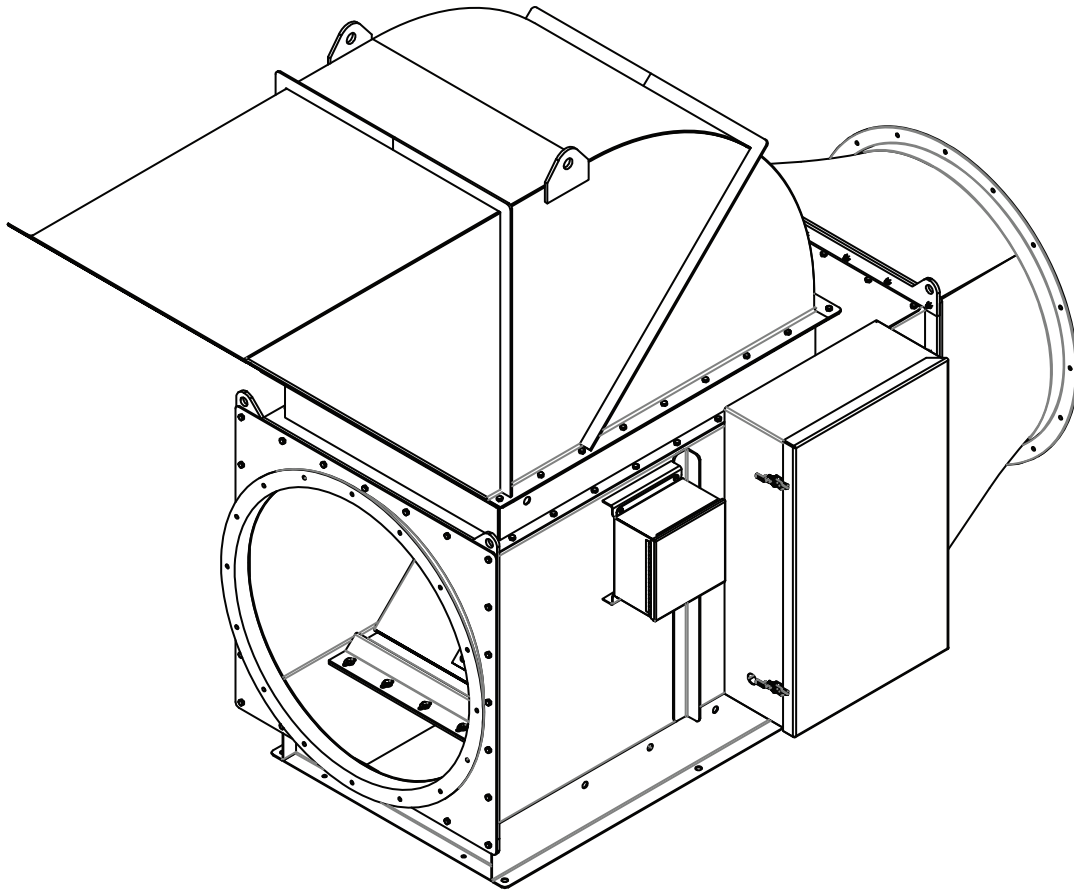




ABORT GATE



Installation, Operation & Maintenance Manual

Revision G16

Imperial Systems, Inc.
300 Imperial Drive
Jackson Center, PA 16133
Phone: 724-662-2801
Fax: 724-662-2803
www.isystemsweb.com

CONTENTS

1. INTRODUCTION AND WARRANTY	4
1.1 Introduction.....	4
1.2 Serial Number	4
1.3 Warranty	4
2. SAFETY	5
2.1 Safety Alert Symbol And Signal Words	5
2.2 Operational Hazards.....	5
2.2.1 PREPARE FOR EMERGENCIES	6
2.2.2 REPLACE SAFETY SIGNS	6
2.3 Maintenance Hazards.....	6
2.4 Hazards From Modifying Equipment	6
2.5 Safety Warning Labels	6
3. SAFETY SIGNS	7
4. UNLOADING EQUIPMENT	8
4.1 Receiving and Inspection	8
4.2 Handling	8
4.3 Storage	8
5. MOUNTING AND INSTALLATION	8
5.1 Foundations	8
5.2 Electrical Requirements.....	8
5.3 Installation.....	9
5.4 Duct Work.....	9
6. OPERATION	10
6.1 Pre-Operation Checks.....	10
6.2 Theory of Operation	10
6.3 Electric Reset Option	10
6.4 Manual Reset Option.....	11
7. MAINTENANCE	12
7.1 Inspect Electrical Connections Monthly.....	12
7.2 Inspect Bearings and Seals Monthly	12
7.3 Test Abort Gate Monthly.....	12
7.4 Test Spark Detection Equipment Monthly	12
7.5 Replace Blade Tension Springs Annually	12
8. PARTS LIST	13
9. TROUBLESHOOTING	14
10. ELECTRICAL.....	15
10.1 Abort Gate Electrical Schematics	15
10.2 Actuator Schematics	17

Appendices

Spark Switch Mounting, Spark Switch Terminal Box

1. INTRODUCTION AND WARRANTY

1.1 INTRODUCTION

Congratulations on your purchase of an Imperial Systems, Inc. product. This product has been designed and manufactured to the strictest specifications. It is our utmost desire that you achieve success and are rewarded with years of service from your equipment purchase.

Carefully examine your equipment upon receipt. Report any damage immediately to the freight carrier and register any claim. Should any material or manufacturing defects be discovered, report your findings to our service department along with the model, serial number and date of purchase. We want to make sure that you are satisfied with the equipment. As always, we welcome input on how our products can be improved to serve you better.

Read and understand this manual before using your equipment. Follow all safety instructions. Keep this manual in an accessible at all times.

Information provided in this manual is current as of the issue date. Imperial Systems, Inc. reserves the right to make design changes without further notice or liability.

Equipment modifications from original design and specifications are prohibited. Modifications may compromise safe operation of the machine, subjecting users to serious injury or death and may void any remaining warranty.

This Operator's Manual does not replace, nor does its use release the owner from observing all safety codes and operating limitations, as well as any applicable federal, state, provincial or local regulations.

1.2 SERIAL NUMBER

The serial number plate is located on the access door to the actuators.

For future reference, write your serial number in the space below:

The image shows a rectangular label for Imperial Systems, Inc. Dust Collection Equipment. At the top is the company logo: 'IMPERIAL SYSTEMS, INC.' inside a blue oval. Below the logo, it says 'DUST COLLECTION EQUIPMENT' and 'Toll Free 800.918.3013'. At the bottom, there is a registration form with four fields: 'Model' and 'Job #' on the top row, and 'Serial #' and 'Date' on the bottom row. Each field has a corresponding empty box for writing.

Serial # – This is the serial number assigned to the product in manufacturing.

Model # – This represents the size of the unit you have. (Example: AG-24 would be an abort gate to fit 24 in. diameter duct.)

Job # – This represents the sales order number the unit was sold under.

Date – This is the date of manufacture.

1.3 WARRANTY

ONE (1) YEAR ABORT GATE LIMITED WARRANTY

Imperial Systems, Inc. warrants the Abort Gate product line under its one (1) year limited warranty. This warranty covers all components of the Abort Gate product line designed and manufactured by Imperial Systems, Inc., including the housing and workmanship. Should the housing, components manufactured by Imperial Systems, Inc. or Imperial Systems, Inc.'s workmanship be found to be defective, the defective item will be repaired or replaced by Imperial Systems, Inc. without charge. Further, all motors, valves, electrical controls and other items that are sold with the equipment not manufactured by Imperial Systems, Inc. will be covered by the original manufacturer's warranty. This warranty does not cover, paint, corrosion, filters, fans, paint or excessive wear and tear.

2. SAFETY

2.1 SAFETY ALERT SYMBOL AND SIGNAL WORDS

You must read, understand and follow the instructions given by the operating unit manufacturers, as well as the instructions in this manual.

The safety information in this manual is denoted by the safety alert symbol:



This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

The level of risk is indicated by the following signal words:



DANGER

DANGER - Indicates a hazardous situation, which, if not avoided, **WILL** result in death or serious injury.



WARNING

WARNING - Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.



CAUTION

CAUTION - Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE - Indicates a situation that could result in damage to the equipment or other property.

2.2 OPERATIONAL HAZARDS



WARNING

Prevent serious injury or death.

Read and understand this manual before operating equipment.



WARNING

Prevent serious injury or death from moving parts.

Moving parts can crush and dismember.

Do not operate without guards and shields in place.

Disconnect and lockout power source before adjusting or servicing.

Carefully read all safety messages in this manual and on equipment safety signs. Keep safety signs in good condition and replace missing or damaged safety signs.

New equipment components and repair parts must include the current safety decal.

Learn how to properly operate equipment. NEVER operate or work around this equipment without proper instruction, while fatigued or under the influence of alcohol, prescription or non-prescription medication or if feeling ill.

Keep your equipment in proper working condition.

Know the regulations and laws that apply to you and your industry. This manual is not to replace any regulations or laws. Additional information may be found at: www.nfpa.org or www.osha.gov.

If you do not understand any part of this manual, contact Imperial Systems, Inc. at 724-662-2801.

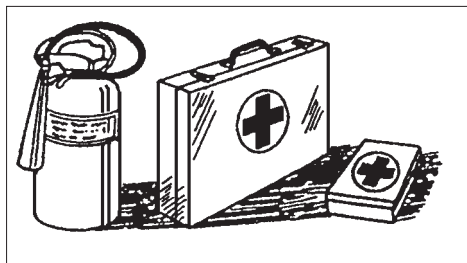
2.2.1 PREPARE FOR EMERGENCIES

Be prepared in case of emergencies.

Keep a fire extinguisher and first aid kit close to the machine.

Keep emergency phone numbers close to your phone.

Know your address so emergency services can locate you if an emergency arises.



2.2.2 REPLACE SAFETY SIGNS

Replace missing or damaged safety signs.

Safety sign locations are identified in Section 3 of this manual.

Replacement safety signs are available from Imperial Systems, Inc.

2.3 MAINTENANCE HAZARDS

Before servicing, disconnect and lockout power source. Read and understand this manual. If you do not understand any part of the manual, contact Imperial Systems, Inc. at 724-662-2801.

Always wear face and/or eye protection, safety shoes, and other protective equipment appropriate for the job.

Do not make unauthorized modifications. Contact Imperial Systems, Inc. at 724-662-2801 before you weld, cut/drill holes, or make any other modifications.

Always use Imperial Systems, Inc. replacement parts.



WARNING

Prevent serious injury or death:

Disconnect and lockout power source before performing inspections, service or maintenance.



WARNING

Keep clear of moving components. Moving parts can crush and cut.

Disconnect and lockout power source before performing inspections, service or maintenance.



WARNING

Entanglement hazard.

Keep clear of moving components.

Wear proper protective equipment appropriate for the job.

2.4 HAZARDS FROM MODIFYING EQUIPMENT

Do not make any alterations to your equipment. Altering may cause your equipment to be unsafe and may void the manufacturers' warranty.

2.5 SAFETY WARNING LABELS



WARNING

To protect you and others against death or serious injury, all labels shown must be on machine and must be legible.

If any of these labels are missing or cannot be read, contact Imperial Systems, Inc. for replacement labels.

3. SAFETY SIGNS



4. UNLOADING EQUIPMENT

4.1 RECEIVING AND INSPECTION

All abort gates ship f.o.b. factory. Abort gates are prepared for shipment according to the uniform freight classification rules of the carriers. The equipment is carefully inspected and tested before shipment. The carrier is responsible for the condition of the abort gate upon arrival.

When the carrier accepts a shipment and signs the bill of lading, it becomes responsible for any subsequent shortages or damage, evident or concealed, and any claim must be made against the carrier.

