

Operating manual IC 022

Ver. 1.04.19



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Your dry-ice blasting unit

Typ
Modell
Modèle

Nr.
No.
No.

Gewicht
Weight
Poids

Druck max.
Pressure max.
Pression max.

Baujahr
Year of manufacture
Année de fabrication



Your contact to ICS:

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Introduction & Copyright

These operating instructions serve as explanation for a safe and undisturbed operation of the IC 022 dry-ice blasting unit.

All individuals who are operating the blasting unit have to read and understand completely the operator`s manual, before using it.

Please keep these operating instructions always close at hand.

Disregarding the procedures described in the operator`s manual may lead to serious consequences for units and persons. The operator has to adhere strictly to the described procedure. Any changing in the operation procedure requires the written approval of ICS ice cleaning systems s.r.o.

The manufacturer of this unit takes no responsibility of damages to the unit or caused by the unit in case of:

- Disregarding these operating instructions,
- Improper use or handling of IC 022,
- Repair and maintenance by unauthorized persons,
- Installation and replacement of non-original ICS parts,
- **Violation of requirements for compressed air (see [Page 16](#))**

ICS ice cleaning systems s.r.o. retains the copyright on the operator`s manual.

These operating instructions are intended for operators and supervision personnel.

It contains regulations, drawings and instructions which shall be neither completely used nor disclosed to third parties without express written consent.

Improvement suggestions for the unit or for the operator`s manual may be communicated to ICS ice cleaning systems s.r.o.

The drawing of the illustrated blasting unit may differ in details from the actual product range and can show extra abilities.

Safety equipment

BEI BETRIEB / DURING OPERATION / EN COURS DE FONCTIONNEMENT / 使用上の注意						
<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>VERLETZUNGSGEFAHR DURCH CO₂ DANGER OF INJURY THROUGH CO₂ RISQUE DE BLESSURE PAR LE CO₂</p> <p>ベレットによる怪我に注意</p>	<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>ERSTICKUNGSGEFAHR DANGER OF SUFFOCATION RISQUE DE SUFFOCATION</p> <p>酸欠・CO₂中毒の 恐れあり</p>	<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>ELEKTROSTATISCHE ENTLADUNG ELEKTROSTATIC DISCHARGE ÉLECTROSTATIQUE</p> <p>静電気に注意</p>	<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>VERBRENNUNGSGEFAHR EISTEMPÉRATUR -79°C DANGER OF INJURY ICE TEMPERATURE -79°C RISQUE DE BRÛLURE TEMPÉ- RATURE DE LA GLACE -79°C</p> <p>ドライアイス(-79°C)取扱注意</p>	<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>SICHT- UND GEHÖRSCHUTZ TRAGEN USE EYE AND EAR PROTECTION UTILISER IMPÉRATIVEMENS DES PROTECTIONS POUR LES OREILLES ET LES YEUX 保護メガネ、耳栓着用厳守</p>	<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>HANDSCHUHE TRAGEN WEAR GLOVES PORT DE GANTS OBLIGATOIRE 手袋着用厳守</p>	<p>WARNUNG / BEWARE ATTENTION / 注意</p>  <p>ARBEITSKLEIDUNG MIT LANGEN ÄRMELN TRAGEN WEAR LONG SLEEVED INDUSTRIAL CLOTHING PORT OBLIGATOIRE D'UNE COMBINATION À MANCHES LONGUES 長袖の作業着を着用</p>
<p>BEACHTEN SIE ALLE HINWEISE IM BEDIENHANDBUCH / ADHERE TO ALL INSTRUCTIONS IN OPERATING MANUAL / TOUTES LES INSTRUCTIONS DANS LE MANUEL 取扱説明書を必ず一読して下さい。</p>						

Before starting work, care should be taken for the kind of dirt and object to be cleaned, so that you can optionally take further safety measures, e.g. full protection.

For a safe operation of a dry-ice blasting unit you always need the following protecting equipment:

1. Safety glasses
2. Ear protection
3. Long-sleeved working suit
4. Protective gloves
5. Dust mask
6. Safety shoes

Caution!

