5°C/38°C kW	R407C t ₀ /t _c 5°C/38°C kW				
CSW6583-40Y	3	195/236	126.6	94.2	–	9.5	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ	57	34
CSW6583-50(Y)	2	195/236	–	–	183,4	9.5		92	55
CSW6593-50Y	3	220/266	142.5	106.1	–	9.5		84	47
CSW6593-60(Y)	2	220/266	–	–	217	9.5		105	62
CSW7573-60Y	3	258/311	174.3	129.8	–	15		76	45
CSW7573-70(Y)	2	258/311	–	–	255	15		123	73
CSW7583-70Y	3	295/356	198.3	147.7	–	15		86	52
CSW7583-80(Y)	2	295/356	–	–	290	15		140	83
CSW7593-80Y	3	336/406	226	168.2	–	15		98	59
CSW7593-90(Y)	2	336/406	–	–	330	15		160	95
CSW8573-80Y	4	410/495	282	210	–	22	400V(±10%) Δ/Δ-3-50Hz 460V(±10%) Δ/Δ-3-60Hz part winding	118	69
CSW8573-90Y	3	410/495	283	211	–	22		116	72
CSW8573-110(Y)	2	410/495	–	–	412	22		173	106
CSW8583-90Y	4	470/567	309	230	–	19		135	76
CSW8583-110Y	3	470/567	306	228	–	19		177	96
CSW8583-125(Y)	2	470/567	–	–	455	19		221	127
CSW8593-110Y	4	535/646	349	260	–	19		156	85
CSW8593-125Y	3	535/646	349	260	–	19		203	109
CSW8593-140(Y)	2	535/646	–	–	517	19		254	144
CSW9563-125Y	4	615/742	431	320	–	30	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ	192	105
CSW9563-140Y	3	615/742	425	316	–	30		233	132
CSW9563-160(Y)	2	615/742	–	–	624	30		291	175
CSW9573-140Y	4	700/845	482	352	–	30		213	118
CSW9573-160Y	3	700/845	486	355	–	30		266	147
CSW9573-180(Y)	2	700/845	–	–	714	30		333	198
CSW9583-160Y	4	805/972	565	421	–	30		238	133
CSW9583-180Y	3	805/972	558	416	–	30		306	167
CSW9583-210(Y)	2	805/972	–	–	829	30		383	223
CSW9593-180Y	4	910/1098	640	476	–	30		263	149
CSW9593-210Y	3	910/1098	634	472	–	30		345	186
CSW9593-240(Y)	2	910/1098	–	–	940	30		431	252
CSW95103-210Y	4	1015/1225	687	511	–	32		307	171
CSW95103-240Y	3	1015/1225	686	510	–	32		378	220
CSW95103-280(Y)	2	1015/1225	–	–	1012	32		456	272
CSW95113-240Y	4	1120/1351	771	574	–	32		335	186
CSW95113-280Y	3	1120/1351	760	566	–	32		411	240
CSW95113-320(Y)	2	1120/1351	–	–	1123	32		510	297
CSW10583-290Y	4	1700/2052	④	④	–	32		④	④
CSW10583-360Y	3	1700/2052	1183	879	–	32		571	340
CSW10593-360Y	4	2000/2414	④	④	–	32		④	④
CSW10593-400Y	3	2000/2414	1403	1043	–	32		635	381

① 50 Hz: 2900 min⁻¹, 60 Hz bei 3500 min⁻¹

② Basis for motor data:

CSH65, CSH75 and CSH85: part winding motor (PW, Δ/ΔΔ).

Data for Y/Δ design upon request.

CSH95: star-delta motor (Y/Δ)

Consider the maximum operating current for the selection of contactors, cables and fuses.

Contactors: operational category AC3.

PW: Select both motor contactors for approx. 60% of the maximum operating current.

Y/Δ: Select the contactors according to contactor manufacturer's instructions. Consider the maximum operating current.

③ The indicated cooling capacity is valid for R134a. Deviations of cooling capacities: R1234yf: 5°C/50°C approx. 94% and 5°C/38°C approx. 97%. R513A: 5°C/50°C approx. 101% and 5°C/38°C approx. 104%.

④ Data upon request.



Technical Data: CSVH and CSVW

Compressor model	Displacement at maximum speed m ³ /h	Refrigerating capacity Q ₀ ①				Oil charge dm ³	Motor connection	Maximum operating current ②		Maximum power consumption kW
		R134a		R1234ze(E)				A ③	A ④	
		t ₀ / t _c 5°C / 50°C kW	t ₀ / t _c -10°C / 45°C kW	t ₀ / t _c 5°C / 50°C kW	t ₀ / t _c -10°C / 45°C kW					
CSVH24-125Y	464	281	161	213	118	18	380...480V / 3 / 50 Hz 380...480V / 3 / 60 Hz	220	190	130
CSVH25-160Y	580	358	203	271	149	18		260	225	167
CSVH26-200Y	725	439	246	326	176	18		340	290	198
CSVH37-240Y	960	593	338	446	250	35		420	370	250
CSVH38-290Y	1156	712	405	536	300	35		490	430	290
CSVW24-125MY	464	285	160	215	118	18	380...480V / 3 / 50Hz 380...480V / 3 / 60Hz	220	190	126
CSVW25-160MY	580	359	201	265	145	18		260	225	162
CSVW26-200MY	725	439	245	327	174	18		340	290	198
CSVW37-240Y	1000	582	328	437	243	35		420	370	250
CSVW38-290Y	1206	705	399	526	292	35		490	430	290

Indicate refrigerant when ordering the compressor.

① Performance data at maximum compressor speed. They are based on the European Standard EN12900 and 50 Hz operation, relating to 10 K suction gas superheat without liquid subcooling. Performance data for individual operating conditions and part load operation for see BITZER SOFTWARE.

