BERLING
REFRIGERATION GROUP

ARKTON
CHŁODNICTWO KLIMATYZACJA

COMPRESSOR UNIT

OPERATION AND MAINTENANCE MANUAL

IO-AS-B-002

Spis treści

1. Safety

Pursuant to the Directive on machinery 2006/42/EC these units are purposed for assembly in systems (machineries) and may be operated, if assembly followed according to the respective Operation Manual of the system (machine) and applicable regulations (with regard to the Standard: See Manufacturer Declaration).* Electrical components comply with Low Voltage Directive 2014/35/UE. With regard to components operating under pressure applies the Pressure Equipment Directive UE 2014/68/UE (in short PED).
* applicable for EC member states

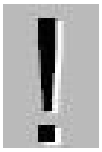
Authorized operation
Any work elated to compressors and cooling devices shall be carried out by qualified and authorized personnel only.
Condensing units have been manufactured in accordance with technical knowledge and applicable regulations. The manufacturer has taken extra efforts to ensure optimum safety for the user.
Keep this manual for the whole unit operation period.

Supplementary operation manuals
In addition to this manual the user shall be familiar with respective manuals of other components of the condensing unit as e.g. compressors and tanks, as well as additional equipment and accessories.

Other threats
Each element of the unit may pose threat or risk for human health or property. Consequently all persons carrying assembly of the system shall read carefully this manual!

Moreover the personnel carrying works shall be familiar with:
• relative norms and safety regulations (e.g. PN-EN 378, PN-EN 60204 and PN-EN 61140),
• commonly applicable safety rules,
• EC directives,

Warning Symbols
Information concerning risk and hazard which shall be followed by operators and users been has been highlighted In this manual with the following symbols. User and operator shall follow and observe all symbols and notices!



Caution!
Risk of possible damage of the equipment.

Warning!
Risk of possible threat for people.

Warning!
Risk of possible serious threat for people.

Hazard!
Risk of serious direct threat for people.

General guidelines regarding industrial safety

Warning!
Units have been factory charged with the shielding gas
(approx**. 5 bar over atmosphere pressure**).
Failure to follow operating procedures may result in skin and eyes injuries.
Apply protective goggles when performing works related to the compressor!
Do not open connections (end-pipes) until equalization of pressure follows!

Caution!
During operation surface temperature may be over 60ºC or below 0ºC.
Risk of serious injuries and frostbites. Follow the tag-out procedure and restrict access to the place of work.
Before commencement of works related to the compressor and pressure components firstly switch off the unit and wait till it cools down.

For works related to the unit, following filling with cooling medium or start:

Warning!
Unit under pressure!
Failure to follow operating procedures may result in serious body injuries.
Equalize compressor pressure!
Wear protective goggles!

For works related to the spinning components:

Hazard!
Risk! Rotating components.
Failure to follow operating procedures may result in serious body injuries.
Before removing fan shield and electrical box cover, firstly switch off the unit and remove the fuses!

Rotating elements:
- Condensing unit fan (air-cooled)
- Clutch (of compressor, open type)
- Belt pulley (of compressor, open type)

2. Classification of condensing units and their components according to EC directives

Pursuant to the Directive on machinery 2006/42/CE these units are purposed for assembly on cooling systems. Electrical components comply with 2014/35/UE Low Voltage Directive. For components operating under pressure apply the Pressure Equipment Directive 2014/68/UE (in short PED).

2.1 Unit factory condition

The unit is charged with the shielding gas:
Approx. 4,5. .. 5 bar over atmospheric pressure.

3. Application scope

Permitted refrigerant ①	HFC / HFO
Charged with oil	Bitzer BSE 32
Max, permitted pressure	28 bar

① Other medium upon request

Application limits – See prospectus of:
• KP-100 (semi-hermetic piston compressors)
• KP-110 (tandem compressors)
• KP-150 (2-stage semi-hermetic piston compressors)
• or Bitzer computer program

4. System designing

4.1 Positioning

Location where the system is to be installed be shall be levelled and resistant to load.