In poorly ventilated areas, the elevated concentration of CO₂ can lead to breathing difficulties and suffocation. Therefore, you should always care for sufficient fresh air in confined spaces (exhaust and fresh air).

When cleaning in silos, tanks or confined spaces, also ensure adequate air circulation or use, in addition, a breathing mask, which has an activated carbon filter interposed in the air supply line.



Emergency stop



The emergency stop button interrupts all functions of the unit immediately.

Caution!
Despite the use of the emergency stop button the unit is still under pressure!



Safety precautions

When working with dry-ice, the safety data sheet of the supplier must be observed. Make sure that only dry-ice pellets are filled into the dry-ice hopper. Always use safety gloves when handling dry-ice, because it can cause cold burns. See the safety data sheet at the end of these operating instructions (page 21).

The dry-ice temperature is -79°C.



When blasting in confined spaces sufficient supply of fresh air must be ensured, CO₂ is odorless and tasteless. It reduces the oxygen content of the breathing air. Failure to do so can be fatal!

If ignored, there is a risk of DEATH!

The maximum allowable concentration (maximum allowable concentration in 8 hours of work) is of 5.000 ppm.

A CO₂ concentration of 8-10% (v/v) in the air is deadly!

Note:

1 kg dry-ice pellets sublimates into about 0.5m³ CO₂ when blasting.

Please avoid storing the dry-ice pellets longer than 15 minutes in the dry-ice hopper to avoid freezing of the IC022. Hopper and dosing system may freeze, if remaining ice stays in the hopper. Therefore, the hopper has to be blasted empty or remaining dry-ice has to be removed by hand. Mechanical interventions for removing the dry-ice pellets are prohibited, as they may damage the dosing system.



Due the high speed of the pellets serious injury may result. Therefore it must never be blasted towards people or animals. Never reach into the blast- **high risk of injury!**

The workspace has to be closed where necessary, not to endanger third parties.
The IC 022 may only be operated by qualified personal and after a thorough training.

The user must operate the IC 022 only in flawless condition and repair any damages immediately (see page 18).

Caution!

The procedure should not be used in areas with potentially explosive air mixtures.



High **electrostatic charges** may occur. Always make sure that the object to be cleaned is grounded and remains so for the duration of the cleaning.
IC 022 is grounded continuously from the blasting gun through the blasting hose package to the unit.



The user should always wear **safety shoes class S2** or higher in order to protect himself from the electrostatic charge.

People who wear a pacemaker are not permitted to work with IC022.



Technical data of the IC 022

Length	532 mm
Width	287 mm
Height	362 mm
Weight	19 kg (including hose package)
Hopper capacity	4 kg standard
Consumption	22 kg/h max.
Operation pressure	min. 4 bar – max. 10 bar
Air consumption	0,3 m ³ /min- 1,1m ³ , depending on the chosen combination of nozzle and operating pressure
Requirements for the compressed air	ISO 8573-1:2010 [1:4:1]
Compressed air supply	Quick coupling NW 7,2 (Standard) ISO 4414 / EN 983
Noise emission	65-120 dB(A), depending on the blasting pressure, combination of nozzles and the surface of the object to be cleaned

Process description

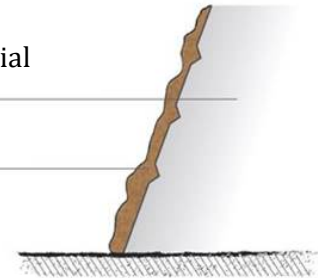
The dry-ice blasting equipment IC 022 operates with granules of dry-ice pellets (Ø3mm), produced through the pressing of the CO₂ snow. The pellets are blasted on the surface to be cleaned. The dirt from the surface is frozen through thermal shock and it breaks because of the different expansion coefficients. The CO₂ granulate sublimates in the moment of impact from solid to gaseous state. Only the initial dirt remains behind.

The dry-ice pellets in the hopper (Ø3mm) will be mixed using a compressed air operated dosing system, transported through the blasting hose and accelerated through blasting nozzle, the pellets can reach the speed of sound (depending on compressed air pressure and blasting nozzle).

