



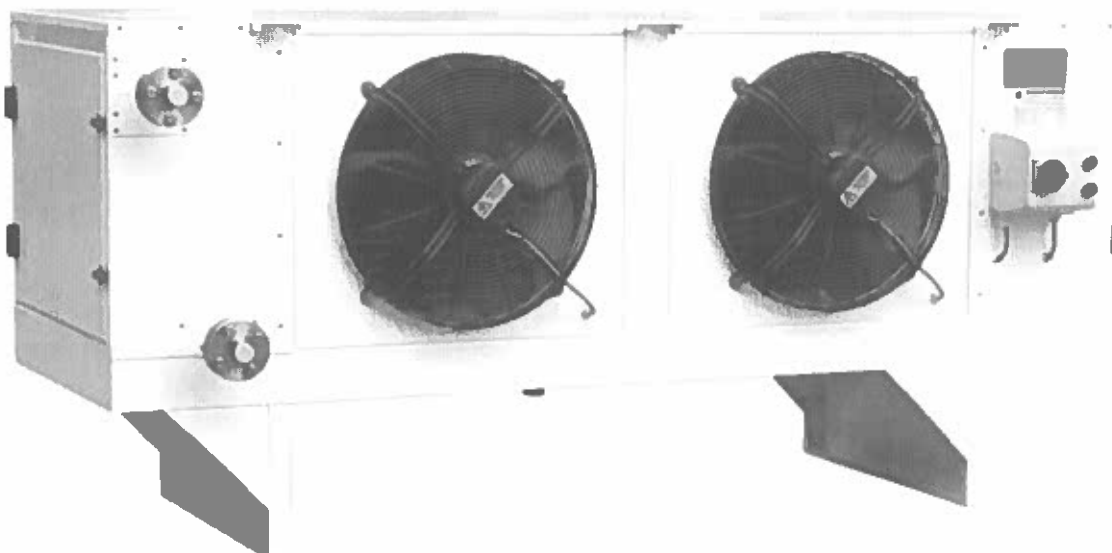
All about CO₂

INSTALLATION MANUAL

ATMOSPHERIC ASCO CO₂
VAPORISER TYP 2
500 kg/h

Version 1.1 / A.1
Craftbrew Alliance, Portland/USA

ascoco2.com

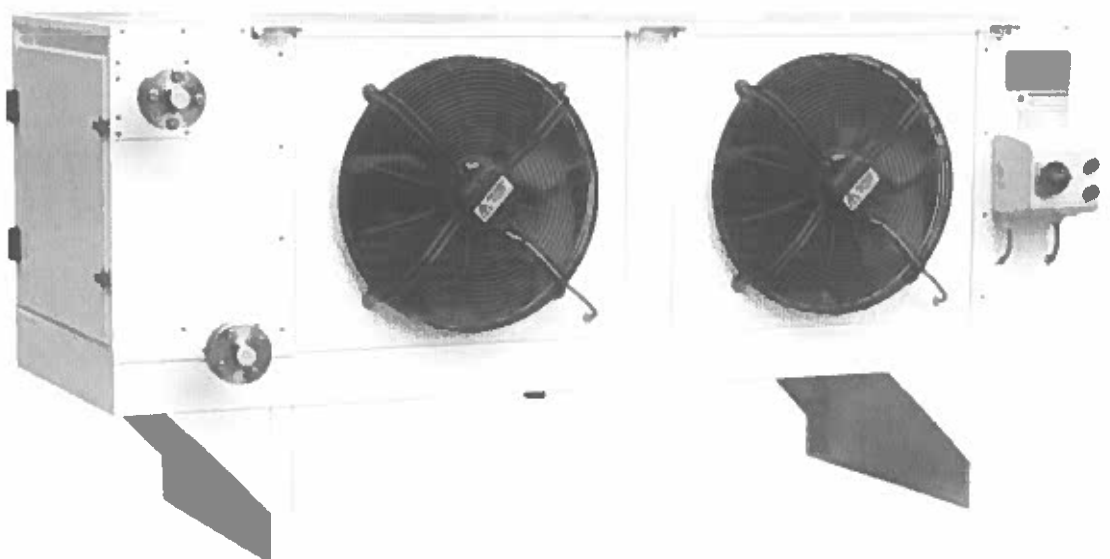


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THANK YOU!

Congratulations - you have acquired an
ASCO CARBON DIOXIDE LTD quality product.



Please read these operating instructions carefully, especially the "safety instructions" before installing and commissioning this product.

We will be happy to assist you with any questions you may have or if any clarification is required.

ASCO CARBON DIOXIDE LTD

INTRODUCTION

These ASCO operating instructions will support and accompany you in the familiarization, installation and also in the commissioning of your ASCO quality product. In addition these operating instructions contain important information for the safe, seamless and efficient operation of your product.

Please ensure that all instructions are observed precisely and in the order described in order to prevent danger and damage and to guarantee the longest possible product life.

In addition to these technical operating instructions and the safety instructions, the local legal regulation for safety and work instructions must also be followed. Whenever you use your ASCO product, the operating instructions must be to hand.

ASCO reserves the right to make technical changes at any time without prior notice.

If anything is unclear, the German version of the operating instructions will apply as a reference document.

GENERAL SAFETY NOTES

GENERAL

This instruction manual contains important information necessary for installation, connection, setting and use of this product for safe and reliable operation and must therefore be read and understood thoroughly before putting the product into operation for the first time. Since an ASCO product is generally used in conjunction with other equipment, the following safety notes are correspondingly more comprehensive.

DRAWING AND SYMBOLS

Many accidents on and with machines are caused by failure to observe the manufacturer's instructions and the safety notes. International signs and symbols draw attention to the hazard situations in the working environment. You will find the following symbols, among others, in the instruction manual of your ASCO product.

	⚠ DANGER Indicates an immediate threat of danger. Failure to heed the information will result in death or severest bodily injury (invalidity).
	⚠ WARNING Indicates a possibly dangerous situation. Failure to heed the information can result in death or severest bodily injury (invalidity).
	⚠ CAUTION Indicates a possibly dangerous situation. Failure to heed the information can result in damage to property as well as minor or medium injuries to body.

Note on useful tips to avoid property damages:

	NOTE Indicates general information, user tips and suggested hints on work which, however, do not affect the safety and health of the personnel. ...emphasizes useful tips and suggestions as well as information for efficient and disturbance-free operation.
---	--

Note on prevention of major property damages:

	⚠ CAUTION Indicates a possibly dangerous situation. Failure to heed the information can result in damage to property. ... indicates a possibly dangerous situation which may result in damage to property if it is not avoided.
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RISK OF ELECTRIC SHOCK

	⚠ DANGER Risk of electric shock. Service works, maintenance and deinstallation may only be performed on de-energized equipment and with disconnected power plug.
	⚠ WARNING Changes on the electrical installation on your own are prohibited. Changes on the electrical installation, on the program or on its parameters can cause serious damages to the machine and its environment. Any change on the control or at the program which is not performed by an ASCO-technician leads to a loss of warranty.

QUALIFICATION OF OPERATOR

	⚠ WARNING It is mandatory that operators are trained by an authorized person (operating company or manufacturer) in the following issues: ▪ safe handling of dry ice and / or liquid / gaseous CO₂ ▪ operation of ASCO equipment ▪ safety precautions / safety equipment ▪ protective clothing
	⚠ WARNING A qualified personnel for maintenance and repair is a skilled and trained engineer or technician for: ▪ Mechanical engineering ▪ Electrical engineering ▪ Hydraulics engineering ▪ Refrigeration engineering

INTERACTING MACHINE PARTS

	⚠ CAUTION Many ASCO appliances are mechanically driven machines. Moving parts present a corresponding danger.
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The service openings as well as the side and rear walls must always be closed during operation so that moving parts cannot be reached. Please ensure that these lids are always fitted before the machine is commissioned.

FURTHER SAFETY MEASURES AND INFORMATION

	⚠ WARNING Dry ice "sublimates", i.e. it goes directly over into a gaseous state without becoming liquid, therefore do not store in hermetically sealed containers. Please observe that 1 kg of dry ice at 1 bar ambient pressure corresponds to a volume of approx. 0.5 m³ CO₂ gas. Generally it is assumed that all CO₂ liquid pipes are pressurised. After the end of production the pipes must be emptied or depressurised. It must be ensured that all pipes are resealed again in order to prevent ingress of damp. Please ensure that your ASCO product is always installed on a level industrial floor. Ventilate the production areas.
	⚠ WARNING Many ASCO appliances are hydraulic driven machines. Oil leakage together with condensed water caused by cold machine components may lead to a slippery floor.
	⚠ CAUTION In order to avoid accidents with "shooting" pellets on start up, it must be ensured that the pellet ejection area is completely clear. While the plant is in operation, never look directly at the pellet exit.
	⚠ CAUTION If the tank and the appliance are switched off together, the pipe safety valve can react under certain circumstances.