If the unit is to operate in extreme conditions (e.g. aggressive atmosphere, low external temperature etc.) adequate means shall be undertaken. Consultation with the deliverer is recommended.

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4.2 Maximum permitted pressure

The system shall be designed appropriately to prevent pressure increase over maximum pressure (PS) in any part of the system. See rated plate.

Condensers and tanks (pressure vessels) shall be absolutely provided with release valves, if:

• permitted pressure may be exceeded as a result of exterior heat forces (e.g. fire), or if

• the system has been charged with the cooling medium- more than 90% of tank capacity at 20ºC. Tank capacity means inner volume between cut-off valves located before and after the tank (or valves that may perform this function). In case of more tanks connected in series capacity shall stand for a sum of tanks' capacity and the connecting pipe.

In these cases it is recommended to install refrigerant discharge cross over system to the low pressure side (reduction of refrigerant emission to the atmosphere).

5. Assembly

5.1 Condensing unit transport

During shipment the unit shall be mounted to the pallet and handled by fixing rails.

Protection of semi-hermetic compressors condensing units

To prevent damages during shipment, the interlock has been provided of compressor anti-vibration. Following unit assembly the interlock shall be removed or loosened.

6. Electrical connection

Semi-hermetic compressors, condenser fans and electrical equipment comply with Low Voltage Directive 2014/35/UE.

Wiring shall be installed according to the diagram inside the electric box of the compressor. Follow requirements of PN-EN 60204 PN-EN 61140 safety standard.

7. Start procedure

• Check system tightness
• Provide vacuum
• Fill with a refrigerant
• Inspect before starting
• Start the system

8. Service and maintenance

8.1 Regular inspections

Regular maintenance inspections of the unit carried out by the specialized engineers shall be provided. Inspection interval shall be determined by the user according to the applied refrigerant and operation nature.

Inspection shall include check of:
- Evaporation point
- Sucked gas temperature
- Condensation temperature
- Differential temperature between condensation point and condenser inlet air temperature
- Supplied gas temperature
- Oil temperature
- Engagement frequency
- Compressor power consumption
- Power consumption by condenser fans

The service log shall be maintained and analysis of measurement results shall be carried out. In case of significant variance required repairs shall be made.

It is required to check:
- Condenser contamination
- Charging with refrigerant (level as according to liquid sight glass)
- Refrigerant humidity level (humidity factor) – replace the drying unit, if necessary
- Protective devices, e.g. pressure switch control, engine protection.

9. Disassembly

9.1 Stoppage

Crankcase heater shall be engaged all the time until compressor disassembly completion, to prevent excessive dissolving of the refrigerant in the oil.

9.2 Unit or its part disassembly

In case of disassembly or replacement of electrical and pressurized components:
Warning!
Live electrical components!
Risk of body serious injuries!
Firstly disconnect from power supply!
Remove fuses!

Warning!
Pressurized compressor or other components!
Risk of body serious injuries!
Firstly equalize pressure!
Apply protective goggles!

Coolant sucking away

Close cut-off valves located before and after the unit's part. Pump away or suck away coolant and dispose of according to applicable environmental protection regulations.

Oil drainage

Warning!
Compressor and oil separator oil temperature may be over 60ºC!
Risk of serious burning!
Wait until oil cooling down!
Before works commencement firstly disconnect from power supply and suck away the coolant– as described above.

Oil separator (Optionally)
The oil may be drained with oil separator inlet or outlet only, after its prior disassembly.

The used oil shall be disposed of according to applicable environmental protection regulations.