② Consider the max. operating current or max. power consumption at max. speed for the selection of cables and fuses.
Fuses: Semiconductor fuses with aR or gR characteristics

③ Nominal supply voltage
(FI input voltage)
400V-3-50/60Hz

④ Nominal supply voltage
(FI input voltage)
460V-3-50/60Hz

Dimensional drawings

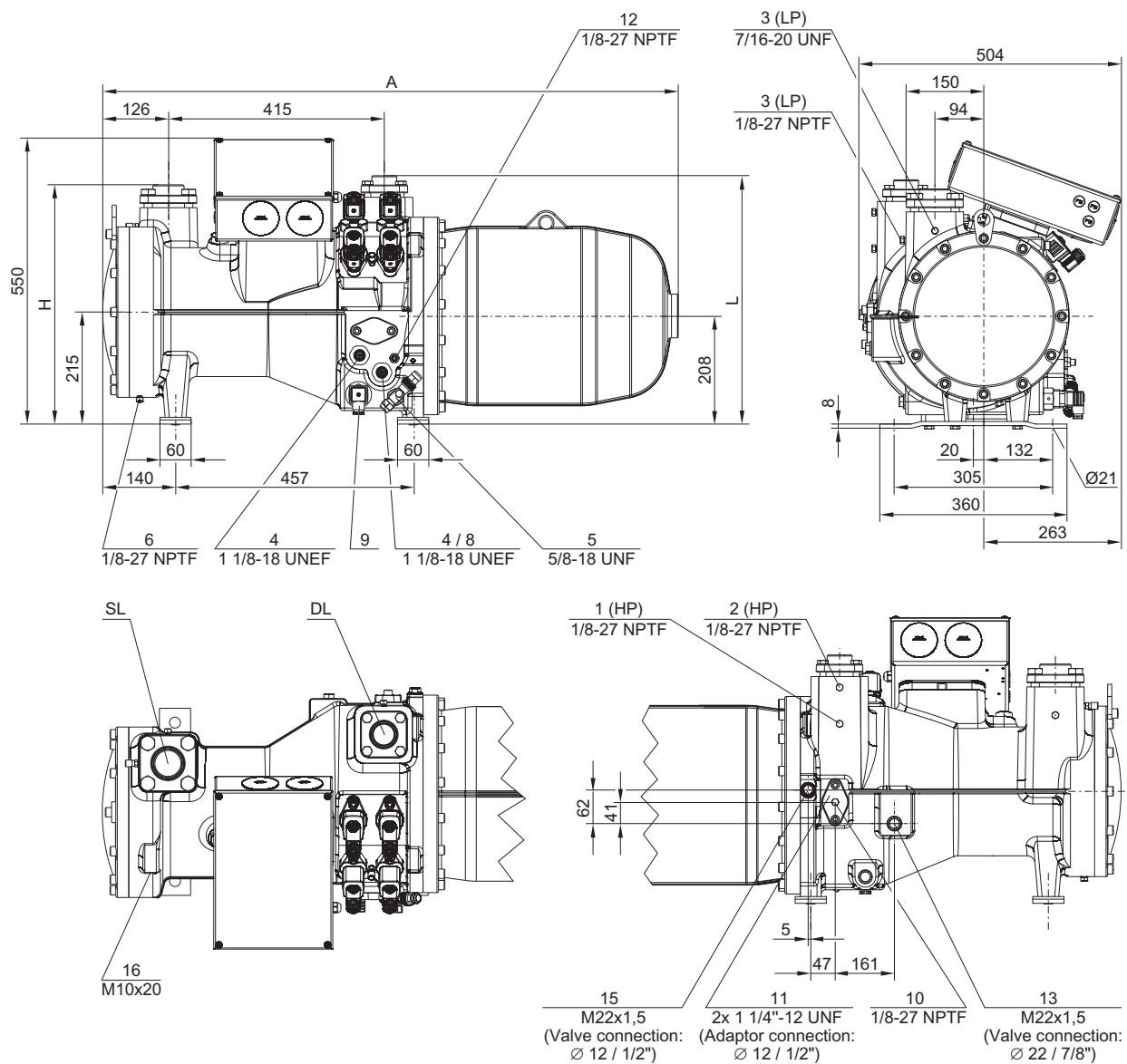
The following pages show the dimensional drawings of the compressors in their standard scope of delivery. CAD data of the compressors including all options can be found as 2D dxf drawings and 3D STP models on the website www.bitzer.de and in the BITZER SOFTWARE.

Connection positions

1	High pressure connection (HP): Connection for high pressure switch (HP)
2	Additional high pressure connection (HP)
2a	Connection for high pressure transmitter (HP) CS.105: connected to the compressor module
3	Low pressure connection (LP): Connection for low pressure switch (LP)
3a	Connection for low pressure transmitter (LP) CS.105: connected to the compressor module
4	Oil sight glass
5	Oil valve for maintenance (standard scope of delivery) / connection for oil equalisation (with parallel operation)
6	Oil drain plug (motor housing)
8	Connection for opto-electronic oil level switch (OLCD1-S) CS.105: connected to the compressor module CSV.: integrated into FI control
9	Oil heater with heater sleeve (standard) CS.105: connected to the compressor module CSV.: integrated into FI control
10	Oil pressure connection
11	Connections for external oil cooler (optional adaptor)
11a	Outlet to oil cooler
11b	Inlet/return from oil cooler
12	Oil temperature sensor CS.105: connected to the compressor module CSV.: integrated into FI control
13	Connection for economiser (ECO, optional shut-off valve, CSH and CSVH with pulsation muffler)
14	Threaded bore for pipe fixture for ECO or LI line
15	Connection for liquid injection (LI, optional shut-off valve)
16	Earth screw for housing
17	CSW and CSVW only: Connection for oil and gas return (for systems with flooded evaporator, optional adaptor)
18	Oil filter (maintenance connection)
19	FI cooling (liquid refrigerant)
20	Frequency inverter (FI)
21	Oil injection valve (internal)
22	Compressor module
23	Slider position indicator
24	Gas permeable plug
SL	Suction gas line
DL	Discharge gas line
X	Removal space for oil filter
X1 .. X4	Plan a removal space for FI housing.