Before cleaning

Dirty carrying material

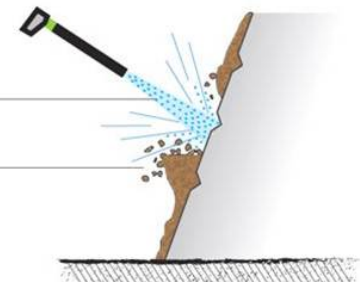
Dirt



During cleaning

Dry-ice pellets

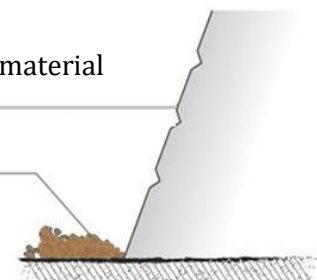
Dirt particles



After cleaning

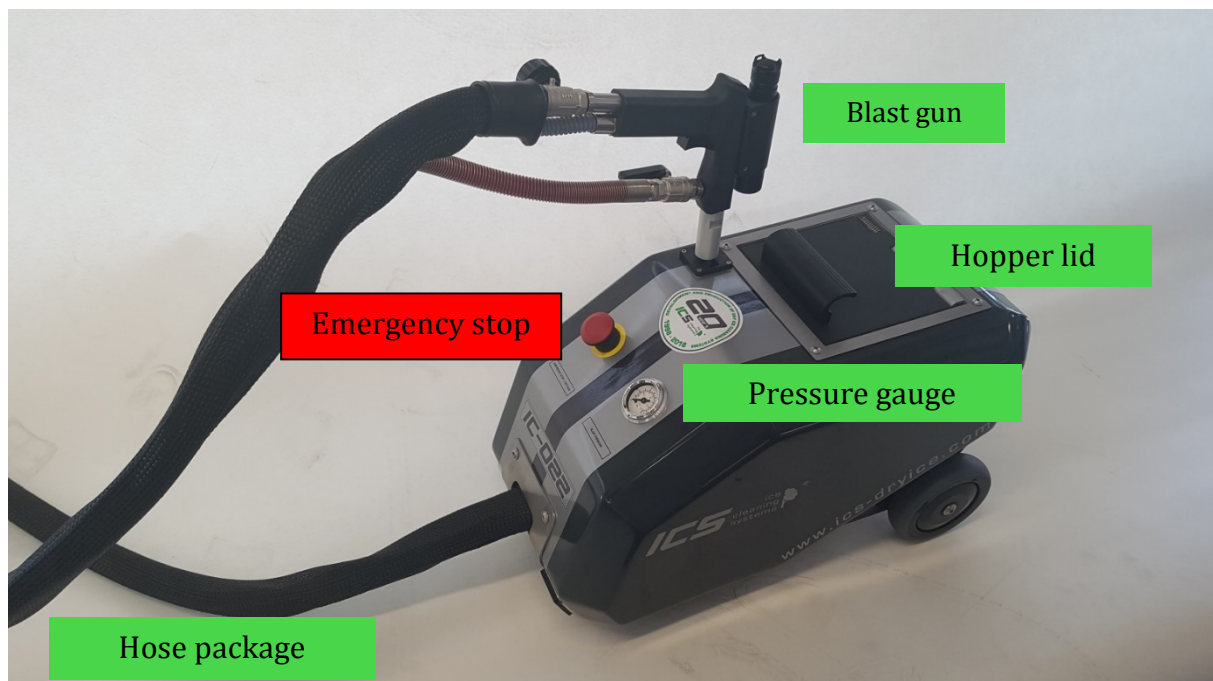
Cleaned carrying material

Dirt removed



Connections and components of the IC 022

Connections and components of the front side



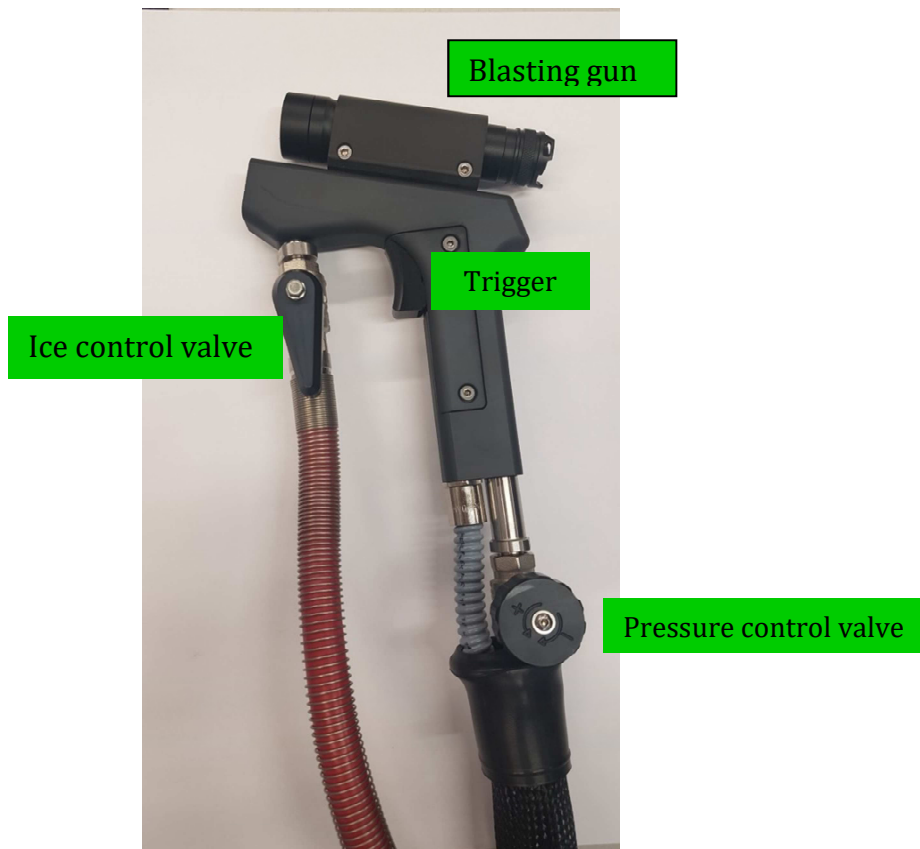
The blasting hose package including the control line is connected firmly with the IC 020.

Connections and components of the back side

Connect the compressed air hose with the quick coupling NW 7.2 by pressing the hose coupling onto the nipple until it clicks. To remove, press the coupling of the non-pressurized compressed air hose towards the machine and pull the outer ring towards you.



Operation of the blasting gun IG 022



To activate the blasting gun, pull the trigger from the handle. The blasting process will stop by releasing the trigger, it will move in start position by itself. By closing the ice control valve the ice supply will be interrupted, so that you can carry out the final dry of the blasted surface only with compressed air.

With the pressure control valve you set desired blasting pressure directly on the gun.

The IC 022 has a **time lag of about 2 seconds** to eliminate residual ice from the dosing system and thus avoid icing.

Caution!

Always make sure you have the gun safe and firmly in the hand in order not to endanger yourself and others.



Start-up

For the start-up of the IC 022 proceed as follows:

1. Check **before each start-up** if the pressure control valve is closed.
2. Connect the compressed air hose first with the quick coupling NW 7.2 on the rear of the blasting unit and then with the compressed air source.
3. Check the hose package and the gun for damages.
4. Open the compressed air source slowly!
5. Aim the blasting gun towards the floor and press it for about 10 seconds to release the residual moisture from the dosing system.
6. Now fill the hopper with dry-ice pellets and close the lid to prevent foreign bodies entering the hopper.
7. Now the IC 022 is ready for use.

Shut-down

After finishing the blasting work proceed as follows:

1. Blast the dry-ice hopper until empty.
2. Close the compressed air source.
3. Actuate the gun to release the residual compressed air.
4. Separate the compressed air hose from the unit.
5. Close the pressure control valve.

Filling the hopper of the IC 022

Open the hopper lid and fill the hopper with 3mm dry-ice pellets (maximum 4kg) and close the hopper lid.



Transport

For easy transport from one place of work to another within your company, please use the transport handle.

For further transport of the IC 022 with a shipping company, we recommend to use the original shipping carton included in the scope of supply.

