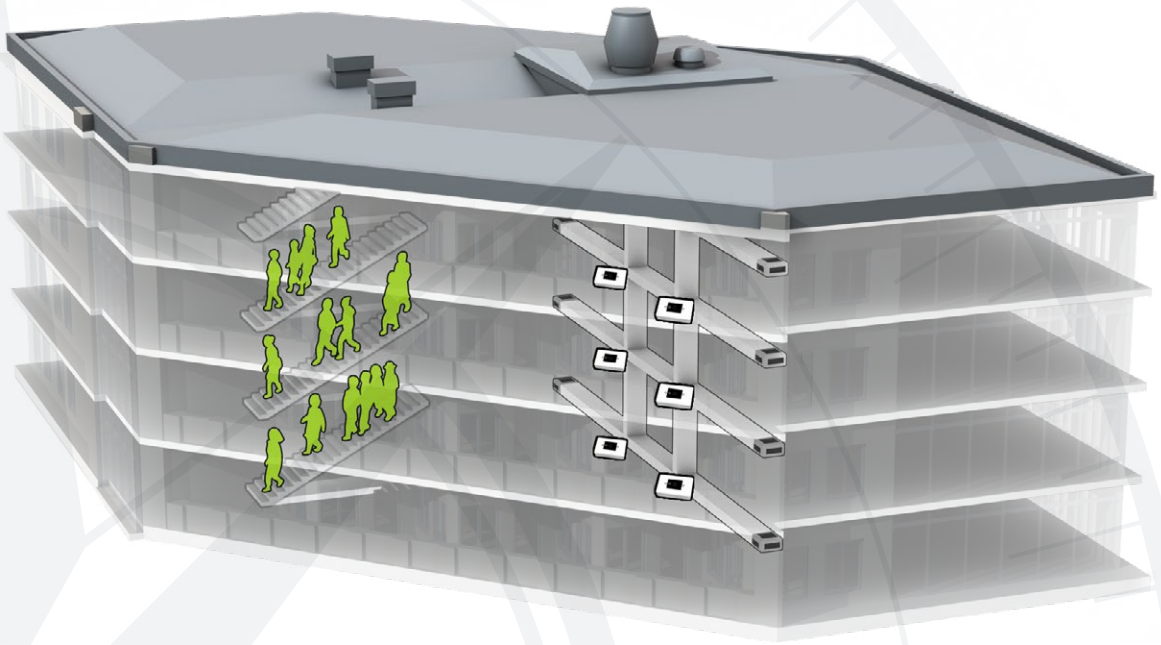
SMOKE CONTROL SYSTEM

A FLEXIBLE SYSTEM FOR

FIRE SAFETY IN VENTILATION

Installation guide for Smoke Control System



For more info - smokecontol.net

SIOX SOLUTIONS

CONTENT

1. PRODUCTS

SX:UNO / SX:DUO

Damper module for one (SX:UNO) or two (SX:DUO) smoke dampers.

Art.No. 8SC2-1:004 (SX:UNO)
8SC2:004 (SX:DUO)

SX:ACCESS

Advanced central unit controlling and monitoring up to 200 damper modules. Suitable for small, simple systems and complex systems with multiple fire cells.

Art.No. 8EX2:002

SX:NETLINK

Simple but powerful Ethernet gateway for SIOX loops, fully controlled from your higher-level system via MODBUS TCP.

Art.No. 6ES2

SX:ECHO

Bus amplifier module that also isolates incoming from outgoing SIOX. More information on page 10.

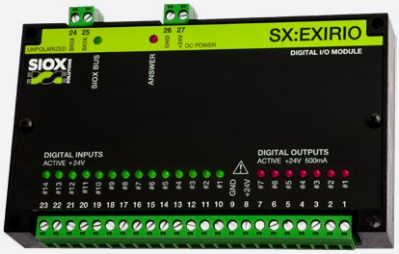
Art.No. 8R30:004

2. I/O MODULES

SX:IMPERIO TC

- 64 digital I/O, individually selectable
- Connection panal with terminals and LEDs
- Locally programmable (PLC)
- Supply 24VDC

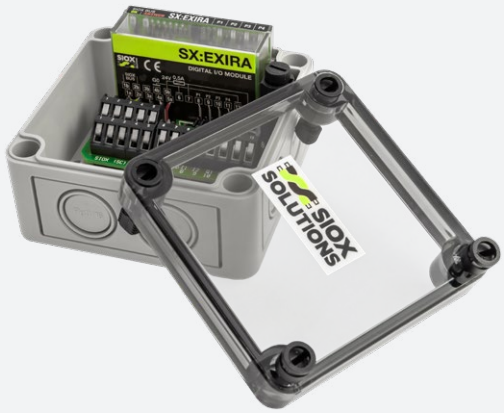
Art.No. 8S27:017



SX:EXIRIO

- 14 digital inputs and 7 digital outputs
- Locally programmable (PLC)
- Supply 24VDC