Dimensional drawings

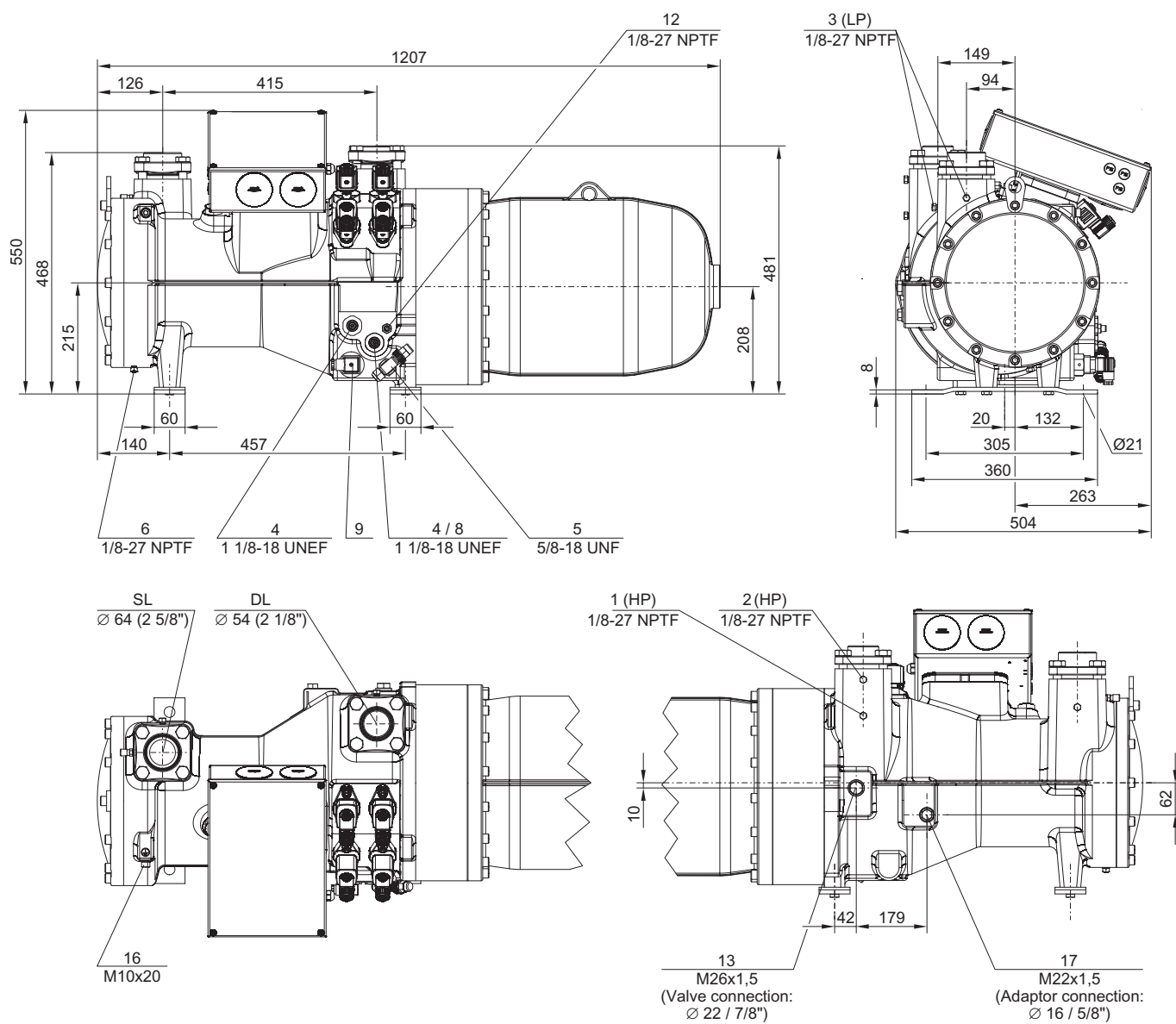
CSH65



	A mm	H mm	L mm	DL mm	SL mm
CSH6553	1107	460	478	Ø42 (1 ⁵ / ₈ "	Ø54 (2 ¹ / ₈ "
CSH6563					
CSH6583	1207	470	481	Ø54 (2 ¹ / ₈ "	Ø64 (2 ⁵ / ₈ "
CSH6593					