Requirements for the compressed air

For an efficient blasting result, the compressed air to be used is of outermost importance. The compressed air should be dry, clean, oil-free and free of foreign bodies.

We recommend that the minimum requirements for the quality of the compressed air comply with **ISO 8573-1: 12010 [1:4:1]**, i.e.

Particle =	class 1 =	0,1 mg/m ³
Water=	class 4 =	DTP 3°C
Oil =	class 1 =	0,01 mg/m ³

Non-compliance with compressed air requirements, when using the dry-ice blasting system IC 022, the warranty is voided!

Repair, maintenance and warranty

Pleas note that all works including inspection and maintenance works, especially the works on the safety devices, must be carried out solely by an ICS technician or by a person who can provide proof of receiving a special training on the machines and equipment of ICS ice cleaning system s.r.o.

Possible required repairs during the warranty period are coordinated in advance with ICS ice cleaning systems s.r.o.

Replacement parts covered by the warranty will be replaced either in our company or shipped to you. Transport, travel and accommodation cost, together with costs for disassembly and reassembly will be borne by the client.

In order to assess the warranty, the replacement part or the machine has to be send to ICS ice cleaning systems s.r.o.

Maintenance

Thanks to the clear structure of the IC 022, maintenance cost are low.
The IC 022 must be maintained regularly, but not later than 12 months.
See the annual inspection plate on the unit.

Terms of warranty

You warranty will be lost if:

- the IC 022 is used improperly
- not original parts are used
- works are carried out on the IC 022 by unauthorized persons
- other blasting media are used as dry-ice
- **the requirements for the compressed air are not complied with**

All unauthorized modifications of the IC 022 are prohibited!

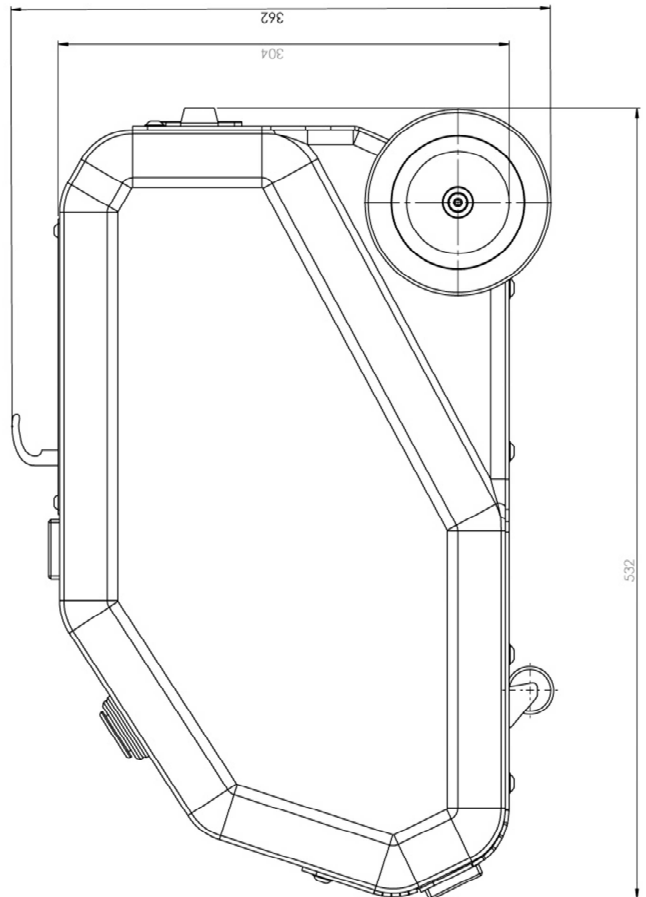
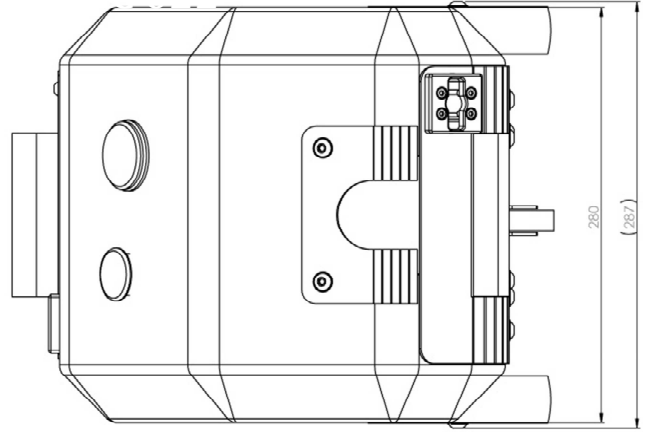
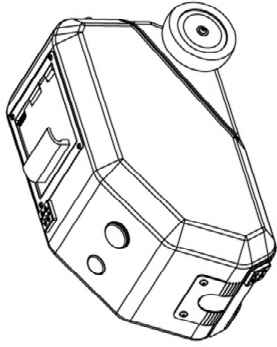
The period of warranty is of 12 months from the delivery.

