Kirchner und Tochter
Durchflussmesstechnik seit 1951

Supplementary Installation and Operating Instructions

Variable Area Flow Meters
SGK-1 Ex
SGK-2 Ex
SGK-3 Ex

Category:
II 2G Ex IIC
II 3G Ex IIC

A. Kirchner & Tochter GmbH Dieselstraße 17 · D-47228 Duisburg
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Version 1.4

Contents

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1 General safety directions

This supplement to the installation and operating instructions is valid for explosion protection designs of variable area flow meters of the following series:

- SGK-1 Ex
- SGK-1-MSK1 Ex
- SGK-1-MSK12 Ex
- SGK-1-MSKW Ex
- SGK-1-RC Ex
- SGK-2 Ex
- SGK-2-MSK1 Ex
- SGK-2-MSK12 Ex
- SGK-2-MSKW Ex
- SGK-3 Ex
- SGK-3-MSK1 Ex
- SGK-3-MSK12 Ex
- SGK-3-MSKW Ex

It supplements the installation and operating instructions for the designs not for protection from explosions.

The information in these instructions only contains data that are related to explosion protection.

The technical information of the installation and operating instructions for the designs not for protection against explosions remain valid unchanged, as long as they are not excluded or replaced by these instructions.

The variable area flow meters of the series

- SGK-1 Ex
- SGK-2 Ex
- SGK-3 Ex

have been tested by TÜV Rheinland according to the European Directive 2014/34/EU per EN 1127-1:2007 and EN 13463-1:2007 for use in potentially explosive areas using the TÜV test report **194/Ex690.00/08**

Danger!
Danger of explosion can result from incorrect handling. Installation, set up, commissioning and service of explosion protected operating material must only be performed by personnel trained in explosion protection („competent person“).

2 Main safety features

2.1 Category / zone

Variable area flow meters of type:

- SGK-1 Ex
- SGK-2 Ex
- SGK-3 Ex

are designed for use in Category 2 according to directive 2014/34/EU and suitable as per EN 60079/14 for use in Zone 1 and Zone 2
(refer to section 9.1 and 9.2).

2.2 Ignition protection types

The electrical circuits of the limit indicator (reed contacts/rc-contacts) are designed in the ignition protection type „intrinsically safe“ of category „ia“. They may only be operated with approved and suitable switch amplifiers, whereby the connection values are limited according to Namur
(sSee section 4.1).

Variable area flow meters of type:

- SGK-1 Ex
- SGK-2 Ex
- SGK-3 Ex

do not fall under 2014/34/EU (also see section 9.1).

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2.3 Temperature classes

Variable area flow meters of type:

- SGK-1 Ex
- SGK-2 Ex
- SGK-3 Ex

are allowed only in specifically described temperature classes (see Table 1).

The ambient temperature T_{amb}, medium temperature T_m and the material of the variable area flow meter are listed in the table.

Table 1

Maximum permissible ambient/medium temperatures in °C when used in temperature class T6-T1.

Material of floats and collectors			
Aluminium/ 1.4571/Hastelloy	PVDF/PTFE	PVC	PP
Temperature class			
T6	T6	T6-1	T6
T_{amb}: < 40 °C	$T_{amb:}$ < 40 °C	T_{amb}: > 0 °C < 40 °C	$T_{amb:}$ > 0 °C < 40 °C
T_m: < 70 °C	$T_{m:}$ < 70 °C	T_m: < 40 °C	Tm: < 70 °C
T5	T5		T5-T1
T_{amb}: < 40 °C	T_{amb}: < 40 °C		T_{amb}: > 0 °C < 40 °C
$T_{m:}$ < 85 °C	T_m: < 85 °C		T_m: < 85 °C
T4-T1	T4-T1		
$T_{amb:}$ < 40 °C	$_{Tamb}$: < 40 °C		
T_m: < 100 °C	$_{Tm}$: < 100 °C		

The tables take into consideration the following parameters for determining the permissible temperature class:

- Ambient temperature T_{amb}
- Medium temperature T_m
- Material of the float

2.4 Operating pressure

Glass size	Max. operating pressure in bar (pmax)
4; 5; 6; 9,5 ;10; 19	10

2.5 Static electricity

With variable area flow meters it is basically possible for the electrostatic field, which is generated in the interior of the measuring tube, to reach to the exterior of the device.

Variable area flow meters of type:

- SGK-1 Ex
- SGK-2 Ex
- SGK-3 Ex

are therefore to be permanently grounded (see section 4).

