



DAS HERZ DER FRISCHE

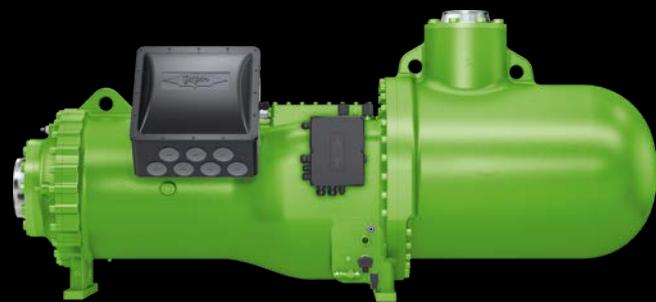
SEMI-HERMETIC

# COMPACT SCREW COMPRESSORS

50 Hz // SP-170-8 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

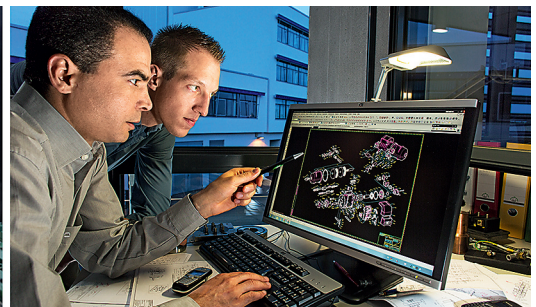
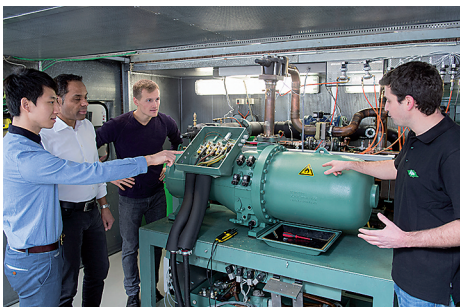
- // Electronic components for
  - data logging
  - capacity regulation
  - actuation of accessories
- // Unified user software for simple configuration. Choose compressor or condensing unit and refrigerant. Ready.

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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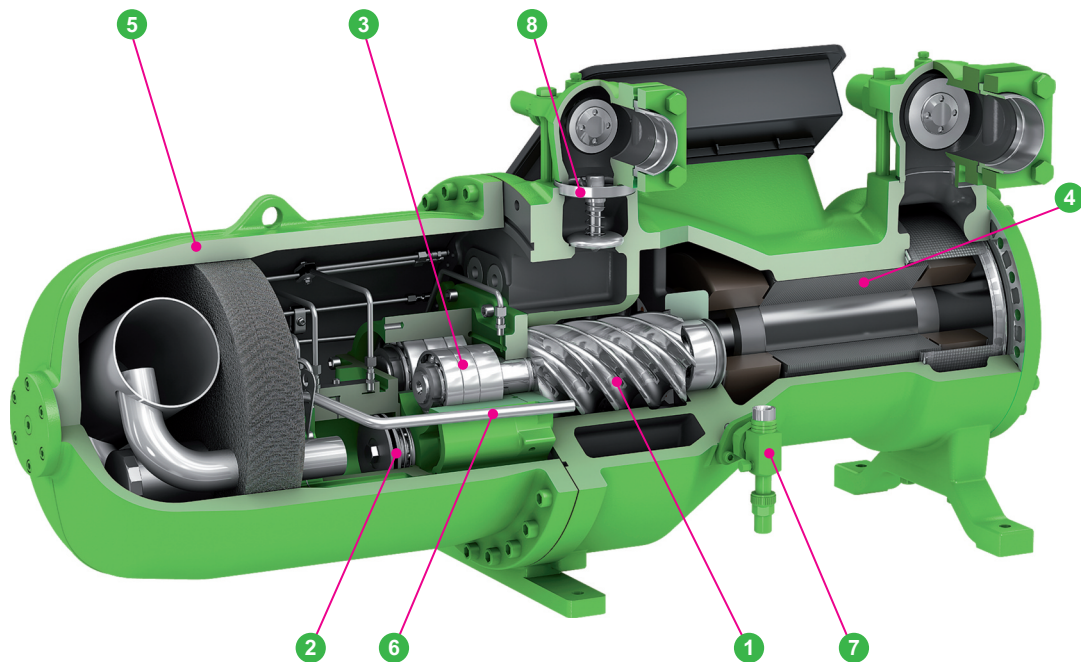


## The CSH, CSW, CSVH and CSVW compact screw compressors

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**

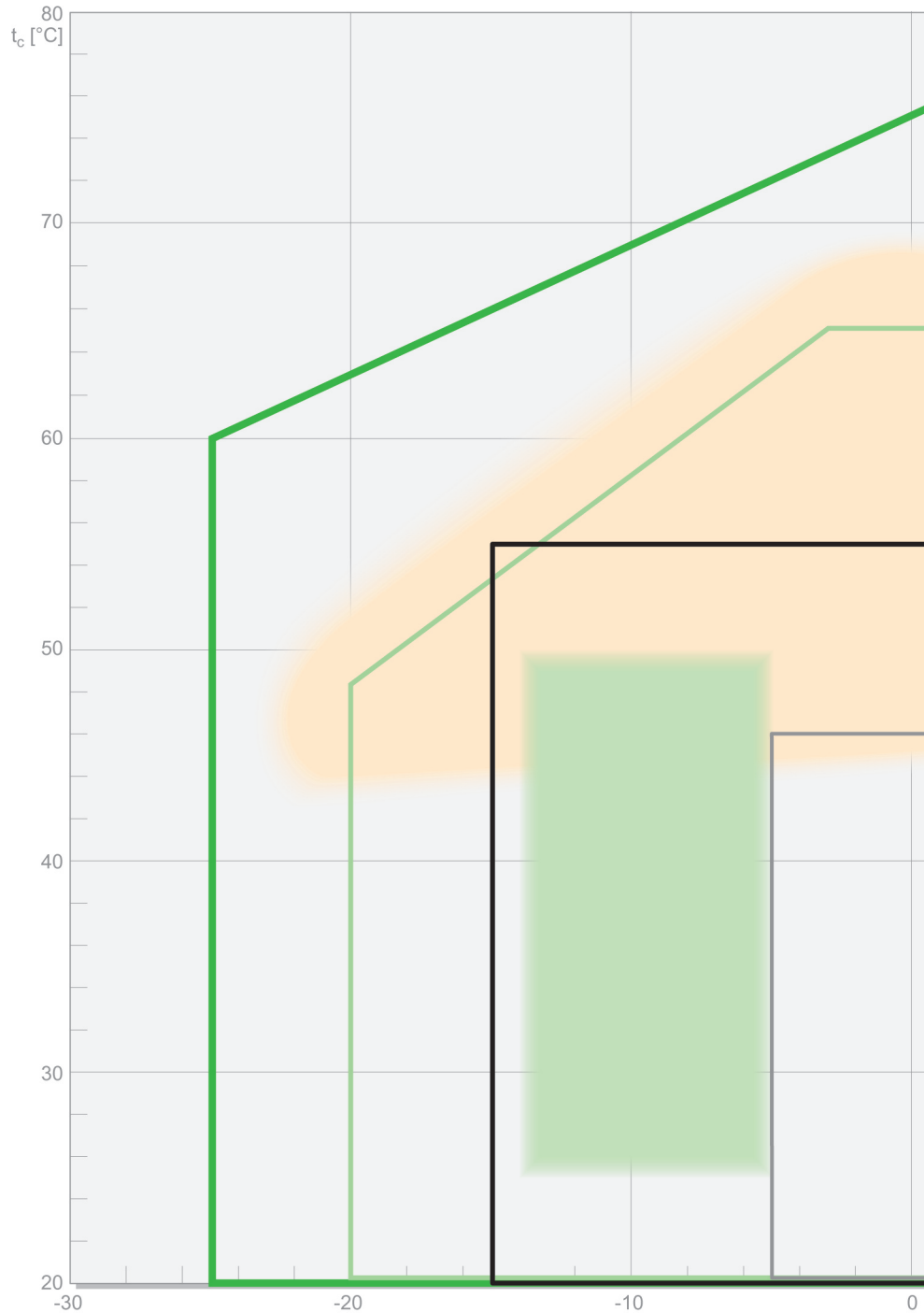
This version is designed for lower condensing temperatures, i. e. for air cooled liquid chillers in cooler regions, or for water cooled liquid chillers in general. It provides a high efficiency at these typical operating points and still has some reserves towards lower evaporating temperatures needed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

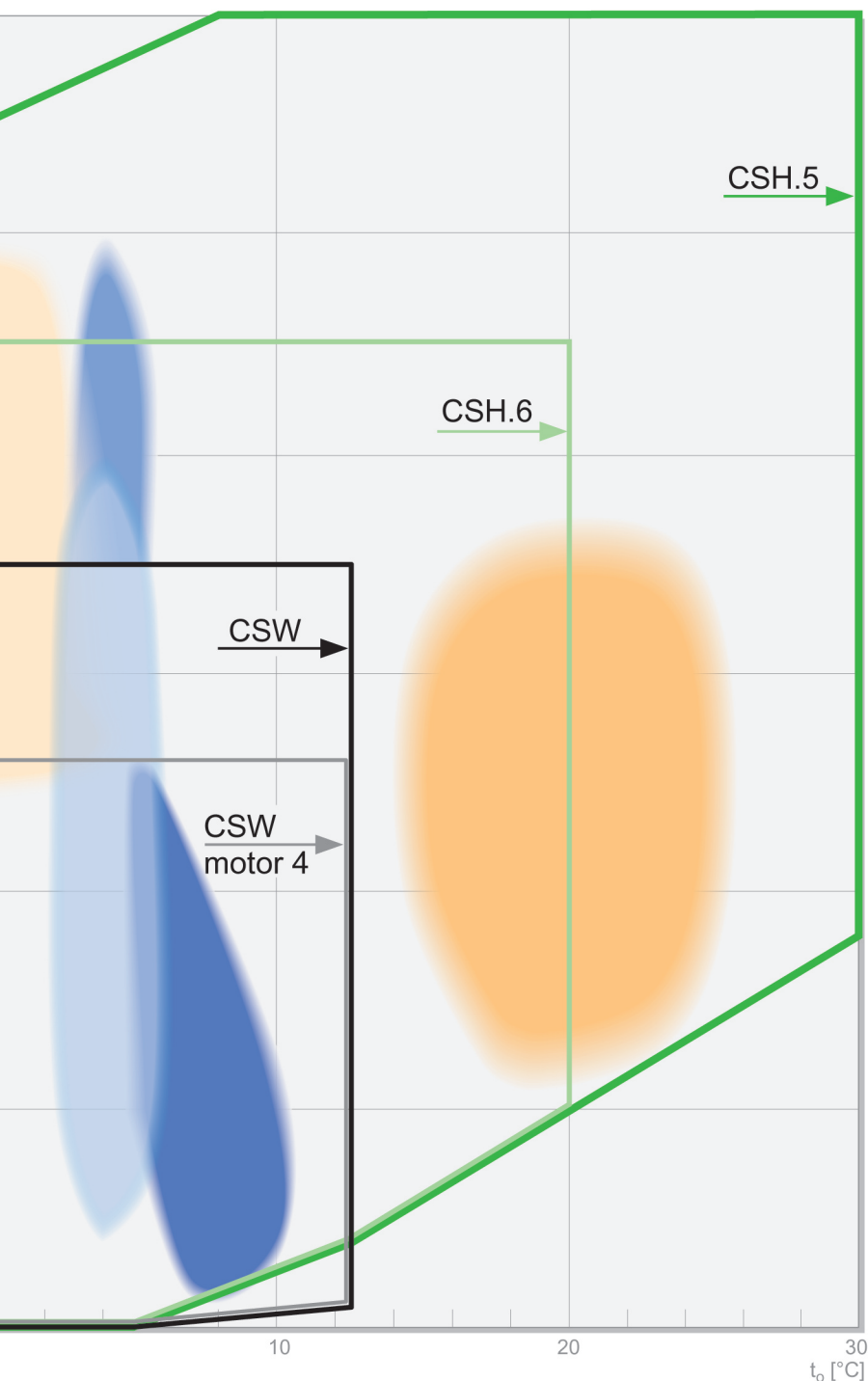
**CSWW**

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



- Building air conditioning at high ambient temperatures
- Highly optimised air conditioning applications
- Data center cooling

### 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.

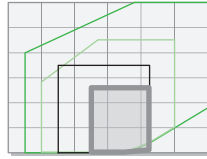
### CSVH

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

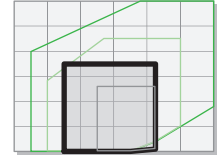
### Refrigerants

- // R134a      // R1234yf
- // R450A      // R1234ze(E)
- // R513A      // R515B

## 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



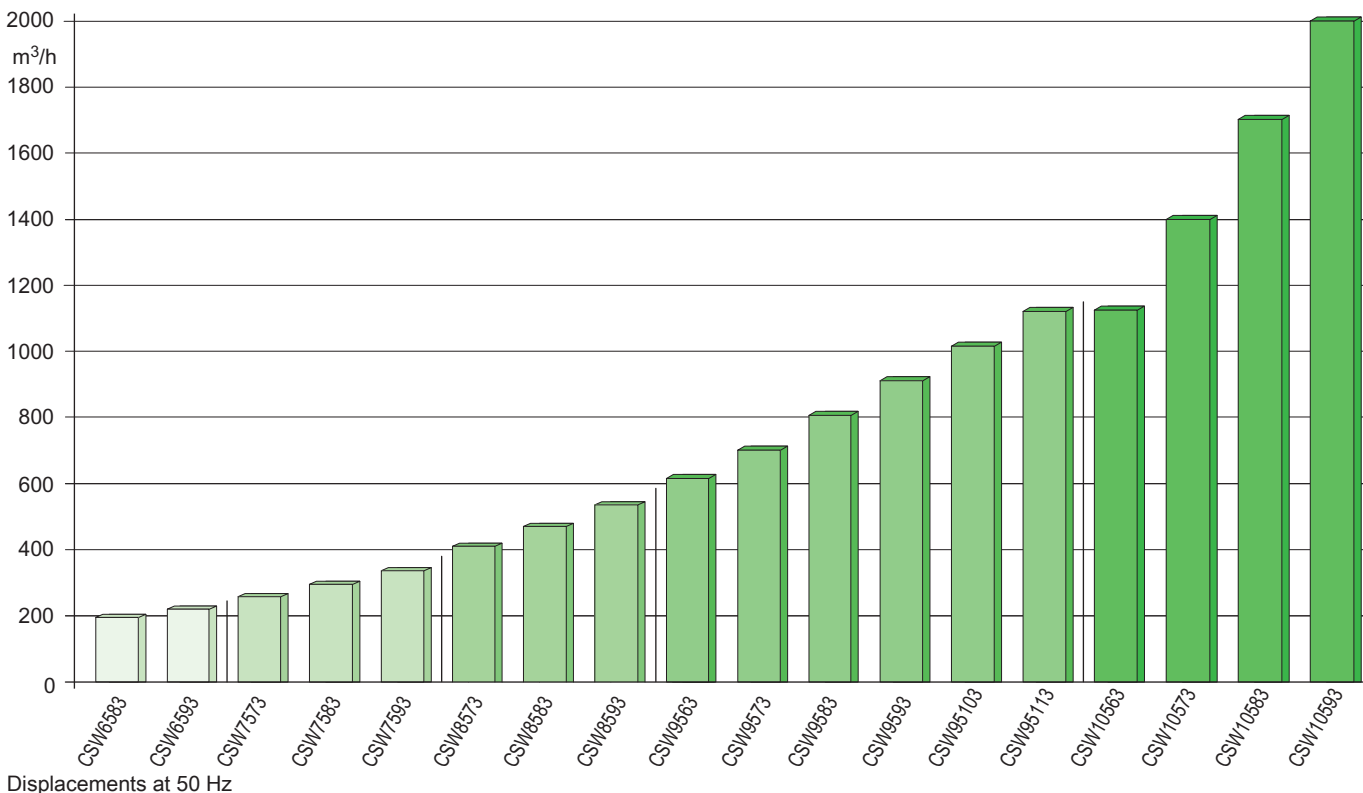
### Technical details

- // 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

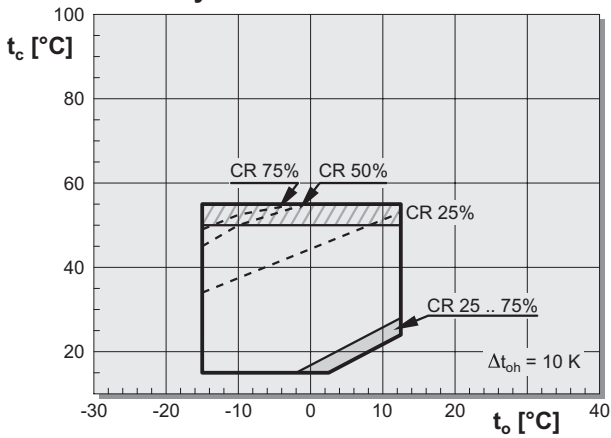
- // R134a      // R1234ze(E)
- // R450A      // R515B
- // R513A      // R407C with CSW65 to CSW95
- // R1234yf    // R22 with CSW65 to CSW95