Compressor and unit other part disassembly
Drain the coolant and oil according to the above instructions.
Disassembly particular part or the whole unit
• Close tightly all open connections (e.g. of cut- off valves, flanges, screw joints)
• Handle heavy parts with the lifting jack
• Make repairs or dispose of according to applicable environmental protection regulations

10. Technical data

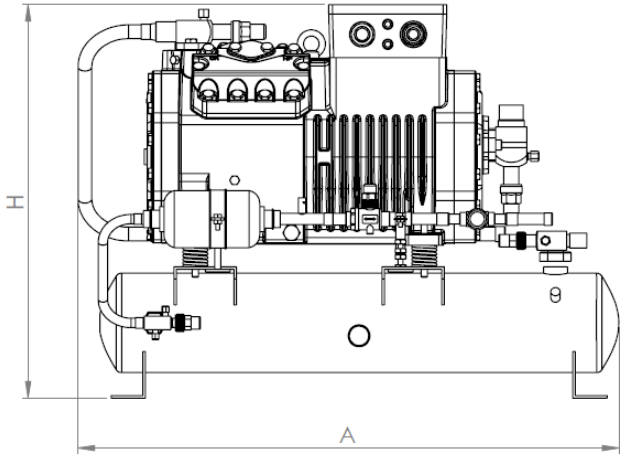
Unit (R404a, R407F, R134) Motor M1 i M2	Dimensions [mm]			Weight [kg]	Connections [mm]			
	A	B	H		Discharge	Suction	Liquid (receiver input)	Liquid (receiver output)
AS-2EES-2Y/DVR500	860	420	430	88	12	22	10	10
AS-2EES-3Y/DVR700	860	420	550	93	12	22	12	12
AS-2DES-2Y/DVR500	860	420	430	88	12	22	10	10
AS-2DES-3Y/DVR700	860	420	550	94	15	22	12	12
AS-2CES-3Y/DVR700	860	420	550	93	15	22	12	12
AS-2CES-4Y/DVR1100	860	420	560	96	15	22	12	12
AS-4FES-3Y/DVR700	860	420	550	106	15	22	12	12
AS-4FES-5Y/DVR1100	860	420	560	113	15	22	12	15
AS-4EES-4Y/DVR1100	860	420	560	111	15	28	12	12
AS-4EES-6Y/DVR1500	860	420	720	117	18	28	15	15
AS-4DES-5Y/DVR1100	860	420	560	113	18	28	12	15
AS-4DES-7Y/DVR1500	860	420	720	119	18	28	15	15
AS-4CES-6Y/DVR1500	860	420	720	121	18	28	15	15
AS-4CES-9Y/DVR1500	860	420	720	122	22	28	15	18
AS-4TES-9Y/RHC15B	870	580	630	165	22	35	22	18
AS-4TES-12Y/RHC30B	890	580	700	187	22	35	28	22
AS-4PES-12Y/RHC30B	890	580	700	185	22	35	28	18
AS-4PES-15Y/RHC30B	910	590	700	188	28	42	28	22
AS-4NES-14Y/RHC30B	890	580	700	187	22	35	28	22
AS-4NES-20Y/RHC30B	910	590	700	197	28	42	28	22
AS-4JE-15Y/RHC30B	890	560	770	229	28	42	28	22
AS-4JE-22Y/RHC30B	890	560	770	240	28	42	28	22
AS-4HE-18Y/RHC30B	890	560	770	233	28	42	28	22
AS-4HE-25Y/RHC45B	1310	560	770	268	28	54	28	28

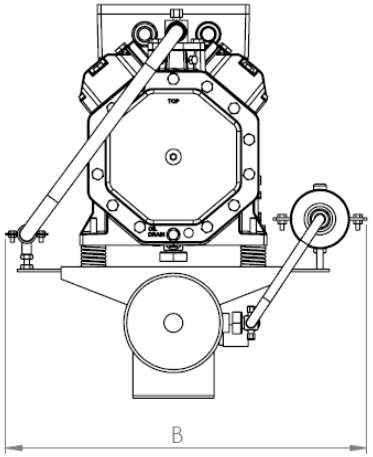
Unit (R404a, R407F, R134) Motor M1 i M2	Dimensions [mm]			Weight [kg]	Connections [mm]			
	A	B	H		Discharge	Suction	Liquid (receiver input)	Liquid (receiver output)
AS-4GE-23Y/RHC30B	890	560	770	243	28	54	28	22
AS-4GE-30Y/RHC45B	1310	560	770	271	28	54	28	28
AS-4FE-28Y/RHC45B	1310	560	770	272	28	54	28	28
AS-4FE-35Y/RHC45B	1310	590	770	274	35	54	28	28
AS-6HE-28Y/RHC45B	1310	590	770	292	35	54	28	28
AS-6HE-35Y/RHC60B	1200	610	870	320	35	54	35	35
AS-6GE-34Y/RHC45B	1310	590	770	296	35	54	28	28
AS-6GE-40Y/RHC60B	1200	610	870	322	35	54	35	35
AS-6FE-44Y/RHC60B	1200	580	870	323	35	54	35	35
AS-6FE-50Y/RHC60B	1220	610	870	326	42	54	35	35