Immediately upon receipt of a shipment, carefully inspect for damage and shortage. If any damage is found, file shortage reports and damage claims with the carrier and your Imperial Systems, Inc. representative.

4.2 HANDLING

The abort gate should only be lifted by the base, mounting supports, or lifting eyes provided on the abort gate assembly. Never lift an abort gate by the weather hood, shaft, blade, or any part not designed for lifting. Lifting decisions must be left to trained personnel. Fork Lift/Crane capacity must be checked for lifting capacity.

4.3 STORAGE

Any abort gate stored for a period of time must be protected from dirt and moisture. Use of a tarp to cover the unit will aid in keeping it clean and dry. Do not use a black plastic tarp, as it will promote condensation.

For long term or outdoor storage, the bearings should be purged monthly with new grease to remove condensation. Motors that are idle should be stored according to the motor manufacturer's recommendations.

5. MOUNTING AND INSTALLATION

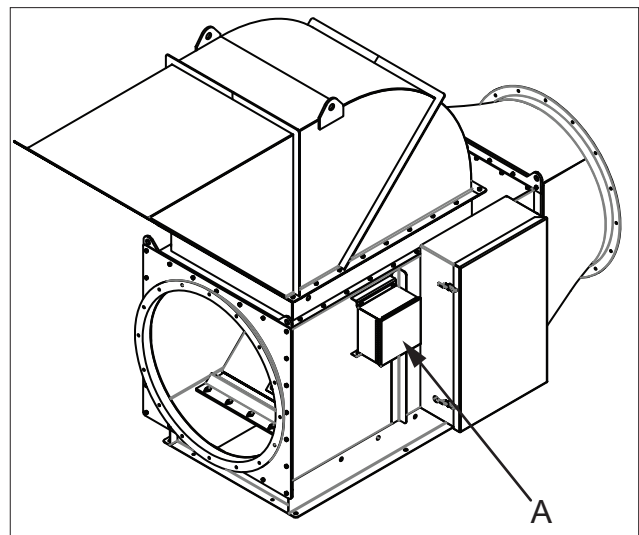
5.1 FOUNDATIONS

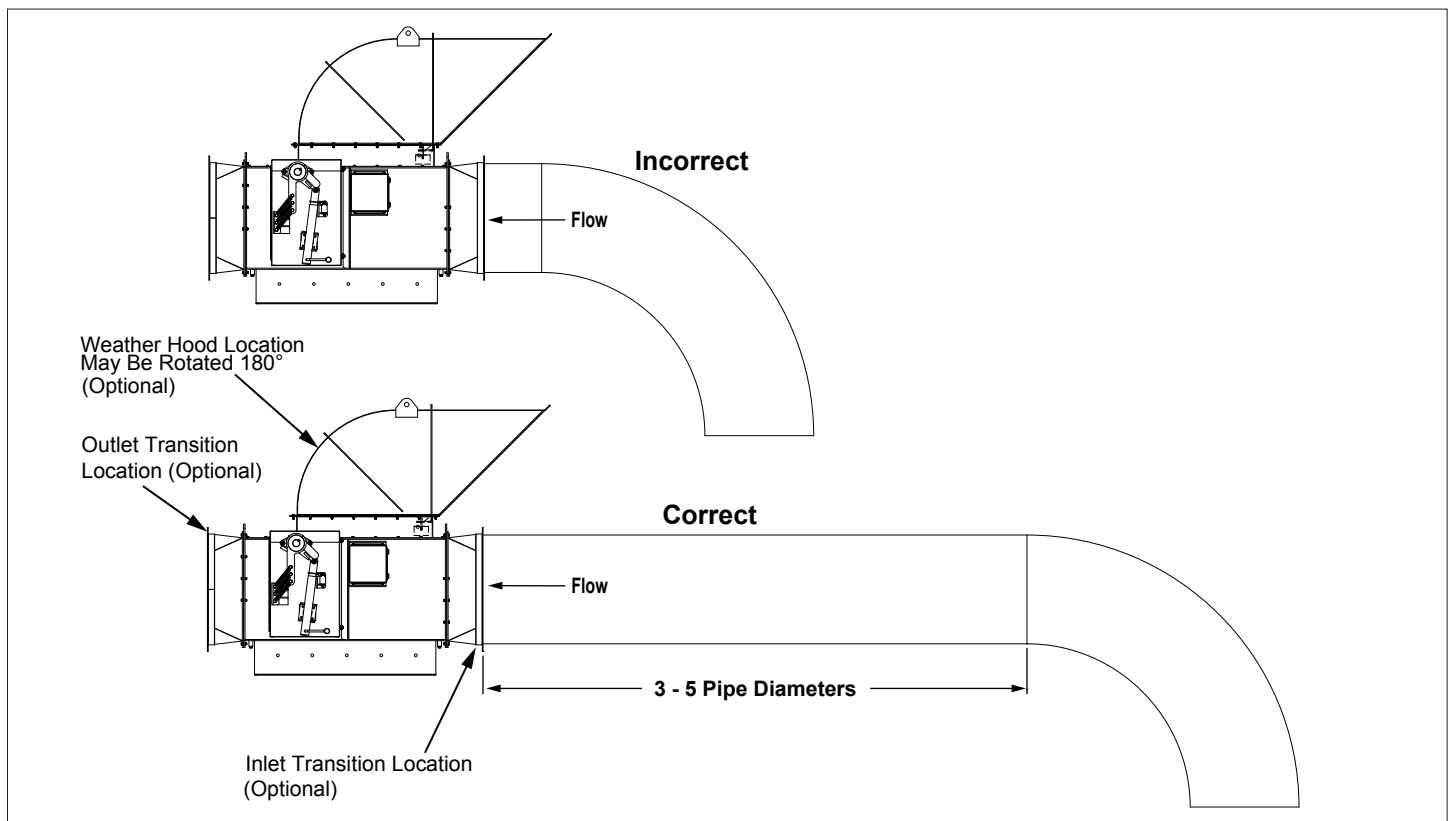
Abort gates should be mounted on level, substantial foundations. Substantial steel frame supports may be used. If abort gate is to be installed on a steel structure, the structure must be adequately designed to support the static and dynamic loads. A fabricated steel base that does not have adequate stiffness can affect alignment of abort gate components. An implied twist to the abort gate base can cause the blade to rub on the side wall, causing the abort gate to not operate properly.

5.2 ELECTRICAL REQUIREMENTS

A prewired electrical control panel (A) is supplied as part of the abort gate. This panel should not be removed from the gate and relocated. Power requirement to the panel is 120VAC, 60Hz, Single Phase. Control wiring between the panel and the spark detection system console is also required.

Electrical installation must be performed by a qualified electrical technician.





5.3 INSTALLATION

Note: Refer to the above drawing for direction of flow and placement of optional equipment.

1. Remove the skid, crate, and packing materials carefully.
2. Move the abort gate to the mounting location. Level the abort gate with shims, as necessary. Shimming must eliminate any “daylight” between the base plates and the foundation. Anchor bolts must be installed at every foundation hole provided.
3. When an elevated or suspended structural steel platform is used, it must be of sufficient size and strength to support the unit static load and maintain permanent alignment of all components. Support the abort gate along its entire length.
4. Install any accessories that were shipped loose from the factory. The abort gate requires its own support structure and access platform.
5. For maximum effectiveness, and intended purpose, the abort gate should be located on the positive pressure side of the fan. Gate location on the negative side of the fan will cause the upstream airflow to stop and may not discharge the hazard to the atmosphere.

6. An abort gate should be installed in the horizontal position. Installation in an inclined pipe is permissible up to 30° from horizontal (air flow direction, uphill only), but is not recommended and should be avoided, if possible. Installation in a vertical pipe is not permitted.

5.4 DUCT WORK

The inlet and outlet ducts must be adequately supported. The abort gate is not designed to support the duct work. Improperly supported duct work can cause distortion and a possible conflict with the operation of the abort gate.

There must be a minimum of 3-5 pipe diameters of straight duct before the abort gate inlet.

Example: If the abort gate inlet is 1.5 ft diameter:

1.5 x 3 = 4.5 ft of straight duct before inlet.

1.5 x 4 = 6 ft of straight duct before inlet.

1.5 x 5 = 7.5 ft of straight duct before inlet.

Spark detection sensor must have enough duct between the sensor and the abort gate to allow the abort gate to react before the spark gets to the unit. Sensor reaction time is 0.5 seconds.

Example: If air velocity in the duct is 4,000 FPM, there will need to be 34 ft of duct between the spark detection sensor and the abort gate.

$4000 \text{ feet per minute} \div 60 = 66.66 \text{ feet per second.}$
 $66.66 \div 0.5 \text{ second reaction time} = 33.33 \text{ feet of duct.}$

6. OPERATION

6.1 PRE-OPERATION CHECKS



WARNING

Dropping the blade when the arming actuator is not in the fully retracted position will damage the unit.

- Prior to shipping the abort gate, all adjustments in sealing tightness, actuator operation, limit switches and magnet position are made, and the gate is test-cycled several times. Due to shipping, there is a possibility that some readjustment of limit switches and/or magnet height will need to be made.
- After installation of the abort gate, several test cycles of “aborting” and resetting the blade will determine if any adjustments are necessary.
- It is very important to ensure that the magnet has a complete magnetic hold on the spring-loaded blade before the actuator starts retracting to the rest position. Damage to the actuator will occur if the blade drops before the actuator completes its return stroke.

6.2 THEORY OF OPERATION

In normal operation, the abort gate blade is held in position by a strong electromagnet.

When activated by the spark detection system, power ceases to the magnet causing it to de-energize and release the blade to the abort position.

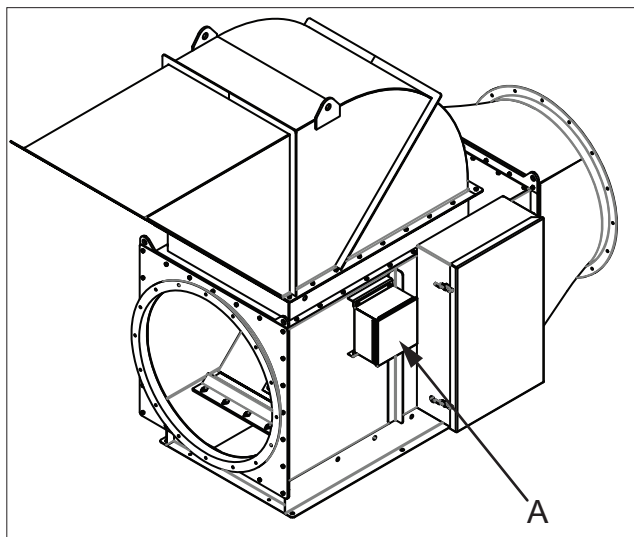
The magnet will not re-energize until the spark detection system console has been reset.

6.3 ELECTRIC RESET OPTION

Shut down the air flow or system fan before re-setting the blade.

To reset the abort gate to the armed position, push the RAISE button on the abort gate control panel (A). Once the blade is in position, release the RAISE button. The electric actuator will automatically retract and the green ARMED light will come on when the actuator is fully

retracted. To manually reset the abort gate, the blade must be lifted back to position using a suitable device and lifting eyes provided.