## The CSW capacity range

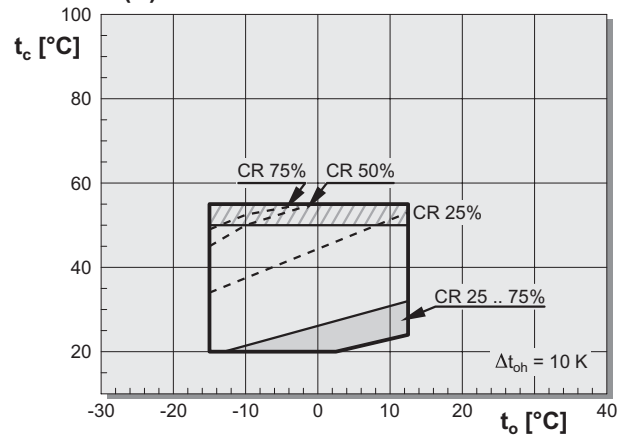


## Application limits for CSW

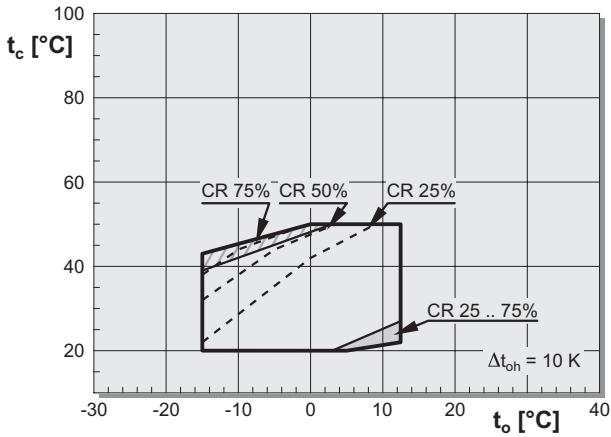
### R134a ■ R1234yf ■ R450A ■ R513A



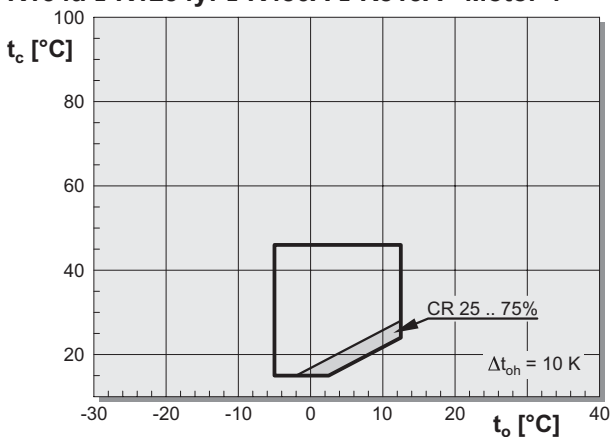
### R1234ze(E) ■ R515B



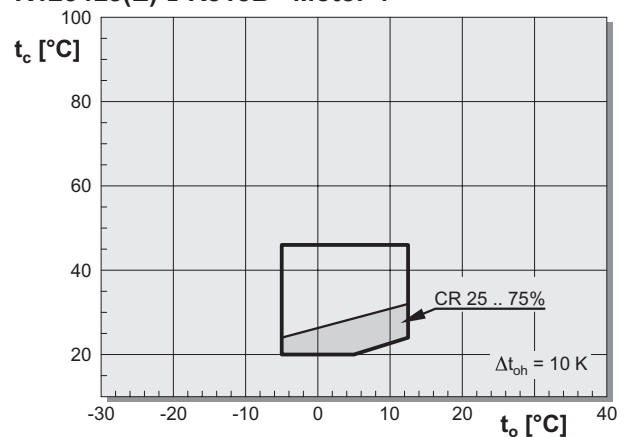
### R407C



### R134a ■ R1234yf ■ R450A ■ R513A Motor 4



### R1234ze(E) ■ R515B Motor 4



#### Legend

$t_o$  Evaporation temperature (°C)

$t_c$  Condensing temperature (°C)

$\Delta t_{oh}$  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.

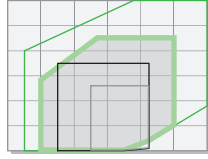
#### Application limits for economiser operation (ECO)

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

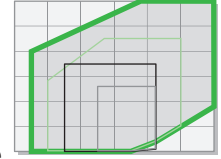
### Refrigerants

- // R134a            // R1234yf
- // R450A           // R1234ze(E)
- // R513A           // R515B

## 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

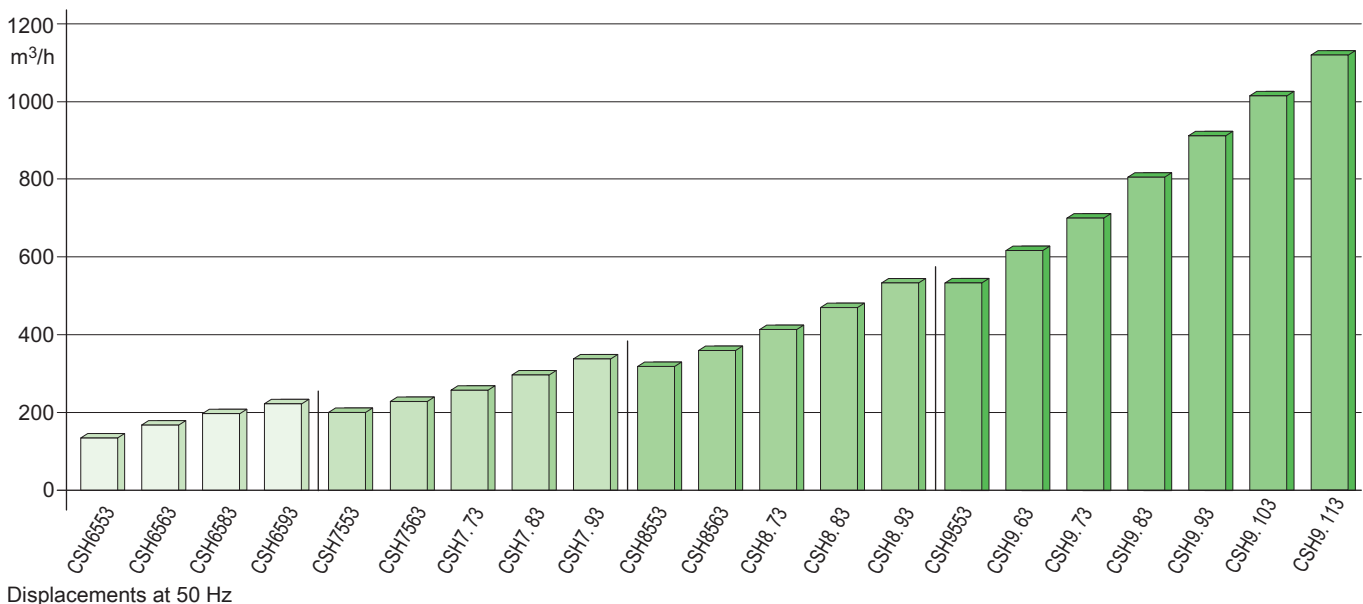
### Refrigerants

- // R134a            // R407A
- // R450A           // R407C
- // R513A           // R407F
- // R1234yf        // R22
- // R1234ze(E)    // R245fa
- // R515B           // R290: special design CSHP



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

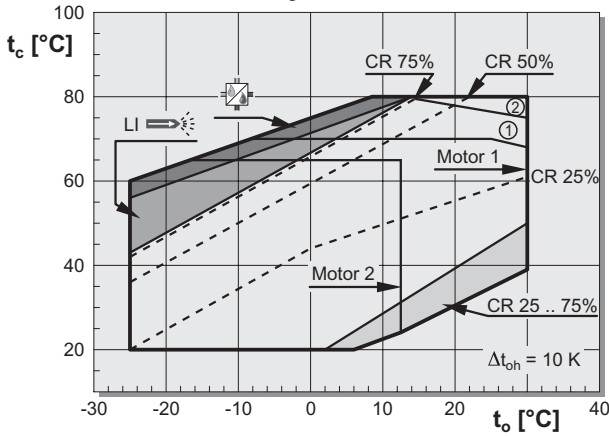
## The CSH capacity range





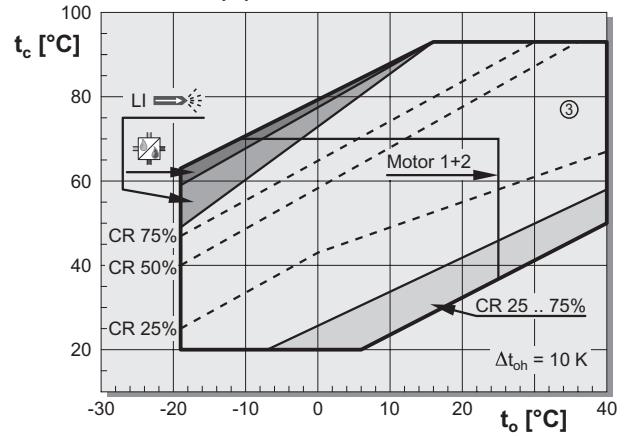
## Application limits for CSH

### CSH.5: R134a ■ R1234yf ■ R450A ■ R513A

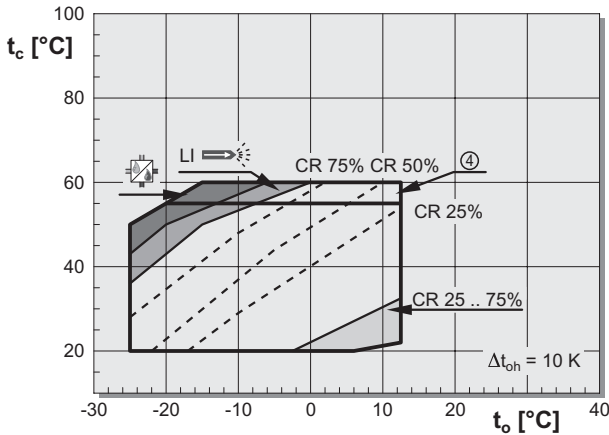


R450A: minimum evaporation temperature: -22°C

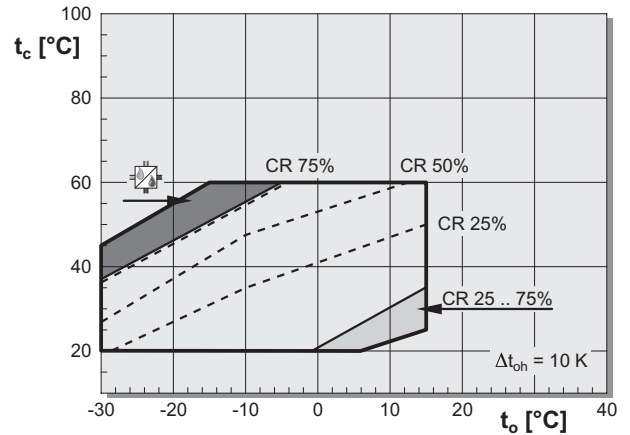
### CSH.5: R1234ze(E) ■ R515B



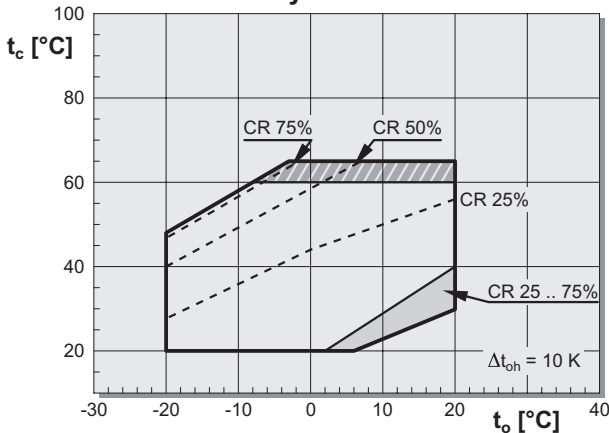
### CSH.5: R407C



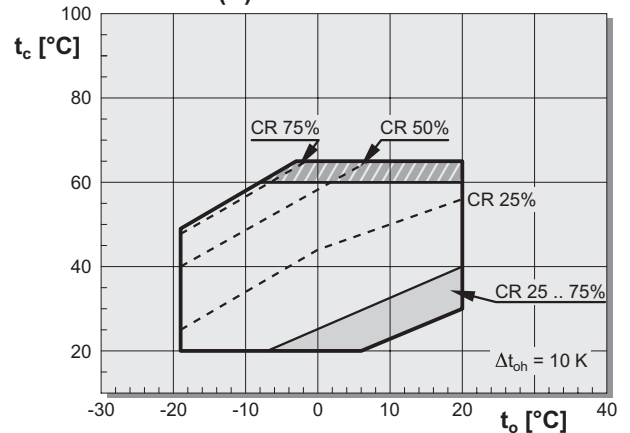
### CSH.5: R290



### CSH.6: R134a ■ R1234yf ■ R450A ■ R513A



### CSH.6: R1234ze(E) ■ R515B



#### Legend

$t_o$  Evaporation temperature (°C)  
 $t_c$  Condensing temperature (°C)  
 $\Delta t_{oh}$  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), $V_i$ and frequency inverter (FI) operation

### 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 (SU)

- // start-up from lowest load conditions

### 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)

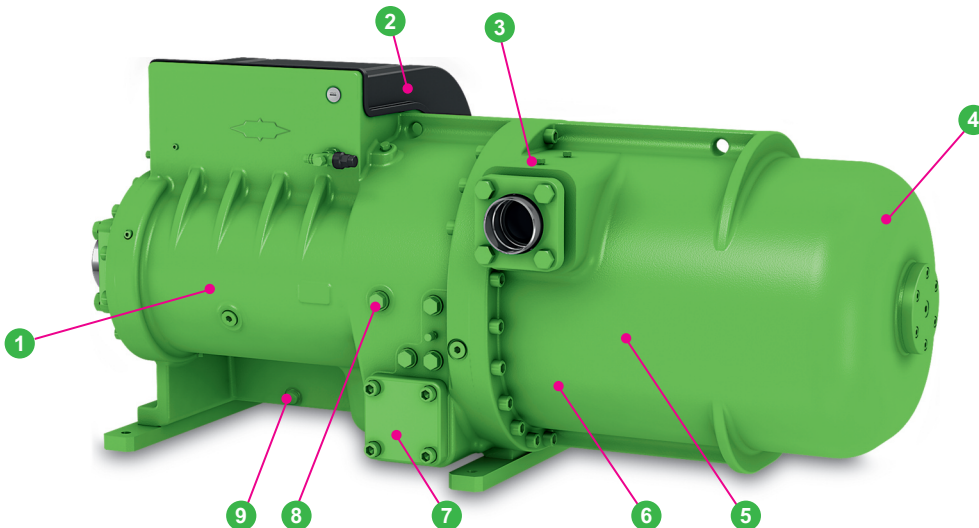
The CSV. compressor series significantly simplifies the installation and stable operation of high efficient variable speed controlled compressors significantly by a pre-wired package with integrated FI, peripheral devices and sensors for compressor protection and monitoring.