Dimensional drawings

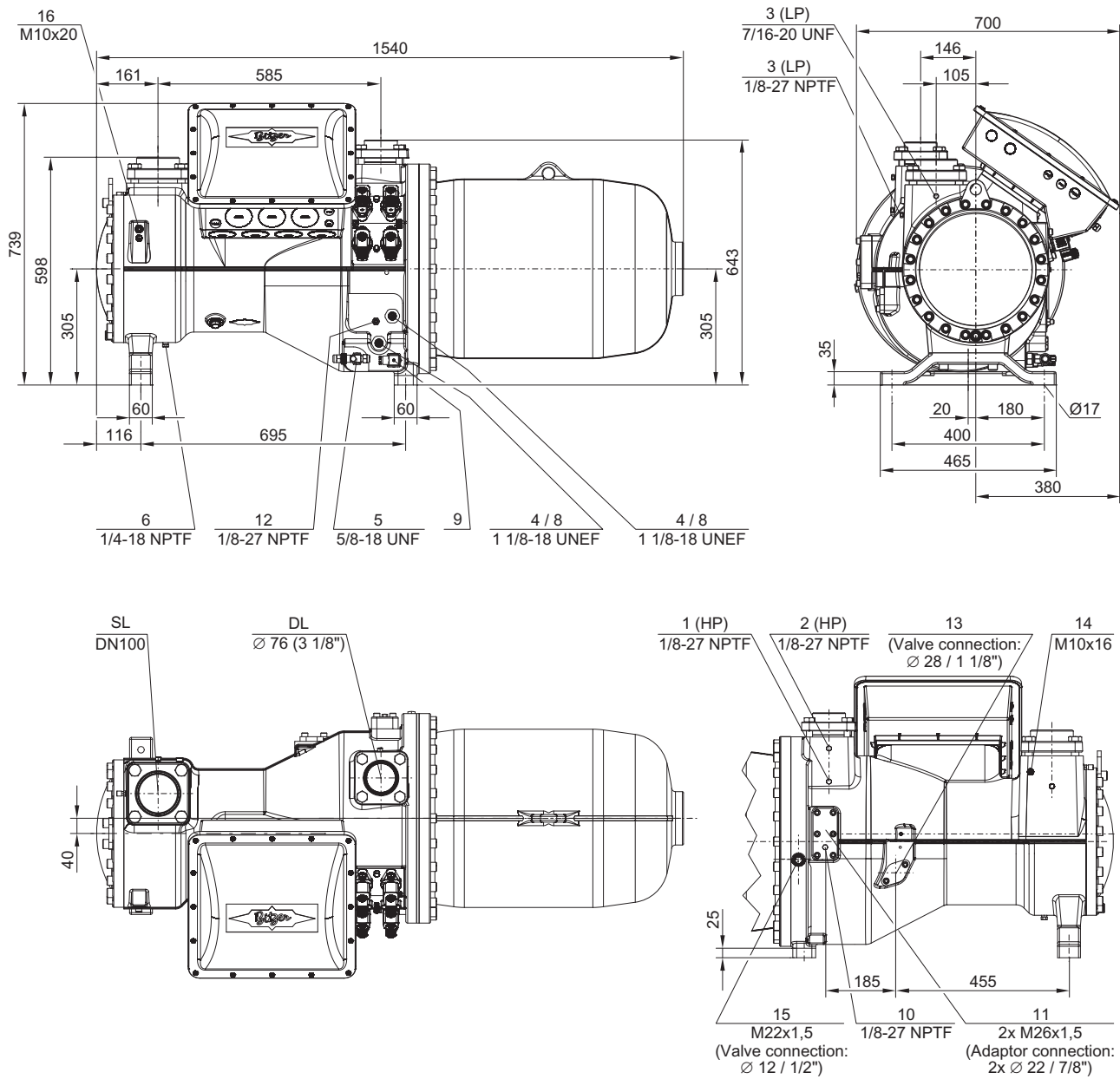
CSW65



Connection positions see page 25.