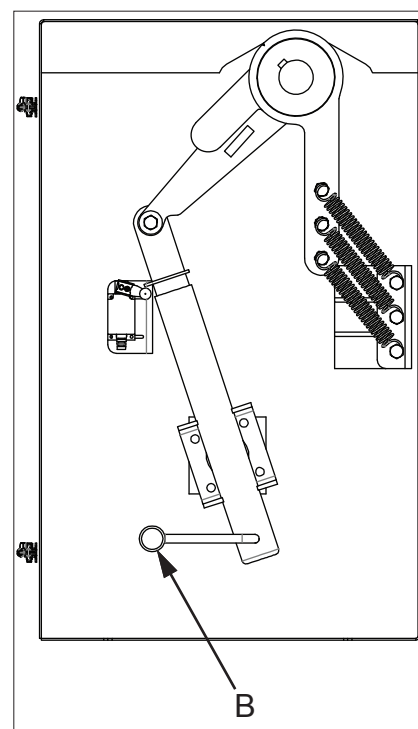
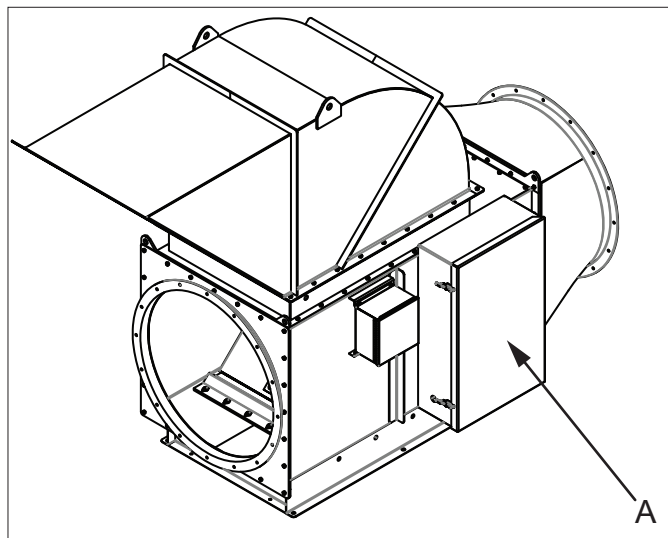
The abort gate is equipped with limit switches to indicate blade and linear actuator positions. A green ARMED light indicates that the blade is in normal position, being held by the magnet, and that the actuator is fully retracted to its resting position. Any variation in the position of the blade or actuator will be indicated by a red TRIPPED light on the control panel.

A test button is also on the control panel. This is used for local testing or activation of the abort gate.

Before resetting the blade, it is necessary to completely inspect the blade sealing surfaces for any build up of material that might cause interference or an incomplete seal. Close attention is needed at the back of the blade to ensure that no material build up has occurred in the valley. Any build up in this area may prevent complete blade closure and magnet latching.

6.4 MANUAL RESET OPTION

1. Shut down the air flow or system fan.
2. Open the door to the reset panel (A).
3. Crank the manual actuator jack (B) until the blade is in full contact and being held by the magnet.
4. The green blade UP light will illuminate.
5. Crank the actuator jack back to the fully retracted position, the green ARMED light will illuminate.



7. MAINTENANCE



WARNING

Prevent serious injury or death:

Disconnect and lockout power source before performing inspections, service or maintenance.

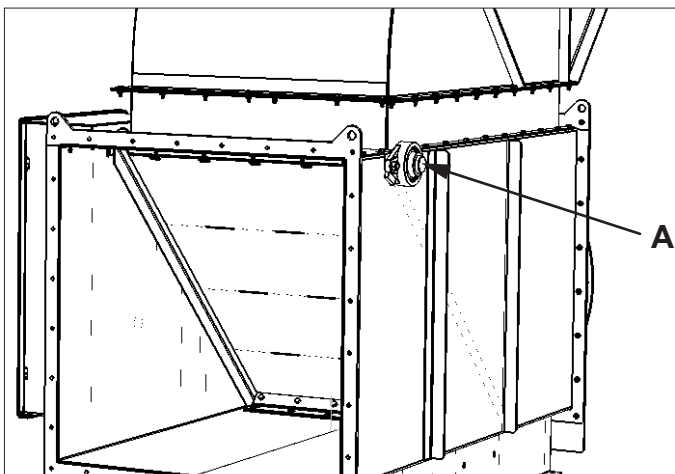
The key to trouble free abort gate operation is good maintenance practices.

7.1 INSPECT ELECTRICAL CONNECTIONS MONTHLY

Inspect all electrical connections. Connections could become loose due to vibration.

7.2 INSPECT BEARINGS AND SEALS MONTHLY

Inspect bearings (A) and seals for excessive wear. Grease bearings as needed.



7.3 TEST ABORT GATE MONTHLY

Press Abort Test (B) on control panel to manually test abort gate function.

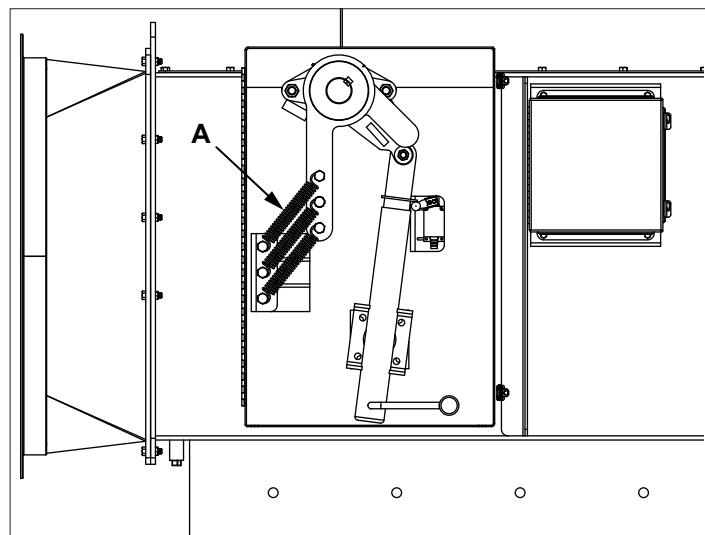


7.4 TEST SPARK DETECTION EQUIPMENT MONTHLY

Refer to OEM manual for spark detection equipment.

7.5 REPLACE BLADE TENSION SPRINGS ANNUALLY

Replace blade tension springs (A) annually.



8. PARTS LIST

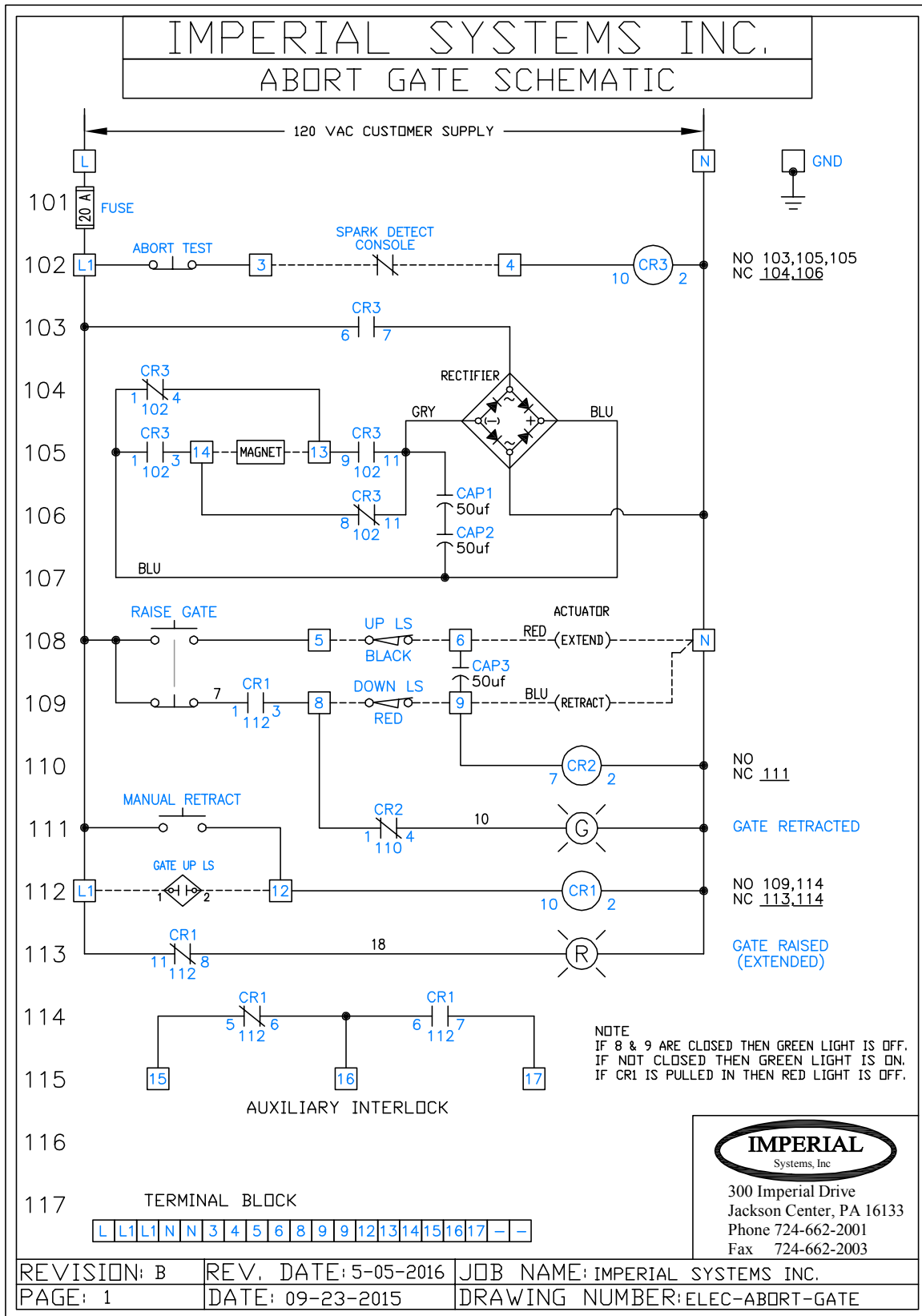
Qty:	Model #	Part Number	Description
Bearings			
2	AG14 - AG25	410017	1 1/2" 2 bolt flange block bearing
2	AG26 - AG42	410016	2" 2 bolt flange block bearing
2	AG43 - AG67	410015	2 7/16" 2 bolt flange block bearing
Manual Actuator			
1	AG14 - AG54	430015	1 ton manual Jack 10" Stroke
1	AG55 - AG67	430015.001	1 ton manual Jack 15" Stroke
Electric Actuator			
1	AG14 - AG20	430032.001	Electromechanical Actuator, Series TAL, 115VAC (60Hz), 08" stroke
1	AG21 - AG42	430032	Electromechanical Actuator, Series TAL, 115VAC (60Hz), 12" stroke
1	AG43 - AG54	430072.001	Electromechanical Actuator, Series SPA, 115VAC (60Hz), 12" stroke
1	AG55 - AG67	430072	Electromechanical Actuator, Series SPA, 115VAC (60Hz), 18" stroke
Controls			
1	ALL Models	450006	Manual reset control panel
1	AG14 - AG67	450005	Electric reset control panel
1	AG32 - AG54	430004.002	1,000 LB Capacity Electromagnet that holds blade in armed position
2	AG55 - AG67	430004.002	1,000 LB Capacity Electromagnet that holds blade in armed position
1	AG05 - AG31	430004.003	700 LB Capacity Electromagnet that holds blade in armed position
1	AG05 - AG54	430004	2,000 LB Capacity Electromagnet that holds blade in armed position (Old Style rectangular magnet)
2	AG55 - AG67	430004	2,000 LB Capacity Electromagnet that holds blade in armed position (Old Style rectangular magnet)
1	ALL Models	430127	Blade up limit switch inductive Prox
1	ALL Models	430076	Lower limit switch for manual actuated abort gates
3	ALL Models	430074	Tension springs for blade Spring-1"Ø x 7" x .135 wire
10	AG14 - AG67	430075	Edge seal 3/4" O.D. EPDM black bulb at location A; 3/16" edge

9. TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Actuator does not operate.	Control not wired properly.	Check that there is 110V supply to the control panel.
	Fuse blown.	Replace fuse.
	Motor limit switches out of adjustment.	Adjust motor limit switches.
Magnet does not hold up the blade.	Spark console not connected.	Verify that a spark detect console is connected between terminals 3 and 4.
	Magnet not aligned with striker plate.	Verify that the magnet is contacting the striker plate evenly (if there is any gap between the magnet and striker plate, the magnet will not hold).
	Magnet not adjusted properly.	Magnet is adjusted too high to lower magnet to allow it to engage the striker plate fully. Check gasket seal around blade for complete seal after adjusting.
Blade not sealing against gasket in armed position.	Magnet not adjusted properly.	Raise magnet with the adjuster nuts until completely sealed.
Blade rubs on side wall.	Abort gate is not aligned properly.	Align support structure. Abort gate must be level and square.
Blade aborts.	Received abort signal from spark detect console.	1. Reset spark detect console. 2. Rearm abort gate.
	Power interruption.	1. Verify power is present at abort gate. 2. Rearm abort gate.