FREQUENCY  
INVERTER

### The highlights

- // Energy efficient
  - automatic  $V_i$  control
  - high efficiency rotor profiles: broad cross sections for high volume flow
  - 3<sup>rd</sup> 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

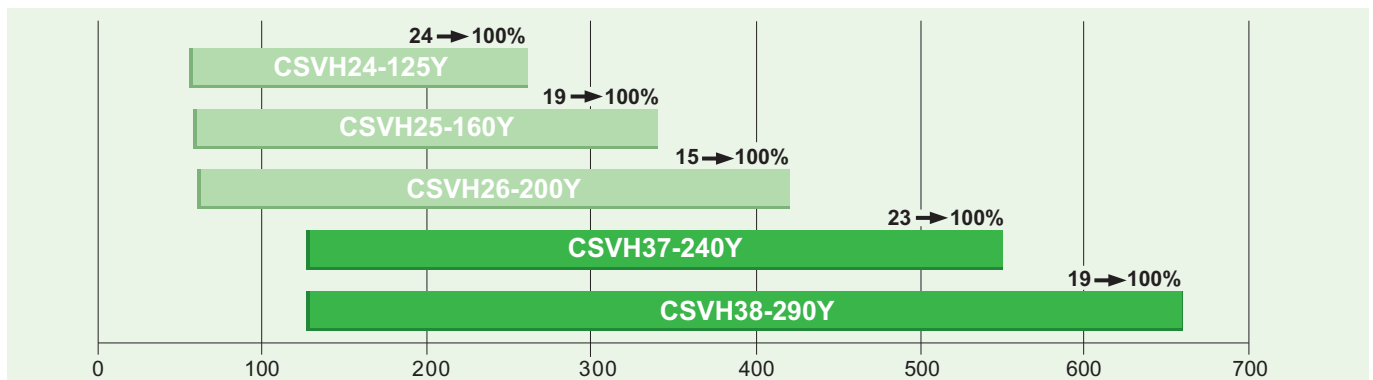
## Technical details

- // especially designed  $V_i$  for the application
- // important design features adapted from CS. developments
- // control range: down to 15% 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           // R515B

## The CSVH capacity range



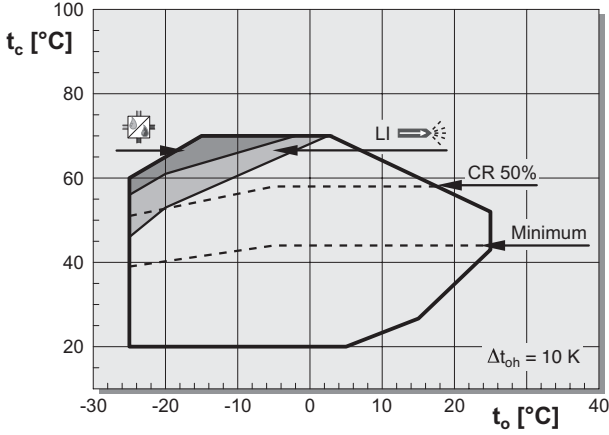
Cooling capacity in kW at typical operating conditions of liquid chillers (to = 5°C) with R134a

## 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

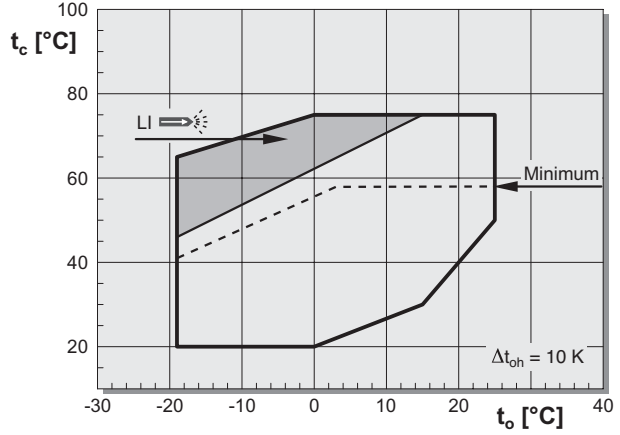
## Application limits for CSV.

### CSVH: R134a ■ R1234yf ■ R450A ■ R513A

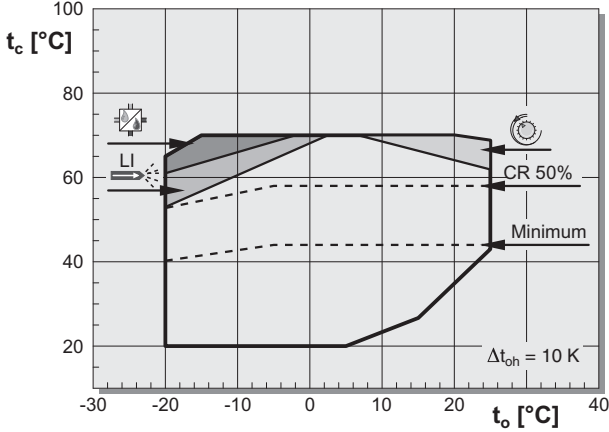


R450A: minimum evaporation temperature: -22°C

### CSVH: R1234ze(E)

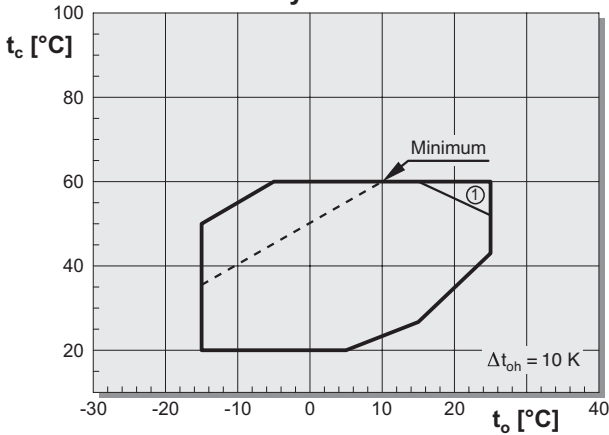


### CSVH2..MY: R134a ■ R1234yf ■ R513A

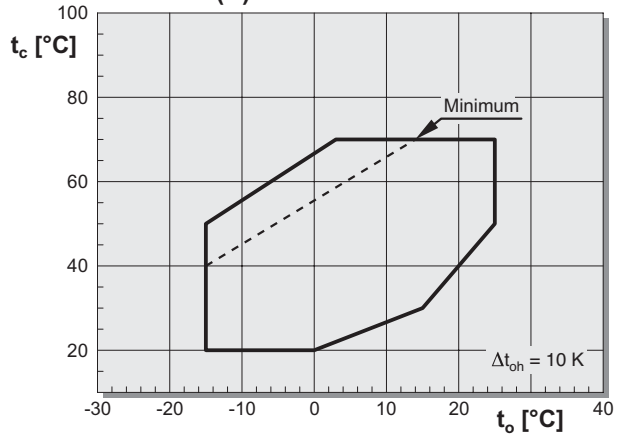


CSVH2 with permanent magnet motor

### CSVW: R134a ■ R1234yf ■ R450A ■ R513A



### CSVW: R1234ze(E)



#### Legend

$t_o$  Evaporation temperature (°C)  
 $t_c$  Condensing temperature (°C)  
 $\Delta t_{oh}$  Suction gas superheat (K)

- Liquid injection or external oil cooling required
- External oil cooling required
- Speed is automatically adjusted if 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

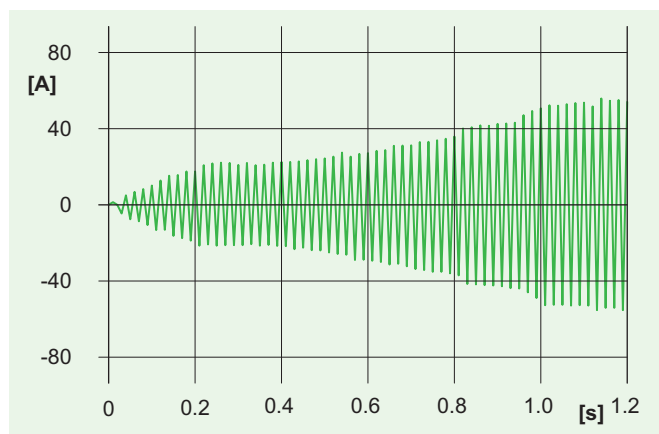
### Motor

- // 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

### Permanent magnet motor

- // synchronous motor with high efficiency due to permanent magnets
- // rotor is synchronous with the rotating field
- // wide working range, with high efficiency
- // significantly more efficient than the standard motor – especially at part load

### Energy efficiency improvement

The permanent magnet motor is designed for the same full load conditions as the standard motor. Therefore, the electrical values on page 28 are almost identical for the two compressor motorisations. Nevertheless, a compressor with permanent magnet motor is more efficient than the standard asynchronous motor in all load conditions, especially in part load. Depending on the compressor, the SEERon value is up to 5.4% higher.

An "M" at the end of the type designation is the coding for compressors with permanent magnet motor.

CSVH24-125(M)Y	4,8%
CSVH25-160(M)Y	5,1%
CSVH26-200(M)Y	5,4%

Improvement of the SEERon, which is the seasonal energy efficiency according to EU 2016/2281, in direct comparison between liquid chillers each with one compressor either with permanent magnet motor e. g. CSVH26-200MY or with standard motor e. g. CSVH26-200Y.

## 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.

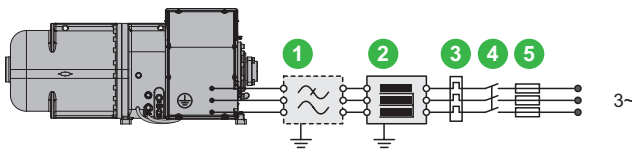
Only with a matching line reactor, the CSV. compressors comply with the category C3 according to EN61800-3:2005. In this case CSV. compressor may be operated at an industrial low voltage network that is separated from the public power supply network by means of a transformer (industrial environment).

### 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.

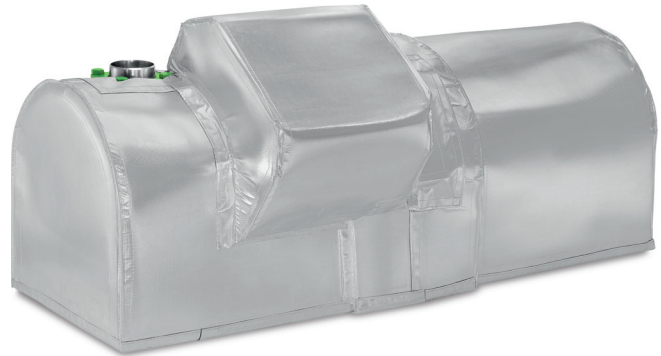
### Connection of power voltage



- 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

## Accessories for CSH, CSW, CSVH and CSVW

### Sound insulation hoods



- // 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 DIN4102)
  - 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.



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

### 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.



### The accessories at a glance

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-E4	✓	✓	✓			
compressor protection device SE-E5	○	○	○			
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 <sub>r</sub> -control				✓	✓	✓
switch for minimum oil level	○	○	○	✓	✓	✓
switch for maximum oil level	○	○	○	○	○	○
economiser valve ③	○	○	○ <sup>④</sup>	○	○	○
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	✓	✓	✓	✓	✓	✓
CE	S	S	S	S	S	S
UKCA ⑧	○	○	○	○	○	○
UL	○		⑨		○	○

- ✓ 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 and CSVH: 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
- ⑧ from 01.2023 on
- ⑨ upon request

## 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
<b>CSH.5</b> Motor 1	BSE170	B320SH	SHC230
<b>CSH.5</b> Motor 2	BSE170		
<b>CSH.6</b>	BSE170L	BSE170	
<b>CSW</b> Motor 1	BSE170L	BSE170	B320SH
<b>CSW</b> Motor 2	BSE170L	BSE170	
<b>CSW</b> Motor 4	BSE55	BSE170L	
<b>CSVH</b>	BSE170		
<b>CSVW</b>	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 heaters

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

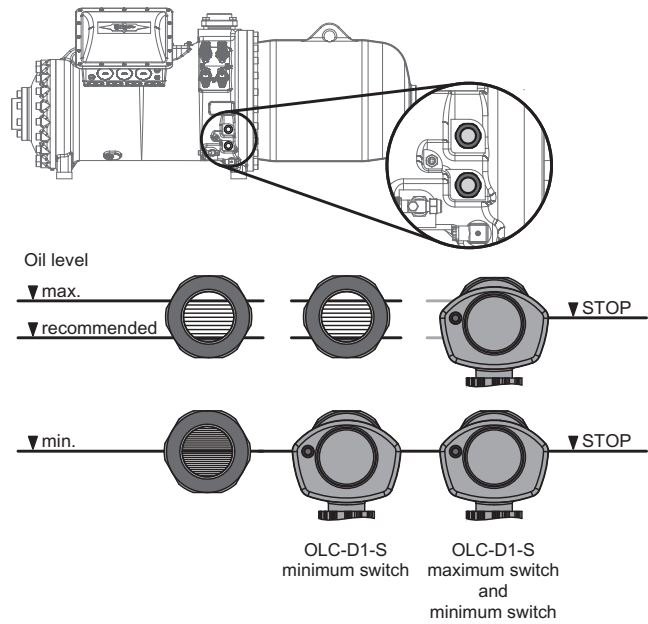
- // outdoor installation of the compressor
- // long shut-off periods
- // high refrigerant charge
- // risk of refrigerant condensation into the compressor

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

## Oil level monitoring OLC-D1-S



For all compressor types, the minimum and maximum oil level can be monitored electronically. Upon request, the prism unit of the sensor is pre-equipped ex-works. For CSW105 and the CSV. series, the minimum switch is fully electrically connected as standard. For the CSV. series, this is also possible for the maximum switch upon request.

## Approvals

BITZER offers ex-works approvals that stand for high quality of the compressors and the manufacturing processes. The respective approval of a legal area naturally includes all design and manufacturing-related legal acts of the respective legal area.

// CE: EU area

// UKCA: United Kingdom

// UL/CSA: USA/Canada and Saudi Arabia

The basic construction of the compressors is designed for the conditions of the CE legal area. Any other product marking may require a special design or equipment and must be known when the order is received. The respective compressor is individually marked. The design of the compressors according to the British product marking UKCA will be offered by BITZER from January 2023. UL availability of the individual compressor series see page 17.

## Special approvals

// BV (Bureau Veritas)

// DNV (Det Norske Veritas)

// LR (Lloyds Register of Shipping)

// RMRS (Russian Maritime Register of Shipping)

// further approvals upon request

BITZER works with a wide variety of international certification bodies, in particular ship classification societies. These approvals usually require an inspection of the compressor at the factory by a representative of the certifying body. The desired special approval must therefore be known at the latest when the order is received. Subsequent approval confirmations are not possible.