OVERPRESSURE IN PIPES

If two shut off valves are connected on a CO₂ liquid pipe, a safety valve must always be installed between the valves. If liquid CO₂ is trapped in the pipe between two shut-off valves, then the pressure in the pipe, triggered by the rapid expansion of CO₂ due to heating, can increase very quickly.

	⚠ WARNING For this reason there is a danger of damage to persons or material damage as the pipe or the hose could burst in the worst case scenario.
---	--

- Therefore it is extremely important that a safety valve is fitted anywhere where liquid CO₂ can be trapped.
- In addition it is recommended to fit a discharge vent valve so that CO₂ can be released when required.



NOTE

Additional machine-specific safety precautions can be found in the main section of the operating manual.

CO₂ SAFETY NOTES

CO₂ data sheet

Name	Carbon dioxide
Chemical formula	CO ₂
Molecular weight (at 0 °C and 101.3 kPa)	44.011 kg/kmol
Molecular volume	22.263 m ³ /kmol
Specific gas constant	0.1889 kJ/(kg/K)
Gas density (at 0 °C and 101.3 kPa)	1.977 kg/m ³
Relative gas density (at 0 °C and 101.3 kPa, air = 1)	1.529 kg/m ³
Triple point	-56.6 °C at 5.18 bar
Gas colour	Colourless
Reaction under normal conditions	Stable molecules, can be used as inert gas
Odour	Odourless
Taste	Neutral, slightly acidic
Toxic classification	Non toxic

Solid CO₂ (dry ice)

Sublimation temperature	-78.9 °C (149.25 K) at p = 0.9807 bar
Latent heat of the sublimation	573.02 kJ/kg (Enthalpy of the sublimation)

The following safety notes refer to the handling of carbon dioxide in its three aggregate conditions:

1. Gaseous CO₂
2. Liquid CO₂
3. Solid CO₂ (also known as "DRY ICE")

FREEZE INJURIES

	⚠ DANGER Dry ice has a temperature of approx -79 °C and it can lead to freeze burns if it comes into contact with inadequate protective clothing. Dry ice must not be taken orally under any circumstances. Keep away from children!
	⚠ CAUTION Metallic parts, such as CO₂ pipes, may only be touched if appropriate protective clothing is being worn. Frozen metal parts can give freeze burns if they come into contact with the skin. Unprotected skin can "stick" to frozen parts.

DANGER OF CARBON DIOXIDE POISONING

Please ensure that your ASCO quality product is always set up in a well-ventilated area.

	⚠ WARNING An increase in carbon dioxide concentration in the ambient air affects breathing.
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The carbon dioxide can no longer be discharged from the blood or the alveoli and this means there is no space for oxygen in the blood which leads to a toxic reaction.

This effect of the carbon dioxide is described as poisoning. The effect of carbon dioxide poisoning is completely independent of the effects of a lack of oxygen. **The content of oxygen in the atmosphere is thus not an effective indication of danger.** It is definitely possible to have an acceptably low oxygen concentration of 18 % in the ambient air and an increased carbon dioxide concentration at the same time which signifies a dangerous situation.

The individual tolerance values can vary strongly depending on the physical condition of the people and the temperature and air humidity ratios of the atmosphere, but the effects mentioned below will generally occur if various carbon dioxide concentrations are inhaled.

1 - 1.5 %	Light effect on the chemical metabolism following exposure over several hours.
3 %	In this concentration the gas has a weak narcotic effect and it causes deeper and quicker breathing and poorer hearing ability along with headache, increased blood pressure and a quicker pulse.
4 - 5 %	Stimulation of the breathing centre and resultant deeper and quicker breathing. After 30 minutes exposure the appearance of poisoning becomes apparent!
5 - 10 %	Breathing becomes more of an effort with headache and loss of judgement!
10 - 100 %	If the carbon dioxide concentration goes above 10 %, loss of consciousness will occur in less than 1 minute - and if no immediate measures are taken, further exposure to such high values can result in death.

The effects of inhaling carbon dioxide in low concentration are physiologically reversible but in higher concentrations the effect is toxic and damaging!

	WARNING
	Heart and breathing defects can increase the danger of carbon dioxide poisoning.

ASCO CARBON DIOXIDE LTD supplies appliances for continuous monitoring of the ambient air in the danger area. These display the current CO₂ concentration and give an acoustic warning when the set highest concentration values are reached.

	NOTE
	ASCO CARBON DIOXIDE LTD expressly recommends the use of a CO ₂ warning device. In accordance with local regulations the room will be ventilated following reaching the alarm threshold and or the appliance and the tank switched off.

PROTECTIVE CLOTHING

	CAUTION In order to avoid the danger of injury, wearing protective clothing is obligatory. Leather gloves must be worn. Rubber gloves are not sufficient.
	WARNING When operating the ASCO equipment safety shoes for industrial use must always be worn.
	CAUTION Suitable safety goggles must be worn at all times when operating ASCO machines.
	WARNING Approved hearing protection must always be worn when operating the ASCO equipment or if you are in the vicinity of the machines.

CO₂ CLASSIFICATION

	<i>Solid</i>	<i>Liquid</i>
UN number	1845	2187
Hazardous goods class	none	22

INFORMATION FOR SAFE OPERATION

Storage and transport	Liquid CO ₂ is stored at temperatures between -28 °C and -17 °C, depending on the storage pressure.
Danger of fire/explosion	CO ₂ is not flammable and it is used as a fire extinguishing agent.

EFFECTS ON HEALTH

	⚠ DANGER Swallowing solid or liquid CO₂ causes serious internal burns. Swallowing larger amounts of gaseous CO₂ causes intestinal irritations due to the formation of bad carbonic acid compounds!
	⚠ WARNING Gaseous CO₂ causes light eye irritations through the formation of bad carbonic acid compounds. Liquid and also solid CO₂ causes serious freeze burns and can lead to blindness.

FIRST AID

Swallowing	Get medical assistance IMMEDIATELY .
Eyes	Rinse the eye with plenty of warm water and get medical assistance IMMEDIATELY .
Skin	Sprinkle the skin with warm water for at least 15 minutes and get medical assistance IMMEDIATELY .
Inhalation	In the case of fainting, move victim to a well-ventilated area IMMEDIATELY. TAKE CARE: DO NOT EXPOSE YOUR-SELF TO DANGER. Get medical assistance IMMEDIATELY. If breathing stops, give artificial respiration IMMEDIATELY and get medical assistance.

1 TECHNICAL SPECIFICATION

1.1 PERFORMANCE DATA

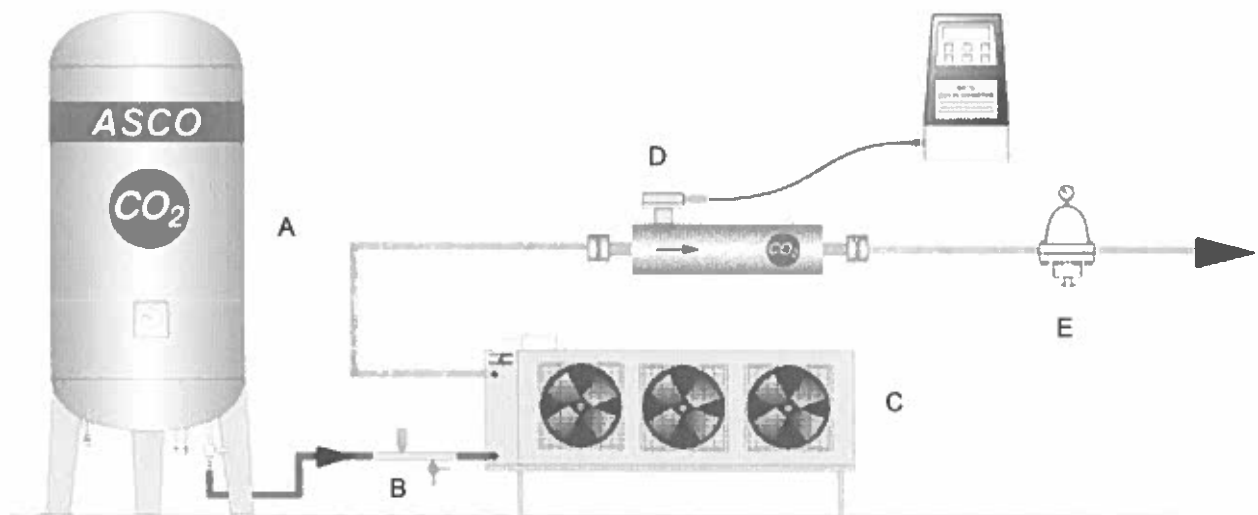
Performance data with liquid CO₂ at around -17 °C and an ambient temperature of + 10 °C.