Maintenance schedule for IC 022

1. General visual inspection of housing, welding seams, chassis, wheels, screw joints
2. Complete exterior and interior cleaning if required
3. Check the operation of the inlet pressure valve
4. Filter/regulator combination, replace filter, clean and re-adjust
5. Check pneumatic control elements, check for leaks and replace sound absorbers
6. Check compressed air inlet filter, filter cartridge and automatic drain, or renew
7. Check compressed air cylinder for operation, leaks and tightness
8. Check complete ice dosing system for wear, operation and leak tightness
9. Check hopper for operation and leak tightness
10. Check hose package for wear, operation and leak tightness (perform pressure test)
11. Check connection elements, connectors and pneumatic couplings for damage, operation and safety
12. Check blasting gun for operation and safety
13. Check existing blasting nozzles for wear and cracks
14. Pressure test and security test
15. Operation test
16. Blasting test
17. Renew inspection and maintenance plate

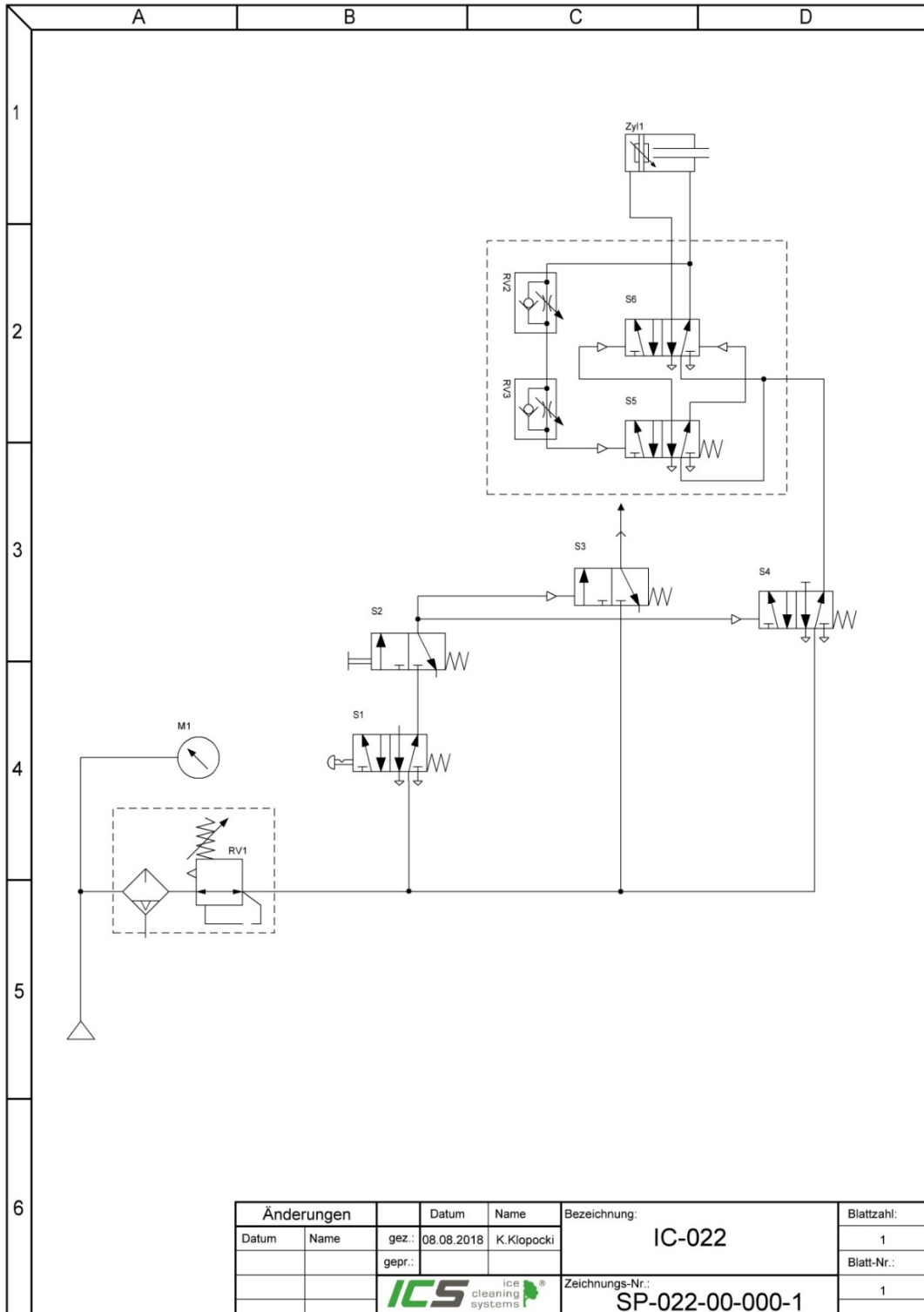
Troubleshooting

Problem	Description	Corrective action
Unit does not turn on	Emergency stop is engaged	Release the emergency stop button by turning it to the right
Unit does not start	After triggering the gun nothing happens	Check the compressed air supply
No air on the gun	Unit is running, but there is no air on the gun	Check the pressure control valve and open it
No ice is coming out	After triggering the gun only air is coming out, but no ice	Fill the hopper with ice. Check the ice control valve and open it