Art.No. 8S45:019



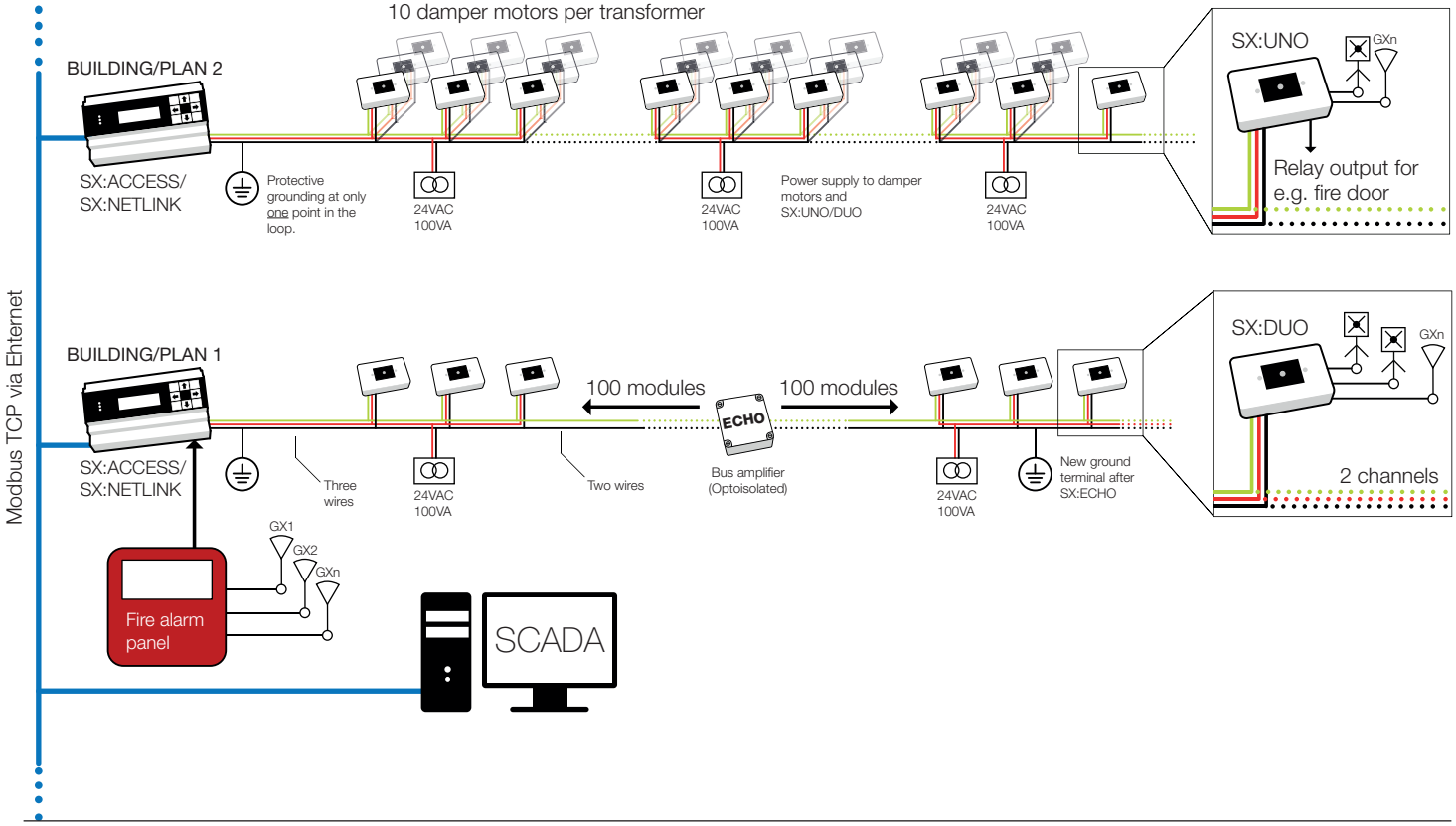
SX:EXIRA

- 4 digital I/O, individually selectable
- Locally programmable (PLC)

Art.No. 8SD1:004

Installation example:

Supervision of smoke alarms from a central fire alarm panel with individual control and supervision of up to 400 fire dampers



3. SYSTEM DESIGN

SX:UNO / SX:DUO - DAMPER MODULE

The damper module is available in two versions with one (SX:UNO) or two (SX:DUO) channels to control one or two dampers. Each module can be connected to one smoke detector and one temperature sensor. The module furthermore includes an alarm relay.

SX:ACCESS - CENTRAL UNIT

The central unit handles up to 200 damper modules and a total of 400 smoke dampers. It handles all system functions and can be monitored by a higher-level system via Ethernet and MODBUS TCP. The module has 4 digital inputs and 4 digital outputs for handling alarms, etc. In systems with more than 200 damper modules, more central units can be added to extend the system.

SX:NETLINK - ETHERNET GATEWAY

To control the entire system from a higher-level system instead, use SX:NETLINK, which acts as an interface between SIOX and the Ethernet and supports MODBUS TCP. The module also handles up to 200 damper modules, and more SX:NETLINKs can be added to expand the system for larger installations. The module includes 4 digital inputs for alarms.

SX:ECHO - BUS AMPLIFIER

If there are more than 100 damper modules in the loop or if the cabling is very long (>500m, 1.5 mm^2), an SX:ECHO is required as a bus amplifier. This module also optoisolates the bus, incoming from outgoing SIOX.

I/O MODULES

To integrate a large number of alarm points or to control other functions, a range of different I/O modules can be added to the system.

DID YOU KNOW

Some DUC products, e.g. SAIA and Larmia, include SIOX drivers to facilitate direct communication with our products!

4. BASIC FUNCTIONS

ALARM

A fire alarm can be triggered by:

- Smoke detectors or temperature sensors directly connected to damper modules.
- Failing or disconnected smoke or temperature sensors.
- Direct input to SX:ACCESS central unit from central fire alarm.
- External alarms connected to I/O modules.
- "Watchdog" triggered by an extended communication failure.

All damper modules are programmed with a standard software for alarm detection, damper control, supervision and monitoring.

FUNCTION TESTING

Function testing can be initiated as follows:

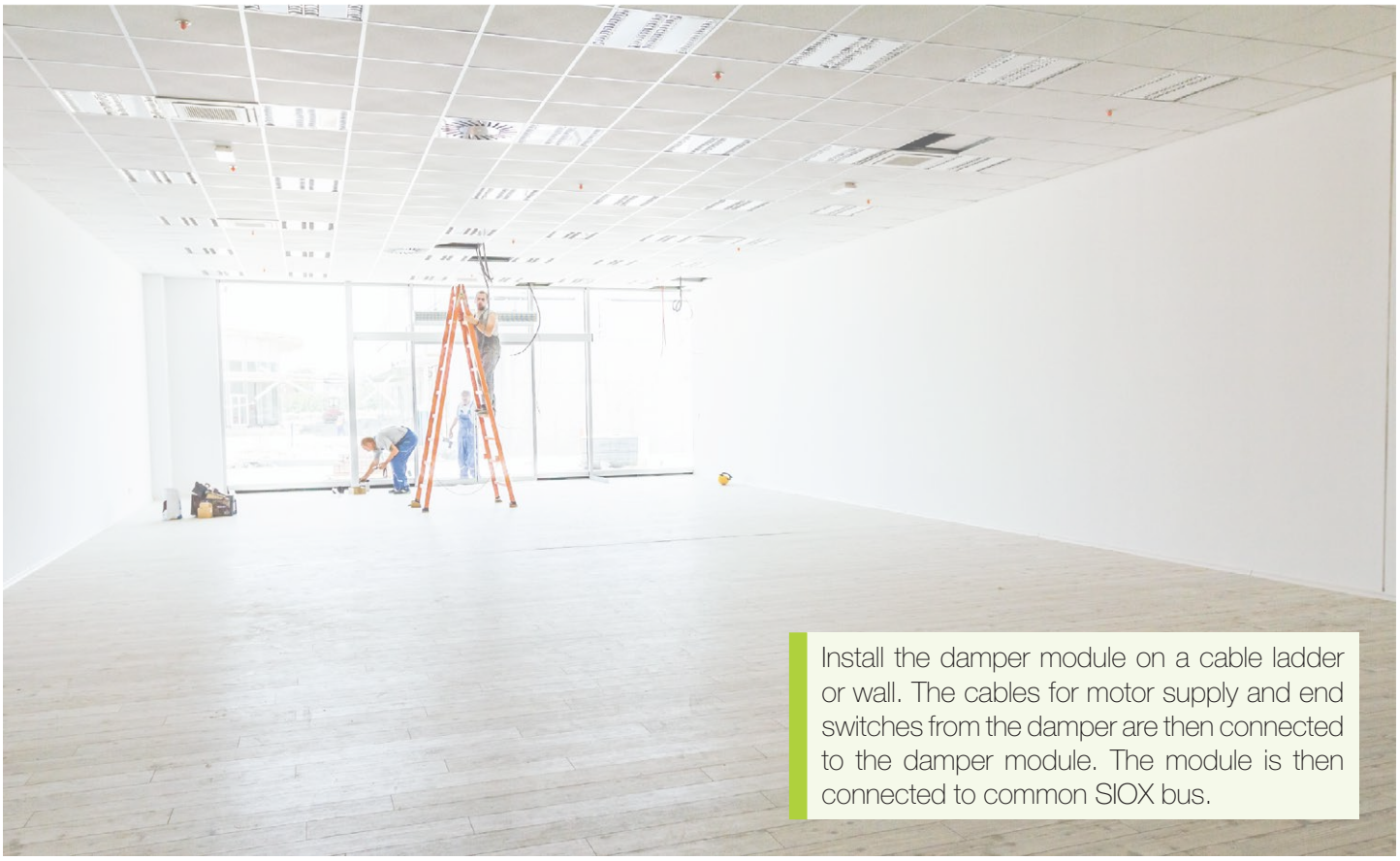
- From the button on the damper module
- Configurable time intervals per fire cell
- Controlled from the SX:ACCESS central unit
- Controlled from the higher-level system via SX:NETLINK or SX:ACCESS