Vaporiser capacity	Air flow rate m ³ /sec	Electrical output connected in kW/hr	Max. working pressure in bar
500 kg/hr	5.1	3.6	25

1.2 DIMENSIONS

Capacity of vaporiser	L x W x H in m	CO ₂ connections input/output	Net weight in kg approx.
500 kg/hr SS	3.0 / 0.9 / 1.2	1", DN25/33.7	250

1.3 INTENDED USE (EXAMPLE)



A	CO ₂ storage tank (liquid)	Liquid CO ₂ is filled into a vertical vacuum insulated CO ₂ storage tank made of stainless steel, from a CO ₂ production plant, a CO ₂ recovery plant or a transportable CO ₂ tank.
B	Line safety assembly	Line safety assembly for a simple connection between tank and vaporiser. It consists of stainless steel pipe, a connection for the vaporiser, a safety valve set at 25 or 31 bar (depends on vaporizers' max. allowable working pressure) and a drain cock if necessary.
C	Atmospheric CO ₂ vaporiser	Atmospheric CO ₂ vaporiser which transforms the liquid CO ₂ into gaseous CO ₂ with the ambient air as a heat source. Electrical energy is only required for the ventilators and the magnetic valves.
D	CO ₂ flow meter (optional)	CO ₂ flow meter for checking and measurement of the CO ₂ gas consumption (e.g. for a drinks bottle filling plant).
E	CO ₂ pressure reducing valve	CO ₂ dome pressure reducer with large CO ₂ flow capacity for the checking and maintenance of the required CO ₂ pressure.

The vaporiser must be connected with the tank with the help of a line safety assembly. The line safety assembly consists of a pipe with 25 or 31 bar safety valve (depends on vaporizers' max. allowable working pressure) and a ball valve and prevents trapped CO₂ expanding in a pipe between two shut off valves and the pressure in the pipe increasing.

	⚠ DANGER Therefore it is extremely important that a safety valve is fitted anywhere where liquid CO₂ can be trapped. Please make sure that the correct sizing of the safety valve will be chosen, depending on the MAWP of the vaporiser (25 or 31 bar; visible on the nameplate). In addition it is recommended to fit a drain cock/ball valve so that CO₂ can be released if required.
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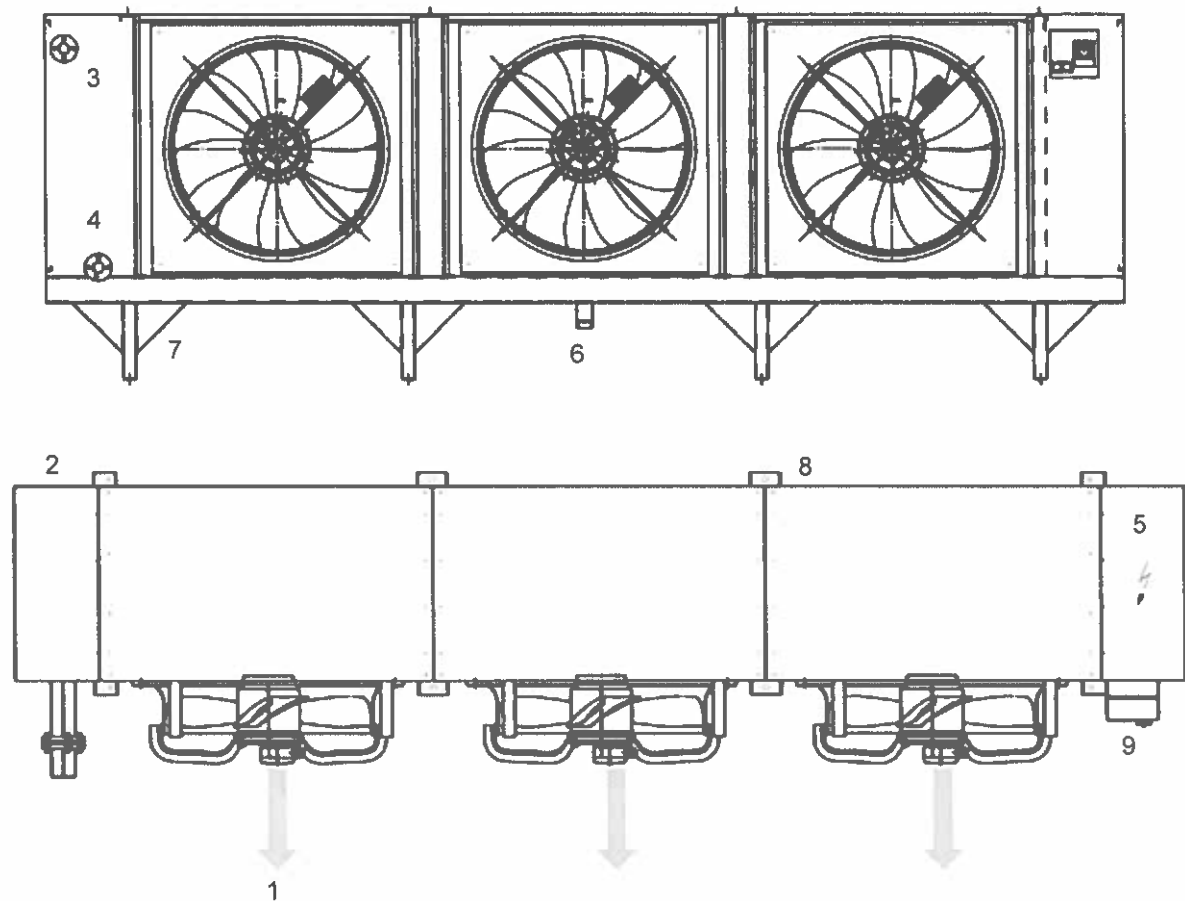
Once the vaporiser has been connected with the tank, a pressure reducing valve is necessary on the vaporiser outlet depending on the vaporiser's intended use.

	⚠ WARNING When the ambient temperature is cooling down below 10 °C and with a defect of one of the solenoid valves at the same time, it may occur that the liquid CO₂ is flowing downstream from the vaporiser to the following machine. If the operator is dosing then the downstream valve, liquid CO₂ can be trapped which can lead to a pressure rise. Therefore ASCO recommends with an installation like described above the mandatory use of a safety valve (25 or 31 bar).
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	NOTE For applications where liquid CO₂ is in no case allowed to reach the "field of application", the installation of a shut off valve (temperature-controlled at the best) in the pipe after the vaporiser is absolutely essential.
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2 INSTALLATION

2.1 ASSEMBLY AND CONNECTION OF VAPORISER



1	Direction of air flow
2	Position at least 1.5 m free all round
3	CO ₂ connection outlet gaseous
4	CO ₂ connection inlet liquid
5	Electrical connection / switchgear cabinet
6	Drain for condensed water
7	Feet of the vaporiser
8	Suspension bracket for ceiling fitting
9	Main box



NOTE

Before the first commissioning of the vaporiser, this must be rinsed twice with CO₂ gas for at least 5 minutes in order to remove any dirt or moisture from the installation from the system.

- When positioning the vaporiser, observe the direction of air flow and that at least 1.5 m distance to walls is maintained so that good air circulation is guaranteed (1) (2).
- Weld the CO₂ pipe to the liquid CO₂ connection of the vaporiser (3).
- Weld the gas pipe at the CO₂ gas outlet of the vaporiser (4).
- The switchgear cabinet for the electrical connection of the vaporiser is located at point (5). At position (9) the main box is mounted.
- Ensure that the excess condensate water can drain (6).
- The vaporiser can either be set up with the help of the feet supplied (7) or fitted to the ceiling with suspension brackets (8).