Unit is blocked	During blasting the hose package get blocked	Blasting pressure and blasting pipe are not perfectly matched. Press the nozzle shortly on the floor while triggering the gun to free the system by causing air backflow.



IC-022

Pneumatic plan IC 022



Part list Pneumatic IC 022

SL-022-00-000-01

Kennung	Artikelbezeichnung	Zusatz/Hinweis	Artikelnummer
M1	Manometer		51079
RV1	Wartungseinheit	automatischer Ablass	51070
RV2	Drosselrückschlagventil	Bestandteil Steuerventil	51074
RV3	Drosselrückschlagventil	Bestandteil Steuerventil	51074
S1	Not Aus Taster		51009
S1	Not Aus Ventil		51000
S2	Microschalter	Strahlpistole	51026
S3	Hauptventil	Strahlluft	51071
S4	Startventil	Steuerung	51073
S5	5/2 Wegeventil	Bestandteil Steuerventil	51074
S6	5/2 Wegeventil	Bestandteil Steuerventil	51074
Zyl1	Zylinder	Dosierung	51072

	Operating manual according to art. 14 of the Ordinance on Hazardous Substances Operating area: Working place:	Status: May 2012 (based on SDB 4/ 2005)
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Identification of hazardous substance

Dry ice

Other designation: Carbon dioxide – in frozen state

CAS no.: 124-38-9

EU index no.: 204-696-9

Aggregate state: solid

Colour: white

Odour: inodorous

Flash point:

Boiling point: -78.5°C

Melting point: -56.6 °C

Dangers for people and environment



Risk of frostbite development (-78°C) at skin contact

Risk of suffocation because of the sublimated vapours (from 1 litre of dry ice result 460 litres of gas)



Loss of mobility and consciousness

The gas released through evaporation is heavier than air and can accumulate in lower spaces.