In MODBUS TCP you can select function testing for one damper, a group of dampers or all dampers in the system.

DID YOU KNOW

Our damper modules can also handle regulating dampers.

5. INSTALLATION



Install the damper module on a cable ladder or wall. The cables for motor supply and end switches from the damper are then connected to the damper module. The module is then connected to common SIOX bus.

6. CABLE SELECTION

A common three-wire bus cable for supply and communication connects the controllers in the system.

Our recommendation is to use 100 meters of 3 x 1.5 mm² cable for each 100VA transformer and 10 dampers. So before the limit of 100 metres or 10 damper motors is reached, the power supply should be split in order to drive a new transformer. See example on next page.

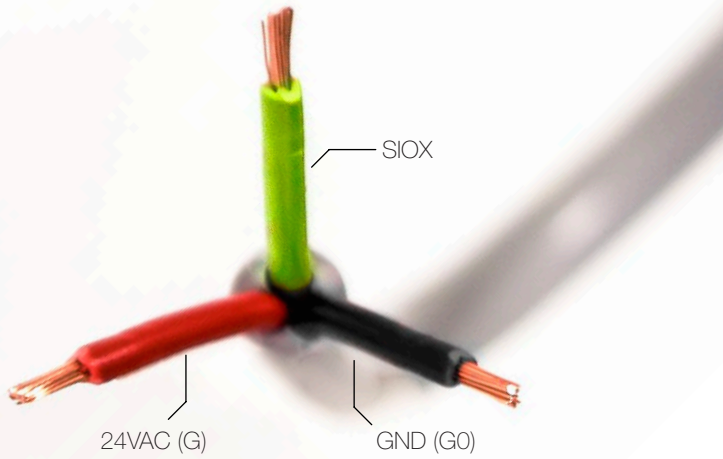
Our customers sometimes use EKK for installation. For distances above 500 m, an SX:ECHO bus amplifier is needed. More info about this on page 11.

INFORMATION

1 mm² cable may be used if necessary. In this case, however, the power supply must be split after 60 metres or 10 damper motors. Tip: ELQRB 3x1

NOTE!

Shielded cable should not be used! This would reduce the possible cable length by two thirds. More info about this on page 11.

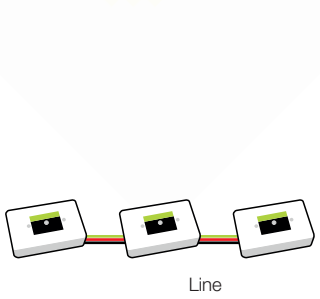


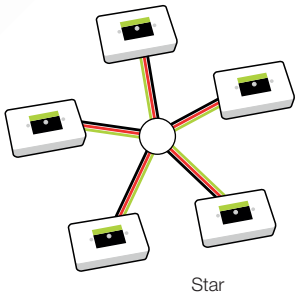
7. TOPOLOGIES

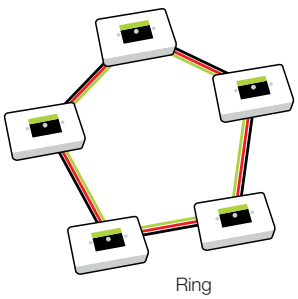
One of the main benefits of the SIOX bus is that it supports all topologies. Provided you keep track of the power supply as described above, and the overall cable length does not exceed 500m, you can choose and combine any topologies.

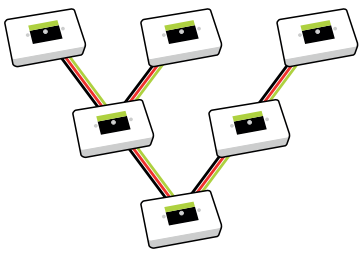
- Line
- Star
- Ring
- Tree

The system never requires a branching product or similar device. Branching is possible directly from a terminal or junction box.