NOTE

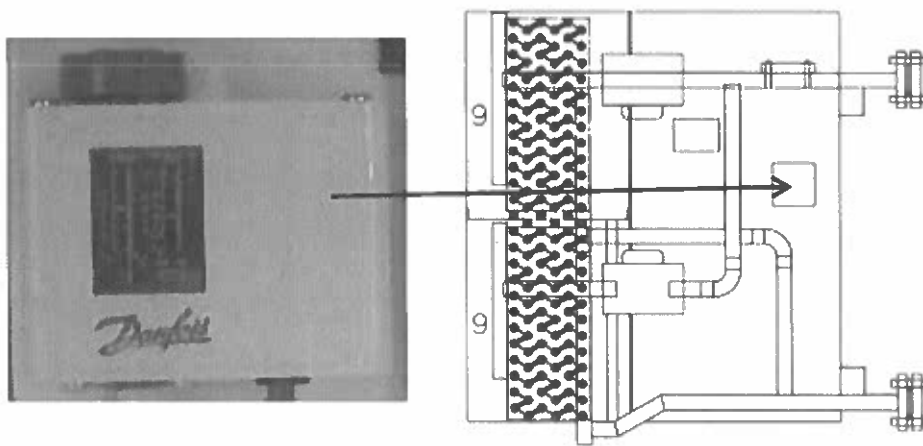
All detailed drawings and circuit diagrams of all ASCO vaporiser models can be found in the ANNEX. Please only use drawings which are relevant for your vaporiser model.

3 OPERATION

3.1 THERMOSTAT

In order to prevent liquid CO₂ entering the gas pipe after the magnetic valves and prevent it causing damage to components, a safety valve is installed on the outlet of the vaporiser. As soon as liquid CO₂ flows through the gas outlet, the thermostat closes the two solenoid valves.

The thermostat is set to 0 °C as standard, the difference range is 10 °C. As a consequence, the magnetic valves close automatically at -10 °C and are only reopened at 0 °C.

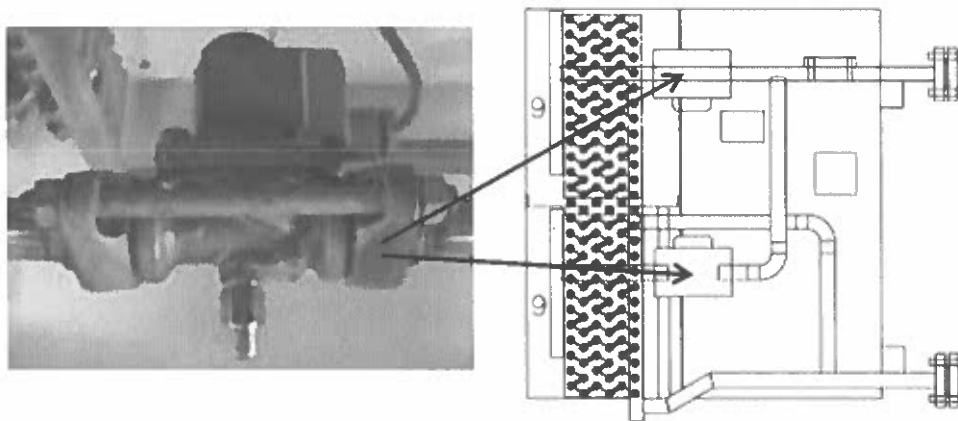


	! WARNING
	When the ambient temperature is cooling down below 10 °C and with a defect of one of the solenoid valves at the same time, it may occur that the liquid CO₂ is flowing downstream from the vaporiser to the following machine. If the operator is dosing then the downstream valve, liquid CO₂ can be trapped which can lead to a pressure rise. Therefore ASCO recommends with an installation like described above the mandatory use of a safety valve (25 or 31 bar).

	NOTE
	For applications where liquid CO₂ is in no case allowed to reach the "field of application", the installation of a shut off valve (temperature-controlled at the best) in the pipe after the vaporiser is absolutely essential.

3.2 SOLENOID VALVES

Two solenoid valves are installed at the outlet of both registers and they are controlled by the time switch and they are responsible for the switching of the register. As the magnetic valves are susceptible to dirt and welding residue, the system should be rinsed with gaseous CO₂ before the vaporiser is used for the first time.



3.3 TIME SWITCH

The vaporiser consists of two register systems through which the liquid CO₂ flows alternately and is transformed into CO₂ gas through the ambient air.

In order to change register a time switch is used. The time intervals can be set directly at the time switch with the help of both dials. The factory setting for both registers was set at 8 minutes. If too strong an icing of the register occurs, the switching time must be shortened and quicker thawing is thus possible.



Located in the switchgear cabinet

3.4 HEATER (OPTIONAL)

**NOTE**

Please note that this point is only applicable for vaporisers with heater, therefore please check your order confirmation if a heater is included in your vaporiser.

The optional ASCO heater is designed to operate the vaporiser at low temperatures. In case the ambient temperature falls below 10 °C, one or both heater will be operated to ensure the max. capacity of the vaporiser.

The heating system contents:

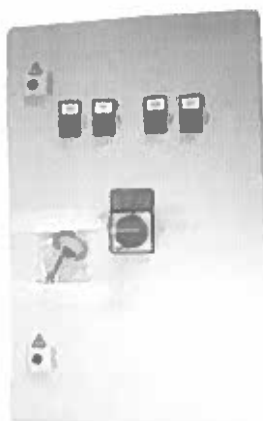
- Heating rod's, splitted into two independent stages, included in the vaporiser's registers.
- Heater control box with pre-installed wires to the interface terminal box.
- Interface terminal box to connect the interconnecting wiring.
- Two control thermostats to handle the respective heater stages.
- Two over temperature thermostats for protection against overheating.

For the installation place the control box close to the vaporiser.

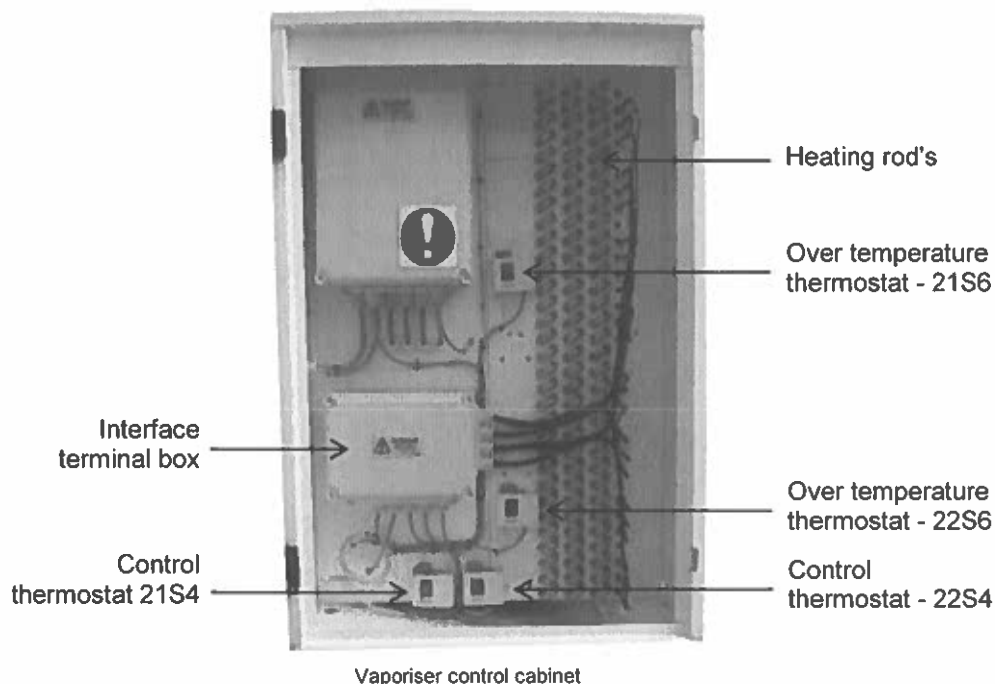
- To complete the electrical installation, install the supply line: 3x400VAC +N +PE, the recommended pre-fuse is 63A.
- Connect the prepared wires to the interface terminal box.

**⚠ DANGER**

Electric shock hazard. Severe static electrical discharges are possible. Always provide a good earthing to the vaporiser and control box.
Work on electrical installations must be carried out by qualified electricians only.



Heater control box front



NOTE

For further information please refer to the electrical diagram which can be found in the ANNEX and the separate electrical diagram for the heater control box, which can be found inside of the box and which you will receive together with the delivery documents.

3.5 OPERATION WITH HEATER (OPTIONAL)



NOTE

Please note that this point is only applicable for vaporisers with heater, therefore please check your order confirmation if a heater is included in your vaporiser.