Unit (R134a) Motor M3	Dimensions [mm]			Weight [kg]	Connections[mm]			
	A	B	H		Discharge	Suction	Liquid (receiver input)	Liquid (receiver output)
AS-2EES-2Y/DVR500	860	420	430	88	12	22	10	10
AS-2DES-2Y/DVR500	860	420	430	88	12	22	10	10
AS-2CES-3Y/DVR700	860	420	550	93	15	22	12	12
AS-4FES-3Y/DVR700	860	420	550	106	15	22	12	12
AS-4EES-4Y/DVR1100	860	420	560	111	15	28	12	12
AS-4DES-5Y/DVR1100	860	420	560	113	18	28	12	15
AS-4CES-6Y/DVR1500	860	420	720	121	18	28	15	15
AS-4TES-8Y/RHC15B	870	580	630	165	22	35	22	18
AS-4PES-10Y/RHC30B	890	580	700	185	22	35	28	18
AS-4NES-12Y/RHC30B	890	580	700	187	22	35	28	22
AS-4JE-13Y/RHC30B	890	560	770	229	28	42	28	22
AS-4HE-15Y/RHC30B	890	560	770	233	28	42	28	22

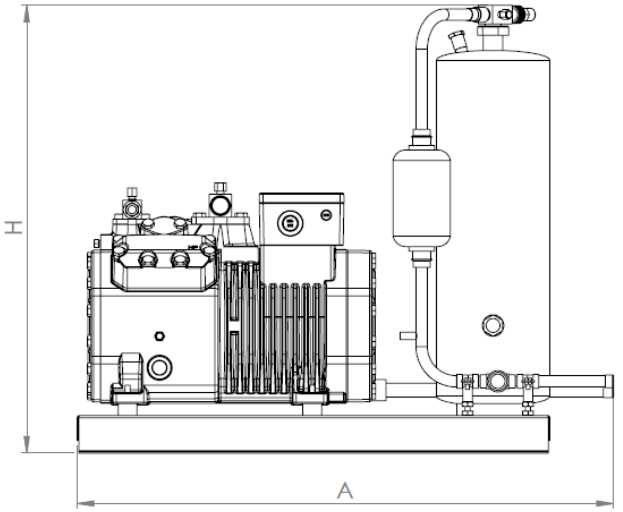
Unit (R134a) Motor M3	Dimensions [mm]			Weight [kg]	Connections[mm]			
	A	B	H		Discharge	Suction	Liquid (receiver input)	Liquid (receiver output)
AS-4GE-20Y/RHC30B	890	560	770	243	28	54	28	22
AS-4FE-25Y/RHC45B	1310	560	770	260	28	54	28	28
AS-6HE-25Y/RHC45B	1310	590	770	292	35	54	28	28
AS-6GE-30Y/RHC45B	1310	590	770	296	35	54	28	28
AS-6FE-40Y/RHC60B	1200	580	870	323	35	54	35	35

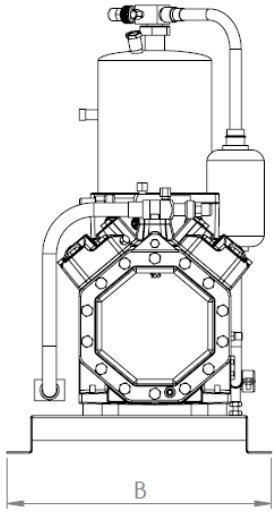
4TES-9Y/RHC15B - 6FE-50Y/RHC60B





2EES-2Y/DVR500 - 4CES-9Y/DVR1500





DECLARATION OF CONFORMITY
Nr **1/AS/2021**

ARKTON Sp. z o.o.
ul. Mórkowska 36
64-115 Wilkowice
hereby certifies that the product