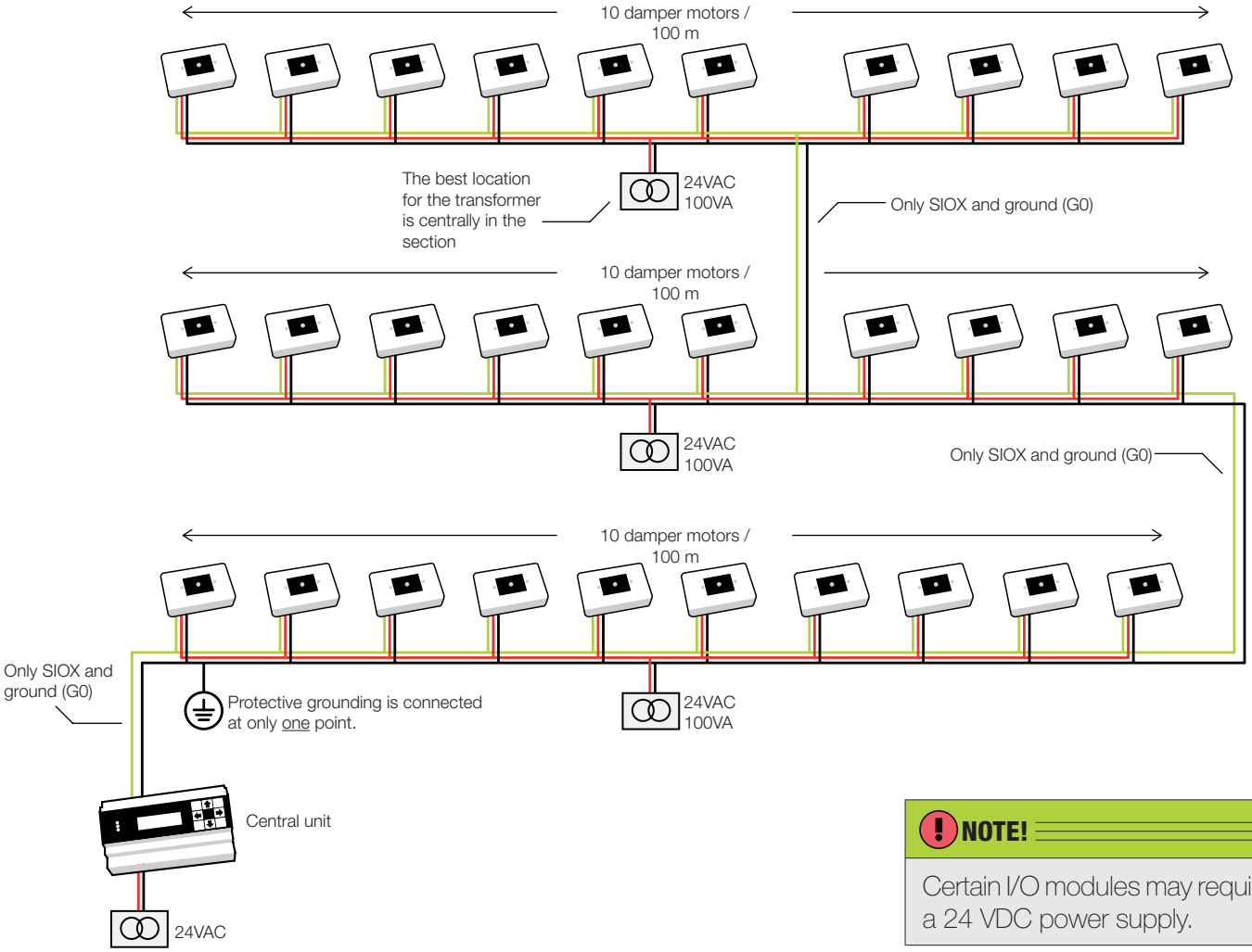




8. POWER SUPPLY

The damper modules are designed for damper motors with a 24 VAC/DC power supply. We strongly recommend using one 100 VA transformer per 10 damper motors and 100 metres of cable.

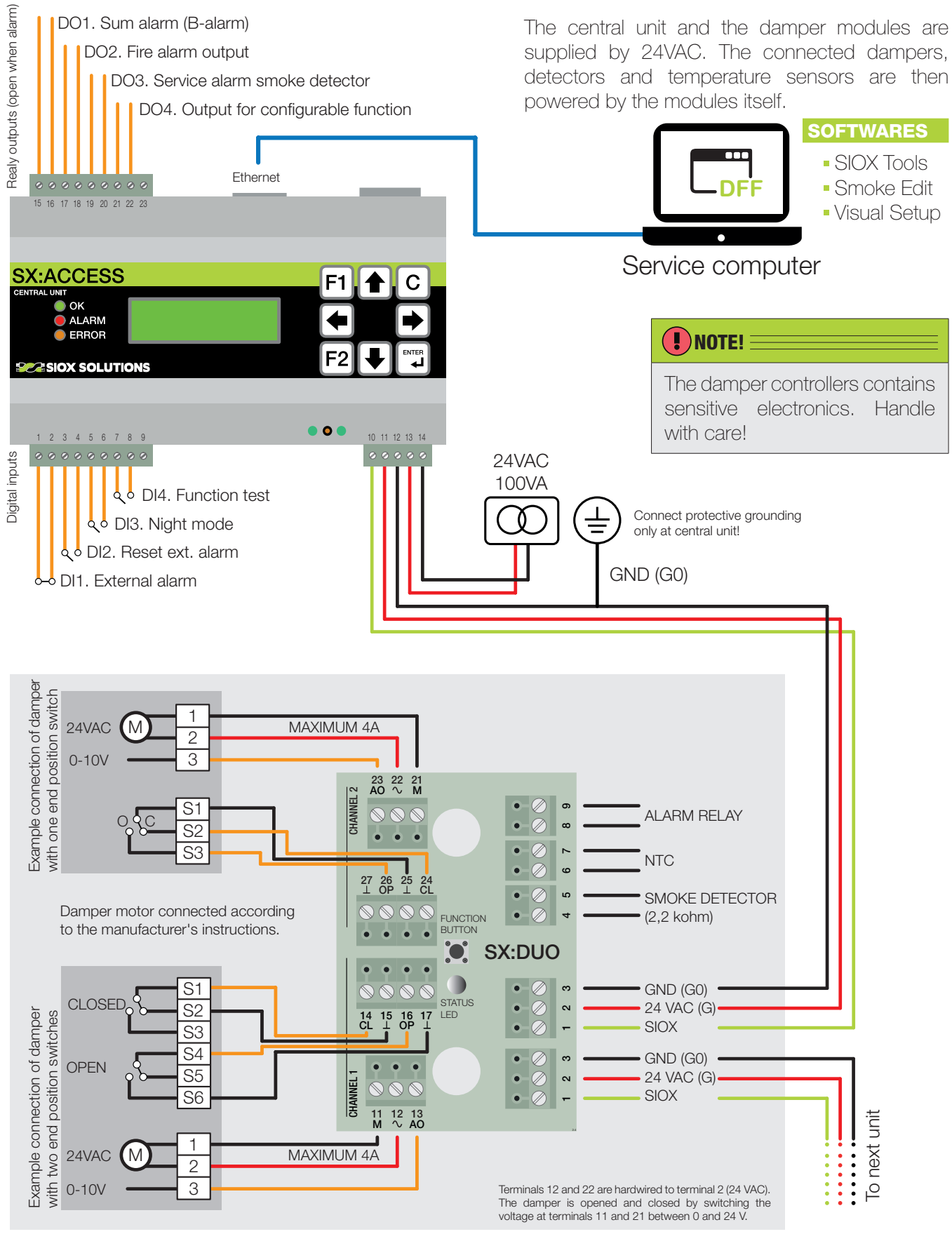
Locate the transformer as centrally in the section as possible. Only SIOX and ground (G0) must be connected between sections with separate power supplies.



NOTE!

Certain I/O modules may require a 24 VDC power supply.