Dimensional drawings

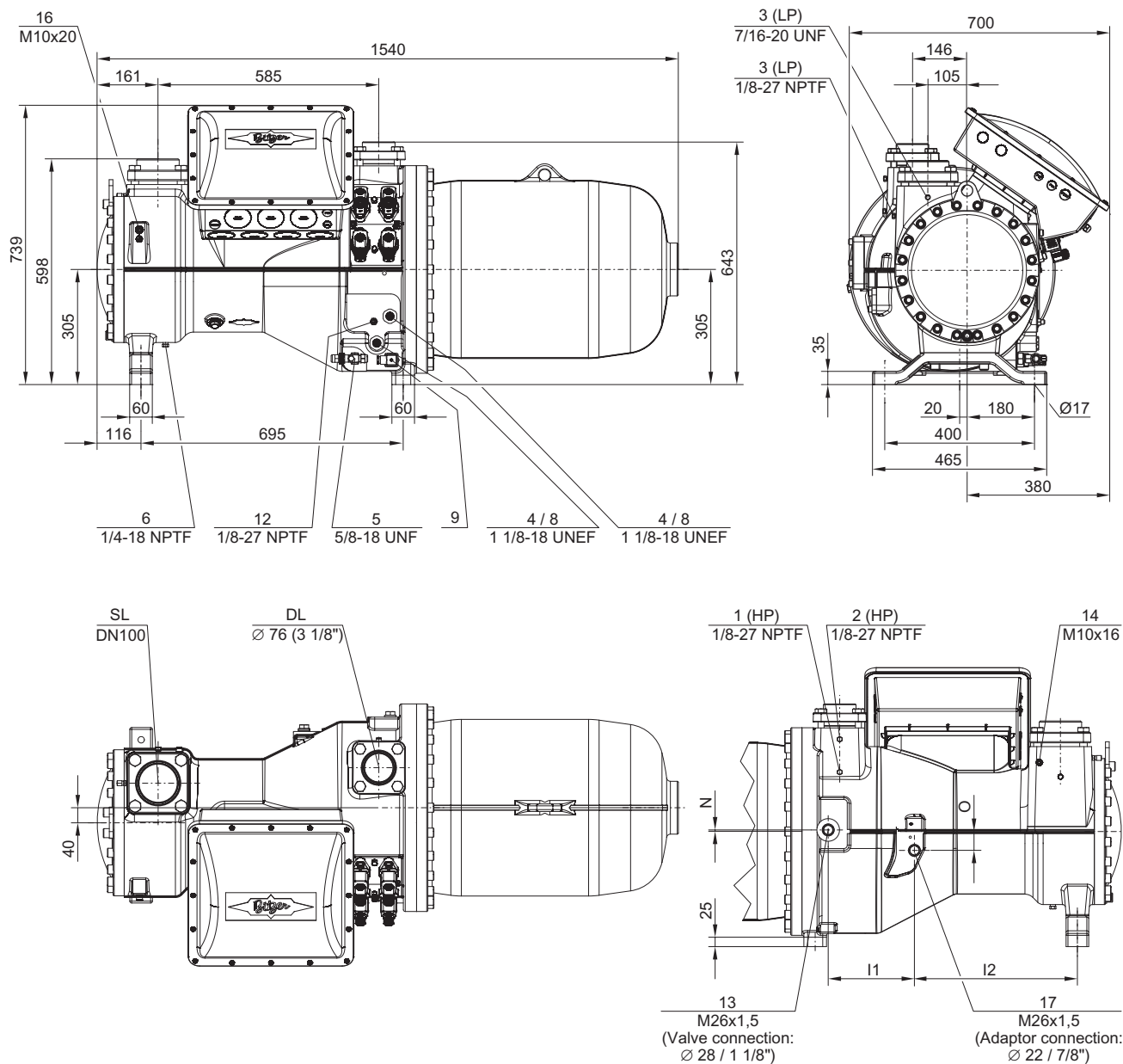
CSH85



Connection positions see page 25.

Dimensional drawings

CSH86 and CSW85

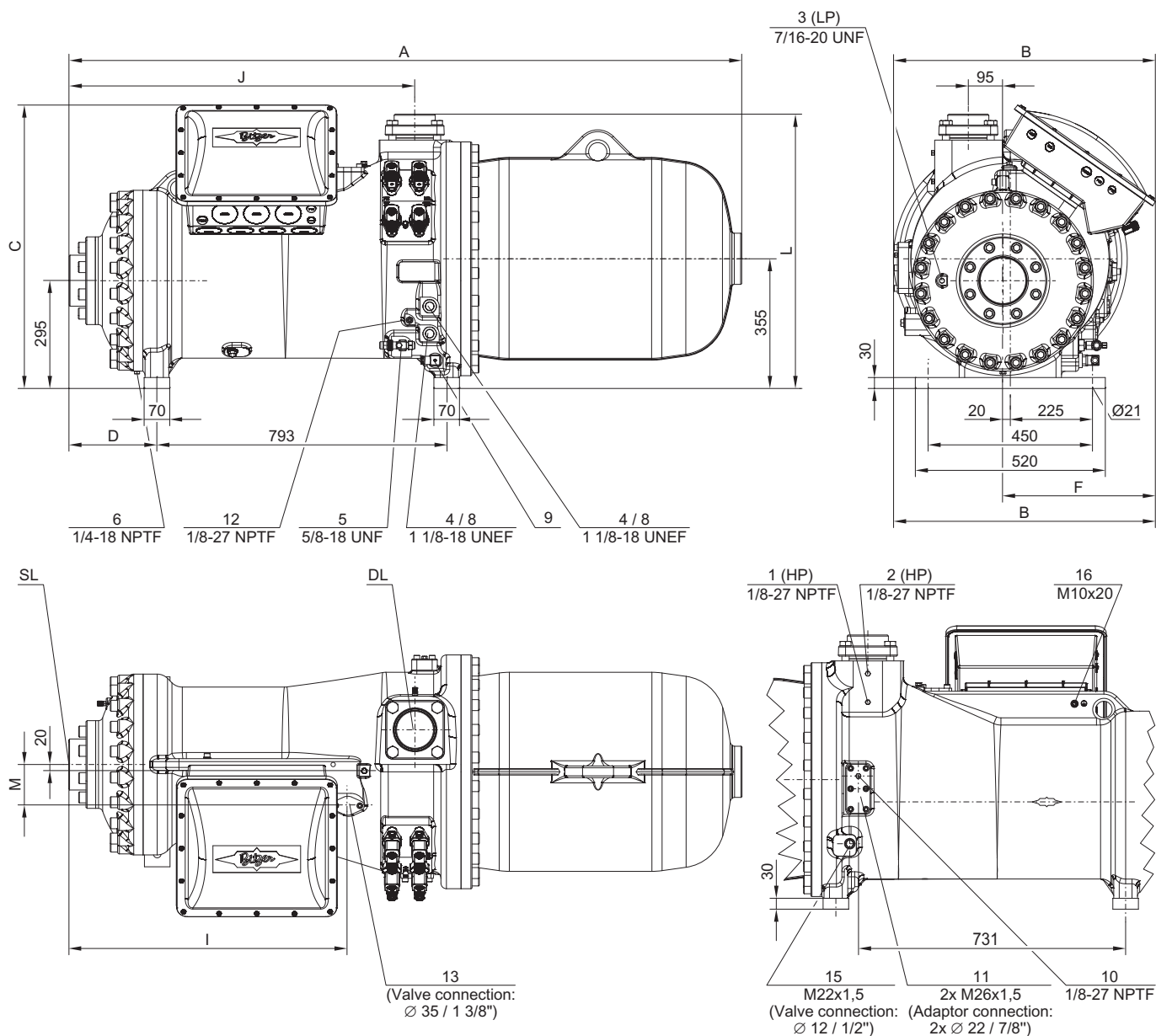


	l_1 mm	l_2 mm	N mm	O mm
CSH8673 CSW8573	221	434	0	56
CSH8686 / CSH8693 CSW8583 / CSW8593	228	432	4	50

Connection positions see page 25.