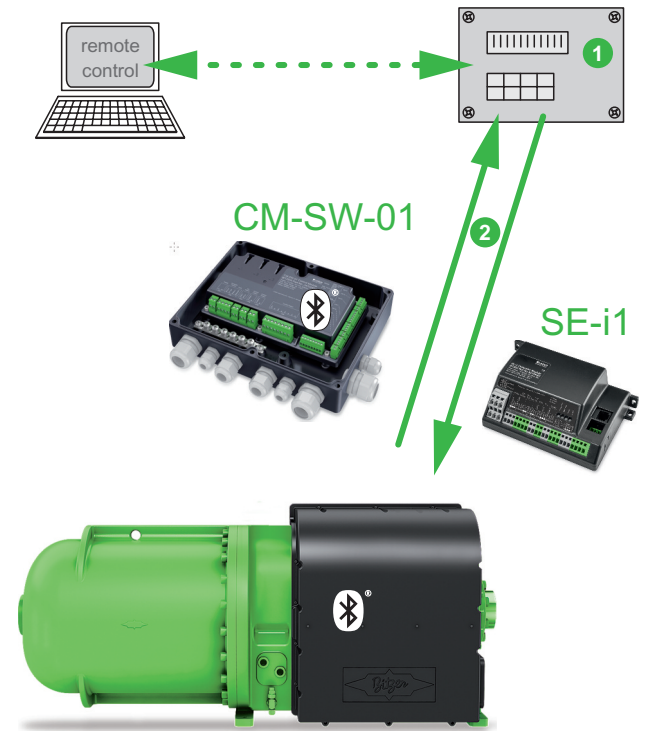
Special type approval certificates are summarised in the online document AU-100.

## 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



1 superior system controller

2 RS485 Modbus RTU and optional remote control

Intelligent compressor control improves system efficiency.

## Compressor monitoring and communication

Compressor protection	SE-E4	SE-E5	SE-i1	CM-SW FU-01	FU CSV.
suitable for	CS.6	CS.6	CS.6	CS.105	CSV.
or	CS.7	CS.7	CS.7		
integrated function	CS.8	CS.8	CS.8		
	CS.9	CS.9	CS.9		
motor voltage	200 .. 690 V	200 .. 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 <sup>①</sup>
thermal motor monitoring	✓	✓	✓	✓	✓
thermal FI monitoring					✓
suitable for FI operation	83 .. 690 V bei 20 .. 135 Hz		✓	✓	integrated
start unloading control				✓	✓
capacity control				✓	✓
V <sub>r</sub> -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	✓	✓	✓	✓	✓

① Daily average: 40°C

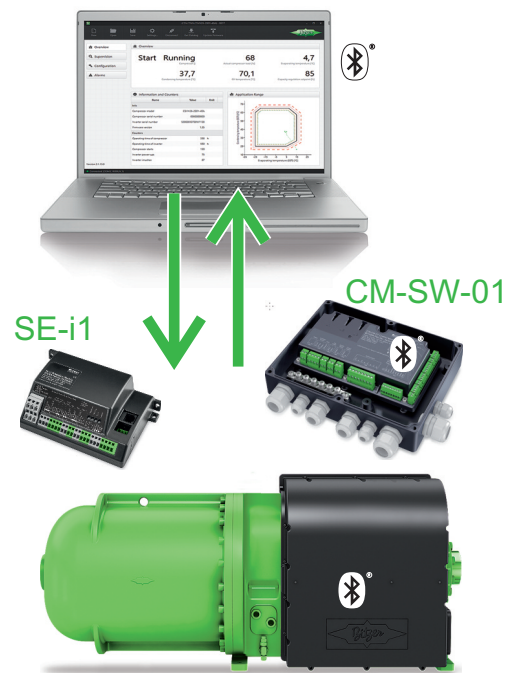
Indicate refrigerant when ordering a CSVH, CSVW, CSW105 or a compressor with SE-i1.



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

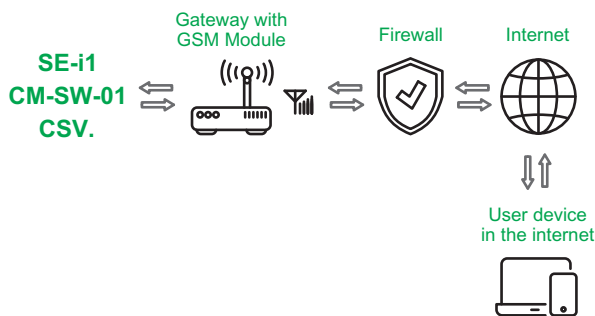
### Comfortable analysis

- // 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

**BITZER DIGITAL NETWORK**

The BITZER Digital Network (BDN) provides comprehensive access to your compressor data. It enables remote access and remote diagnostics in real time by connecting to your own refrigeration system.

- // at any time.
- // at any place.
- // well protected.



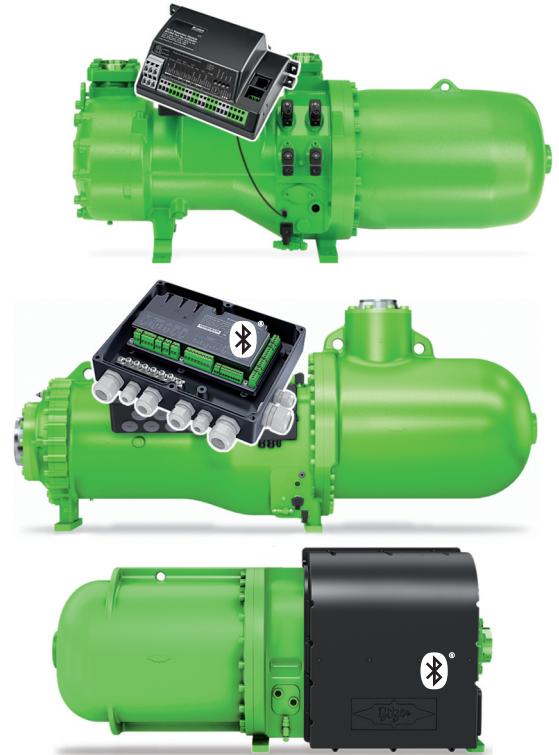
The pre-configured BITZER gateway provides a secure data connection between the compressor and the internet.

All BITZER applications are quickly and easily accessible via the BDN. It connects the user with the entire product knowledge. The BDN makes these innovations possible:

- // easy installation and integration into customer systems
- // preventive maintenance
- // own digital infrastructure
- // saving time
  - when visiting the system
  - in the analysis of operating data
  - in the diagnosis of problems
- // data analysis in high temporal resolution
- // fast troubleshooting
- // notification of problems, e. g. error messages via email

**Intelligent compressor protection and remote control**

A new generation of intelligent electronics operates, monitors and protects screw compressors beyond the standard requirements and communicates with the superior system controller.



- // SE-i1
  - communicates via: RS485 Modbus RTU, BEST interface converter
  - option for CSH65 to CSH95 and CSH96
  - option for CSW65 to CSW95
- // CM-SW-01 standard in CSW105
  - communicates via: RS485 Modbus RTU, Bluetooth, BEST interface converter
- // CSVH and CSVW, integrated FI
  - communicates via: RS485 Modbus RTU, Bluetooth, BEST interface converter

The internal data logging provides runtime and load statistics and the history of alarm and warning messages. This makes it possible to analyse the system situation at any time.

These BITZER IQ products actively protect the compressor. They switch off the compressor from critical operating conditions.

The sensors and actuators of the BITZER IQ products are delivered ex-works factory wired and preconfigured. This enables quick diagnosis, maintenance and remote control.

## CSW105

The CSW105 series comprises the currently largest commercially available series screw compressors: four displacement stages from 1170 to 2000 m<sup>3</sup>/h at 50 Hz and up to 2400 m<sup>3</sup>/h at 60 Hz or FI operation.

The exceptional full load and part load efficiency of the compressors enables series production of highly efficient liquid chillers that meet the world's most demanding efficiency requirements:

// EU: 2016/2281 Ecodesign Directive for comfort air conditioning liquid chillers

// China: GB19577:2015

### Applications

- 1 highly energy-efficient water cooled liquid chillers
  - with only one compressor
  - with the refrigerants R134a or R513A
  - at typical operating conditions for water cooled liquid chillers
- 2 highly energy-efficient high power air cooled liquid chillers
  - with the refrigerants R1234ze(E) and R515B
  - The CSW105 also allows high performance with R1234ze(E) or R515B, although the volumetric cooling capacity is noticeably lower than R134a or R513A.
- 3 heat pumps for energy recovery
  - in reversible chillers for combined cooling and heating
  - with the refrigerants R1234ze(E) and R515B
  - Comfort heating or process heat pump (COP<sub>heat</sub> up to 5.49)

CSW10593-400Y at 60 Hz or FI operation

Refrigerant	t <sub>0</sub>	t <sub>c</sub>	Δt <sub>u</sub>	Δt <sub>oh</sub>	Q <sub>o</sub>	COP
① R134a/R513A	6°C	36°C	3 K	2 K	1.8 MW	6.41
② R1234ze(E)/R515B	4.5°C	47°C	3 K	2 K	1.1 MW	4.22
③ R1234ze(E)/R515B	25°C	65°C	3 K	2 K	Q <sub>c</sub> 2.4 MW	COP <sub>heat</sub> 5.49

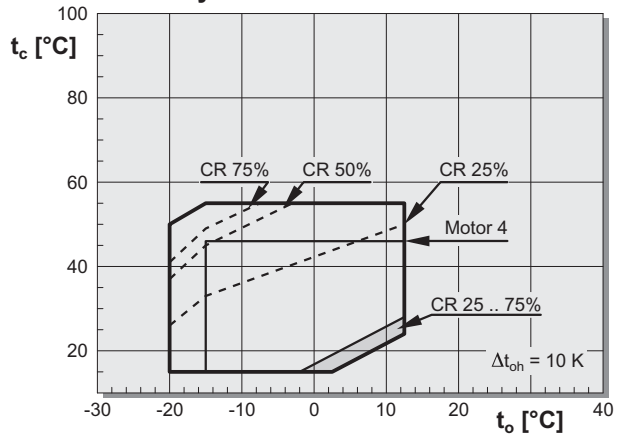


### Technical details

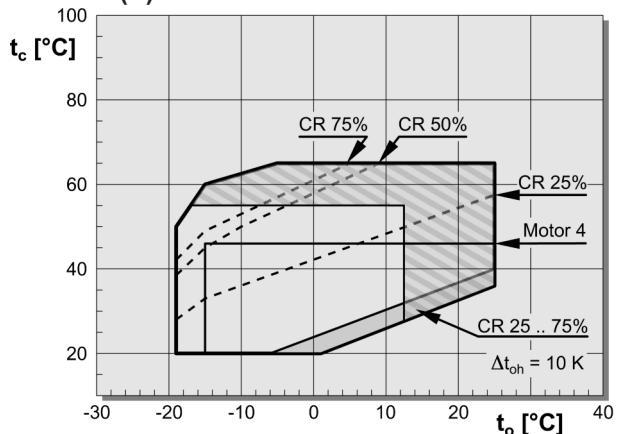
- // double-slider technology
- // IQ module with automatic V<sub>i</sub> adaption
  - operation at optimum V<sub>i</sub>
  - avoids losses due to under- or over-compression
  - integrated mechanical capacity control from 25 to 100%, steplessly controlled by the IQ module
- // large-volume built-in motor
- // highly optimised profile geometry

### Application limits for CSW105

#### R134a ■ R1234yf ■ R450A ■ R513A



#### R1234ze(E) ■ R515B



#### Legend

t<sub>0</sub> Evaporation temperature (°C)  
 t<sub>c</sub> Condensing temperature (°C)  
 Δt<sub>oh</sub> Suction gas superheat (K)

■ Capacity control CR 25% .. max. CR 75%  
 ▨ BSE170 required

#### Capacity control (CR)

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

## Heat pump application

This field of application is subject to dynamic development. Heat pumps are differentiated according to the useful temperature, which in the heat pump process is the condensing temperature minus the temperature difference in the condenser.

- // low temperature heat pump:  
useful temperature up to 35°C  
efficient panel heating
- // medium temperature heat pump:  
useful temperature up to 65°C  
hot water heating
- // high temperature heat pump:  
useful temperature above 80°C  
industrial process area

Low and medium useful temperatures can be served by air-conditioning chillers in heat pump operation with the common refrigerants. For the high temperature range, refrigerants with other thermodynamic properties such as R245fa may be required.

The CSH series with motor 1 and refrigerant R1234ze(E) is suitable as a high temperature heat pump. With this, up to  $t_o = 40^\circ\text{C}$  or  $t_c = 93^\circ\text{C}$  can be realised. With R245fa, higher condensing temperatures can be achieved. More information upon request.

## 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, have very low GWP values. 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 special explosion-proof compressor versions CSH.5..EXY and CSHP.5..EXP are to be used. 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.

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.





## Model designation

### CSH- and CSW-Serie

Example

	<b>CSW 7573 - 60 Y - 40P</b>
Semi-hermetic compact screw compressor	<b>CSW 7573 - 60 Y - 40P</b>
Application range	<b>CSW 7573 - 60 Y - 40P</b>
Housing size	<b>CSW 7573 - 60 Y - 40P</b>
Compressor execution	<b>CSW 7573 - 60 Y - 40P</b>
Displacement	<b>CSW 7573 - 60 Y - 40P</b>
Compressor execution	<b>CSW 7573 - 60 Y - 40P</b>
Motor size	<b>CSW 7573 - 60 Y - 40P</b>
Oil charge: polyolester oil	<b>CSW 7573 - 60 Y - 40P</b>
Motor code	<b>CSW 7573 - 60 Y - 40P</b>

### CSVH- and CSVW-Serie

Example

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

### Special versions

Example

	<b>CSHP 8563 - 125 EX P - 40P</b>
Semi-hermetic compact screw compressor	<b>CSHP 8563 - 125 EX P - 40P</b>
Application range	<b>CSHP 8563 - 125 EX P - 40P</b>
Special version for R290	<b>CSHP 8563 - 125 EX P - 40P</b>
Housing size	<b>CSHP 8563 - 125 EX P - 40P</b>
Compressor execution	<b>CSHP 8563 - 125 EX P - 40P</b>
Displacement	<b>CSHP 8563 - 125 EX P - 40P</b>
Compressor execution	<b>CSHP 8563 - 125 EX P - 40P</b>
Motor size	<b>CSHP 8563 - 125 EX P - 40P</b>
Ex protection special version	<b>CSHP 8563 - 125 EX P - 40P</b>
Oil charge: SHC230	<b>CSHP 8563 - 125 EX P - 40P</b>
Motor code	<b>CSHP 8563 - 125 EX P - 40P</b>



## 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.

The screenshot displays the BITZER Software interface. On the left, the 'Compact Screw Compressors CS' section is active, showing the following settings:

- Series: CSVH
- Refrigerant: R513A
- Reference temperature: Dew point temp.
- Compressor selection: Compressor model (CSVH38-290Y)
- Operating point: Evaporating SST: 5 °C, Condensing SDT: 50 °C
- Operating conditions: Liq. subc. (in condenser): 0 K, Suct. gas superheat: 10 K
- Power supply: Power frequency: 50Hz, Power voltage: 400V-AS (40A), Frequency compressor: 100%

The central diagram shows a schematic of the CSVH38-290Y (100.0 %) compressor connected to a condenser and evaporator. The condenser temperature is 50.0 °C and the evaporator temperature is 5.0 °C. The discharge gas temperature is 69.1 °C.