The heating system is prepared for a fully automatic operation. The functions are linked with the vaporiser and the heater elements are controlled by the respective thermostats. The actual working conditions are indicated by the signal lamps.

Standard setting for the thermostats:

- Control heater 1 - 21S4 10 °C
Heater stage 1 will be ON if ambient temperature is below 10 °C
- Control heater 2 - 22S4 5 °C
Heater stage 2 will be ON if ambient temperature is below 5 °C

4 MAINTENANCE



DANGER

Before the vaporiser is operated, checked or parts are exchanged, please ensure that the vaporiser is at a complete standstill, all pipes are free of pressure and the power connection is separated from the network.

Following installation and commissioning of the vaporiser we recommend you to carry out the following maintenance work regularly:

- Checking and cleaning of the heat exchangers and lamellas twice per year.
- General and regular checking of the solenoid valves for contamination and wear and cleaning of the solenoid valves if necessary.

PROBLEM	CAUSE	REMEDY
Low capacity	Dirt on the heat exchanger lamellae	▪ Clean the lamellae with compressed air
Solenoid valve does not switch	Time switch was set wrongly	▪ Check the setting
	Time switch is defective	▪ Replace the time switch
Ice forms on the heat exchanger	Switch time is too long	▪ Reduce the set time step by step
	Solenoid valve always open	▪ Check the solenoid valve
	CO ₂ consumption too high	▪ Reduce consumption
	Ambient temperature too low	▪ Reduce consumption or place the vaporiser at a point with at least +10 °C ambient temperature.
	Ventilator does not work	▪ Check the motor protection relay ▪ Check the motor for loose connections
	Air flow insufficient or blocked	▪ Ensure unobstructed air flow
Solenoid valves remain open	Dust or dirt in the valve	▪ Clean the valve
	Moisture in the system, rust or water ice in the valve	▪ Use dry CO ₂ for rinsing

25/25

Head Office
ASCO CARBON DIOXIDE LTD
Industriestrasse 2, CH-8590 Romanshorn
T +41 71 486 80 80 / F +41 71 486 80 66
info@ascoco2.com / ascoco2.com

Production facility
ASCO KOHLENSÄURE AG
Sprudelstrasse 3, DE-53557 Bad Honningen
T +49 2635 92 534-0
F +49 2635 92 534 192

US subsidiary
ASCO CARBON DIOXIDE INC
5409 Highway Ave., Jacksonville, FL 32254
T +1 904 278 6503
info@ascoco2.com

ANNEX A ERSATZTEILLISTE / SPARE PARTS LIST A.1



A-1

Head Office
ASCO CARBON DIOXIDE LTD
Industriestrasse 2, CH-8590 Romanshorn
T +41 71 466 80 80 / F +41 71 466 80 66
info@ascoco2.com / ascoco2.com

Production facility
ASCO KOHLENSÄURE AG
Sprudelstrasse 3, DE-53557 Bad Honningen
T +49 2635 92 534-0
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info@ascoco2.com

Ersatzteil	Spare part	Artikel-Nr. Article no.	Anzahl Quantity	Typ Type
Motor und Ventilator	<i>Motor and ventilator</i>	4046135	3	500 kg/h (50Hz)
Motor und Ventilator	<i>Motor and ventilator</i>	4046137	3	500 kg/h (60Hz)
Motorschütz	<i>Motor contactor</i>	4063453	3	500 kg/h
Motorschutzscharter	<i>Motor protection switch</i>	4063451	3	500 kg/h
Feinsicherung	<i>Microfuse</i>	4046131	1	500 kg/h
Elektrobox-Heizung	<i>Electric box heating</i>	4063455	1	500 kg/h
Thermostat	<i>Thermostat</i>	4046134	1	500 kg/h
Zeitscharter	<i>Time switch</i>	4063454	1	500 kg/h
Magnetventil	<i>Solenoid valve</i>	4046127	2	500 kg/h
Spule	<i>Coil</i>	4046128	2	500 kg/h

ANNEX B ZEICHNUNGEN / DRAWINGS



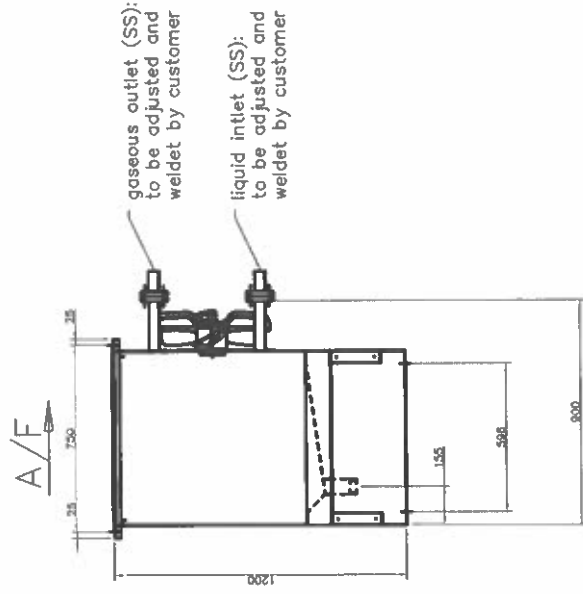
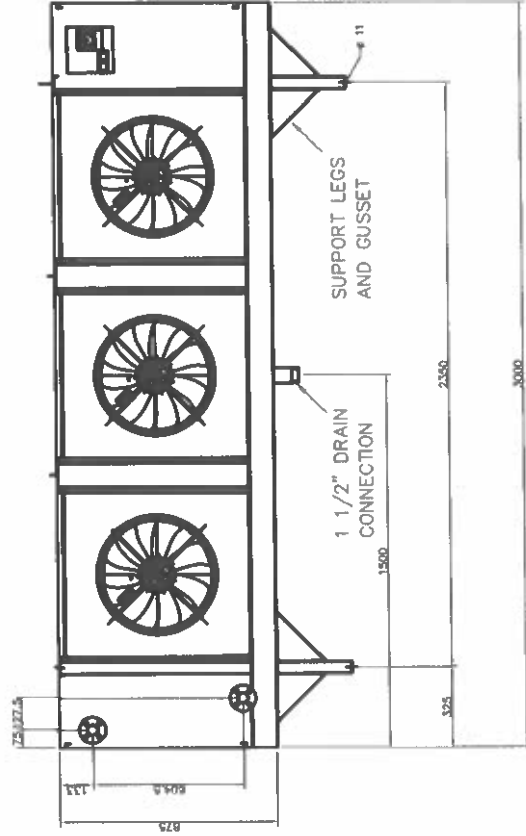
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Head Office
ASCO CARBON DIOXIDE LTD
Industriestrasse 2, CH-8590 Romanshorn
T +41 71 466 80 80 / F +41 71 466 80 66
info@ascoco2.com / ascoco2.com

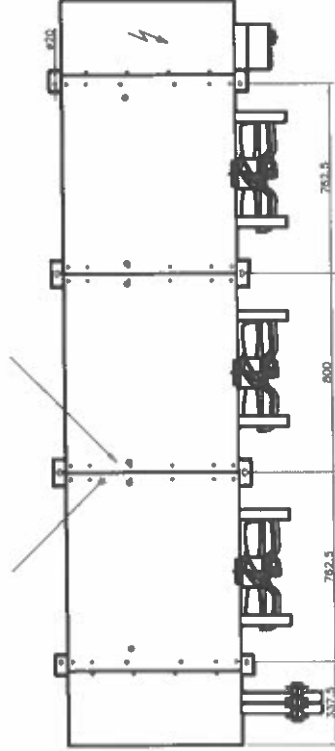
Production facility
ASCO KOHLENSÄURE AG
Sprudelstrasse 3, DE-53557 Bad Honningen
T +49 2635 92 534-0
F +49 2635 92 534 192

US subsidiary
ASCO CARBON DIOXIDE INC
5409 Highway Ave., Jacksonville, FL 32254
T +1 904 278 6503
info@ascoco2.com

500 kg/h SS VAPORISER



COIL BLOCK * INTERMEDIATE DRAIN POINTS (4 OFF)



PACKING DIM. L x W x H	2600 x 1200 x 1600	RATING	JP 54
COIL TUBE	SS304	FANSET QUANTITY	3
COIL FIN MATL.	AL	FAN DIA.	500
LIQUID PIPE END CONN.	1" PN40	MOTOR SPEED	1330
GASEOUS PIPE END CON.	1" PN40	MOTOR POWER	0.79 kW
TESTING PRESSURE	36.7 bar	ELECTRICAL SUPPLY	3400W/240V
MAX. OP. PRESSURE	25 bar	CURRENT	1.46 A
CASEWORK MATL.	GALV	UNIT DRY WEIGHT APPROX.	250kg
CASEWORK FINISH	White Powder Coated	STANDARD	PED/CE