Dimensional drawings

CSH95



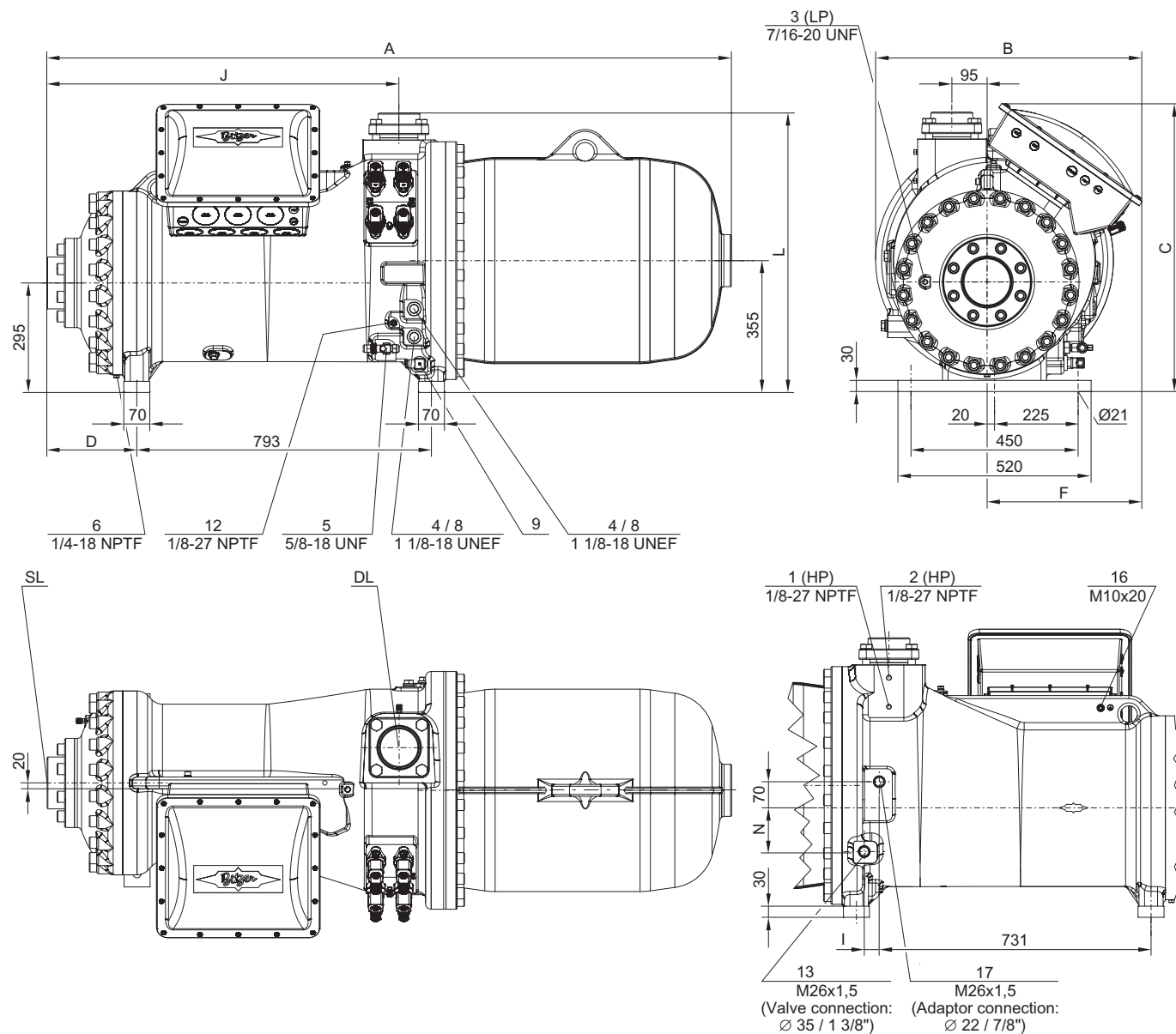
	A mm	B mm	C mm	D mm	F mm	I mm	J mm	L mm	M mm	DL mm	SL mm
CSH9553 CSH9563 CSH9573	1824	717	776	224	417	746	930	744	106	Ø76 (3 1/8")	DN100
CSH9583-210Y CSH9593-240Y	1842	717	776	242	417	764	948	751	113	DN100	DN125
CSH9583-280(Y) CSH9593-300(Y)	1869	717	776	269	417	791	975	751	113	DN100	DN125
CSH95103-280Y	1955	731	796	269	431	791	975	758	113	DN100	DN125
CSH95103-320(Y) CSH95113-320Y	1975	731	796	289	431	810	995	758	113	DN100	DN125

Connection positions see page 25.

Using larger suction gas flanges changes the dimensions A, D and J.