9.1. CONNECTION - SX:ACCESS & DUO



The central unit and the damper modules are supplied by 24VAC. The connected dampers, detectors and temperature sensors are then powered by the modules itself.

Service computer

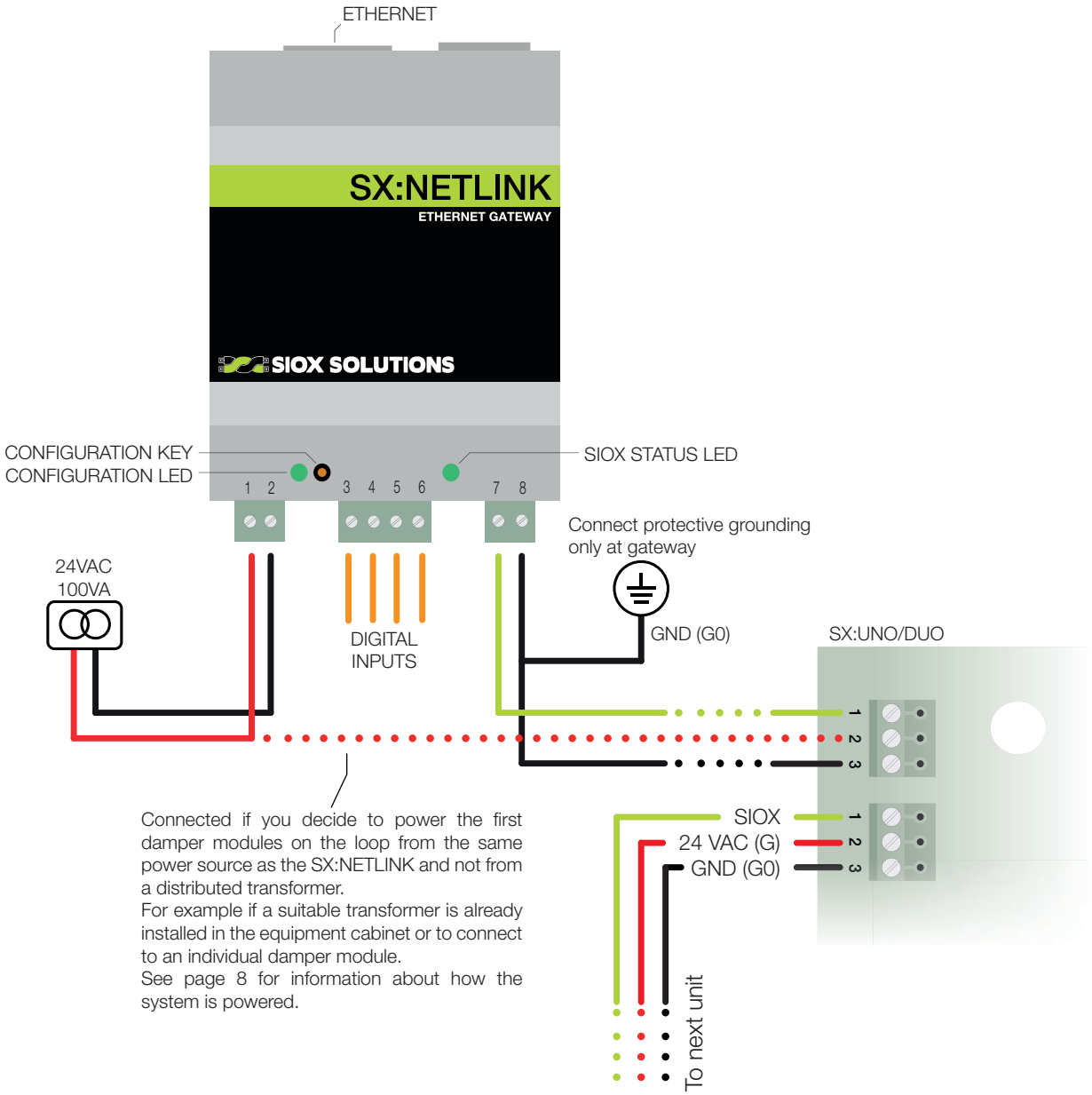
SOFTWARES

- SIOX Tools
- Smoke Edit
- Visual Setup

NOTE!

The damper controllers contains sensitive electronics. Handle with care!

9.2. CONNECTION - SX:NETLINK



Connected if you decide to power the first damper modules on the loop from the same power source as the SX:NETLINK and not from a distributed transformer.
For example if a suitable transformer is already installed in the equipment cabinet or to connect to an individual damper module.
See page 8 for information about how the system is powered.

10. BUS AMPLIFICATION

SX:ECHO

If the SIOX loop is over 500 metres long or if more than 100 damper motors are connected (assuming that 1.5 mm² cable has been used), signal amplification is necessary. SX:ECHO is the name of our bus amplifier, which also provides full isolation between the buses because the primary and secondary sides are optoisolated. The unit is powered from the secondary side.

WHEN IS BUS AMPLIFICATION NEEDED?

SX:ECHO is therefore needed if a loop either has:

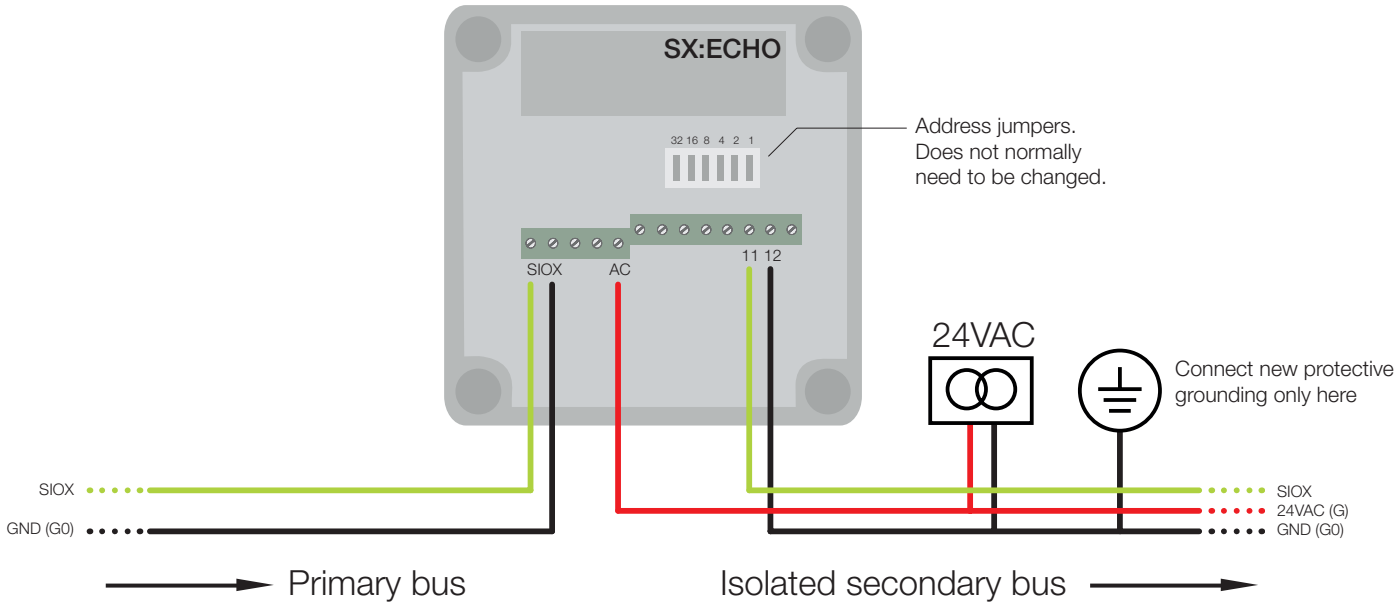
- More than 100 damper modules
- More than 500 meter cabel