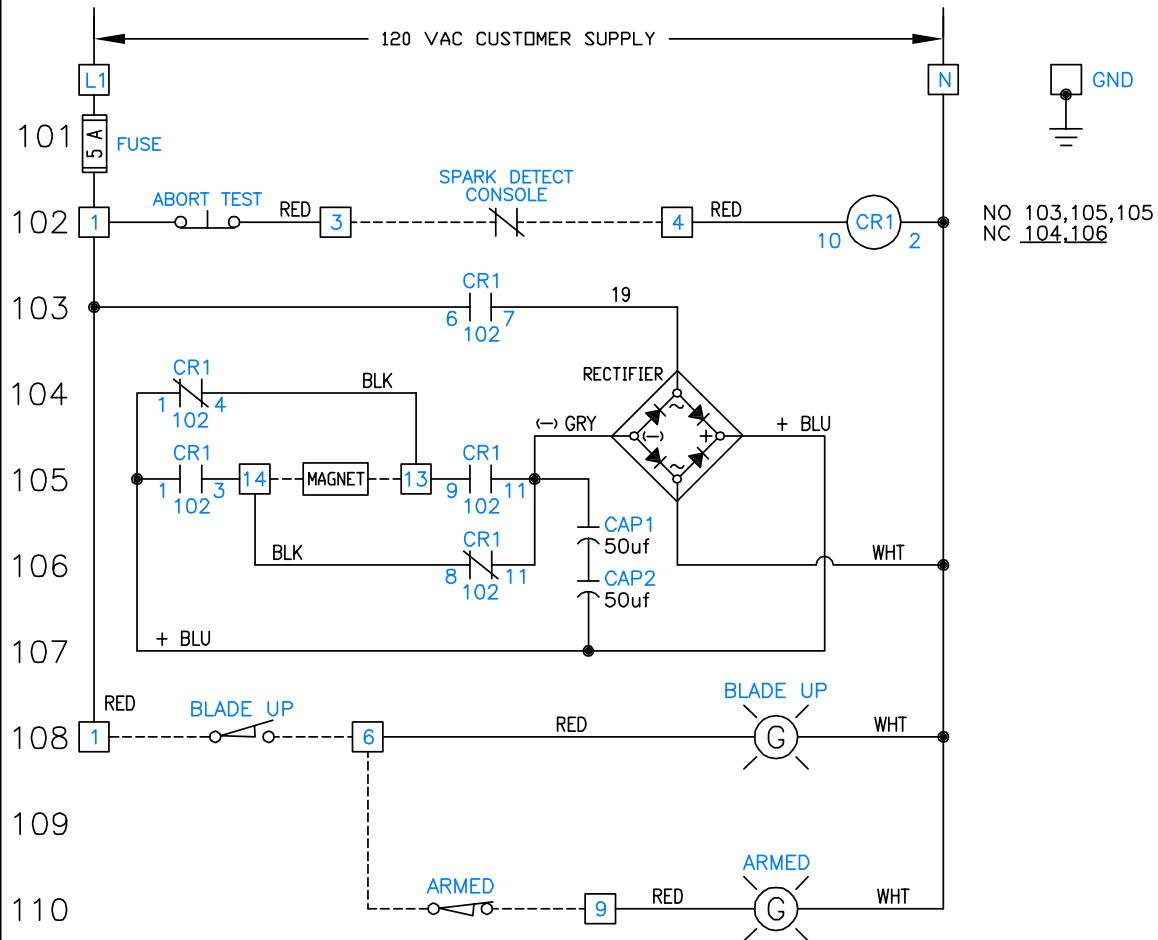
10. ELECTRICAL

10.1 ABORT GATE ELECTRICAL SCHEMATICS



IMPERIAL SYSTEMS INC.

ABORT GATE SCHEMATIC



TERMINAL BLOCK

G	L1	N	1	1	3	4	6	9	13	14	15	16	17
---	----	---	---	---	---	---	---	---	----	----	----	----	----



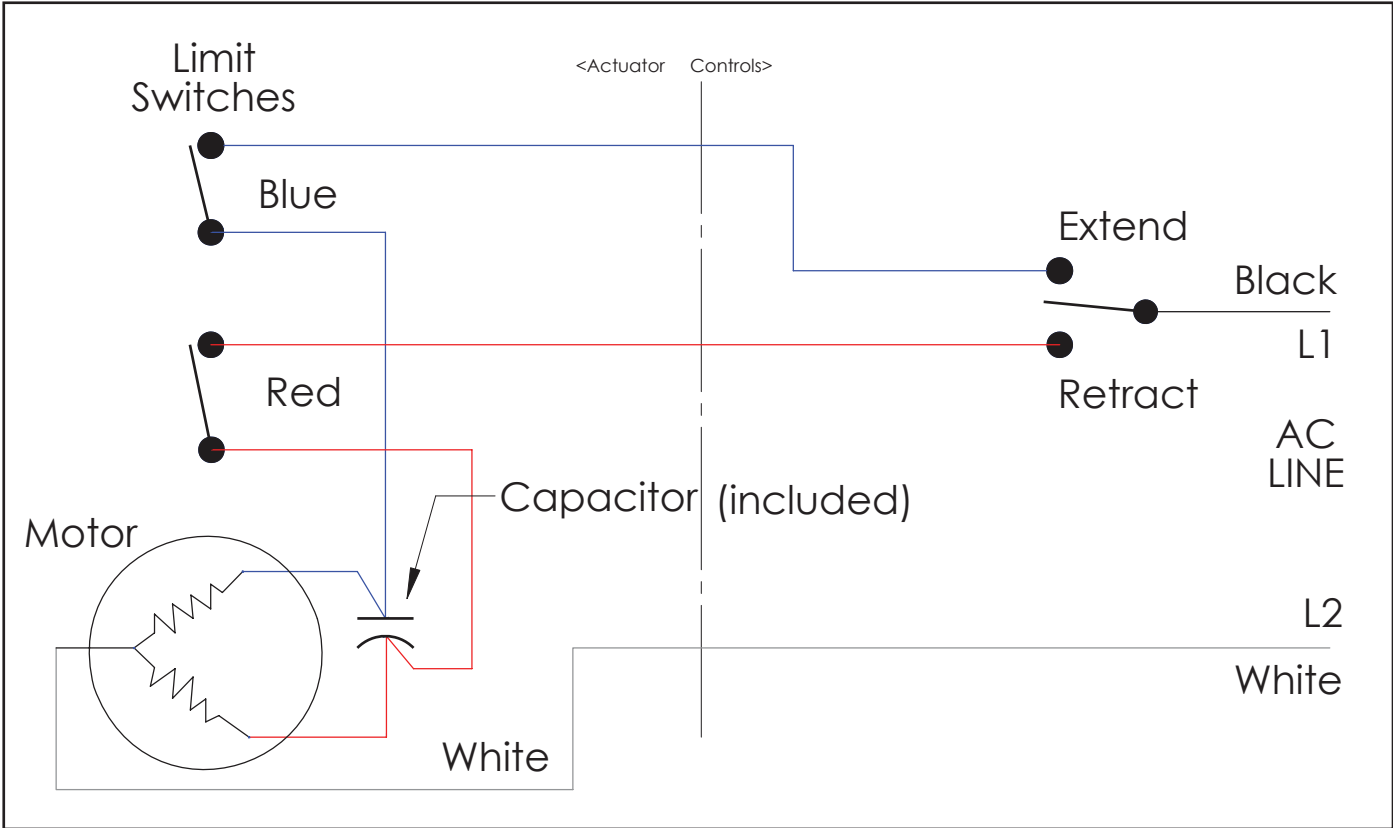
300 Imperial Drive
Jackson Center, PA 16133
Phone 724-662-2001
Fax 724-662-2003

REVISION: F16	REV. DATE: 06-08-16	JOB NAME: IMPERIAL SYSTEMS INC.
PAGE: 1	DATE: 10-14-2015	DRAWING NUMBER: MANUAL-ABORT-GATE

10.2 ACTUATOR SCHEMATICS

The diagram illustrates the electrical wiring for an actuator system. On the left, AC Power is supplied to a terminal block with five terminals. The top terminal is labeled 'Common' and is connected to a 'White' wire that runs horizontally across the top of the 'Actuator Enclosure' (indicated by a dashed box). The second terminal is labeled 'Extend' and is connected to the top terminal of the 'Upper Switch'. The third terminal is labeled 'Retract' and is connected to the top terminal of the 'Lower Switch'. The fourth terminal is connected to one side of a 'Motor Run Capacitor' (represented by two parallel lines of unequal length). The bottom terminal is connected to the other side of the capacitor and to the bottom terminal of the 'Lower Switch'. Inside the 'Actuator Enclosure', the 'White' wire connects to the top terminal of a motor (represented by a circle with a zigzag line). The 'Upper Switch' and 'Lower Switch' are shown as single-pole switches. The 'Lower Switch' is connected to a 'Red' wire that runs horizontally across the bottom of the enclosure. The 'Red' wire connects to the bottom terminal of the motor. A 'Black' wire is also shown running horizontally across the bottom of the enclosure, connected to the bottom terminal of the 'Lower Switch' and the bottom terminal of the motor. The 'Motor Run Capacitor' is connected to the 'Retract' terminal and the bottom terminal of the 'Lower Switch'.

TAL Series Actuator fits Abort Gate models AG14 to AG42



SPA Series Actuator fits Abort Gate models AG43 to AG67

APPENDIX 1- SPARK SWITCH MOUNTING

INTRODUCTION

START-UP BY GRECON

The Spark Extinguishment System must be started up by a GreCon-service technician, or by personnel authorized by GreCon in order to validate warranty.

Never attempt to start up the system by yourself.

REGULAR MAINTENANCE

GreCon Spark Extinguishment Systems are part of the safety-system installations and must therefore be serviced regularly. Please perform all maintenance checks given in the Maintenance & Service manual at regular intervals.

A Service Contract with GreCon will ensure regular maintenance and service of your system.

Contact the service department or your nearest GreCon office for details.

MAINTENANCE WORK FOR SPARK SENSORS AND EXTINGUISHMENT DEVICES:

Spark sensors can only be removed using force. They can be released by the mounting adapters quite suddenly. When you are standing on a ladder, or some form of scaffold during maintenance checks of the sensor lenses, make sure that you are protected against falling.

Do not remove any sensors or extinguishment nozzles during production. Material might leave the duct through the drill-holes and cause serious injuries.

CHOOSING INSTALLATION SITE

When choosing the installation sites of the spark sensors and extinguishment nozzles, make sure that they are easily accessible for later maintenance work. Provide ladders or scaffolding if necessary.

FOR STEAM EXTINGUISHMENT SYSTEMS

When working on steam-extinguishment systems, there is the danger of scalding. Make sure that steam extinguishment is disabled while work on the system is in progress.