Minimum distance around vaporiser: 1m

Drawn by KGI	Scale 1:20	Revised by OS	Revised date 05.07.10
This drawing must not be loaned, copied or reproduced without written permission from ASCO CARGILL PAPER LTD.			
500kg/h Vaporiser SS IT			
2009031		b A3	

ANNEX C ELEKTROSCHEMA / ELECTRICAL DIAGRAM



C-1

Head Office
ASCO CARBON DIOXIDE LTD
Industriestrasse 2, CH-8590 Romanshorn
T +41 71 466 80 80 / F +41 71 466 80 66
info@ascoco2.com / ascoco2.com

Production facility
ASCO KOHLENSÄURE AG
Sprudelstrasse 3, DE-53557 Bad Honningen
T +49 2635 92 534-0
F +49 2635 92 534 192

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ASCO CARBON DIOXIDE INC
5409 Highway Ave., Jacksonville, FL 32254
T +1 904 278 6503
info@ascoco2.com

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[illegible]

0	1	2	4	5	7	8	9
Wire colors according to standard IEC 204-1/EN 60 204-1				Abbreviations wire colors (IEC 757) color sequence (DIN 47 100)			
power							
pole conductor	L1-L3	black	BK				
neutral conductor	N	light blue	LBU				
protective wire	PE	green - yellow	GNYE				
control voltage							
pole conductor	L	red	RD	1 white	WH	11 gray - pink	GYPK
neutral conductor	N	red 2	RD 2	2 brown	BN	12 blue - red	BURD
24VAC		violet	VT	3 green	GN	13 white - green	WHGN
0 VAC		violet 2	VT 2	4 yellow	YE	14 brown - green	BNGN
+24VDC	+	dark blue	BU	5 gray	GY	15 white - yellow	WHYE
0 VDC	-	dark blue 2	BU 2	6 pink	PK	16 yellow - brown	YEBN
Measurement signals	+	brown	BN	7 blue	BU	17 white - gray	WHGY
Measurement signals	-	gray	GY	8 red	RD	18 gray - brown	GYBN
External voltage		orange	OG	9 black	BK	19 white - pink	WHPK
				10 violet	VT	20 pink - brown	PKBN

BMS Project no.			+ INFO	
201400333				
drawing number			Page	
E1-00333			17	

Drähtfarben nach Norm IEC			+ INFO	
Evaporator 500				
Replaced by			Replaced by	
Date			Date	
Name			Name	
0.4			18.11.2009	
0.3			EDR	
0.2			EDR	
Modification			Date	

2

0.4

0.3

0.2

03.07.2018

26.04.2018

25.11.2016

CH

EDR

EDR

Date

Ed.

EDR

18.11.2009

EDR

Evaporator 500

Replaced by

Replaced by

Drahtfarben nach Norm IEC

BMS Project no.

201400333

drawing number

EL40333

+ INFO

Page

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Page

17

Cross section of a line

cross-section	current
0.5 mm²	3 Amp
0.75 mm²	4 Amp
1.0 mm²	6 Amp
1.5 mm²	13 Amp
2.5 mm²	16 Amp
4.0 mm²	20 Amp
6.0 mm²	25 Amp
10.0 mm²	40 Amp
16.0 mm²	63 Amp
25.0 mm²	80 Amp
35.0 mm²	100 Amp
50.0 mm²	125 Amp
70.0 mm²	160 Amp
95.0 mm²	200 Amp
120.0 mm²	250 Amp
150.0 mm²	250 Amp
185.0 mm²	315 Amp
240.0 mm²	350 Amp

cross-section	current
AWG 24 (0.21 mm²)	2 Amp
AWG 22 (0.33 mm²)	4 Amp
AWG 20 (0.52 mm²)	6 Amp
AWG 19 (0.65 mm²)	7 Amp
AWG 18 (0.82 mm²)	8 Amp
AWG 16 (1.31 mm²)	10 Amp
AWG 14 (2.08 mm²)	20 Amp
AWG 12 (3.32 mm²)	25 Amp
AWG 10 (5.26 mm²)	40 Amp
AWG 8 (8.35 mm²)	55 Amp
AWG 6 (13.30 mm²)	80 Amp
AWG 4 (21.15 mm²)	105 Amp
AWG 3 (26.67 mm²)	120 Amp
AWG 2 (33.63 mm²)	140 Amp
AWG 1 (42.41 mm²)	165 Amp
AWG 0 (53.48 mm²)	195 Amp
AWG 2/0 (67.43 mm²)	225 Amp
AWG 3/0 (85.03 mm²)	260 Amp
AWG 4/0 (107.20 mm²)	300 Amp

Copper rail cross sections

Copper brightly

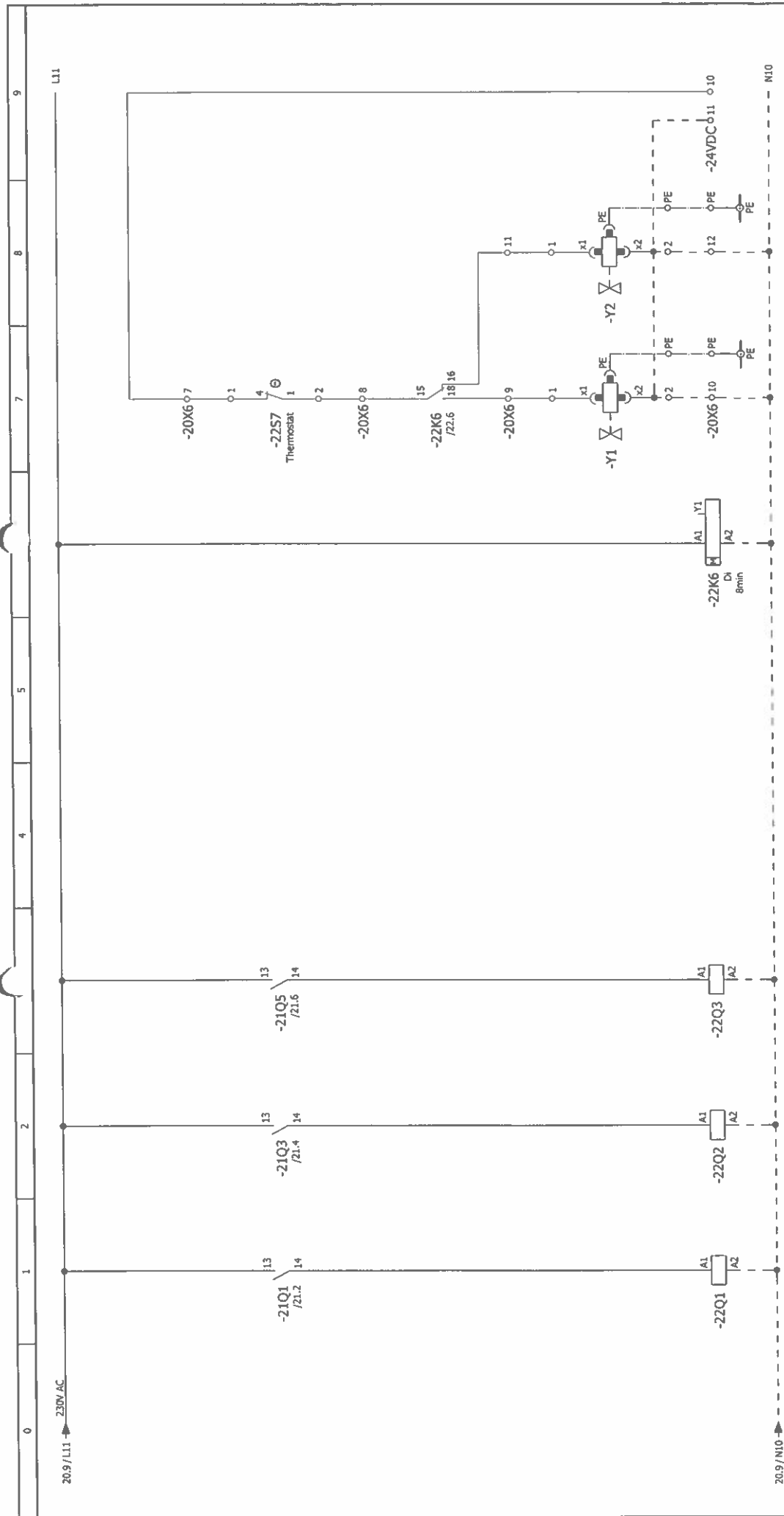
cross-section	current
12 x 2 mm²	123 Amp
15 x 2 mm²	143 Amp
15 x 3 mm²	197 Amp
20 x 2 mm²	189 Amp
20 x 3 mm²	237 Amp
20 x 5 mm²	319 Amp
20 x 10 mm²	497 Amp
25 x 3 mm²	287 Amp
25 x 5 mm²	384 Amp
30 x 3 mm²	337 Amp
30 x 5 mm²	447 Amp
30 x 10 mm²	676 Amp
40 x 3 mm²	436 Amp
40 x 5 mm²	573 Amp
40 x 10 mm²	850 Amp
50 x 5 mm²	697 Amp
50 x 10 mm²	1020 Amp
60 x 5 mm²	826 Amp
60 x 10 mm²	1180 Amp
80 x 5 mm²	1070 Amp
80 x 10 mm²	1500 Amp
100 x 5 mm²	1300 Amp
100 x 10 mm²	1810 Amp
120 x 10 mm²	2110 Amp
160 x 10 mm²	2700 Amp