NOTE!

If shielded cable has been used, SX:ECHO must be connected after just 200 metres. This is because the shielded cable produces slow edges on the SIOX bus.

TIP

For easy fault finding e.g. when the bus has become short-circuited, it may be smart to section an installation with several SX:ECHOs, typically one per floor.



11.1. COMMISSIONING - INTRODUCTION

INTRODUCTION

Smoke Control System commissioning differs depending on how the system is structured. Here are three examples of common configurations.

1. System with all damper modules in one fire cell
2. A more advanced system with the damper modules in more than one fire cell. Alarm points, I/Os, etc.
3. System entirely controlled from the customer's higher-level system

1 The SX:ACCESS central unit is used as a master unit in the SIOX loop in the first example. It works as a standalone unit and does not need to be connected to a higher-level system after commissioning.

2 SX:ACCESS is also used in the second example. In this case, however, a configuration needs to be created using our PC software SMOKE EDIT. The configuration is then downloaded to the unit.

3 In the third example, our SX:NETLINK Ethernet Gateway is used as the master. The system is fully controlled from the customer's higher-level system via MODBUS TCP.

INFORMATION

We recommend always using a PC and SIOX TOOLS during commissioning. This makes it easier to keep track and to pinpoint possible faults.

WE CAN DO IT FOR YOU

Time is precious for just about everyone. That is why we offer preconfigured systems for purchase. We carry out damper module addressing and central unit programming, using the damper names, fire cells, function testing schedule and alarm management, etc. specified by you. Contact us for more information (see the next page).

11.2. COMMISSIONING - ADDRESSING

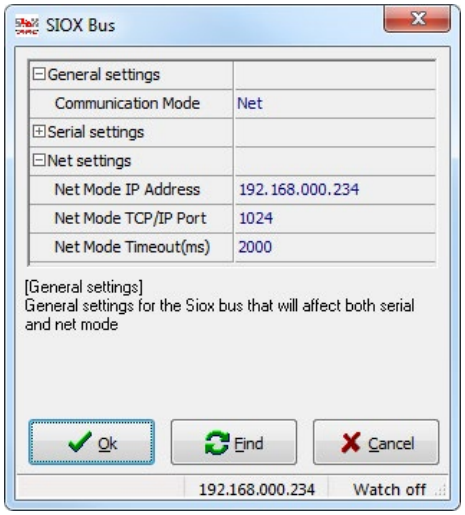
SIOX TOOLS

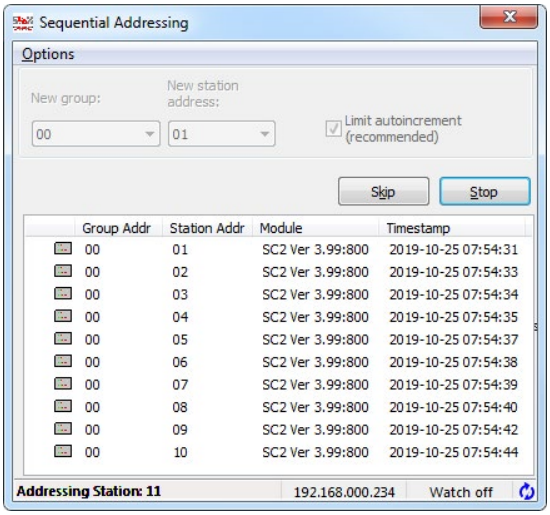
The first step in commissioning is to specify the addresses of all the damper modules. This is done using the “Sequential Addressing Tool”, which is part of the SIOX TOOLS PC software.
Download the software from sioxsolutions.se.
Press “Support” and “Software”.

- Download and install the SIOX Driver
- Download and install the SIOX Tools
- Start the SIOX Tools and click “SIOX BUS”. Next, choose Communication Mode and use the IP settings* shown in the next page.

INFORMATION

No access to a PC? Addressing is possible directly in SX:ACCESS using the menu. However, we still recommend using a PC and SIOX TOOLS. For more information about how to use the menu for addressing, see page 9 of the manual.
Scan the QR code for direct access.





** The default IP address is shown above. If you have changed the IP address of the master unit, select the new address.*

ADDRESSING

Once SIOX TOOLS is configured, you can start addressing. Connect the computer to the Ethernet port of the master unit. Now click "SEQUENTIAL ADDR".

A new window appears. This is where you select the start group and start address. Four start groups are available: 00, 61, 62 and 63. You will normally start with group 00. Choose a start address between 01-59 (normally 01). Press "Start". All damper modules in the system should now start flashing rapidly. See below.

LED flashing during sequential addressing

INFORMATION

If the damper modules do not start flashing when addressing starts, this is probably because communication between the PC and master unit is not set up correctly. If WIFI is switched on, switch it off and manually set an IP address on the PC. For example 192.168.0.10 (if the IP address of the master unit has not been changed). Now check that you can ping the IP address of the master unit.

Next, press the physical button on the first damper module. When you release the button, the module confirms that it has received the address by flashing green five times. SIOX TOOLS also confirms on a new line which address was received by the module plus a time stamp. The address that will be given to the next module appears at the bottom of the window. See the figure on the right above.

Keep checking SIOX TOOLS to ensure that the damper modules have been given their correct address, and continue until all modules are addressed. End the process by clicking "Stop".

WATCHDOG

The watchdog function must be enabled in all damper modules so they automatically switch to fire mode if there is a communication failure. If SX:ACCESS is used as the master unit, skip to "10.3 - COMMISSIONING - SX:ACCESS".

If you are using SX:NETLINK, however, it is configured last, along with the watchdog function and deactivation of the local function test. This is done manually in the damper modules using the DFF form. See page 16 for further instructions.