The right panel displays the 'Technical Data' for the selected compressor:

Parameter	Value
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 <sup>3</sup> /h <sup>①</sup>	Refrigerating capacity Q <sub>0</sub>				Oil charge dm <sup>3</sup>	Motor connection ②	Maximum operating current A	Maximum power consumption kW
			R134a R1234yf <sup>③</sup> R513A <sup>③</sup> t <sub>0</sub> /t <sub>c</sub> 5°C/50°C kW	R1234ze(E) t <sub>0</sub> /t <sub>c</sub> 5°C/50°C kW	R407C t <sub>0</sub> /t <sub>c</sub> 5°C/50°C kW	R290 t <sub>0</sub> /t <sub>c</sub> 5°C/50°C kW				
CSH6553-35Y	2	137/165	75.6	57.0	–	–	8.5	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	–	8.5		86	52
CSHP6553-50P	1	137/165	–	–	–	100.6	8.5		79	52
CSH6563-40Y	2	170/205	94.3	71.3	–	–	8.5		66	41
CSH6563-60(Y)	1	170/205	94.3	71.3	133.7	–	8.5		108	65
CSHP6563-60P	1	170/205	–	–	–	128.8	8.5		105	65
CSH6583-50Y	2	195/236	108.8	82.1	–	–	9		86	51
CSH6593-60Y	2	220/266	122.8	92.6	–	–	9		108	56
CSH7553-50Y	2	197/238	106.7	80.7	–	–	14		79	52
CSH7553-70(Y)	1	197/238	108.4	82.0	155.0	–	14		128	78
CSHP7553-70P	1	197/238	–	–	–	145.3	14	124	78	
CSH7563-60Y	2	227/274	125.8	95.1	–	–	14	98	65	
CSH7563-80(Y)	1	227/274	125.0	94.5	175.4	–	14	144	88	
CSHP7563-80P	1	227/274	–	–	–	168.6	14	144	88	
CSH7673-70Y	2	258/311	150.2	114.5	–	–	14	123	73	
CSH7573-70Y	2	258/311	144.6	109.4	–	–	14	124	78	
CSH7573-90(Y)	1	258/311	145.0	109.7	204	–	14	162	96	
CSHP7573-90P	1	258/311	–	–	–	194.4	14	162	96	
CSH7683-80Y	2	295/356	174.9	131.7	–	–	14	140	83	
CSH7583-80Y	2	295/356	168.6	127.2	–	–	14	144	88	
CSH7583-100(Y)	1	295/356	169.1	127.6	238	–	14	170	102	
CSH7583-100P	1	295/356	–	–	–	226	14	170	102	
CSH7693-90Y	2	336/406	199.2	150.6	–	–	14	160	96	
CSH7593-90Y	2	336/406	192.0	144.9	–	–	14	162	93	
CSH7593-110(Y)	1	336/406	192.5	145.3	270	–	14	180	112	
CSHP7593-110P	1	336/406	–	–	–	252	14	180	112	
CSH8553-80Y	2	315/380	177.5	134.0	–	–	21	144	88	
CSH8553-110(Y)	1	315/380	181.7	137.2	257	–	21	185	112	
CSHP8553-110P	1	315/380	–	–	–	229	21	185	112	
CSH8563-90Y	2	359/433	205	154.4	–	–	21	155	96	
CSH8563-125(Y)	1	359/433	207	155.9	293	–	21	216	132	
CSHP8563-125P	1	359/433	–	–	–	261	21	215	132	
CSH8673-110Y	2	410/495	243	184.1	–	–	21	195	114	
CSH8573-110Y	2	410/495	240	180.5	–	–	21	182	110	
CSH8573-140(Y)	1	410/495	239	179.7	338	–	21	246	150	
CSHP8573-140P	1	410/495	–	–	–	301	21	246	150	
CSH8683-125Y	2	470/567	273	210	–	–	18	221	129	
CSH8583-125Y	2	470/567	265	199.9	–	–	18	196	120	
CSH8583-160(Y)	1	470/567	259	195.4	379	–	18	260	160	
CSHP8583-160P	1	470/567	–	–	–	333	18	260	160	
CSH8693-140Y	2	535/646	311	237	–	–	18	254	148	
CSH8593-140Y	2	535/646	301	228	–	–	18	214	131	
CSH8593-180(Y)	1	535/646	302	229	455	–	18	310	186	
CSHP8593-180P	1	535/646	–	–	–	390	18	310	186	
CSH9553-180(Y)	1	535/646	304	231	444	–	29	330	205	
CSHP9553-180P	1	535/646	–	–	–	383	29	330	205	
CSH9663-160Y	2	615/742	361	276	–	–	29	291	173	
CSH9563-160Y	2	615/742	357	264	–	–	29	280	155	
CSH9563-210(Y)	1	615/742	354	262	505	–	29	370	246	
CSHP9563-210P	1	615/742	–	–	–	449	29	370	246	
CSH9673-180Y	2	700/845	420	316	–	–	29	333	200	
CSH9573-180Y	2	700/845	417	310	–	–	29	310	175	
CSH9573-240(Y)	1	700/845	409	304	601	–	29	420	255	
CSHP9573-240P	1	700/845	–	–	–	522	29	420	255	
CSH9683-210Y	2	805/972	486	366	–	–	29	383	226	
CSH9583-210Y	2	805/972	480	358	–	–	29	320	204	
CSH9583-280(Y)	1	805/972	472	352	689	–	29	450	280	
CSHP9583-280P	1	805/972	–	–	–	612	29	450	280	
CSH9693-240Y	2	910/1098	552	414	–	–	29	384	255	
CSH9593-240Y	2	910/1098	546	407	–	–	29	360	222	
CSH9593-300(Y)	1	910/1098	546	407	783	–	29	450	280	
CSHP9593-300P	1	910/1098	–	–	–	700	29	450	280	
CSH96103-280Y	2	1015/1225	594	454	–	–	31	456	271	
CSH95103-280Y	2	1015/1225	588	440	–	–	31	413	254	
CSH95103-320(Y)	1	1015/1225	588	440	868	–	31	566	332	
CSHP95103-320P	1	1015/1225	–	–	–	758	31	566	332	
CSH96113-320Y	2	1120/1351	651	507	–	–	31	510	301	
CSH95113-320Y	2	1120/1351	644	481	–	–	31	447	277	

Technical data

## Technical data: CSW

Compressor model	Motor version	Displacement 50/60 Hz  m <sup>3</sup> /h <sup>①</sup>	Refrigerating capacity Q <sub>0</sub>			Oil charge  dm <sup>3</sup>	Motor connection  ②	Maximum operating current  A	Maximum power consumption  kW	
			R134a R1234yf <sup>③</sup> R513A <sup>③</sup> t <sub>0</sub> /t <sub>c</sub> 5°C/38°C kW	R1234ze(E)  t <sub>0</sub> /t <sub>c</sub> 5°C/38°C kW	R407C  t <sub>0</sub> /t <sub>c</sub> 5°C/38°C kW					
CSW6583-40Y	2	195/236	126.6	94.2	-	9	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ	74	43	
CSW6583-50(Y)	1	195/236	-	-	183,4	9		92	55	
CSW6593-50Y	2	220/266	142.5	106.1	-	9		84	47	
CSW6593-60(Y)	1	220/266	-	-	217	9		105	62	
CSW7573-60Y	2	258/311	174.3	129.8	-	14		98	55	
CSW7573-70(Y)	1	258/311	-	-	255	14		123	73	
CSW7583-70Y	2	295/356	198.3	147.7	-	14		112	64	
CSW7583-80(Y)	1	295/356	-	-	290	14		140	83	
CSW7593-80Y	2	336/406	226	168.2	-	14		128	72	
CSW7593-90(Y)	1	336/406	-	-	330	14		160	95	
CSW8573-80Y	4	410/495	282	210	-	20		400V(±10%) Δ/Δ-3-50Hz 460V(±10%) Δ/Δ-3-60Hz part winding Y/Δ	118	72
CSW8573-90Y	2	410/495	283	211	-	20			156	87
CSW8573-110(Y)	1	410/495	-	-	412	20			195	116
CSW8583-90Y	4	470/567	309	230	-	17			135	80
CSW8583-110Y	2	470/567	306	228	-	17	177		96	
CSW8583-125(Y)	1	470/567	-	-	455	17	221		127	
CSW8593-110Y	4	535/646	349	260	-	17	156		90	
CSW8593-125Y	2	535/646	349	260	-	17	203		109	
CSW8593-140(Y)	1	535/646	-	-	517	17	254		144	
CSW9563-125Y	4	615/742	431	320	-	27	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ		192	105
CSW9563-140Y	2	615/742	425	316	-	27			233	132
CSW9563-160(Y)	1	615/742	-	-	624	27			291	175
CSW9573-140Y	4	700/845	482	352	-	27			213	125
CSW9573-160Y	2	700/845	486	355	-	27			266	147
CSW9573-180(Y)	1	700/845	-	-	714	27		333	198	
CSW9583-160Y	4	805/972	565	421	-	27		238	140	
CSW9583-180Y	2	805/972	558	416	-	27		306	167	
CSW9583-210(Y)	1	805/972	-	-	829	27		383	223	
CSW9593-180Y	4	910/1098	640	476	-	27		263	155	
CSW9593-210Y	2	910/1098	634	472	-	27		345	186	
CSW9593-240(Y)	1	910/1098	-	-	940	27		431	252	
CSW95103-210Y	4	1015/1225	687	511	-	29		307	179	
CSW95103-240Y	2	1015/1225	686	510	-	29		378	220	
CSW95103-280(Y)	1	1015/1225	-	-	1012	29	456	272		
CSW95113-240Y	4	1120/1351	771	574	-	29	335	196		
CSW95113-280Y	2	1120/1351	760	566	-	29	411	240		
CSW95113-320(Y)	1	1120/1351	-	-	1123	29	510	297		
CSW10563-210Y	4	1170/1401	795	604	-	32	400V(±10%) Δ-3-50Hz 460V(±10%) Δ-3-60Hz Y/Δ	327	210	
CSW10563-240Y	2	1170/1401	798	606	-	32		394	240	
CSW10573-240Y	4	1400/1690	952	722	-	32		377	230	
CSW10573-290Y	2	1400/1690	955	725	-	32		454	276	
CSW10583-290Y	4	1700/2052	1148	868	-	32		454	276	
CSW10583-360Y	2	1700/2052	1152	871	-	32		565	340	
CSW10593-360Y	4	2000/2414	1373	1043	-	32		565	340	
CSW10593-400Y	2	2000/2414	1378	1047	-	32		629	382	

① 50 Hz: 2900 min<sup>-1</sup>, 60 Hz bei 3500 min<sup>-1</sup>

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 <sup>3</sup> /h	Refrigerating capacity Q <sub>o</sub> <sup>①</sup>				Oil charge dm <sup>3</sup>	Motor connection	Maximum operating current <sup>②</sup>		Maximum power consumption kW
		R134a		R1234ze(E)				A <sup>③</sup>	A <sup>④</sup>	
		t <sub>0</sub> /t <sub>c</sub> 5°C / 50°C kW	t <sub>0</sub> /t <sub>c</sub> -10°C / 45°C kW	t <sub>0</sub> /t <sub>c</sub> 5°C / 50°C kW	t <sub>0</sub> /t <sub>c</sub> -10°C / 45°C kW					
CSVH24-125Y CSVH24-125MY	464	281	161	213	118	18	380...480V / 3 / 50 Hz 380...480V / 3 / 60 Hz	220	190	130
CSVH25-160Y CSVH25-160MY	580	358	203	271	149	18		260	225	167
CSVH26-200Y CSVH26-200MY	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
CSVW24-125Y CSVW24-125MY	464	285	160	213	119	18	380...480V / 3 / 50Hz 380...480V / 3 / 60Hz	220	190	126
CSVW25-160Y CSVW25-160MY	580	359	201	268	149	18		260	225	162
CSVW26-200Y CSVW26-200MY	725	439	245	327	179	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.

Permanent magnet motor: CSV..MY.

The efficiency difference is particularly noticeable at part load.

See page 15.

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

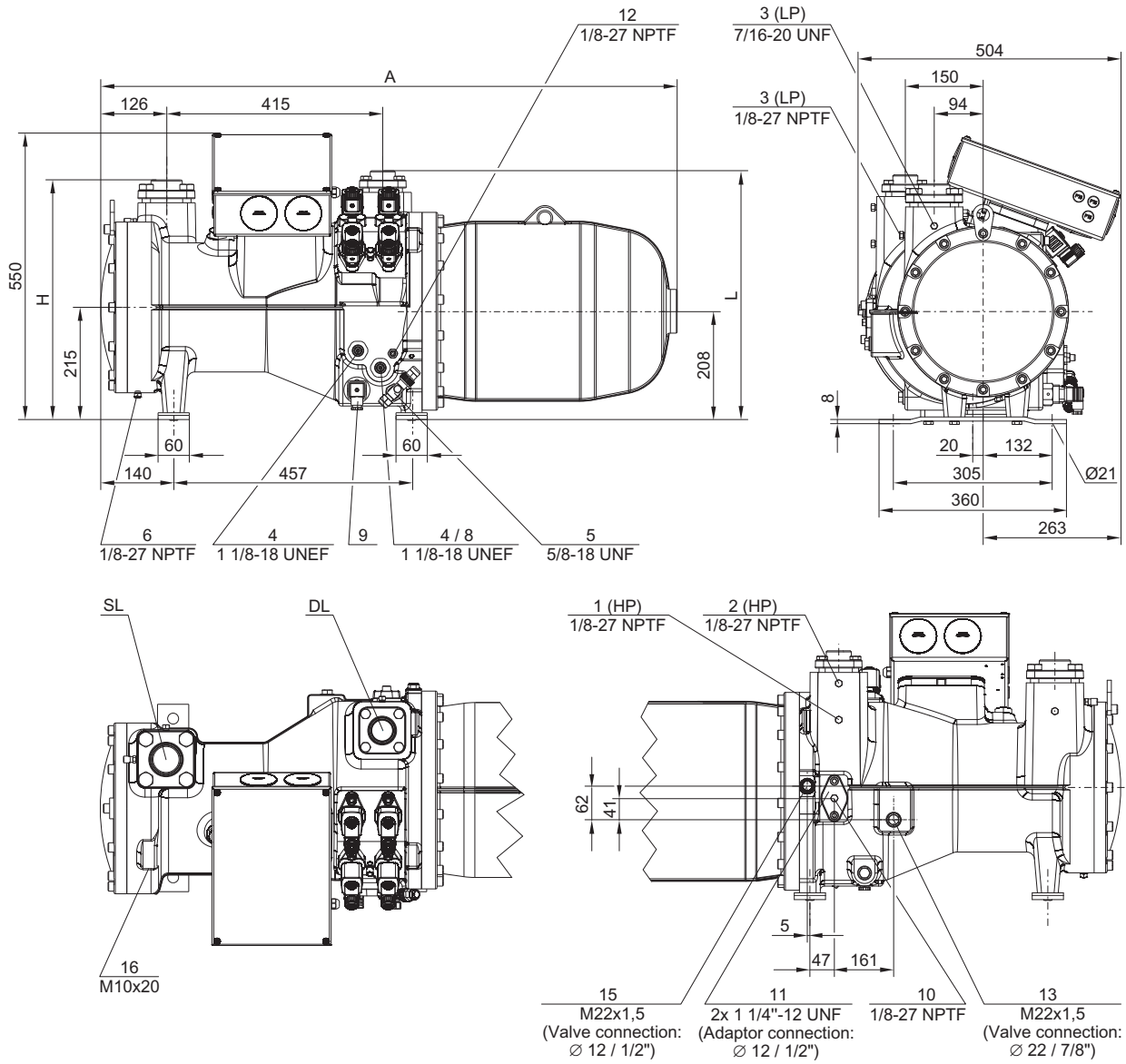
The following pages show the dimensional drawings of the compressors in their standard scope of delivery. CAD data of the compressors including all options can be found as 2D dxf drawings and 3D STP models on the website [www.bitzer.de](http://www.bitzer.de) and in the BITZER SOFTWARE.