Danger!
Danger of explosion can result from incorrect connection. The operating company is responsible for installing error free grounding of the process line.

2.6 Static discharge

Surfaces can be electrostatically, combustibly charged during cleaning (e.g. Plexiglas protection on viewing window). These surfaces are marked with the shown adhesive label.

Caution! Measures against static charging
Do not rub the plastic surface.
Clean surfaces only with damp cloth.

The marked locations may be cleaned only with a damp, lint-free cloth.

In addition, caution should be taken not to rub against these surfaces with clothing, since static charge can occur at any time.
Dust deposits on the housing of the variable area flow meter are also to be removed with a damp cloth.

The deposits must not exceed a thickness of 3 mm.

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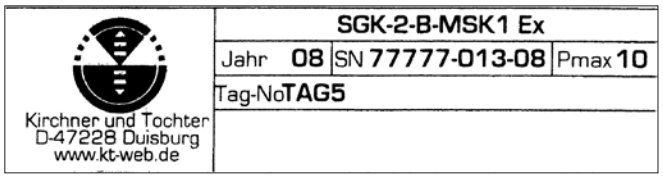
3 Identification

The identification of the entire device is done on the sleeve parallel to the viewing window with the following rating plates:

SGK-2



Year	Year of manufacture
P max	Max. allowable operating pressure
Tag No.	Measurement point marking
SN	Serial number

Composition of the serial number nnnnn-mmm-yy

Example:

77777-013-08	Order number 77777 Device no. 13 in order with year of manufacture 2008

4 Installation and setup

Danger!
Danger of explosion can result from incorrect handling. Installation and setup of explosion protected operating material must only be performed by personnel trained in explosion protection.

The instructions of the installation and operating instructions and the supplement to the installation and operating instructions are absolutely to be followed here.

Calibration of the variable area flow meters with respect to the area of use is to be checked by inspection of the rating plate.

The variable area flow meter is to be grounded (also refer to the illustration in section 4.4).

If the equipment is not sufficiently grounded via the process line, an additional ground connection is to be created via the ground connection on the back of the sleeve. The connection only guarantees an electrostatic connection of the equipment and does not meet the requirements of a potential equalization connection.

The equipment must be operated with an upstream throttle valve if possible pressure surges in the piping cannot be operationally avoided.

4.1 Electrical connection

The simple, intrinsically safe reed contact is fastened to the variable area flow meter.

This reed contact must only be done by a type-approved, suitable switch amplifier with intrinsically safe electrical circuits. The following maximum values must be observed:

Characteristic data Limit value switch	Ui [V]	Ii [mA]
MSK1 Ex MSK12 Ex MSKW Ex	20 V	40 mA
RC 10-14-N3 RC 15-14-N3	8 VDC	1 mA/3 mA

These limit value switches do not assume safety relevant functions within the system.

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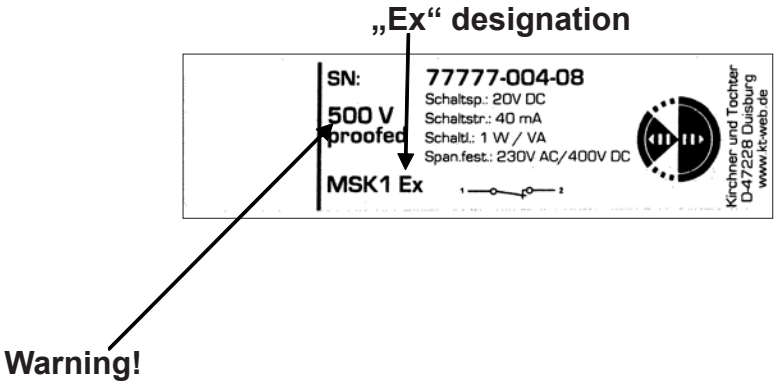
4.2 Pin assignments

The electrical connection of the installed limit value switch is described in the installation and operating instructions and pictured on the product label.

For the „Ex“ design, the remark „500 V proofed“ must be on the contact label as shown in the following illustration. In addition, the type designation also contains „Ex“. Only equipment with this tested and marked contact is allowed for operation in the „Ex area“. The operating company of the system must ensure that the contact label shown below is present on the flow meter.