TIP

Take care to document the addresses and positions of the damper modules at the time the system is addressed.

11.3. COMMISSIONING - SX:ACCESS

- You can now choose from the following options

S1 One damper	(default setting)
LP S1	Alarm point + One damper
S1 S2	Two dampers
LP S1 S2	Alarm point + Two dampers
LP	Alarm point only

- Use the following controls

→	Scroll between options
↑ ↓	Move between the addresses
F1	Activate all damper modules and alarm points
F2	Deactivate all alarm points

- End with ENTER
- Press F2 and C to close service mode.

SIMPLE SYSTEM CONFIGURATION

After addressing, a "simple system configuration" can take place using the menu. The central unit generates a configuration by itself depending on the modules it finds in the loop. A simple system configuration is possible if all damper modules are in a single fire cell and they are addressed in sequence with 1 as the first address.

- Press F2 and ENTER to enter service mode
- Move down to **SIMPLE SYSTEM CONFIGURATION**
- Press ENTER.
- When **MODULES FOUND** appears, press ENTER
- **OK, CONFIGURATION FOR XX MODULES** appears. If the number is wrong, you can use ↑ and ↓ to scroll through the addresses to find the problem.
  KOM = Communication error
  DBL = Double addressing
- Press F2 and C to close service mode.

MODULE CONFIGURATION

If you want a damper module to operate an alarm point (smoke detector connected) or if you need to specify whether one or two dampers are connected (two dampers for SX:DUO only), a module configuration is necessary.

- Press F2 and ENTER to enter service mode
- Move down to **MODULE CONFIGURATION**
- Press ENTER.

INFORMATION

If a damper module is configured as an alarm point, all modules in the same fire cell will be activated if the smoke detector is triggered. A triggered smoke detector will always switch the module to local fire mode.

FUNCTION TEST SETTINGS

The damper modules automatically perform function testing on the dampers every 48 hours after they are switched on. If you want this to happen on a certain day or time, or if you only want the function test to be started from MODBUS communication or the digital input to SX:ACCESS, change the settings as follows.

- Press F2 and ENTER to enter service mode
- Move down to **FUNCTION TEST SETTINGS**
- Press ENTER.
- Use the ← → buttons to move between the days. Press ↓ to select a day.
- Set the time on the right
- To start the function test only from the digital input or MODBUS communication, choose "I".
- Confirm with ENTER or cancel with C
- Press F2 and C to close service mode.

DATE AND TIME SETTINGS

If the date and time settings are incorrect, the function test settings might not work properly.

- Press F2 and ENTER to enter service mode
- Move down to **SET DATE/TIME**
- Press ENTER.
- Press the ⬅ ➡ buttons to move the marker. Flashing values can be changed with ⬇ ⬆.
- Confirm with ENTER or cancel with C
- Press F2 and C to exit service mode

SERVICE MODE TIMEOUT

If the central unit is left in service mode, functions such as alarm, function test and fire will not work. A timeout can be set to automatically return to normal mode.

- Press F2 and ENTER to enter service mode
- Move down to **SET SERVICE MODE TIMEOUT**
- Press ENTER.
- Press ⬆ to select a number of hours. Press ⬇ to deactivate the function.
- Confirm with ENTER or cancel with C
- Press F2 and C to exit service mode

SETTING WATCHDOG

As described above, the watchdog function must be enabled in all damper modules so they automatically switch to fire mode if there is a communication failure.

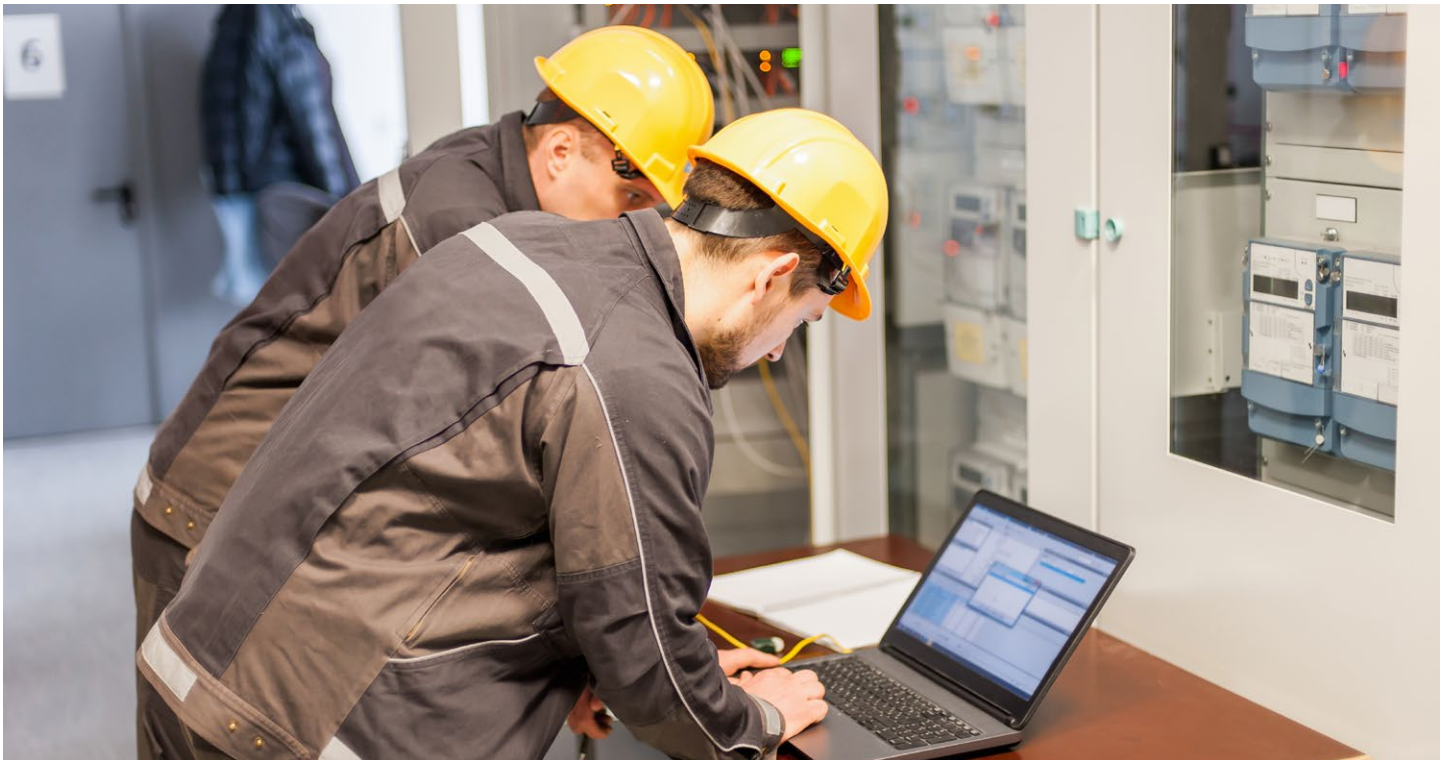
- Press F2 and ENTER to enter service mode
- Move down to **SET WATCHDOG**
- **Tc = X s** is the measured cycle time for communication to all modules in the loop.
- Use ⬆ ⬇ to set the time between 30 and 90 seconds. The time you set must be longer than one measured cycle time.
- Confirm with ENTER or cancel with C
- Press F2 and C to close service mode.