### 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) CSW105: connected to the compressor module
3	Low pressure connection (LP): Connection for low pressure switch (LP)
3a	Connection for low pressure transmitter (LP) CSW105: 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 - (OLC-D1-S) CSW105: connected to the compressor module CSV.: integrated into FI control
9	Oil heater with heater sleeve (standard) CSW105: 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 CSW105: 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	Gewindebohrung für Rohralterung
14a	for ECO line
14b	for 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

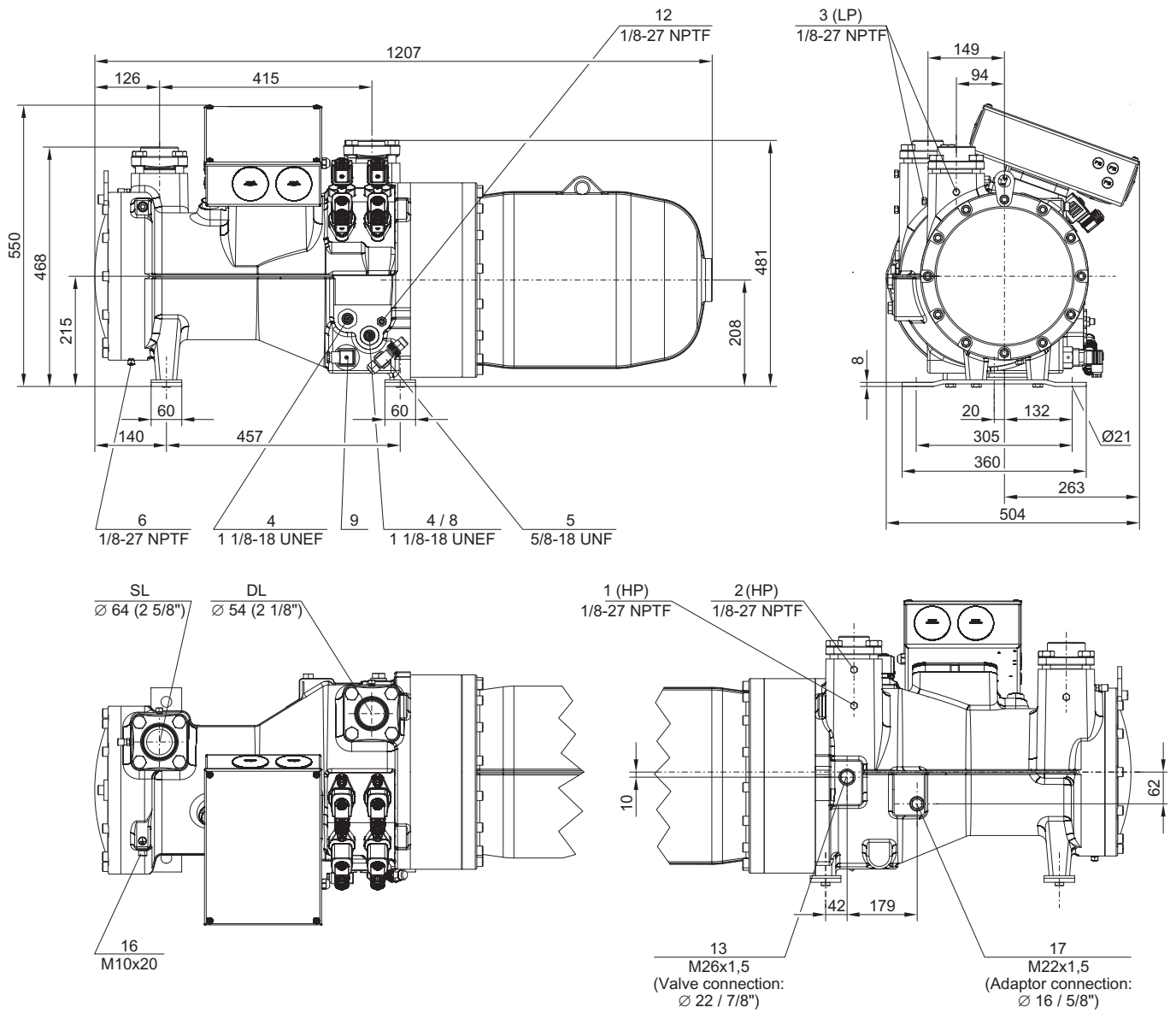


	A	H	L	DL	SL
	mm	mm	mm	mm	mm
CSH6553	1107	460	478	Ø42	Ø54
CSH6563				(1 <sup>5</sup> / <sub>8</sub> "	(2 <sup>1</sup> / <sub>8</sub> "
CSH6583	1207	470	481	Ø54	Ø64
CSH6593				(2 <sup>1</sup> / <sub>8</sub> "	(2 <sup>5</sup> / <sub>8</sub> "

Connection positions see page 29.

## Dimensional drawings

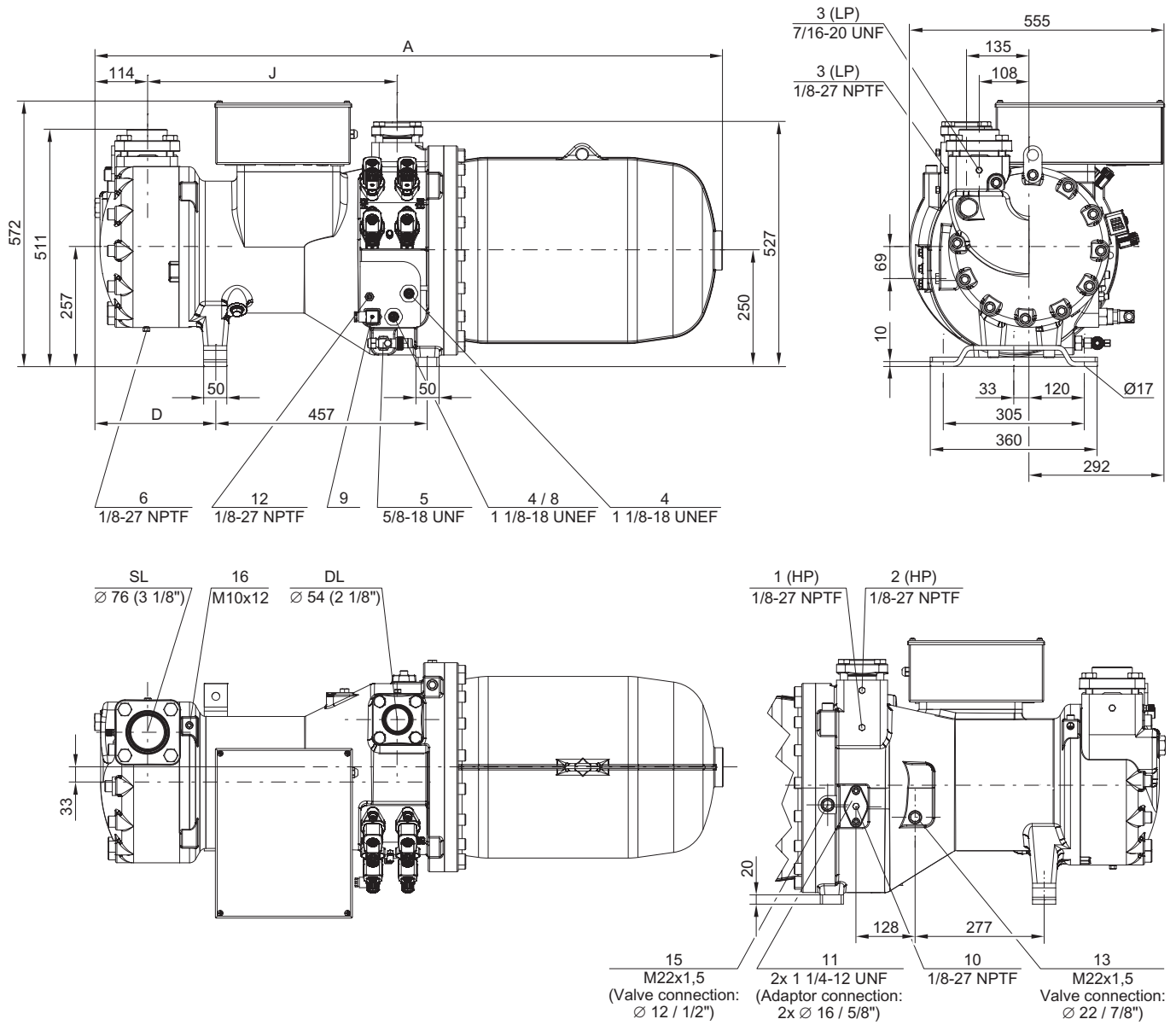
### CSW65



Connection positions see page 29.

## Dimensional drawings

### CSH75



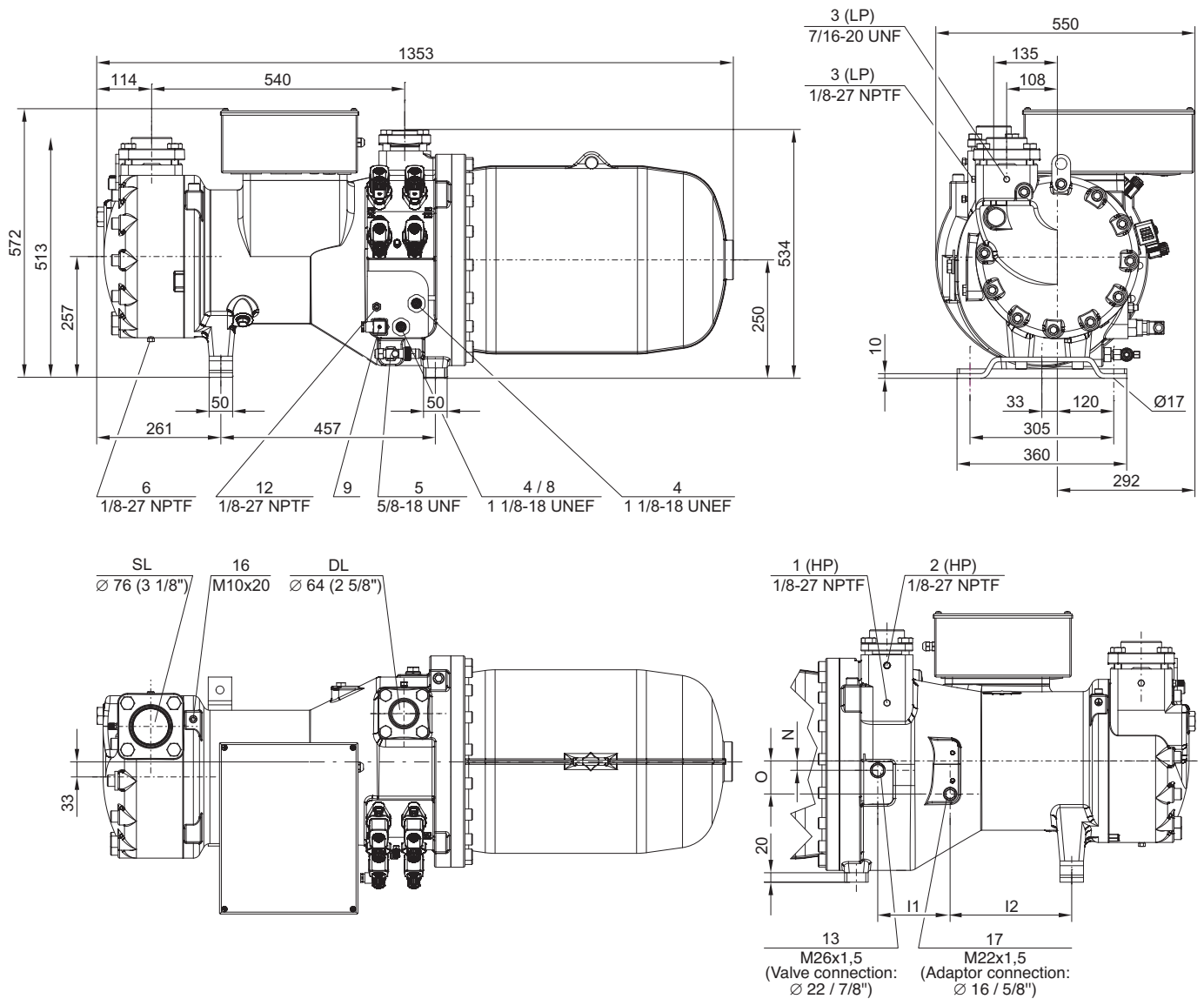
	A mm	D mm	J mm
CSH7553 / CSH7563 / CSH7573 CSH7583-80Y / CSH7593-90Y	1354	262	540
CSH7583-100(Y) CSH7593-110(Y)	1385	293	570

Connection positions see page 29.



## Dimensional drawings

### CSH76 and CSW75

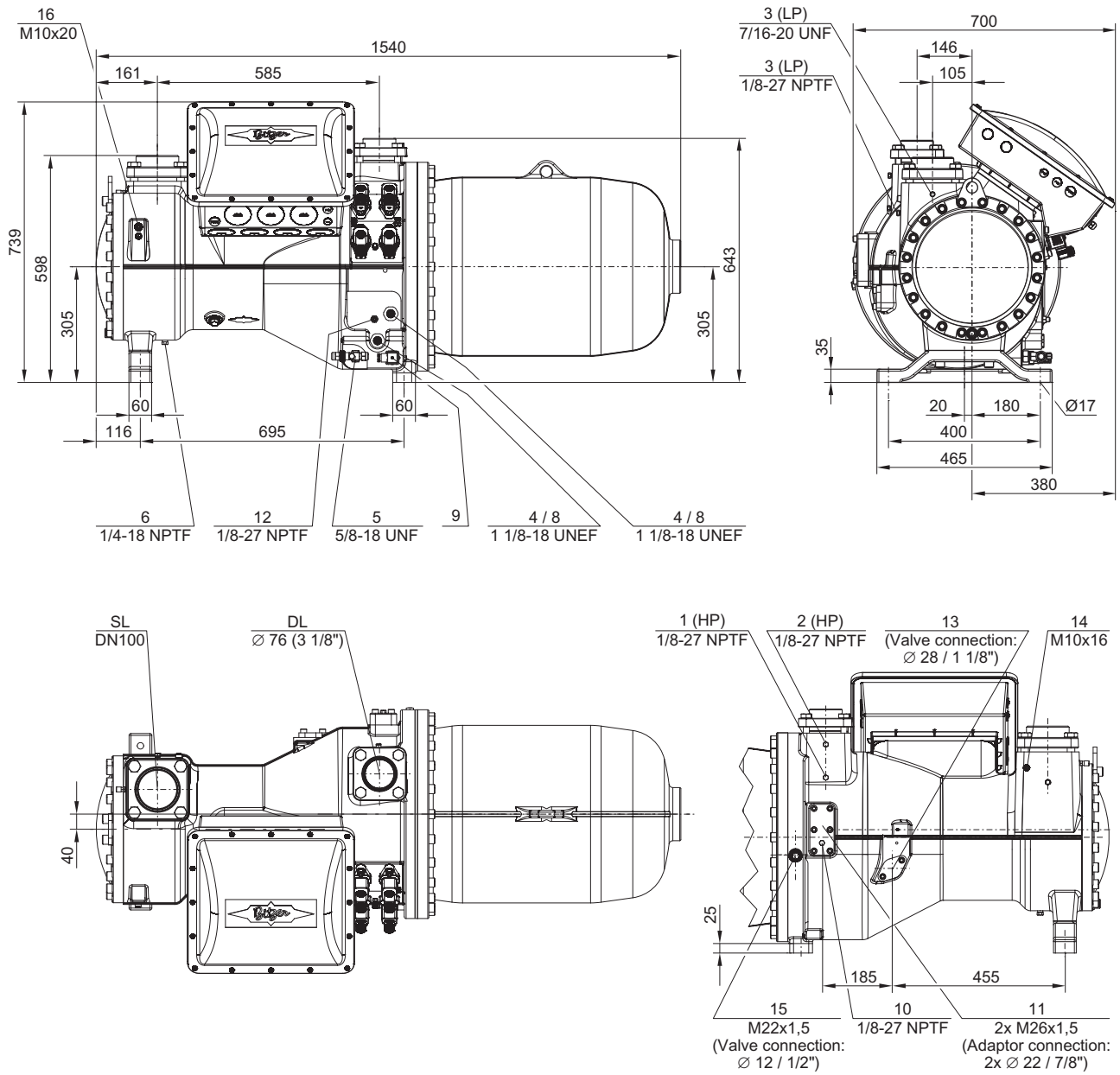


	$l_1$ mm	$l_2$ mm	N mm	O mm
CSH7673 CSW7573	153	258	20	70
CSH7683 / CSH7693 CSW7583 / CSW7593	157	261	23	69

Connection positions see page 29.