This remark must be present on the label to be allowed to operate the equipment in the „Ex” area

4.3 Connection cable

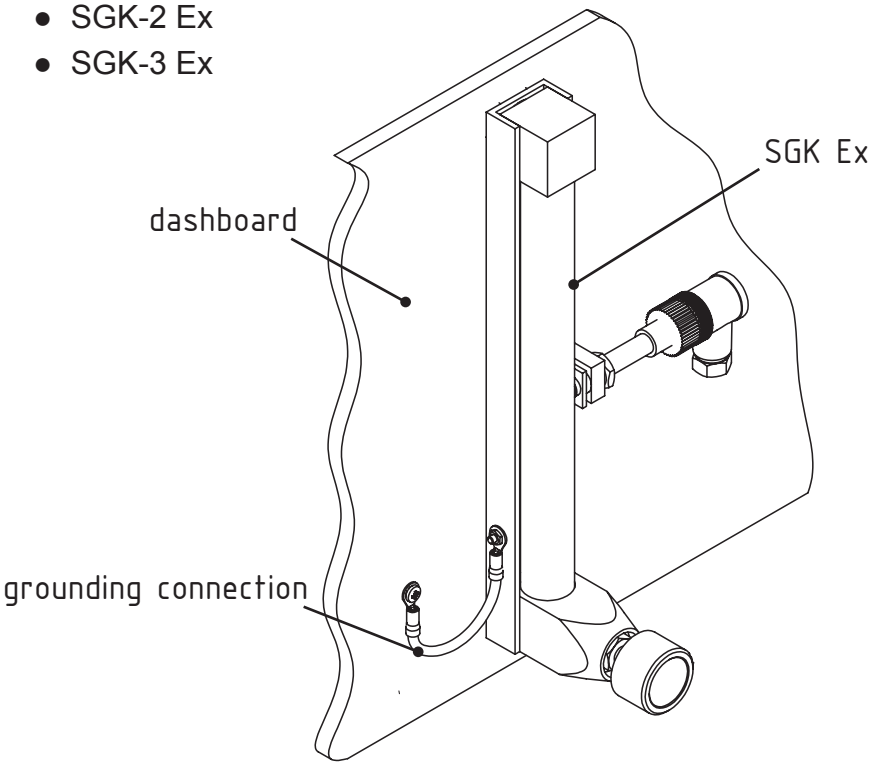
The connection cable for the intrinsically safe electrical circuits is to be selected according to the valid installation standard (e.g. EN 60079-14). Summed current generation between different, intrinsically safe electrical currents of the variable area flow meter is to be avoided.

4.4 Ground connector

The following illustration shows a principle sketch of the connection of the ground cable with the process line.

This ground cable must be connected with the process line resp. the grounded dashboard before starting up equipment of type:

- SGK-1 Ex
- SGK-2 Ex
- SGK-3 Ex



5 Start-up

Before start-up, the following tests are to be performed:

1. Qualification testing for sufficient corrosion resistance to the measuring media of the materials used for measurement parts and the used sealing materials.
2. Connect the installed, intrinsically safe reed contacts correctly.
3. Electronically ground the measurement equipment (also see illustration in section 4.4)
4. To prevent pressure surges, the operating company must ensure that the device is run with a continuous volume flow. Do not use solenoid valves!

6 Service

The variable area flow meters of type:

- SGK-1 Ex,
- SGK-2 Ex,
- SGK-3 Ex

are maintenance free under normal operating conditions and proper usage.

In unfavourable operating modes, adverse measurement functions can occur due to soiling of the measuring glass or the variable area flow meter. In this case a cleaning of the measurement glass and the variable area flow meter is to be performed according to the installation and operating instructions. Alternatively, the device can be sent to Kirchner und Tochter GmbH for cleaning.

Danger!
Danger of explosion can result from incorrect handling. The service of explosion protected operating material must only be performed by personnel trained in explosion protection.

Systems in potentially explosive areas must be regularly inspected for their proper condition. The following tests must be performed regularly:

- Visual inspection of the housing, measurement glass and connection pieces for damage or corrosion.
- Check the measurement parts for leaks.
- Include the variable area flow meter in the regular pressure tests of the process line.
- Visual inspection of the variable area flow meter collectors (must be replaced if there is brittleness)
- Dust deposits on the equipment must not exceed a thickness of 3 mm.
- The equipment is to be thoroughly cleaned with a damp cloth.

7 Dismantling

7.1 Electrical connection

Disassembly should be performed with the power off if at all possible. If this is not possible, the basic conditions for intrinsic safety (e.g. no grounding or connection of different intrinsically safe electrical currents) must be observed during disassembly.

7.2 Process connections

Danger!