Copper isolated

cross-section	current
6 x 9.0 x 0.8 mm	220 Amp
6 x 13.0 x 0.5 mm	150 Amp
4 x 15.5 x 0.8 mm	210 Amp
6 x 15.5 x 0.8 mm	290 Amp
10 x 15.5 x 0.8 mm	350 Amp
5 x 20.0 x 1.0 mm	300 Amp
5 x 24.0 x 1.0 mm	370 Amp
10 x 24.0 x 1.0 mm	600 Amp
5 x 32.0 x 1.0 mm	470 Amp
10 x 32.0 x 1.0 mm	800 Amp
5 x 40.0 x 1.0 mm	600 Amp
10 x 40.0 x 1.0 mm	950 Amp
5 x 50.0 x 1.0 mm	700 Amp
10 x 50.0 x 1.0 mm	1000 Amp
10 x 63.0 x 1.0 mm	1240 Amp

Structure identifier overview

Full designation	Structure description
Mounting location	
+INFO	Project Information
+HS	Main Cabinet
+IB	Isolator Box
+KLP	Terminal documentation



18-15/22.7
16

10 / 2 / 21.5
30 / 4 / 21.5
50 / 6 / 21.5
13 - 14 / 20.7

10-2 /21.3
30-4 /21.3
50-6 /21.3
13-14 /20.7

10-2 /21.1
30-4 /21.1
50-6 /21.1
13-14 /20.7

[illegible]

Terminal-strip overview

terminal strip	function text	Terminals					Terminal diagram page
		first	last	Total PE	Total N	Total number	
+HS-24VDC		10	11	0	0	2	+KLP/2
+HS-20X1		L1	PE	2	1	6	+KLP/3
+HS-20X6		PE	PE	3	0	15	+KLP/4
+HS-21X1		1	PE	3	0	12	+KLP/5
+HS-20XS4		L10	N10	0	1	2	

Terminal diagram

[illegible]

Terminal diagram

Strip =+HS-20X6										Cable name																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</
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Terminal diagram

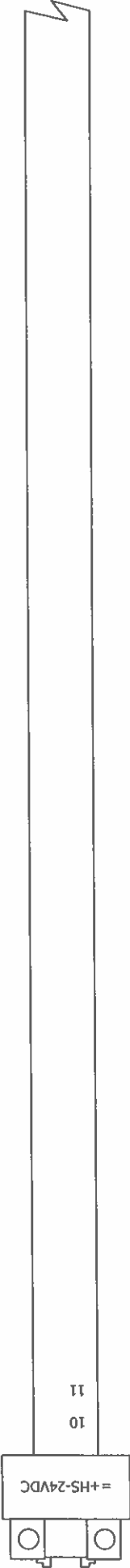
function text		Cable name		Strip =+HS-21X1						Cable name		Page / column	
		cable type		Target designation	Connection point	terminal	jumper	Target designation	Connection point	cable type			
		-21W1	JB 4x1.5 mm²	BN	-21M1	U1 1	-22Q1		2			/21.1	
		-21W3	JB 4x1.5 mm²	BK	-21M1	V1 2	-22Q1		4			/21.1	
		-21W5	JB 4x1.5 mm²	GY	-21M1	W1 3	-22Q1		6			/21.1	
				BN	-21M1	PE	PE					/21.1	
				BK	-21M3	U1 4	-22Q2		2			/21.3	
				GY	-21M3	V1 5	-22Q2		4			/21.3	
				BN	-21M3	W1 6	-22Q2		6			/21.3	
				BK	-21M3	PE	PE					/21.3	
				GY	-21M5	U1 7	-22Q3		2			/21.5	
				BN	-21M5	V1 8	-22Q3		4			/21.5	
				BK	-21M5	W1 9	-22Q3		6			/21.5	
				GY	-21M5	PE	PE					/21.5	
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Terminal-connection diagram

F11_006

-2257

-20X6

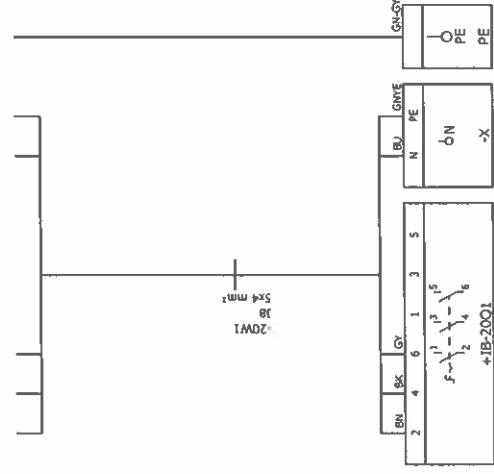
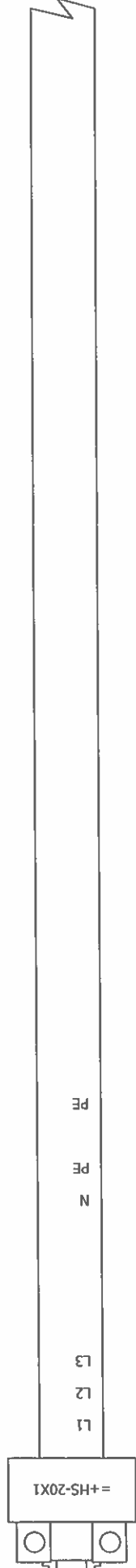