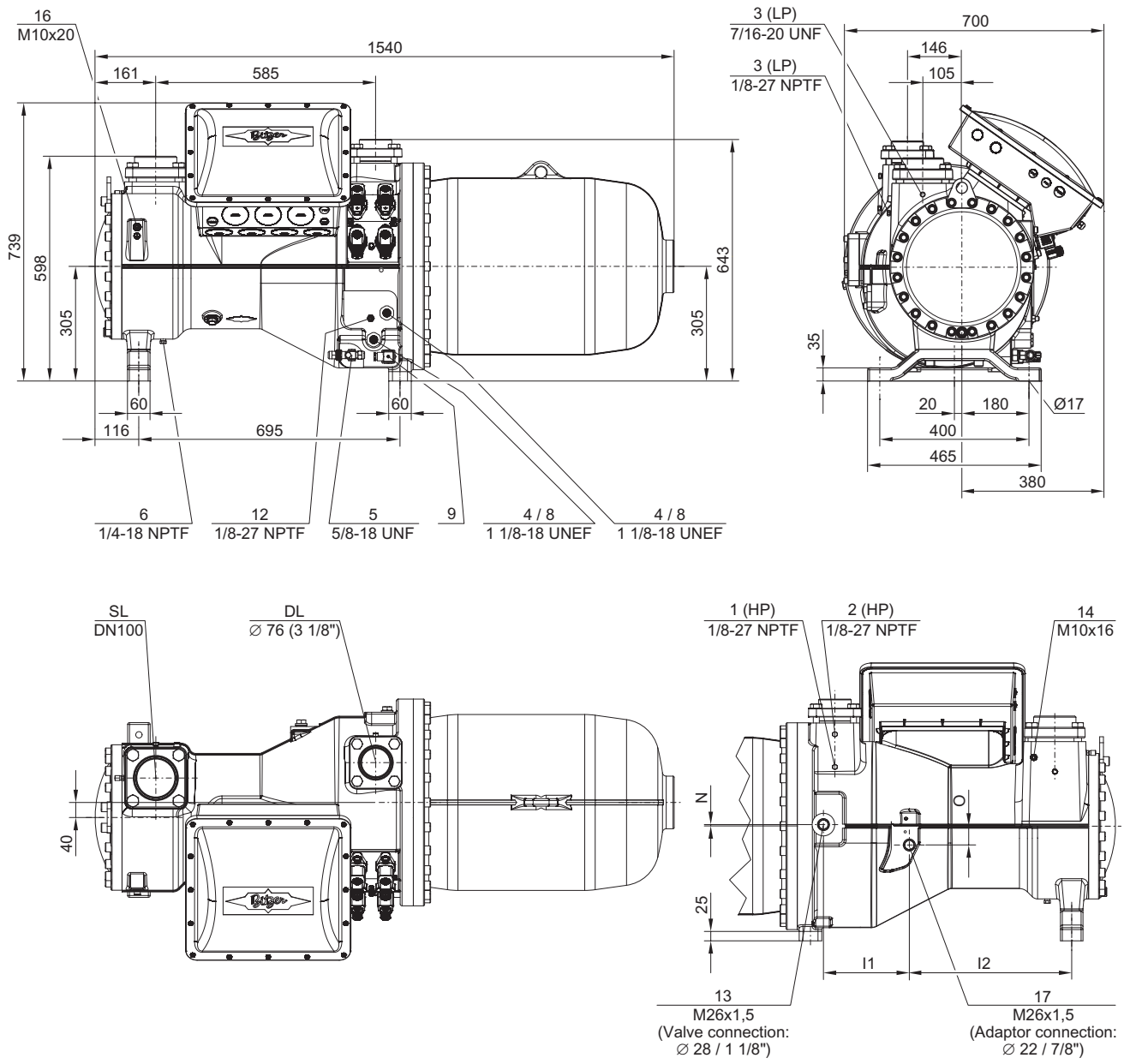
## Dimensional drawings

### CSH85



## Dimensional drawings

### CSH86 and CSW85

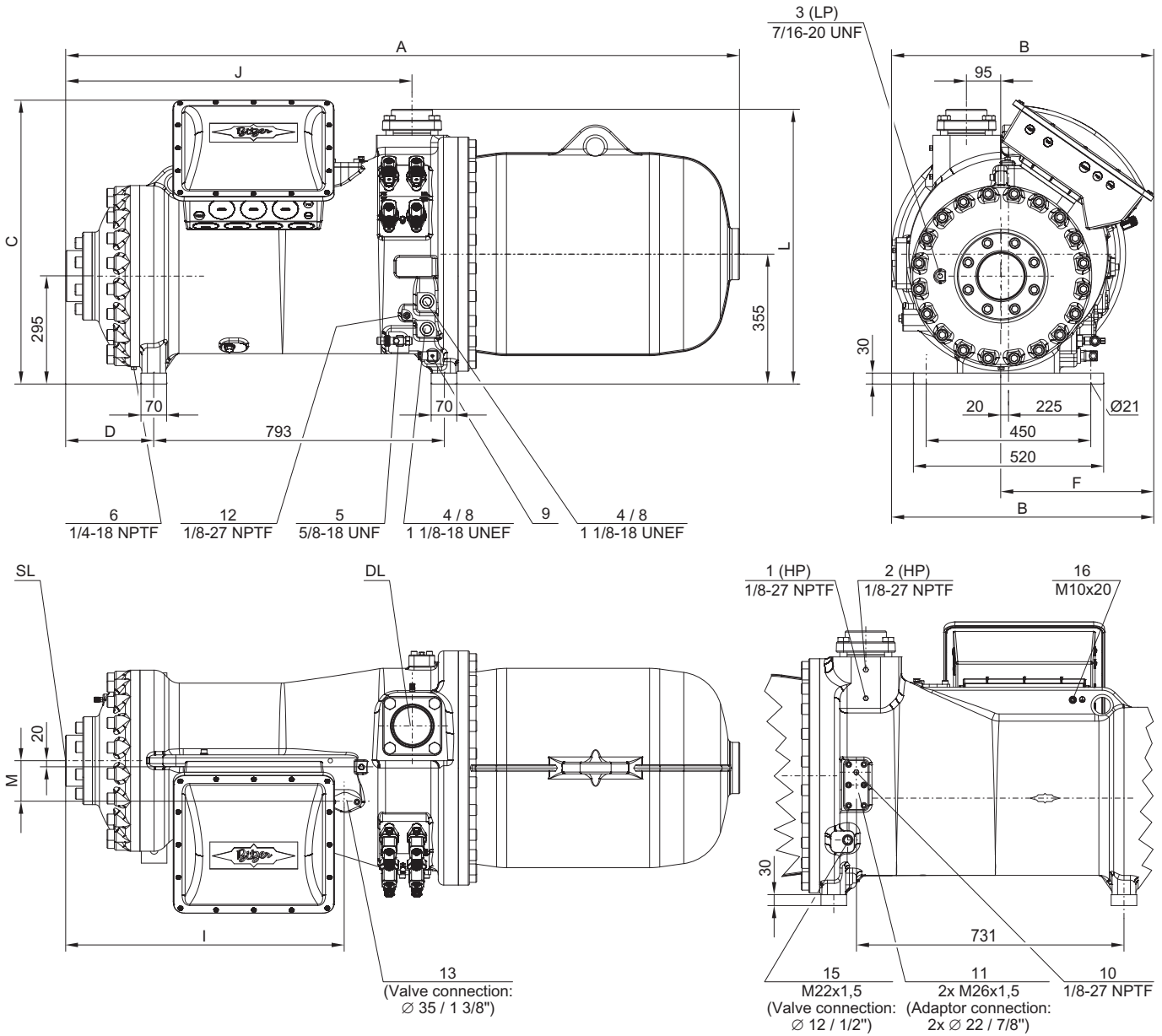


	$l_1$ mm	$l_2$ mm	N mm	O mm
CSH8673 CSW8573	221	434	0	56
CSH8686 / CSH8693 CSW8583 / CSW8593	228	432	4	50

Connection positions see page 29.

## Dimensional drawings

### CSH95



Technical data

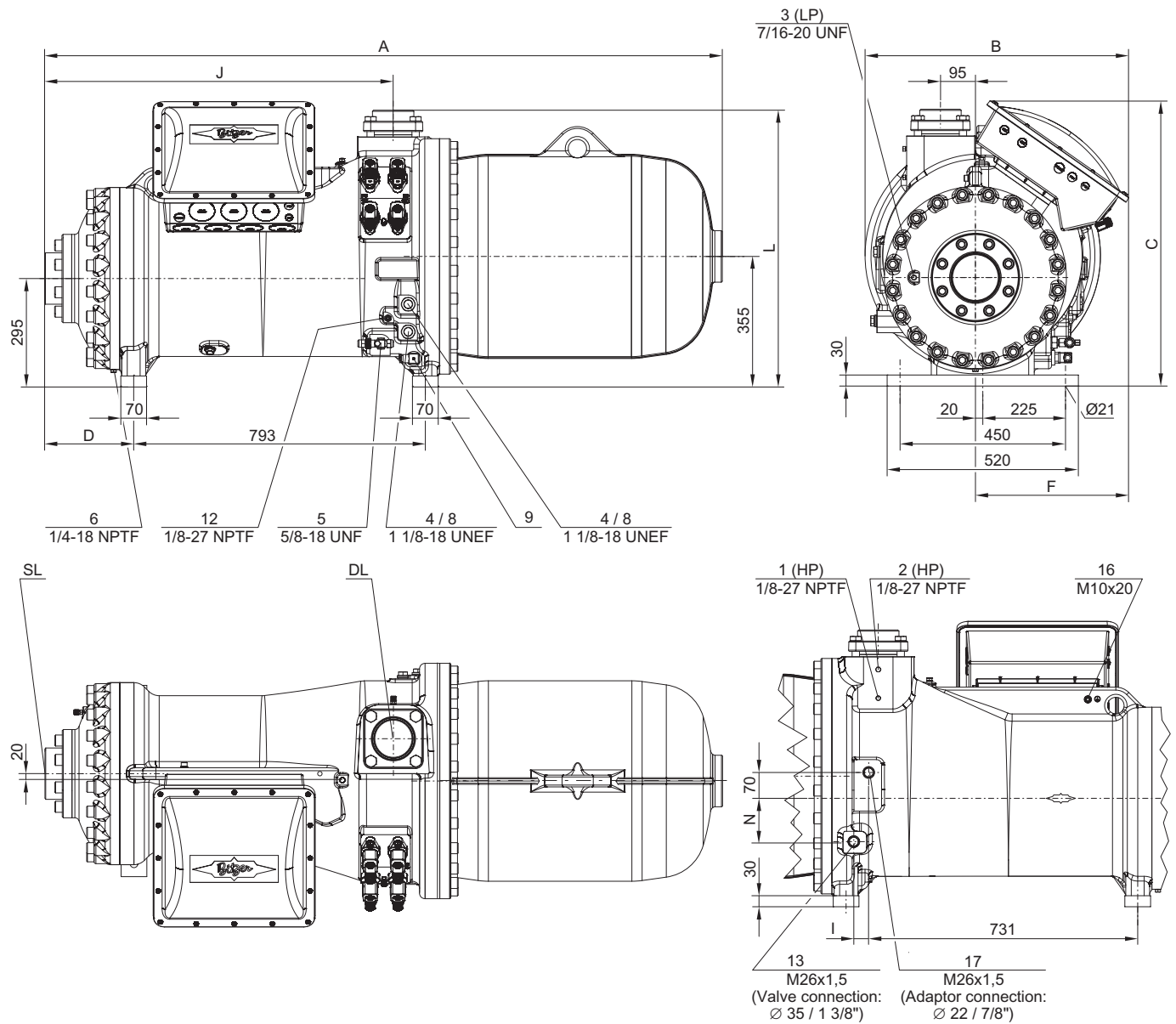
	A mm	B mm	C mm	D mm	F mm	I mm	J mm	L mm	M mm	DL mm	SL mm
CSH9553 CSH9563 CSH9573	1824	717	776	224	417	746	930	744	106	Ø76 (3 1/8")	DN100
CSH9583-210Y CSH9593-240Y	1842	717	776	242	417	764	948	751	113	DN100	DN125
CSH9583-280(Y) CSH9593-300(Y)	1869	717	776	269	417	791	975	751	113	DN100	DN125
CSH95103-280Y	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 29.

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

## Dimensional drawings

### CSH96 and CSW95



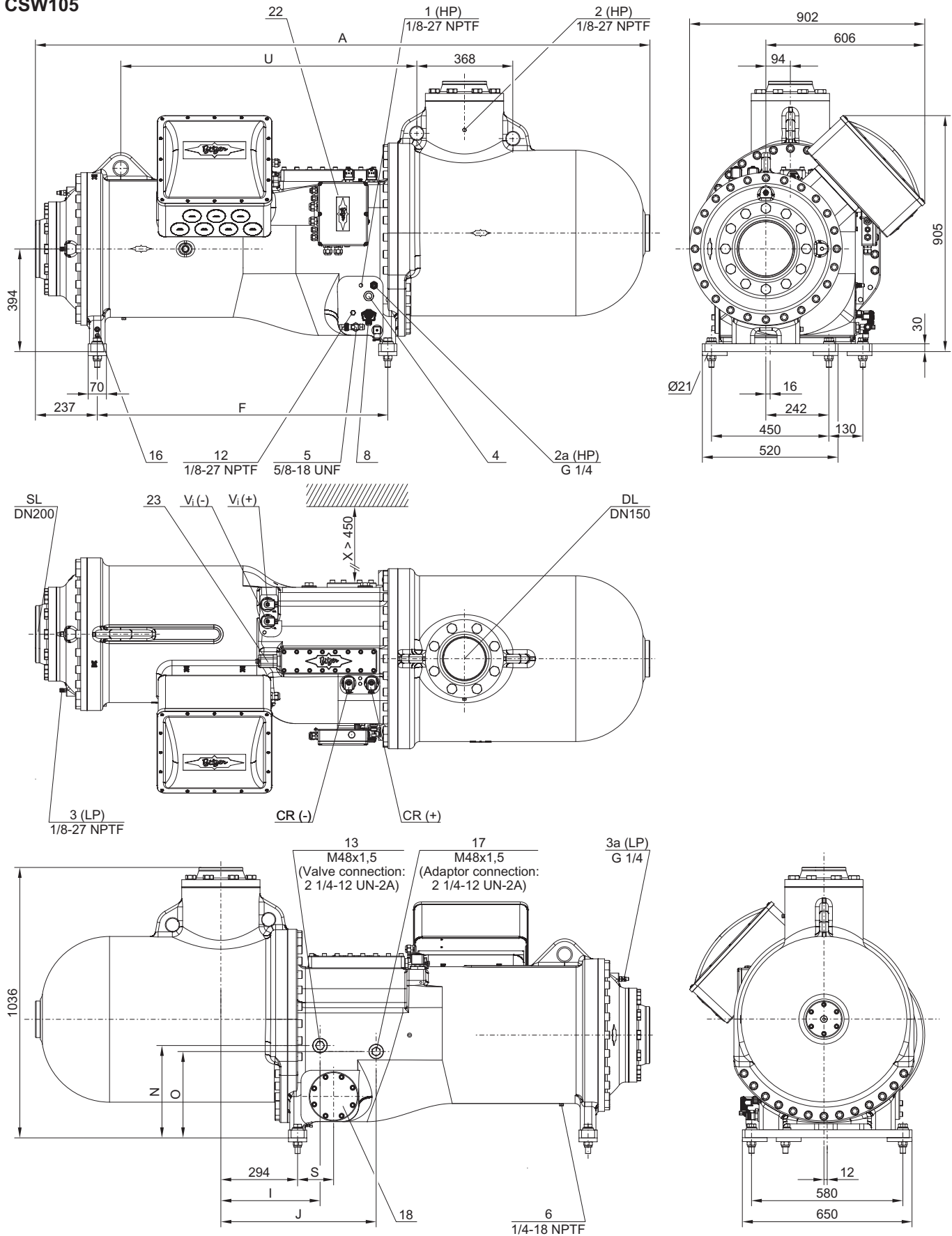
	A	B	C	D	F	I	J	L	N	DL	SL
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
CSH9663 / CSH9673 CSW9563 / CSW9573	1824	717	776	224	417	41	930	751	118	Ø76 (3 1/8")	DN100
CSH9683 / CSH9693 CSW9583 / CSW9593	1842	717	776	242	417	34	948	751	122	DN100	DN125
CSW95103-240Y	1927	731	796	242	431	26	948	751	120	DN100	DN125
CSH96103-280Y 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 29.