Danger of injury due to media escaping under pressure. The lines in which the variable area flow meter is installed are to be discharged before disassembly.

Depending on the medium, damage e.g. to the respiratory system or the skin may occur. Uncontrolled discharge of residual liquid from the measurement piece is to be avoided.

For environmentally critical measuring media, all parts which have been in contact with the media are to be decontaminated carefully after removal. Removal and installation is the responsibility of the operating company.

8 Maintenance

Maintenance, which is relevant to safety in regards to explosion protection, is only to be performed by the manufacturer, their agents or supervised by authorised technicians.

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9 Annex

9.1 TÜV statement [Technical Control Board]

Stellungnahme zur Anwendbarkeit der RL 94/9/EG (ATEX)

Für Geräte und Komponenten zur Verwendung in explosionsgefährdeten Bereichen

Statement for application of directive 94/9/EC

for Equipment and Components intended for use in Potentially Explosive Atmospheres

Gegenstand: Equipment/Component type	Schwebekörperdurchflußmeßgeräte SGK 1 Ex, SGK 2 Ex, SGK 3 Ex
Hergestellt und zur Prüfung vorgelegt Manufactured and submitted for examination	A. Kirchner & Tochter GmbH
Anschrift	D – 47228 Duisburg , Dieselstraße 17
Prüfgrundlage Basis for examination	Anhang II der Richtlinie 94/9/EG Annex II of Directive 94/9/EC
Verwendete Normen	EN 1127-1: 2007 und EN 13463-1: 2007 EN 13463-5:2003
Schutzartkennzeichen Code for type of protection	Keine
Prüfergebnis: Examination result	Das Gerät fällt, unter den weiter unten genannten Bedingungen, nicht in den Anwendungsbereich der Richtlinie 94/9/EG.
Prüfbericht-Nr: Assessment number	194/Ex690.00/08

TÜV Rheinland Industrie Service GmbH
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Genau. Richtig.

1) Gegenstand und Typ

Schwebekörperdurchflußmeßgeräte SGK 1 Ex, SGK 2 Ex, SGK 3 Ex

2) Beschreibung

Das Schwebekörperdurchflussmessgerät ist ein Durchflußmessgerät für Flüssigkeiten und Gase. Alle Geräte sind konstruktiv sehr identisch und messen den Durchfluss von Gasen und Flüssigkeiten nach dem Schwebekörperverfahren. Die Durchflußmenge durchströmender, durchsichtiger Medien wird direkt an einem kalibrierten Borosilikat-Messkonus und der Höhe des Schwebekörpers abgelesen. Die Anschlüsse der Durchflußmessgeräte sind als Rohrgewinde ausgeführt. Als Zusatz gibt es Geräte mit einer in den Gerätekopf integrierten Spindel um den Volumenstrom zu regeln. Die Angebauten Sensoren RC.. sind zertifiziert in der EG-Baumusterprüfbescheinigung PTB 99 ATEX 2128 X. Die MSK Sensoren sind einfache Betriebsmittel und brauchen keine eigene ATEX Bescheinigung, sind aber eigensicher Anzusteuern. Die Installation des Gerätes muss gemäß den Angaben des Herstellers in der Bedienungsanleitung erfolgen.

3) Dokumentation

Nr.	Bezeichnung	vom	Seiten	unterschrieben am
1	Produktbeschreibung	2008	16	20.12.08
2	Einbau- und Betriebsanleitung	2008	29	20.12.08
3	Registrierbescheinigungen	2008	37	20.12.08

4) Technische Daten

Umgebungstemperatur:	0 °C bis 40 °C
Messstofftemperatur:	70ºC
Max. Betriebsdruck:	10 bar
Skalenlänge:	220mm max.

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5) Prüfergebnis

Die im Kapitel 1 aufgeführten Schwebekörperdurchflussmessgeräte fallen nicht in den Anwendungsbereich der Richtlinie 94/9/EG, weil sie bei bestimmungsgemäßer Verwendung keine eigenen potentiellen Zündquellen besitzen und keine potentiellen Zündquellen im explosionsgefährdeten Bereich verursachen.

6) ATEX Kennzeichnung

Nicht erforderlich

7) Bedingungen für die sichere Verwendung bzw. Verwendungshinweise

Elektrostatische Aufladung
Der Betreiber muss elektrostatische Aufladung des Gerätes gemäß den Herstellerangaben vermeiden.