CORRECT POSITIONING OF SENSORS AND OPTICAL FIBERS

Spark sensors and optical fibres must be installed into the transport duct in such a way that they are not subjected to excessive wear because of constant collisions with the transported material.

Please observe the "Important information on the positioning of the spark sensors", pages 1-10 and 1-11, and the "Important information on the positioning of the optical fibres", page 1-12.

SPARK SENSOR FM 1/8 AND TERMINAL BOX KK 1/8

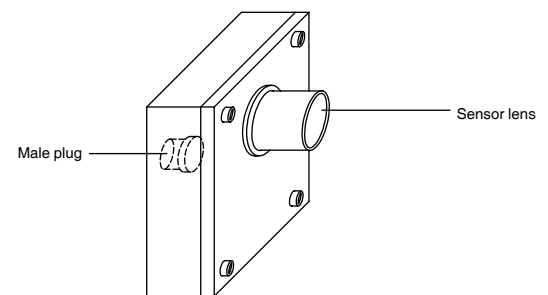


Fig. 1.1 Spark sensor FM 1/8

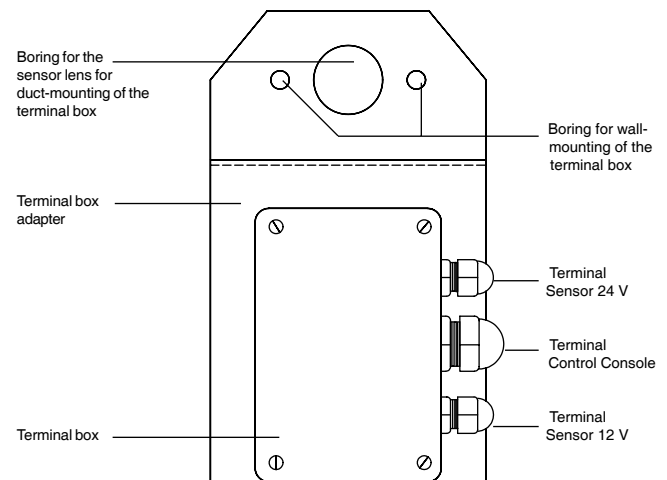


Fig. 1.2 Terminal box KK 1/8 with terminal box adapter

Spark sensor FM 1/8 - dimensions and technical data

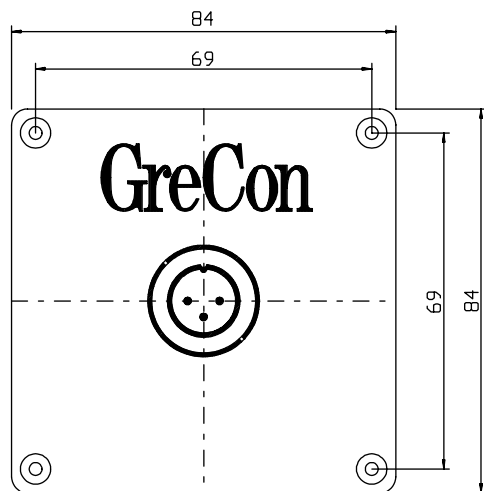


Fig. 1.7: FM 1/8 front view

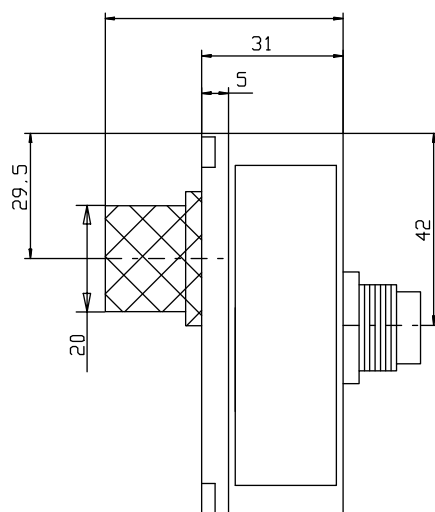


Fig. 1.8: FM 1/8 side view
(dimensions in millimeters)

TECHNICAL DATA:

Input voltage + 20 V \pm 10%
 Input current 10 mA \pm 10%
 Spectral resolution 800 - 1100 nm
 Working temperature - 40°F to + 158°F
 Protection standard NEMA 4
 View angle $\geq 100^\circ$
 Test signal
 + 12 V \pm 20% / + 24 V \pm 20% (with KK 1/8) for ≥ 3 ms

Terminal box KK 1/8 - dimensions and technical data

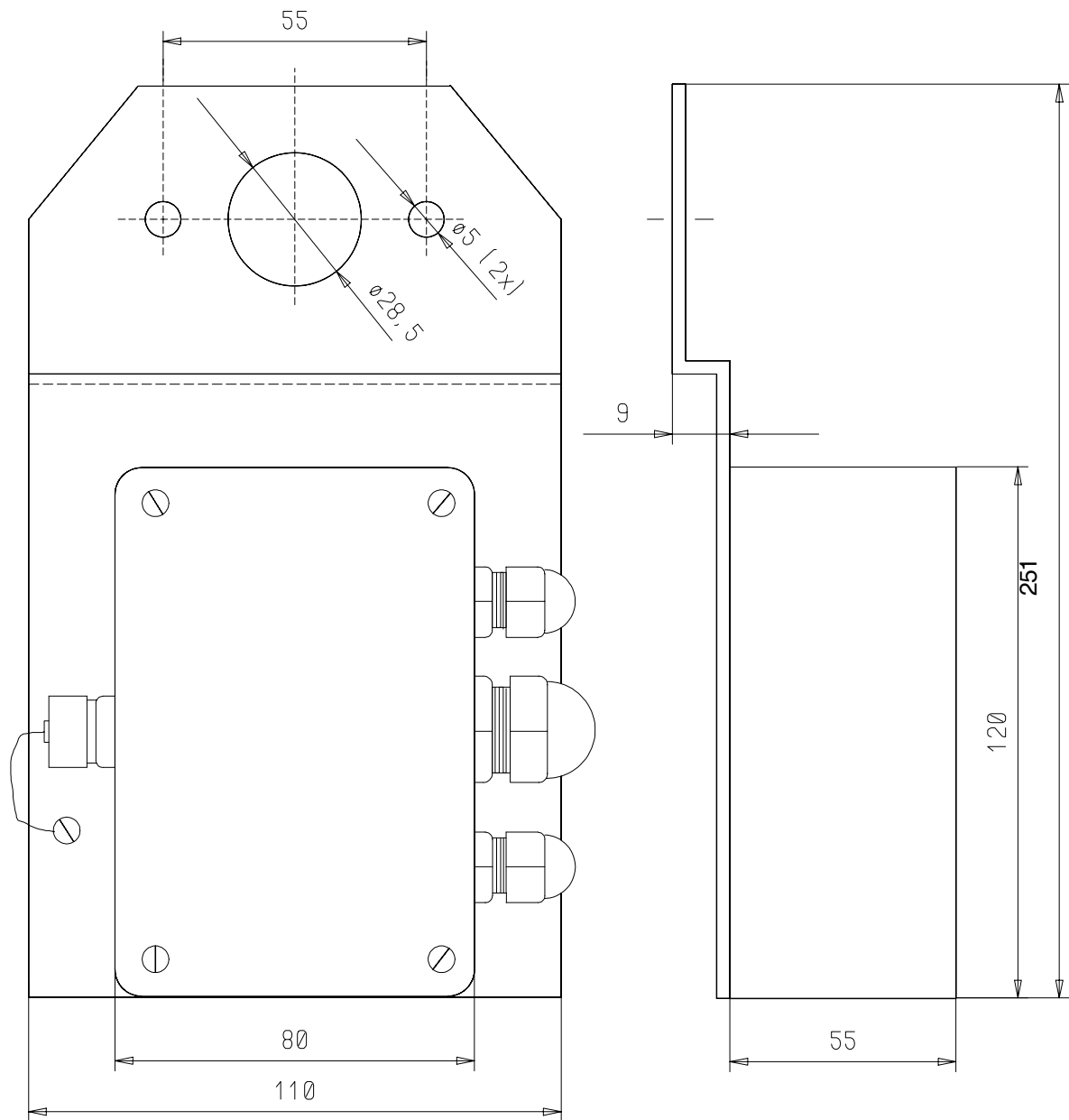


Fig. 1.11 Terminal box with adapter
front view

side view

(dimensions in millimeters)

Technical data:

Protection standard:

NEMA 4

Terminals:

max. 14 AWG

How to position the spark sensors

- | | |
|------------------------|---|
| Space | <ul style="list-style-type: none">Choose the installation site of the spark sensors so that there is enough space available to properly handle the installation tools. This is of particular importance for the removal of the mounting tool after installation of the different adapters. |
| Access | <ul style="list-style-type: none">There must be easy access to the spark sensors for maintenance and servicing. Provide ladders or appropriate scaffolding. |
| Light incidence | <p>Attention ! Light leakage through open transport ducts or inspection flaps, can initiate false alarms.</p> <ul style="list-style-type: none">Seal the transport duct to prevent false alarm.During inspection of a transport duct through an inspection flap the corresponding surveillance zone should be disabled. |

Preventing the danger of wear by correctly positioning of the spark sensors.

- Installation in a horizontal straight section of the transport duct

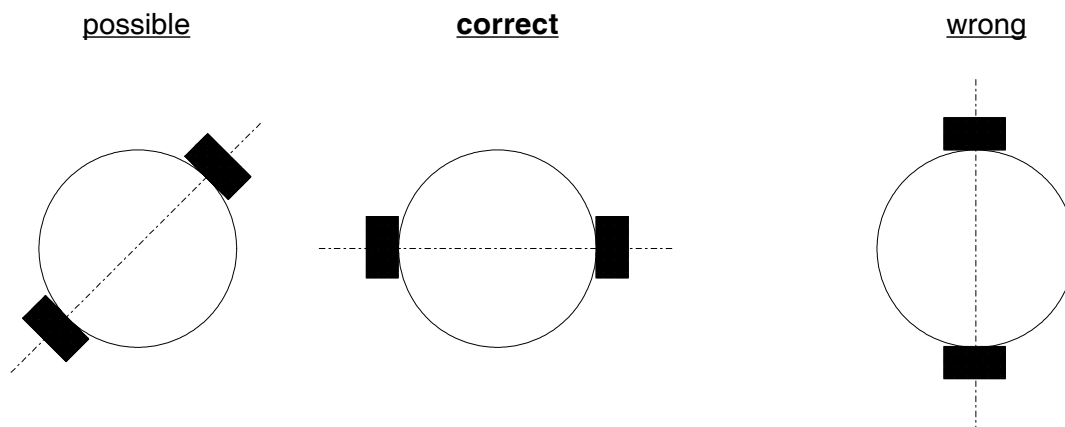


Fig. 1.12

- Do not mount the spark sensor at the bottom of the transport duct -

The spark sensor at the bottom would be subjected to pollution and wear from material accumulation and extinguishment water.

- **Installation in duct bends**

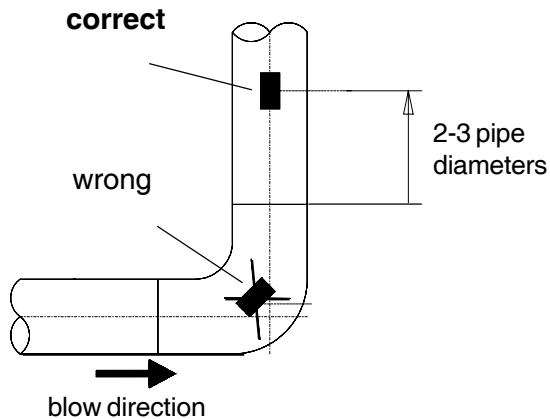


Fig. 1.13

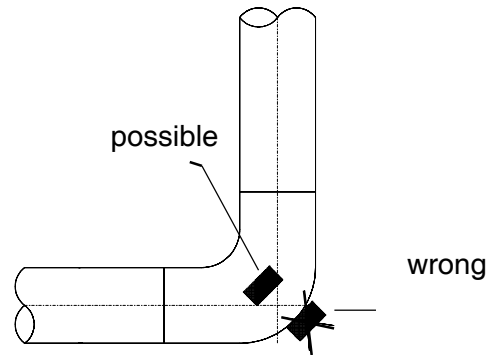


Fig. 1.14

Do not mount the spark sensors at the bottom of the transport duct !