Type: **Compressor Unit**

AS-2EES-2Y/DVR500 , AS-2EES-3Y/DVR700 ,AS-2DES-2Y/DVR500
AS-2DES-3Y/DVR700 ,AS-2CES-3Y/DVR700 ,AS-2CES-4Y/DVR1100
AS-4FES-3Y/DVR700 ,AS-4FES-5Y/DVR1100 ,AS-4EES-4Y/DVR1100
AS-4EES-6Y/DVR1500 ,AS-4DES-5Y/DVR1100 ,AS-4DES-7Y/DVR1500
AS-4CES-6Y/DVR1500 ,AS-4CES-9Y/DVR1500 ,AS-4TES-9Y/RHC15B
AS-4TES-12Y/RHC30B ,AS-4PES-12Y/RHC30B ,AS-4PES-15Y/RHC30B
AS-4NES-14Y/RHC30B ,AS-4NES-20Y/RHC30B ,AS-4JE-15Y/RHC30B
AS-4JE-22Y/RHC30B ,AS-4HE-18Y/RHC30B ,AS-4HE-25Y/RHC45B
AS-4GE-23Y/RHC30B ,AS-4GE-30Y/RHC45B ,AS-4FE-28Y/RHC45B
AS-4FE-35Y/RHC45B ,AS-6HE-28Y/RHC45B ,AS-6HE-35Y/RHC60B
AS-6GE-34Y/RHC45B ,AS-6GE-40Y/RHC60B ,AS-6FE-44Y/RHC60B
AS-6FE-50Y/RHC60B , AS-2EES-2Y/DVR500 ,AS-2DES-2Y/DVR500 ,
AS-2CES-3Y/DVR700 ,AS-4FES-3Y/DVR700 ,AS-4EES-4Y/DVR1100
AS-4DES-5Y/DVR1100 ,AS-4CES-6Y/DVR1500 ,AS-4TES-8Y/RHC15B
AS-4PES-10Y/RHC30B ,AS-4NES-12Y/RHC30B ,AS-4JE-13Y/RHC30B
AS-4HE-15Y/RHC30B ,AS-4GE-20Y/RHC30B ,AS-4FE-25Y/RHC45B
AS-6HE-25Y/RHC45B ,AS-6GE-30Y/RHC45B ,AS-6FE-40Y/RHC60B

Max permissible pressure:	**28 bar**
Permissible temperature:	**- 40° C/+80° C**
Working medium:	**HFC/HFO refrigerant (group 2)**
Category of risk:	**I**

Satisfies requirements of following directives:

1. 2006/42/WE Safety of machinery [MD]
   Implemented to Polish Law
   Regulation of Economy Minister from 21st October 2008
   on essential requirements for the machines.
2. 2014/35/UE Low Voltage [LVD]
   Implemented to Polish Law
   Regulation of Minister of Economy, Work and Social Policy from 15th December 2005
   on essential requirements for electrical equipment
3. 2014/30/UE Electromagnetic compatibility [EMC]
   Implemented to Polish Law
   Regulation of Minister of Transport and Construction from 27th December 2005 about
   assessing the conformity of the apparatus with the essential requirements
   electromagnetic compatibility and how its labels

4. 2014/68/EU Pressure Devices [PED]
   Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment

And following harmonized standards:

Ad1.
- a) PN-EN ISO 12100-1:2005
- b) PN-EN 418:1999
- c) PN-EN 1050:1999
- d) PN-EN ISO 13849-2:2005

Ad2.
- a) PN-EN 61140:2005

Ad3.
- a) PN-EN 60034-1:2005U
- b) PN-EN 60947-1:2002

Ad4.
- a) PN-EN 378-1:2017
- b) PN-EN 378-2:2017
- c) PN-EN 12263:2003
- d) PN-EN 13136:2014-03