Staubablagerung
Staubablagerung muss vermieden werden. Die Schichtdicke darf 3mm nicht übersteigen

Elektrischer Anschluss von Zusatzgeräten

Am Schwebekörperdurchflussmessgerät sind Durchfluss-Sensoren befestigt. Der Sensor ist nur an einen eigensicheren Stromkreis anzuschließen. Der eigensichere Stromkeis war nicht Grundlage dieser Prüfung. Die Höchstwerte sind den jeweiligen Bauart Zulassungen der eigensicheren Betriebsmittel zu entnehmen.

TÜV Rheinland Industrie Service GmbH
Haumannplatz 4
45130 Essen

Essen, 15. Januar 2009

Stefanie Schwarz

ATEX Notified body • TÜV Rheinland Industrie Service • 0035

Friedhelm Risse

Prüfbericht-Nr.: 194 / Ex 690.00 / 08
Test and Assessment Report-No.:

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9.2 Declaration of conformity

Kirchner und Tochter
Durchflussmesstechnik seit 1951

Konformitätserklärung
Declaration of Conformity

A. Kirchner & Tochter GmbH, Dieselstr. 17, 47228 Duisburg, Deutschland

Wir erklären hiermit unter alleiniger Verantwortung, dass folgende Produkte
We declare herewith under sole responsibilty that the products

SGK1 / SGK2 / SGK3 / ... Ex
Schwebekörper-Durchflussmessgerät/ Variable Area Flow meter

konform sind mit den Schutzzielen der Richtlinien des Europäischen Parlaments (soweit zutreffend).
are in conformity with the protection requirements of Council Directives (as far as applicable).

Der geforderte Sicherheits- und Gesundheitsschutz wird erfüllt in Übereinstimmung mit den harmonisierten Standards oder den angeführten technischen Normen (soweit zutreffend):
The stipulated safety and public health safety requirements are fullfilled in accordance with the harmonized standards or mentioned technical specifications (as far as applicable):

Die Geräte der Baureihe SGK sind keine Druckgeräte im Sinne der RL 2014/68/EU.
Ausgelegt nach AD-2000 Merkblättern B0 und N4 (PSmax = 10 bar) und geprüft nach DIN EN 12266-1:2012-06 (Druck- und Dichtheitsprüfung) durchlaufen die Geräte der Baureihe SGK dieselben Prüfungen wie Geräte der Firma Kirchner und Tochter die nach RL 2014/68/EU als Druckgeräte eingestuft werden.

The devices of the SGK series are no pressure equipment in the sense of Directive 2014/68/EU.
Designed according to AD-2000 instruction sheets B0 and N4 (PSmax = 10 bar) and tested according to DIN EN 12266-1:2012-06 (pressure and leak test) the devices of the SGK series pass through the same checks as devices from Kirchner und Tochter classified as pressure equipment according to 2014/68/EU.

Laut Stellungnahme zur Anwendbarkeit der RL 94/9/EG des TÜV Rheinland fallen die Geräte nicht unter den Anwendungsbereich der Richtlinie 94/9/EG (ATEX) bzw. 2014/34/EU. Sie haben keine eigenen Zündquellen.
Laut Prüfbericht des TÜV Rheinland mit der Nr. 296/Ex653.00/08 vom 25.09.2008, zur Anwendbarkeit der RL 94/9/EG, dürfen die oben genannten Geräte in Zone 1, Explosionsgruppe IIC eingesetzt werden.

According to the opinion on applicability of the Directive 94/9/EC by the TÜV Rheinland, the devices do not fall under the scope of Directive 94/9/EC (ATEX) resp. 2014/34/EU. They have no own sources of ignition.
According to the test report of TÜV Rheinland with the No. 296/Ex653.00/08 from 25.09.2008, to the applicability of Directive 94/9/EC, the devices mentioned above may be used in Zone 1, explosion group IIC.

Duisburg, 21.09.2016

Torsten Krawczyk
Geschäftsführer/
Managing Director

i.V. Stanislaw Wosmiller
Konstruktion/
Engineering

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Geschäftsführende Gesellschafterin: Almuth Anne Römer
Amtsgericht Duisburg

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Notes

Notes

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Notes

The devices from **Kirchner und Tochter** have been tested in compliance with applicable EC/EU CE-regulations of the European Community.

The respective declaration of conformity is available on request. Subject to change without notice. The current valid version of our documents can be found at www.kt-flow.de.

The **Kirchner und Tochter** QM-System is certified in accordance with DIN EN ISO 9001:2015. The quality is systematically adapted to the continuously increasing demands.

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