When mounting the spark sensor in the direction of flow of the transported material, the sensor lens can be subjected to excessive wear.

Exception:

The spark sensors can only be mounted in bends of the transport duct in exceptional cases. Even in these cases, the spark sensor should not be mounted at the bottom or back heel of the elbow.

- **Installation behind a fan**

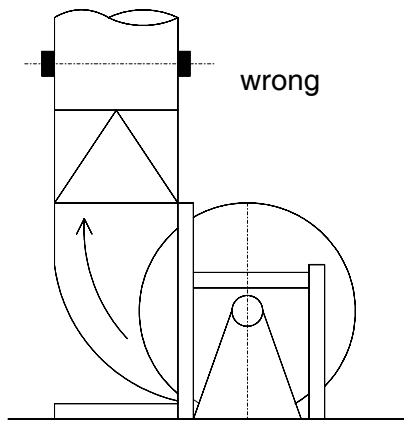


Fig. 1.15

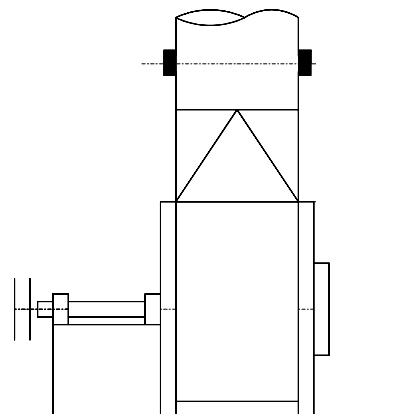


Fig. 1.16

Do not mount the spark sensor in the blow direction of the fan !

Pieces of transported material colliding with the sensor lens will cause excessive wear.

Mount the spark sensors at least 5 ft away from the end of the fan discharge transition.

Sparks originating in the fan can cause spark alarms.

How to position the optical fibres

- **Mount the optical fibres in a plane normal to the direction of flow.**

correct

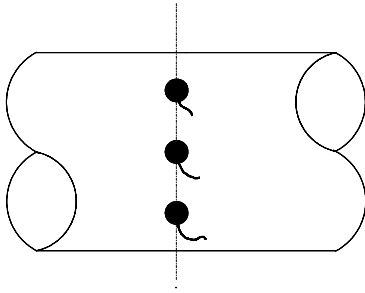


Fig. 1.17

wrong

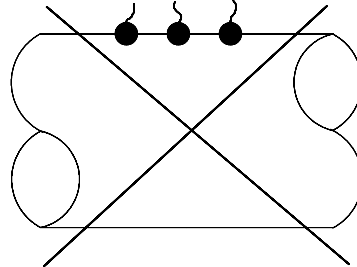


Fig. 1.18

- **Distribute the connector terminals for the optical fibres evenly around the transport duct, and do not mount them at the bottom of the duct.**

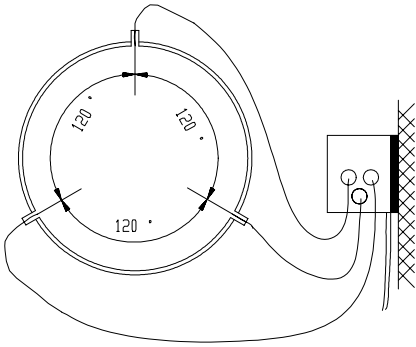


Fig. 1.19

Diameter of the transport duct
< 56" including insulation
1 sensor, 3 optical fibres

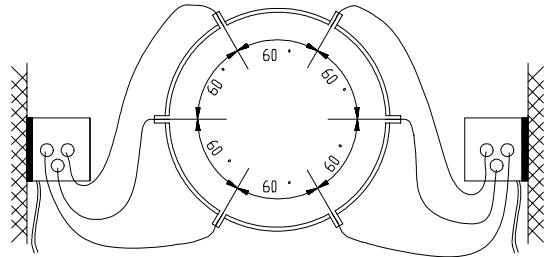


Fig. 1.20

Diameter of the transport duct
> 57-120"Ø including insulation
2 sensors, 6 optical fibres

- **If the transport duct is insulated, provide openings in the insulation material for the connector terminals of the optical fibres.**

To prevent condensation,
seal the insulation again
using a lid. Ensure that
cable may still be removed
for inspection.

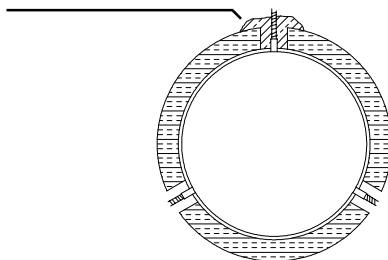


Fig. 1.21

Special tools

For mounting of the adapters for the spark sensors, the optical fibres and the extinguishment nozzles, you need special tools. These are supplied with the spark extinguishment system.

- **Circular cutter:** 32 mm
40 mm

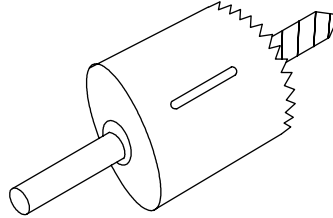


Fig. 1.22

- **Mounting tool:** For mounting the spark sensors, the optical fibres, and the extinguishment nozzle adapter.

mounting the
extinguishment nozzle

mounting the
spark sensor
FM 1/7

counter checking while
tightening the
adapter nut

mounting the optical
fibre adapter
FM 3/8

mounting the spark
sensor
FM 1/8

Fig. 1.23

- **Wrench**

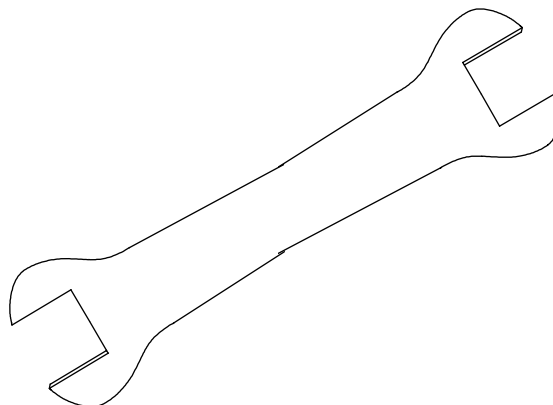


Fig. 1.24

How to mount the Spark sensor FM 1/8 to the transport duct

When mounting the Spark sensor FM 1/8, you first must install the sensor mounting adapter into the transport duct. Then insert the sensor lens into the adapter. The minimum diameter of the transport duct is 8"Ø for 16 ga. and thinner wall thickness, or => 10"Ø up to maximum of 10 ga. or 1/8" wall thickness.

For smaller duct diameters you can use special mounting bands.

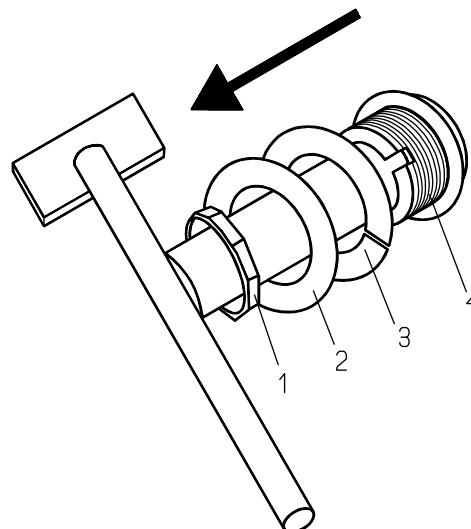
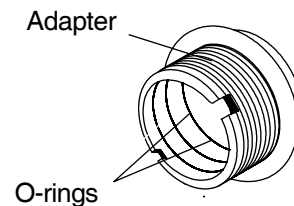


Caution !

Make sure the installation is shut down while mounting work is in progress.

Mounting the sensor mounting adapter

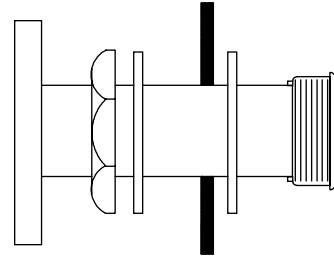
- Choose an installation site for the spark sensors.
 - installation site see pgs. 1-10 / 1-11
- Bore a hole of 32 mm diameter into the duct wall.
 - circular cutter see Fig. 1.22
- Carefully remove the circular cutter to prevent the cut out circular section from falling into the transport duct.
- Put the o-rings into the internal grooves of the adapter.
- Put the different parts of the sensor mounting adapter onto the mounting tool.
 - mounting device see Fig. 1.23
 - **observe the correct sequence:**
 - 1 = nut
 - 2 = washer, round
 - 3 = washer, slotted
 - 4 = adapter



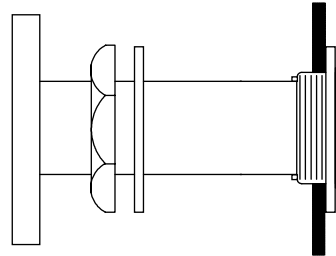
Notice:

When mounting the terminal box to the transport duct, the round washer is replaced with the terminal box adapter plate.

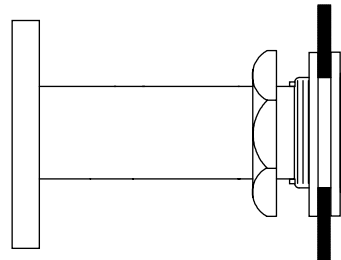
- Insert the adapter and the slotted washer into the hole.



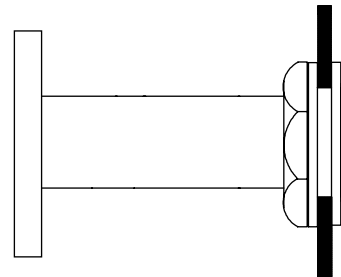
- **Carefully** withdraw the mounting tool, making sure that the adapter does not slip from the device. The threading of the adapter must be on the outside of the duct, and the slotted washer must connect to the inside of the wall.



- Move the round washer (or the terminal box adapter, if the terminal box is mounted onto the transport duct) and the nut to the outside of the duct wall.



- Screw the nut onto the adapter and **tighten** it using the wrench.
 - wrench see Fig. 1.24



- Remove the mounting tool by simultaneously pulling and turning it.

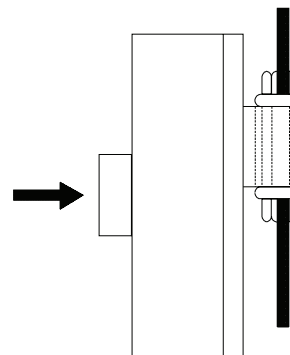
Mounting the spark sensor

- Ensure the o-rings are correctly installed and in good condition.
- Insert the lens of the spark sensor into the sensor mounting adapter by simultaneously pushing and turning it evenly, until sensor is fully seated.



Caution !

Ceramic lens may crack if taken out improperly. Lubricating adapter O-rings with non-petroleum based lubricant will make installation/removal of sensors easier, thereby minimizing risk of damage.



Caution !

When removing the spark sensor, make sure that you are secured against falling. The spark sensors can only be removed from the mounting using some force, and they may release quite suddenly.



Important !