The unit nameplate is marked as:

CE

Wilkowice, 01.01.2021
(place)

ARKTON Sp. z o.o.
ul. Mórkowska 36
64-115 Wilkowice
tel. 65 525 28 30, NIP 697-20-51-086
nr rejestrowy BDO 000029751

Declaration of Incorporation
in accordance with directive UE
concerning machine 2006/42/UE
attachment II, nr 1B

ARKTON Sp. z o.o.
Mórkowska 36 street
64-115 Wilkowice
hereby certifies that the product

Type: **Compressor Unit**

AS-2EES-2Y/DVR500 , AS-2EES-3Y/DVR700 ,AS-2DES-2Y/DVR500 ,AS-2DES-3Y/DVR700 ,AS-2CES-3Y/DVR700 ,AS-2CES-4Y/DVR1100 ,AS-4FES-3Y/DVR700 ,AS-4FES-5Y/DVR1100 ,AS-4EES-4Y/DVR1100 ,AS-4EES-6Y/DVR1500 ,AS-4DES-5Y/DVR1100 ,AS-4DES-7Y/DVR1500 ,AS-4CES-6Y/DVR1500 ,AS-4CES-9Y/DVR1500 ,AS-4TES-9Y/RHC15B ,AS-4TES-12Y/RHC30B ,AS-4PES-12Y/RHC30B ,AS-4PES-15Y/RHC30B, AS-4NES-14Y/RHC30B ,AS-4NES-20Y/RHC30B ,AS-4JE-15Y/RHC30B ,AS-4JE-22Y/RHC30B ,AS-4HE-18Y/RHC30B ,AS-4HE-25Y/RHC45B ,AS-4GE-23Y/RHC30B ,AS-4GE-30Y/RHC45B ,AS-4FE-28Y/RHC45B ,AS-4FE-35Y/RHC45B ,AS-6HE-28Y/RHC45B ,AS-6HE-35Y/RHC60B ,AS-6GE-34Y/RHC45B ,AS-6GE-40Y/RHC60B ,AS-6FE-44Y/RHC60B ,AS-6FE-50Y/RHC60B , AS-2EES-2Y/DVR500 ,AS-2DES-2Y/DVR500 „AS-2CES-3Y/DVR700 ,AS-4FES-3Y/DVR700 ,AS-4EES-4Y/DVR1100, AS-4DES-5Y/DVR1100 ,AS-4CES-6Y/DVR1500 ,AS-4TES-8Y/RHC15B ,AS-4PES-10Y/RHC30B ,AS-4NES-12Y/RHC30B ,AS-4JE-13Y/RHC30B ,AS-4HE-15Y/RHC30B ,AS-4GE-20Y/RHC30B ,AS-4FE-25Y/RHC45B ,AS-6HE-25Y/RHC45B ,AS-6GE-30Y/RHC45B ,AS-6FE-40Y/RHC60B

Max permissible pressure: **28 bar**
Permissible temperature: **- 40° C/+80° C**

Is provided for involving in refrigeration system and satisfies the requirements of directives 2006/42/WE Safety of the machine [MD] implemented to Polish law Regulation of Minister of Economy from 21th October 2008 on fundamental requirements for machine and succeeding toned standards:

a) PN-EN ISO 12100-1:2005
b) PN-EN 418:1999
c) PN-EN 1050:1999
d) PN-EN ISO 13849-2:2005

It is not allowed to submit our products into using until whole refrigeration system which they need to be connected with or they are part of as a whole with product, which is the subject of hereby declaration, will not be liable to statutory regulations.

The compressor unit is acquiescent with directive UE concerning pressure machines 2014/68/EU.

Wilkowice 01.01.2021r.
(place and date)

ARKTON Sp. z o.o.
ul. Mórkowska 36
64-115 Wilkowice
tel. 65 525 28 30, NIP 697-20-51-086
nr rejestrowy BDO 000029751