Dimensional drawings

CSH96 and CSW95



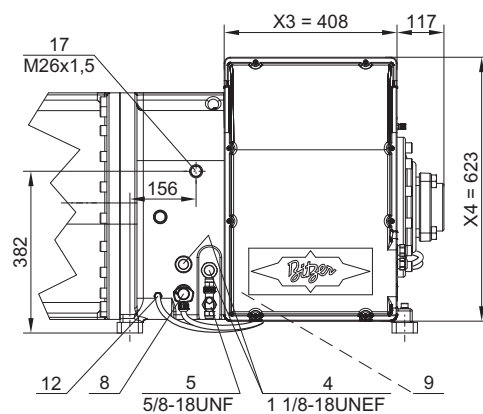
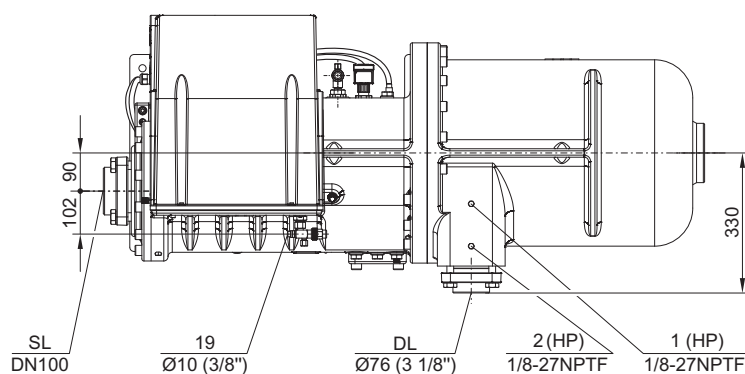
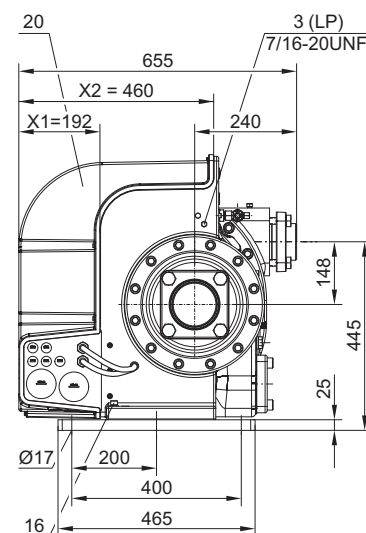
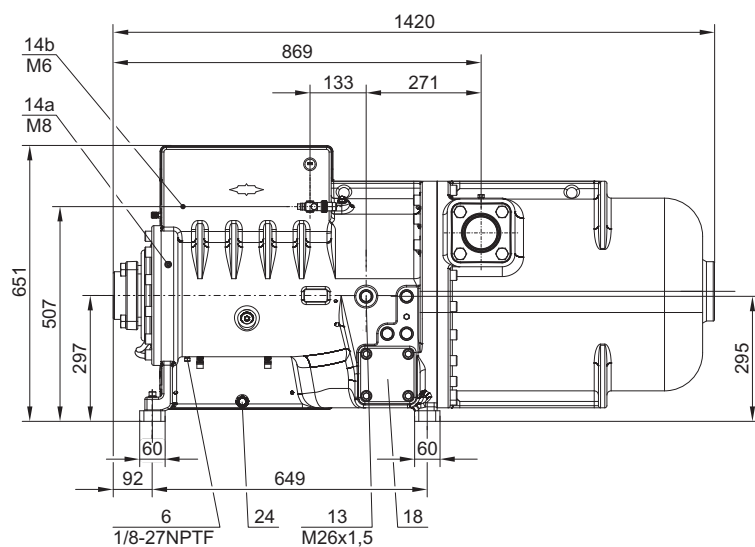
	A mm	B mm	C mm	D mm	F mm	I mm	J mm	L mm	N mm	DL mm	SL mm
CSH9663 / CSH9673 CSW9563 / CSW9573	1824	717	776	224	417	41	930	751	118	Ø76 (3 1/8")	DN100
CSH9683 / CSH9693 CSW9583 / CSW9593	1842	717	776	242	417	34	948	751	122	DN100	DN125
CSW95103-240Y	1927	731	796	242	431	26	948	751	120	DN100	DN125
CSH96103-280Y CSW95103-280(Y) CSW95113-280Y	1955	731	796	269	431	26	975	751	120	DN100	DN125
CSH96113-320Y CSW95113-320(Y)	1974	731	796	289	431	26	994	751	120	DN100	DN125

Connection positions see page 25.

Using larger suction gas flanges changes the dimensions A, D and J.