Remove the protecting cap of the male plug only immediately before inserting it into the sensor. The cap prevents moisture from entering the sensor.

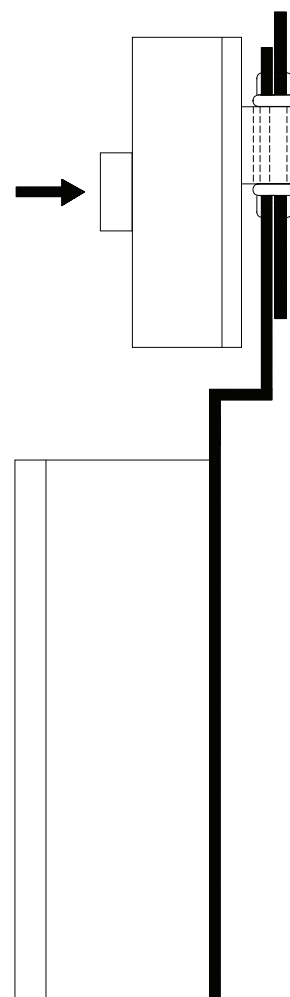


Fig. 1.25: Spark sensor FM 1/8 and terminal box mounted to the transport duct

Adapter for Spark sensor FM 1/8 / FM 1/7

This adapter serves for the fitting of the sensor lens of a Spark sensor FM 1/8 into the adapter of a Spark sensor FM 1/7.

Mounting a Spark sensor FM 1/8 with adapter

- Wet the ceramic part of the sensor lens.
- Fit the adapter onto the sensor lens of the Spark sensor FM 1/8 by simultaneously pushing and turning it until fully seated.
- Insert the sensor lens with the fitted adapter into the adapter of a Spark sensor FM 1/7 until fully seated.

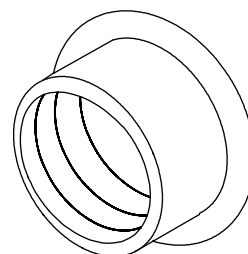


Fig. 1.26

How to mount the optical fibre adapters of a Spark sensor FM 3/8

When mounting the optical fibres of a Spark sensor FM 3/8, you must first mount the optical fibre adapters into the transport duct. Then insert the optical fibre sleeve into the adapter. The minimum diameter of the transport duct is 10" . The wall thickness should be at most 3/16" or straight walls up to 1/4".

For smaller duct diameters or larger wall thicknesses you can use special mounting bands.



Caution !

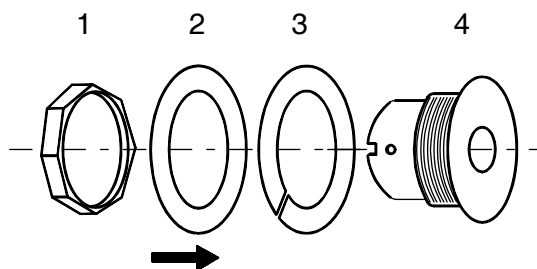
Make sure the installation is shut down while mounting work is in progress.

Mounting the sensor mounting adapter

- Choose the installation site of the optical fibres.
 - installation site see pg. 1-12

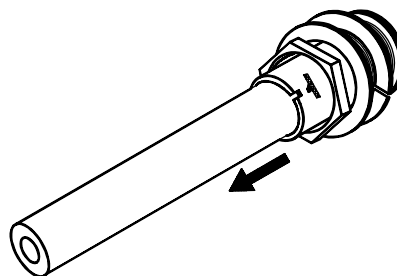
Bore three holes of 40 mm diameter for the optical fibres into the transport duct.

- circular cutter see Fig. 1.22
- Carefully remove the circular cutter to prevent the cut out circular section from falling into the transport duct.
- Fit the slotted washer, the round washer, and the nut, onto the optical fibre adapter.
- Now fit the optical fibre adapter onto the slim end of the mounting tool and tighten the thumb screw.
 - Mounting tool see Fig.1.23

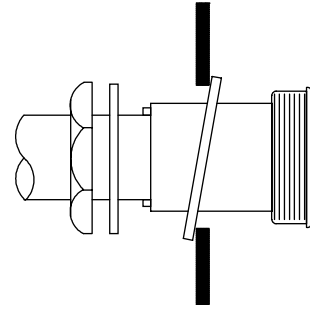


Observe the correct sequence:

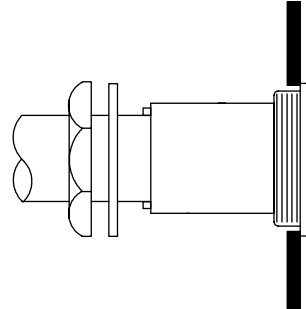
- 1 = nut
- 2 = washer, round
- 3 = washer, slotted
- 4 = adapter
- 5 = thumb screw



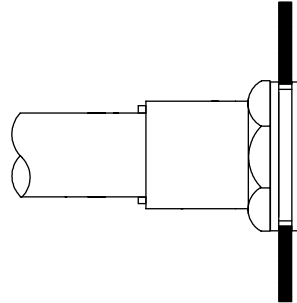
- Insert the adapter and the slotted washer into the hole.



- Withdraw the mounting tool.
The threading of the adapter must be on the outside of the duct, and the slotted washer must connect to the inside of the wall.

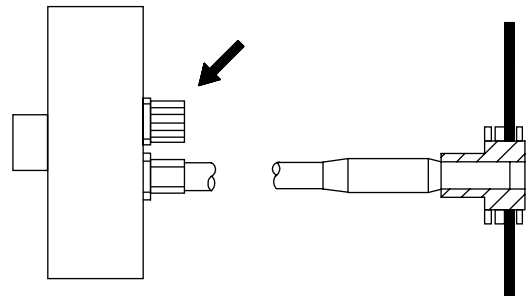


- Move the round washer and the nut to the outside of the duct wall.
- Screw on the nut and tighten it with the wrench.
 - wrench see Fig. 1.24
- Loosen the thumb screw and remove the mounting tool.



Mounting the optical fibres

- Insert the optical fibre sleeve of a Spark sensor FM 3/8 into the optical fibre adapter by simultaneously pushing and turning it until fully seated and secure with the thumbscrew.



Important !

If not all optical fibres available are connected, seal the optical fibre connector terminals with one of the protection caps supplied with the system.

Mounting examples

Two different mounting options for the terminal box of a FM 1/8

- 1. Mounting on the duct:** The terminal box and the sensor 1 are mounted together on the duct using the terminal box adapter. The large hole 28.5 mm in the adapter (*see Fig. 1.2 / pg. 1-3*) serves for the mounting of the terminal box adapter and the simultaneous fitting of a sensor.

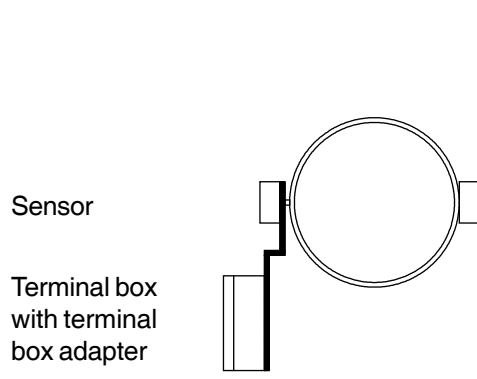


Fig. 1.27 horizontal duct

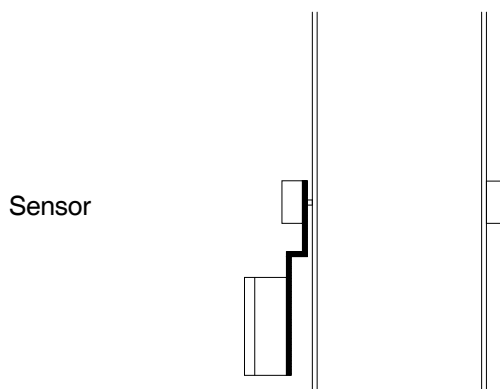


Fig. 1.28 vertical duct

- Wall installation:** The terminal box is mounted separately at a wall using the terminal box adapter. The small holes (*see Fig. 1.2 / pg. 1-3*) in the terminal box adapter are reserved for wall installation.

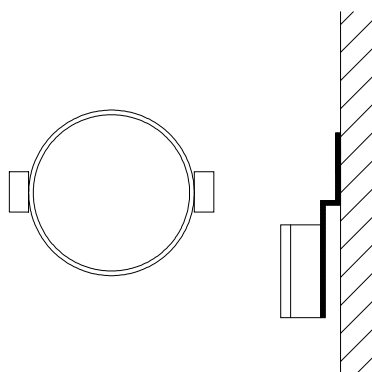


Fig. 1.29 horizontal duct

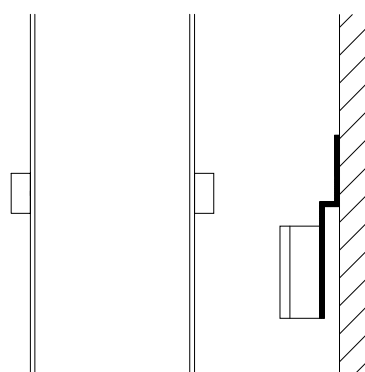


Fig. 1.30 vertical duct



Spark Extinguishment System BS 7

Spark Switch Terminal Box KKS 1/8

GreCon, Inc.

15875 SW 74th Avenue
Tigard, OR 97224

Telephone: 503/641-7731
Fax: 503/641-7508

Imprint

© GreCon
Technical Documentation
All rights reserved

Edition: 2-02
Subject to technical modifications.

Table of Contents

Basic information on the Spark Switch Terminal Box KKS 1/8	3
Overview of functions	3
Versions available	4
Technical Data	4
Spark Switch Terminal Box KKS 1/8 with mounting plate	5
Setting the jumpers	6
Important information on the connecting of the spark sensors	6
How to connect two spark sensors FM 1/8, FM 3/8	7
Trouble shooting and elimination of troubles	8

Basic information on the Spark Switch Terminal Box KKS 1/8

Overview of functions

Conversion of alarm and trouble signals

In systems that do not use a control console the Spark Switch Terminal Box KKS 1/8 effects the conversion of alarm and trouble signals emitted by the sensors. One or two spark sensors FM 1/8 or FM 3/8, daylight sensors DLD 1/8 A or DLD 1/8 as well as heat sensors TM 1/8 or smoke sensors IR 1/8 may be connected to the KKS 1/8. In the Spark Switch Terminal Box KKS 1/8 the signals are converted to potential-free relay contacts to which the customer may connect alarm and trouble reactions.

The Spark Switch Terminal Box KKS 1/8 is mounted close to the sensors which are connected to the terminal box by means of a pre-fabricated cable.

Test of Function

The Spark Switch Terminal Box KKS 1/8 monitors the sensors for short and open circuits as well as for an excessive temperature. An automatic sensor test is also carried out.

Trouble

A trouble indication can be caused by a short or open circuit of the pre-fabricated cable, a failure of the supply voltage, temperature rise in the terminal box KKS 1/8 or by a failed sensor test.



Notice:

There will also be a trouble message if the number of sensors detected is not identical to the number of sensors set. The number of sensors connected is set by means of jumper BR1 (see also p. 6 "Setting the jumpers").

In case of a fault the trouble relay becomes relaxed. During trouble-free operation the relay is energized.

After the trouble has been eliminated the trouble relay is reset by interrupting and subsequently reapplying the voltage supply for the terminal box KKS 1/8.

For further notes on trouble shooting in case of a trouble see p. 13f.

Alarm

In case one of the sensors detects a spark, a temperature rise or smoke the alarm relay becomes energized. During normal operation the relay is relaxed. Depending on the position of jumper BR2 the relay is either reset by interrupting the voltage supply for the terminal box KKS 1/8 or is reset automatically two seconds after the last alarm message (see also p. 6 "Setting the jumpers").