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

## Dimensional drawings

### CSW105

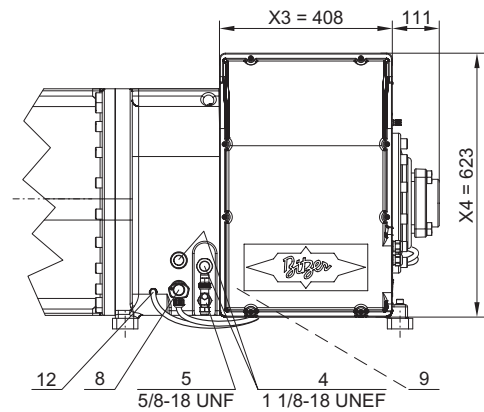
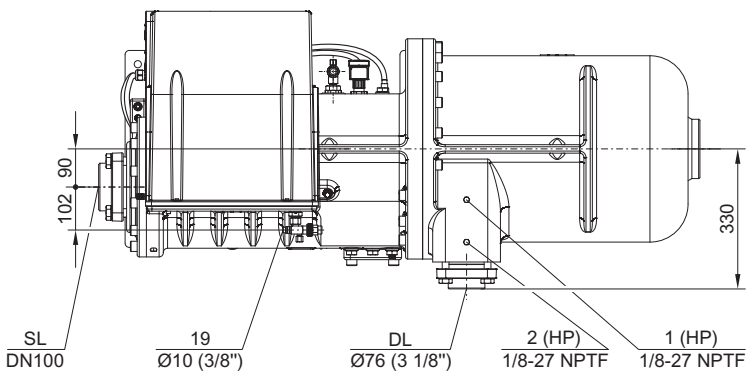
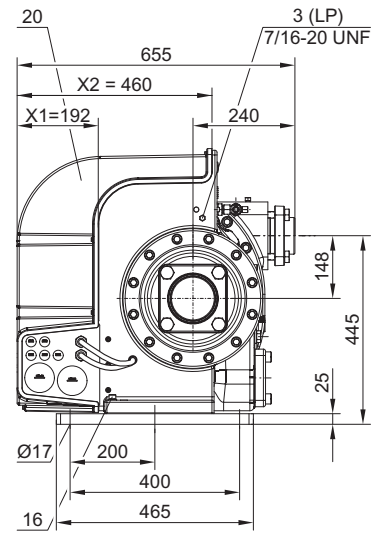
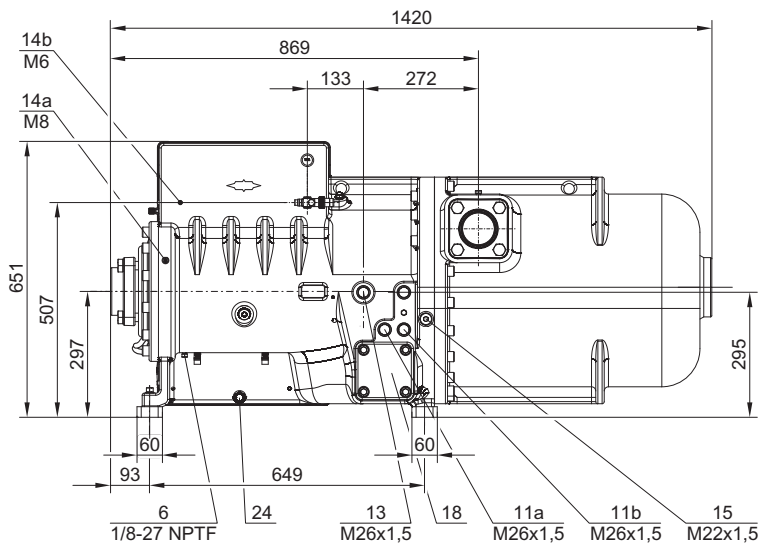


Connection positions see page 29.

	A mm	F mm	I mm	J mm	N mm	O mm	S mm	U mm
<b>CSW10563</b> <b>CSW10573</b>	2310	1069	380	591	454	336	163	1090
<b>CSW10583</b> <b>CSW10593</b>	2354	1113	421	595	354	330	138	1134

## Dimensional drawings

### CSVH2

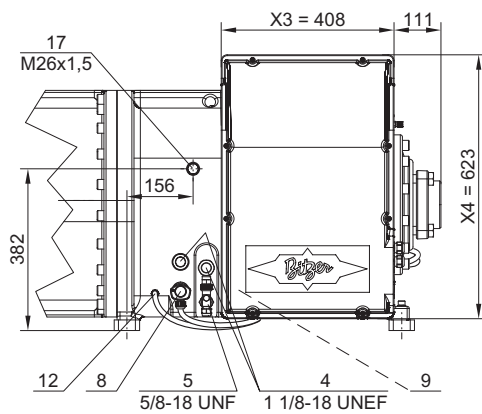
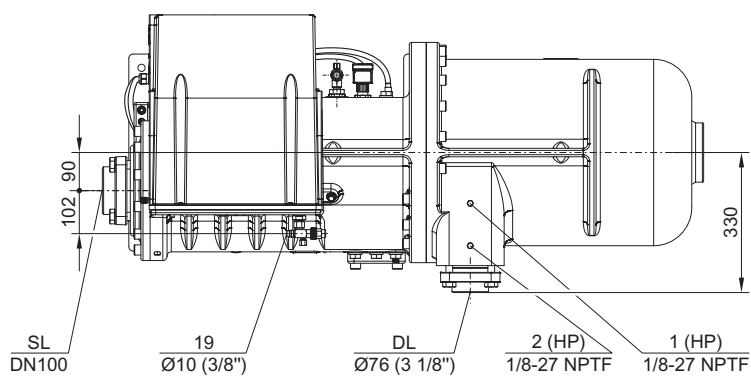
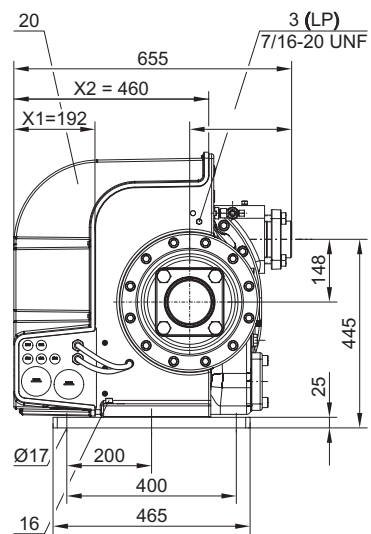
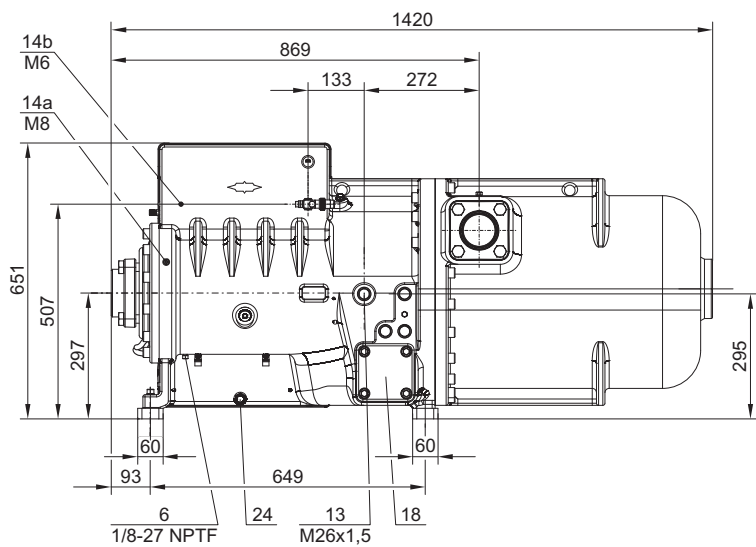


Optional alternative suction gas connection: DN125  
This flange is 14 mm longer.



## Dimensional drawings

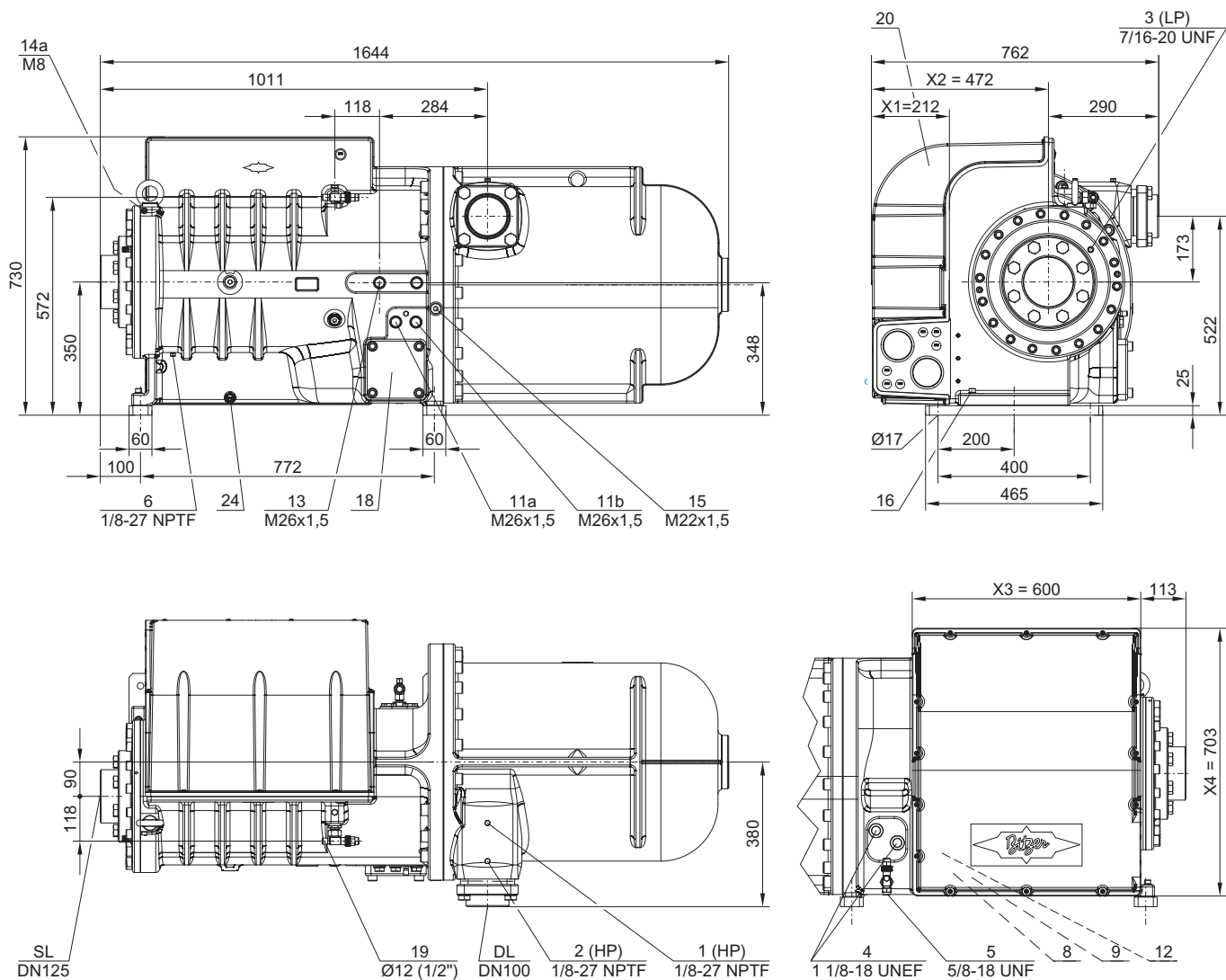
### CSVW2



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

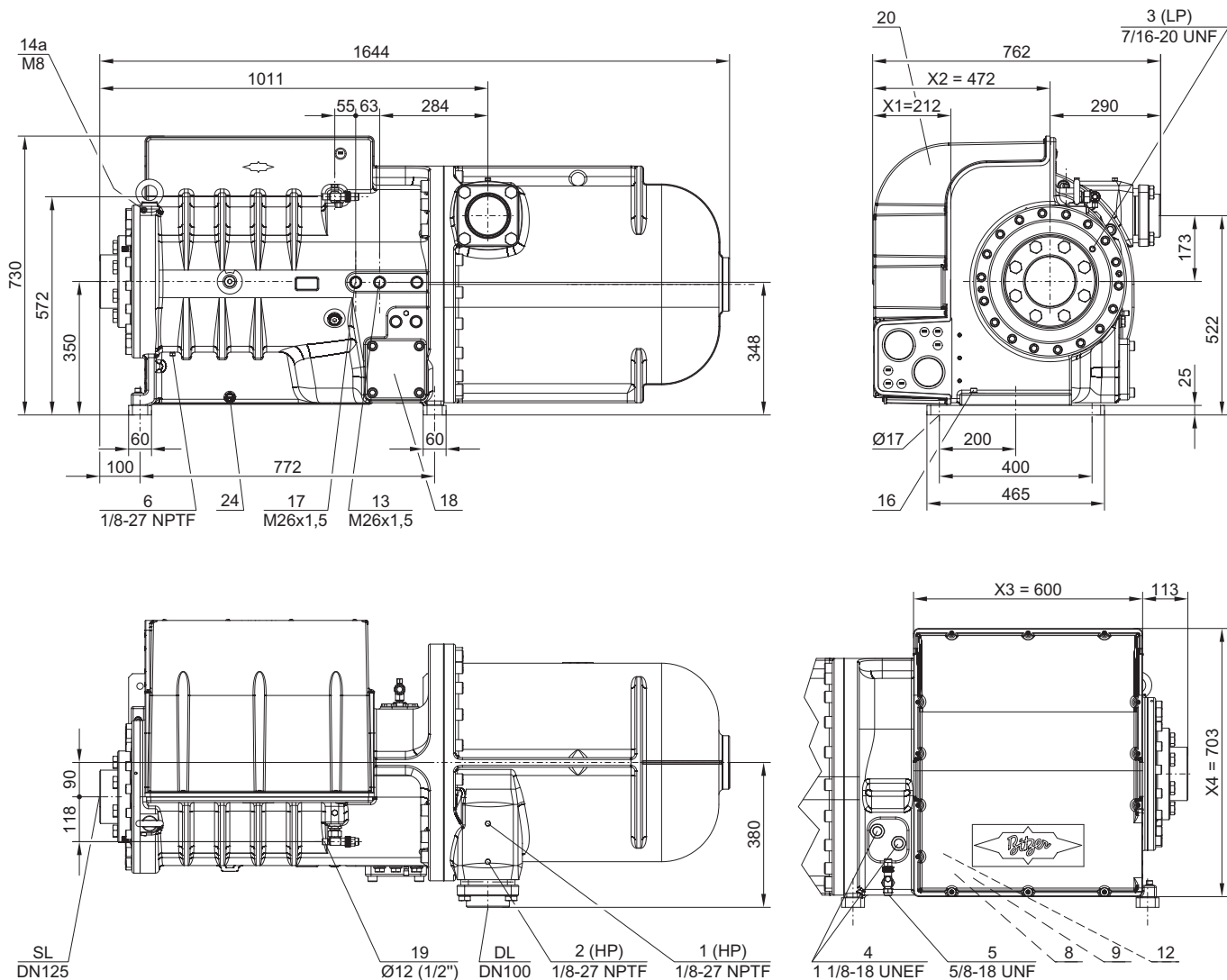
## Dimensional drawings

### CSVH3



## Dimensional drawings

### CSVW3



Connection positions see page 29.



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