First aid measure and rules of conduct



Protective measures:

- Avoid contact of the product with skin and eyes;
- During usage, ensure proper ventilation in the room;
- During the shredding operation, avoid dispersion of the chips;
- Do not transport with elevator if the elevator is being used by people;
- Avoid protrusion of the gas released by evaporation in the sewerage or in lower areas.



Eye protection:

Wear goggles with tight-closing system.

Hand protection:

Wear protective gloves made of leather or low temperature resistant gloves

Suitable extinguishing agents According to the conditions; carbon dioxide does not burn

Storage:

- not to be stored in basements and unventilated spaces;
- not to be stored in gas-tight containers (risk of bursting because of high pressure).

First aid measures

Injured persons have to be transported out of the danger area, using protection means, proper ventilation has to be ensured, in case of high concentration levels, a self-contained breathing apparatus has to be used.

Administering first aid



General information

After inhalation Ensure proper ventilation, in case a person becomes unconscious, the victim should be positioned in a stable side position, in case of respiratory arrest administer artificial respiration, seek medical assistance.

In case of skin contact In case of frostbites, rinse for 15 minutes with lukewarm water.

In case of eye contact Rinse eyes for at least 15 minutes, afterwards see an ophthalmologist.

After swallowing Drink plenty of water, seek medical assistance.

Appropriate disposal

The dry ice residues can be stored outdoors and left to evaporate, but only under strict supervision.

For additional information, contact the Labour Protection Department.

EC DECLARATION OF CONFORMITY

in compliance with the Machine Directive 2006/42/EC dated 17 May 2006, Annex II A

We hereby declare that the machine specified below complies in its design and construction and in the version marketed by us with the basic safety and health requirements of the EC Directive 2006/42/EC. Any changes to the machine unauthorized by us shall invalidate this declaration.

Product: dry ice blasting unit

Type: IC 020 / IC 110 / IC 110E / IC 310 / IC 310S

Manufacturer:

ICS ice cleaning systems s.r.o.

Robotnícka 2192, Považská Bystrica, Slovak Republic

Phone: +421 42 4261 135

Email: info@ics-dryice.de

Web: www.ics-dryice.de

It is declared the compliance with other directives/regulations applicable to the product:

- 2006/42/EC - Machine Directive
- 2006/95/EC - Low Voltage Directive
- EMC Directive (2004/108/EC) dated 15 December 2004

Applied harmonized standards in particular:

- DIN EN 12100 Safety of machinery - Basic concepts, general principles for design - basic terminology, methodology, risk assessment
- DIN EN 60204-1 Safety of machinery - Electrical equipment of machines, Part 1: General requirements
- DIN EN ISO 13849-1: Safety of machinery - Safety-related Parts of Control Systems

Representative for the technical documentation: Eng. Ľudovít Bakala, PhD.

Place/Date: Považská Bystrica, Slovak Republic, 01.10.2015


Peter Gabriš
Geschäftsführer


Ing. Ľudovít Bakala, PhD.
Konstrukteur

ISO Certificate

CERTIFICATE ◆ CERTIFICADO ◆ CERTIFIKAT ◆ СЕРТИФИКАТ ◆ 認證證書 ◆ CERTIFICATE ◆ CERTIFIKAT





CERTIFICATE

TÜV SÜD Slovakia s.r.o.
Certification Body for Management Systems
 Accredited by SNAS
 Certificate on accreditation No. Q-011
 certifies that



ICS ice cleaning systems s. r. o.
Robotnícka 2192
SK – 017 01 Považská Bystrica
IČO: 45 570 370

has established and applies
 a Quality Management System for

Development, manufacture, sale and service of machines for dry ice blasting. Development, manufacture, sale and service of machines for the production of dry ice. Production of dry ice. Industrial cleaning with dry ice.

An audit was performed, Report No. **1587/30/16/Q/AS/C**
 Proof has been furnished that the requirements
 according to

STN EN ISO 9001:2009

are fulfilled. The certificate is valid until **2018-09-14**
 Certificate Registration No. **Q 1587-1**

Bratislava, 2016-05-19





TÜV SÜD Slovakia s.r.o.
 Certification Body for Management Systems
 Member of Group TÜV SÜD
 Jašíkova 6, 821 03 Bratislava

F-Q-018/2/5