Versions available

Three different versions of the Spark Switch Terminal Box KKS 1/8 are available:

- ☐ without power supply unit (if a 24 V DC power supply is available) and without terminal resistors at the alarm relay
- ☐ without power supply unit (if 24 V DC power supply is available) and with terminal resistors at the alarm relay
- ☐ with power supply unit (if 100 V AC to 240 V AC power supply is available) and without terminal resistors at the alarm relay

Technical Data

Supply voltage: 100 - 240 V AC 50 / 60 Hz
24 V DC \pm 10%

Input current: 100 mA

max. load on the
potential-free contacts: 5 A / 30 V DC
2 A / 250 V AC

Ambient temperature: -13°F to +140°F

Casing (Protection): IP 65



Caution !

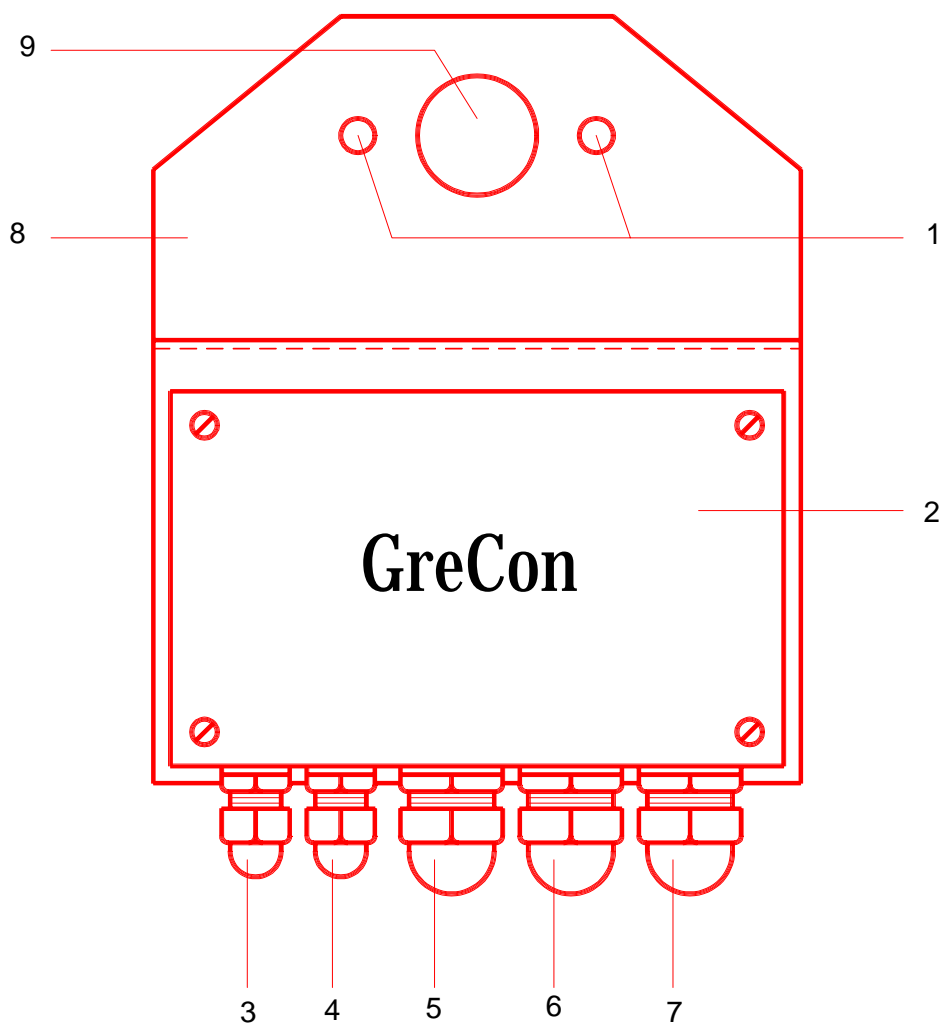
During the start-up procedure **two dry-units** are to be put in the Spark Switch Terminal Box KKS 1/8.

Whenever the Terminal Box is opened the dry-units have to be checked and replaced in case they are not completely functional any more.

Spark Switch Terminal Box KKS 1/8 with mounting plate


Notice:

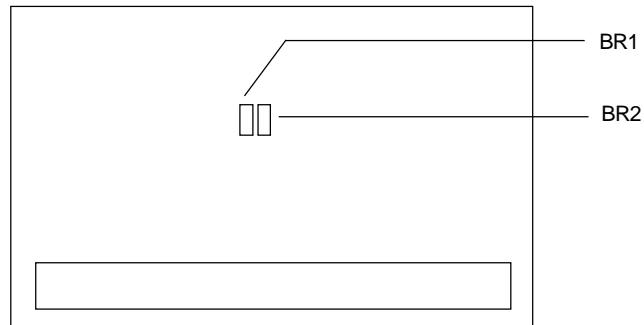
For instructions on how to mount the spark sensors see "Mounting instructions Sensors and Extinguishment devices".



- 1 Holes for wall-mounting the terminal box
- 2 Terminal Box KKS 1/8
- 3 Cable gland 1st sensor
- 4 Cable gland 2nd sensor
- 5 Cable gland alarm relay
- 6 Cable gland trouble relay
- 7 Cable gland power supply
- 8 Mounting plate
- 9 Hole for the sensor lens when duct-mounting the terminal box

Setting the jumpers

Position of the jumpers on the main circuit board of the KKS 1/8:



Setting jumper BR1

(determines the number of sensors):

BR1 open = 1 sensor (12V)

BR1 made = 2 sensors (12V and 24V)

Setting jumper BR2

(determines the alarm reset):

BR2 open = automatic reset after 2 seconds

BR2 made = alarm relay remains energized until supply voltage is interrupted

Important information on the connecting of the spark sensors



Notice:

The spark sensors **FM 1/8** and **FM 3/8** are connected to the terminal box KKS 1/8 by means of a pre-fabricated cable. The wires of this cable are designated "1", "2" and "3".

Sensor 12 V:

Wire "1"	⇒	A (Test)
Wire "2"	⇒	B (GND)
Wire "3"	⇒	C (+ 20 V)

Sensor 24 V:

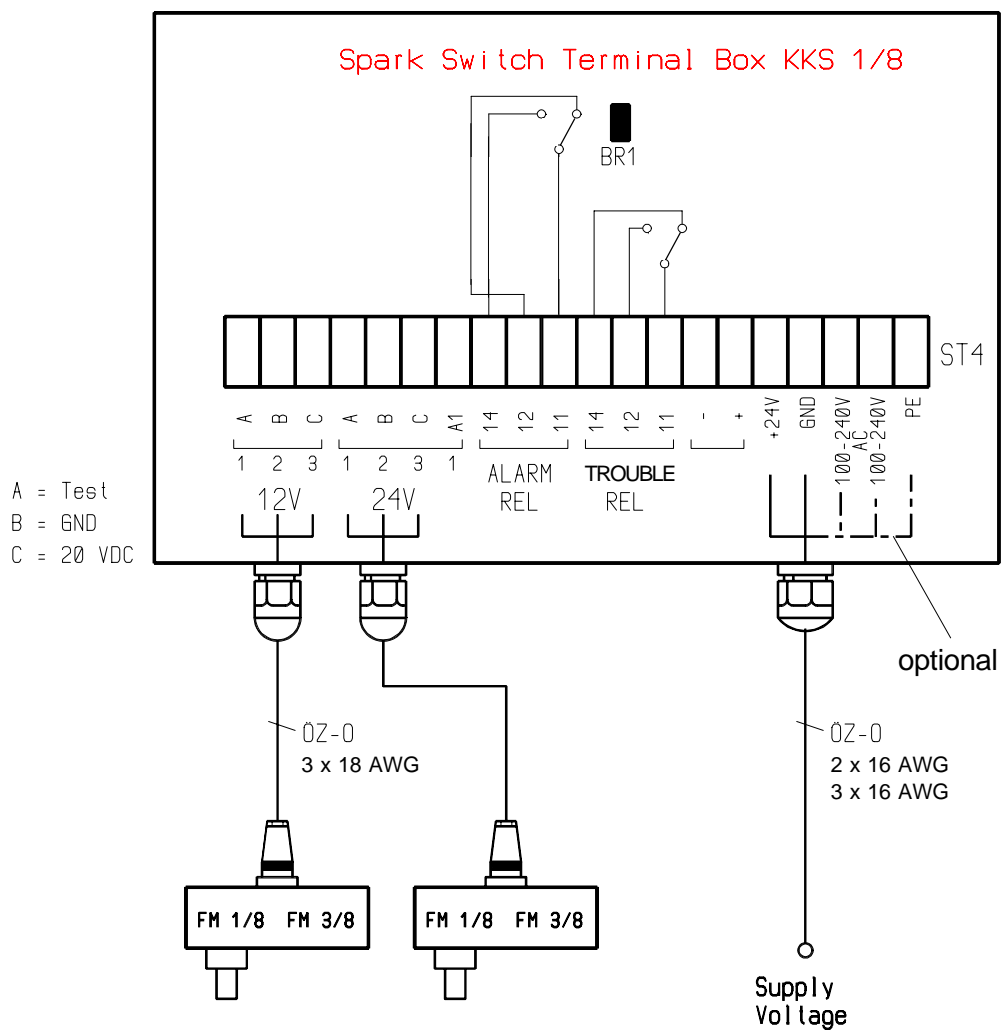
Wire "1"	⇒	A (Test)
Wire "2"	⇒	B (GND)
Wire "3"	⇒	C (+ 20 V)

How to connect two spark sensors FM 1/8, FM 3/8



Caution !

- Jumper BR1 has to be made.



Trouble shooting and elimination of troubles



Notice:

We recommend that you proceed according to the following order when checking the cause of the trouble:

1. Check the supply voltage
2. Check the temperature inside the casing
3. Check the number of sensors set
4. Check the wiring to the sensors
5. Carry out a sensor test

Check the supply voltage

- ☐ The green LED in terminal box KKS 1/8 has to be lit.

If the green LED is not lit even though a voltage of 100 - 240 VAC or +24 VDC/GND is available across the terminals, the terminal box KKS 1/8 has to be sent to the address given on the second cover page for repairing.

Check the temperature inside the casing

- ☐ If the temperature is more than 140°F because of a high ambient temperature there will be a trouble message.
- Provide for cooling or move sensors to a cooler position.



Caution !

If the terminal box KKS 1/8 is exposed to temperatures exceeding 160°F, it is likely that components will be damaged and correct functioning permanently impaired.

Check the number of sensors set

- ☐ If the number of sensors set by means of the jumper BR2 does not correspond to the number of sensors actually connected there will be a trouble message.
- Correct the setting accordingly. (*see also p. 6 "Setting the jumpers"*)

Check the wiring to the sensors

- A short or open circuit in the wiring of one or both of the sensors will result in a trouble message.
- Correct wiring or exchange cables.

Carry out a sensor test

- Interrupt the supply voltage for a moment.
- If the trouble occurs exactly 10 seconds (or 4, 8 or 12 hours as the automatic sensor test is effected every four hours) after the supply voltage has been reapplied at least one of the sensors is defective.
- Exchange the sensor(s) that is/are defective.

Resetting the trouble relay after the fault has been eliminated

After the fault has been eliminated reset the trouble relay by interrupting and subsequently reconnecting the supply voltage for the terminal box KKS 1/8.



Notice:

If the fault is not due to one of the causes indicated above please contact the GreCon service department. The address as well as the phone numbers can be found on the inside cover page.



Imperial Systems, Inc.
300 Imperial Drive
Jackson Center, PA 16133
Phone: 724-662-2801
Fax: 724-662-2803
www.isystemsweb.com