Dimensional drawings

CSVW2

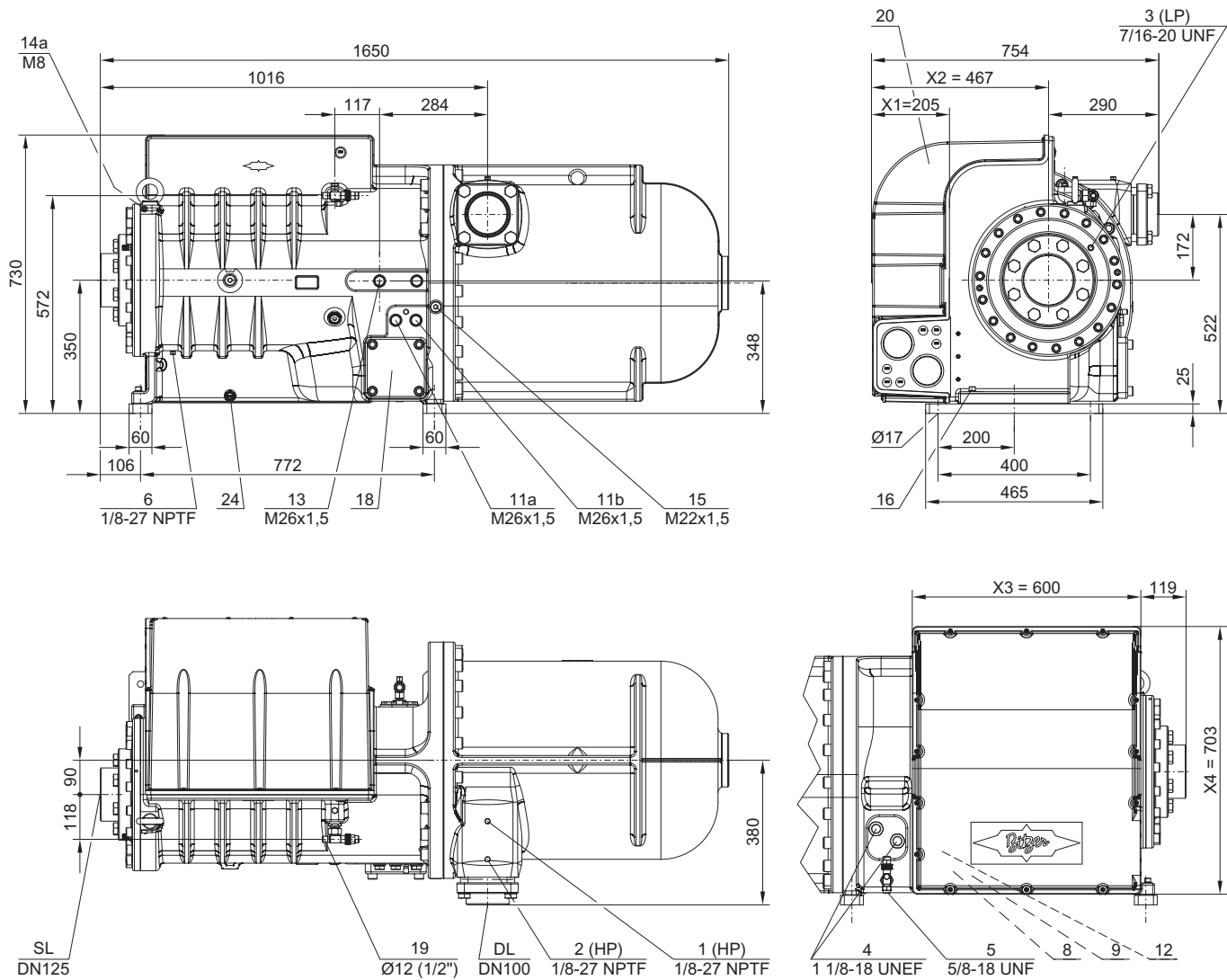


Optional alternative suction gas connection: DN125
This flange is 14 mm longer.

Connection positions see page 25.

Dimensional drawings

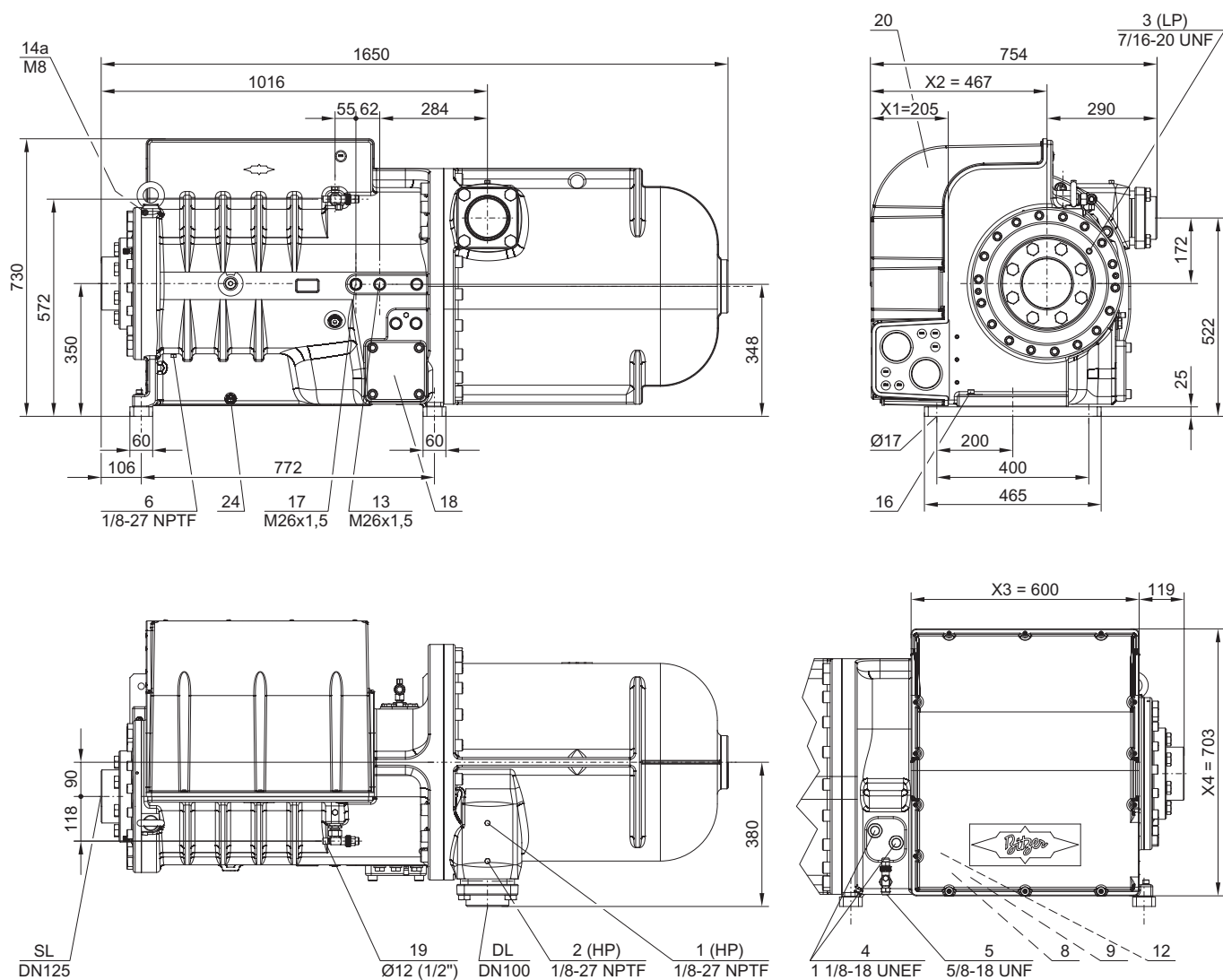
CSVH3



Connection positions see page 25.

Dimensional drawings

CSVW3



Connection positions see page 25.



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