Terminal-connection diagram

F11_006

-20F3
-20F4
-21Q1

PE
PE
PE



Power supply Customer

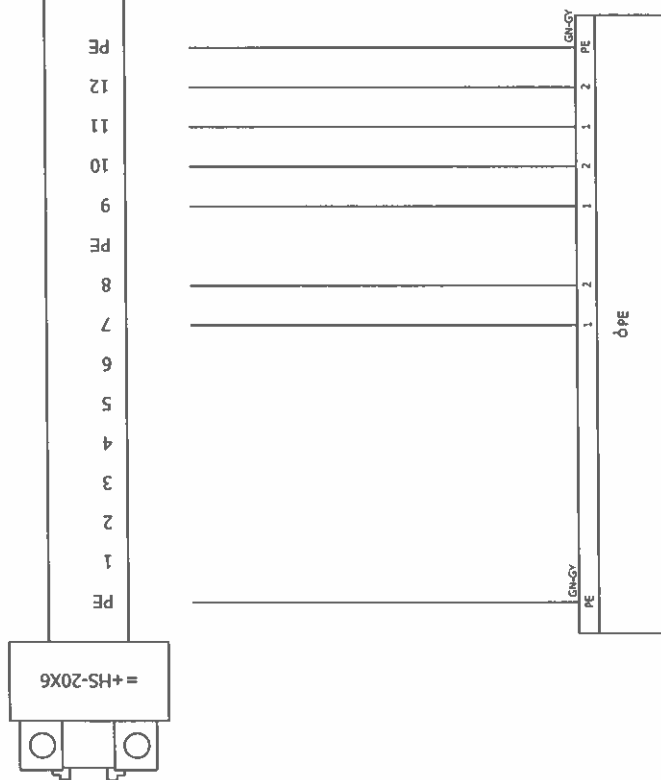
Power supply Customer

cabinet frame

Mounting panel

Terminal-connection diagram

F11_006



Switchgear cabinet door

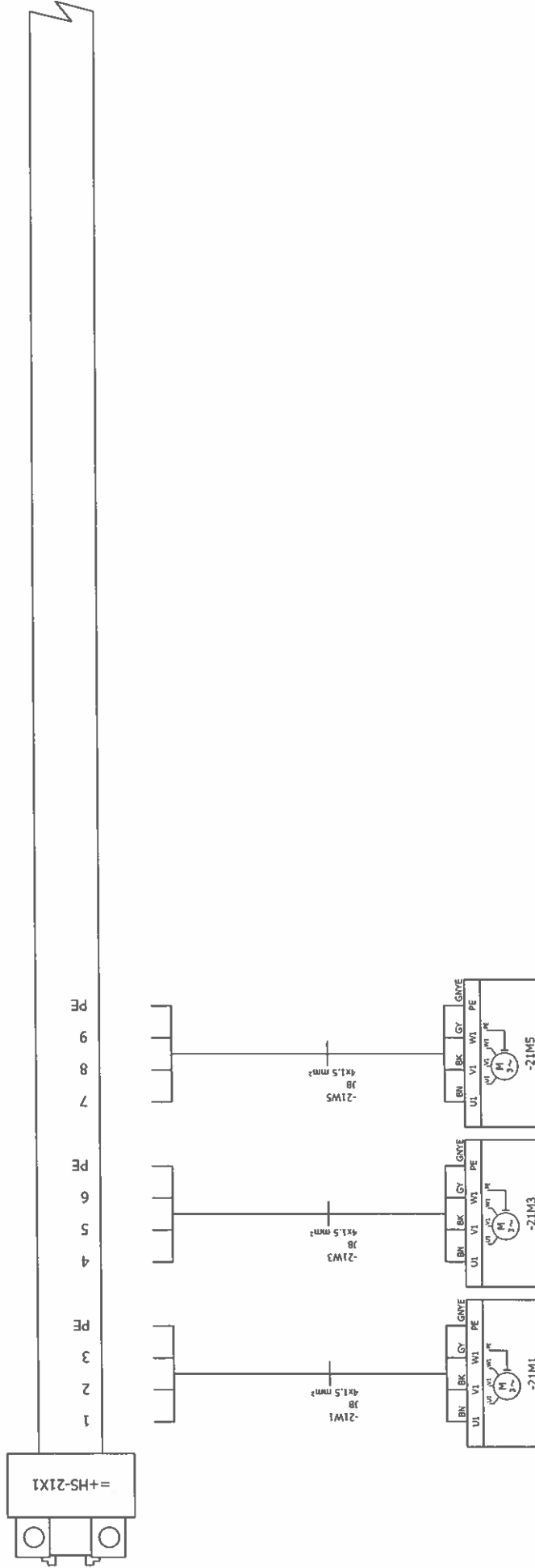
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Evaporator 500					Terminal-connection diagram = +HS-20X6		BMS Project no. 201400333		13	
11										
0.4	03.07.2018	CH	Date	26.04.2018			■			
0.3	26.04.2018	EDR	Ed.	CH			+ KLP			
0.2	25.11.2016	EDR					drawing number E140333		12	Page
									17	Page

Terminal-connection diagram

F11_006

-22Q1 PE
-22Q1
-22Q2 PE
-22Q2
-22Q2
-22Q3 PE
-22Q3
-22Q3
-22Q3



ANNEX D MUSTER QUALITÄTSDOKUMENT / SAMPLE QUALITY DOCUMENT



D-1

Head Office
ASCO CARBON DIOXIDE LTD
Industriestrasse 2, CH-8590 Romanshorn
T +41 71 466 80 80 / F +41 71 466 80 66
info@ascoco2.com / ascoco2.com

Production facility
ASCO KOHLENSÄURE AG
Sprudelstrasse 3, DE-53557 Bad Honningen
T +49 2635 92 534-0
F +49 2635 92 534 192

US subsidiary
ASCO CARBON DIOXIDE INC
5409 Highway Ave., Jacksonville, FL 32254
T +1 904 278 6503
info@ascoco2.com

EC Declaration of Conformity / EG - Konformitätserklärung

ASCO CARBON DIOXIDE LTD, Romanshorn/Switzerland, herewith declares:
ASCO KOHLENSÄURE AG, Romanshorn/Schweiz, erklärt hiermit, dass:

ASCO Vaporiser; 1000 kg/h CU
ASCO Verdampfer; 1000 kg/h CU

Serial no. / Serien-Nr.:

PED – 97/23/EEC and its amendments / und Anhänge
EMC – 2004/108/EC
LVD – 2006/95/EC
M.D. – 2006/42/EC

The component specified conforms to the regulation of the following European directives and meets the requirements of the confirmed order:

Die folgenden harmonisierten europäischen Normen und technischen Spezifikationen wurden angewandt:

PED category:
PED Kategorie:

P.E.D. CAT II

PED conformity assessment procedure: module
PED Konformitätsbewertungs-Prozess: Modul

B + D

Where appropriate, name and address of notified body:
Name und Adresse der benannten Stelle:

Royal and Sun Alliance
Certification Services
17 York Street
Manchester, M2 3RS

Where appropriate, EC type examination certificate:
EG-Zertifizierungszertifikat:

RSACS 029925 EC

Harmonized standards applied:
Angewendete harmonisierte Standards:

BS EN ISO 12100
ISO 13857

Other technical standards and specifications used:
Andere angewendete technische Standards und Spezifikationen:

ASME IX & PD5500

Declaration:

The above equipment conforms to the Pressure Equipment Directive and the supply of machinery (safety) regulation 2008 and is designed and constructed so it complies with the relevant health and safety requirements as indicated in the technical file.

We further declare that the equipment identified above may be intended to be assembled with other equipment to constitute an assembly or machinery, which shall not be put into service until the assembly/machinery has been declared to be in conformity with the pressure equipment/machinery directives.

The named person at the above address is also authorised to compile the technical file which would be made available to the official authorities on a reasonable request.

Erklärung:

Diese Produkte wurden nach der Druckbehälter-Richtlinie und der Maschinen-Richtlinie geprüft, gebaut und konstruiert und stimmen mit den relevanten Gesundheits- und Sicherheitsbestimmungen, wie in den technischen Dokumenten beschrieben, überein.

Des Weiteren erklären wir, dass die oben aufgeführten Produkte nur in Verbindung mit anderen Geräten oder Maschinen genutzt bzw. eingesetzt werden dürfen, wenn die Konformität mit den Druckbehälter- / Maschinen-Richtlinien gewährleistet ist.

Romanshorn, xx.xx.xxx

.....
Martin Küng

Leiter Technik & Entwicklung DIB/DIP
Manager Technic & Development DIB/DI

D-2

Head Office
ASCO CARBON DIOXIDE LTD
Industriestrasse 2, CH-8590 Romanshorn
T +41 71 466 80 80 / F +41 71 466 80 66
info@ascoco2.com / ascoco2.com

Production facility
ASCO KOHLENSÄURE AG
Sprudelstrasse 3, DE-53557 Bad Honningen
T +49 2635 92 534-0
F +49 2635 92 534 192

US subsidiary
ASCO CARBON DIOXIDE INC
5409 Highway Ave., Jacksonville, FL 32254
T +1 904 278 6503
info@ascoco2.com

ANNEX E ANZUGSMOMENTE / TORQUE SETTINGS

Die Schrauben der ASCO Produkte haben keine speziellen Anzugsdrehmomente.
Die Standard-Drehmomente betragen:

The ASCO products do not have any special torques. The standard torques are:

TYP / TYPE	STANDARD Nm	NIEDERKOPF / LOW HEAD V2A Nm
M 3	1.27	0.95
M 4	3.0	2.19
M 5	5.9	4.3
M 6	10.1	7.5
M 8	24.6	18.2
M10	48	36.5
M12	84	62
M14	133	100
M16	206	153
M18	295	212
M20	415	300
M22	567	403
M24	714	515
M27	1050	759
M30	1420	1031

E-1

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info@ascoco2.com

ANNEX F KONTAKT / CONTACT

Für weitere Auskünfte oder im Notfall, kontaktieren Sie bitte:

For further information or in an emergency please contact:

ASCO CARBON DIOXIDE LTD
Industriestrasse 2
CH-8590 ROMANSHORN / SWITZERLAND

TEL: +41 71 466 80 80
FAX: +41 71 466 80 66
E-MAIL: info@ascoco2.com
INTERNET : www.ascoco2.com

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