NOTE!

Don't forget to close service mode! F2 + C. Outgoing fire alarms are blocked in service mode and all dampers are open. The green “OK” LED means normal mode and indicates that service mode is inactive.

INFORMATION

For more detailed information, see the SX:ACCESS manual. It is available on our web site or directly via the QR code.



12. DFF FORM

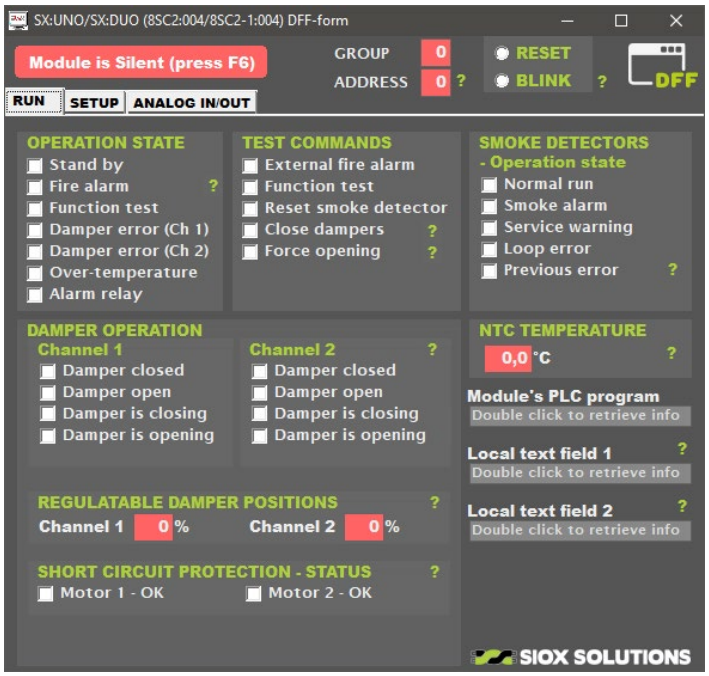
INTRODUCTION

A DFF form is an executable PC file, a window with access to information and options for a specific SIOX product. A DFF form can do different things but is normally used to present values and parameters and provide users with easy access to configuration options.

VISUAL SETUP

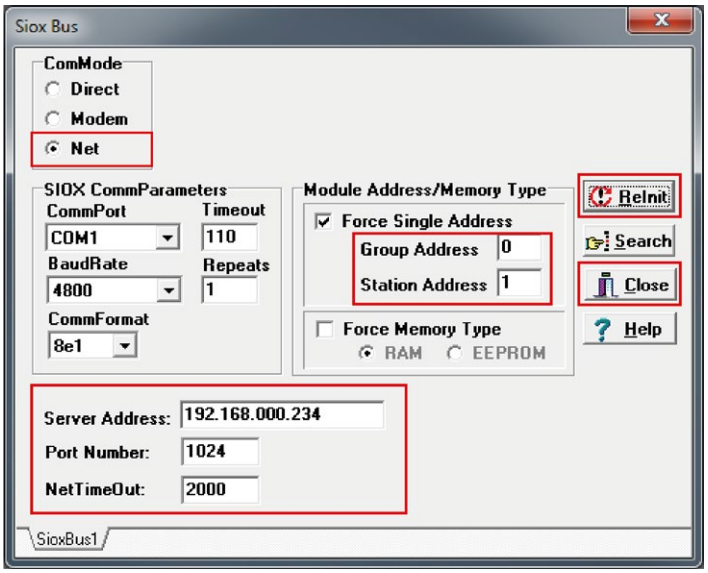
The actual DFF is just a simple file of a few KB with the file name extension .dff. Visual Setup must be installed to make the files executable or clickable.

- Go to sioxsolutions.se.
- Click Support and Software.
- Download and install Visual Setup.
- Any .dff file can now be executed.
- DFF forms are available for download from sioxsolutions.se/smokecontrolsystem.



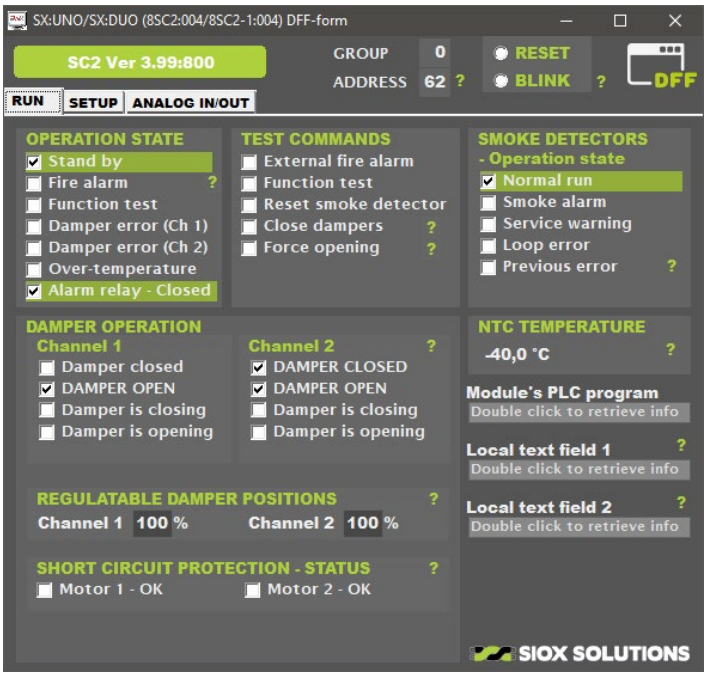
SETUP

When a DFF form is run, there is usually no contact with a module. Communication must be set up. Press **F6**, select **Net** in the **Com Mode** box, and enter the correct IP settings at the bottom. Now select the module you want to communicate with in the **Group Address** and **Station Address** boxes. Leave the other settings unchanged and click **ReInit** and **Close**.



EXAMPLE - SX:UNO / SX:DUO - FIRST TAB

The DFF form for SX:UNO / SX:DUO now appears. The first tab contains indicators for fire, function test, damper fault, etc. You can also see the current position of the damper, whether the damper is attempting to open or close, the motor output short circuit status, and you can run test commands such as fire alarm, forced opening and much more.

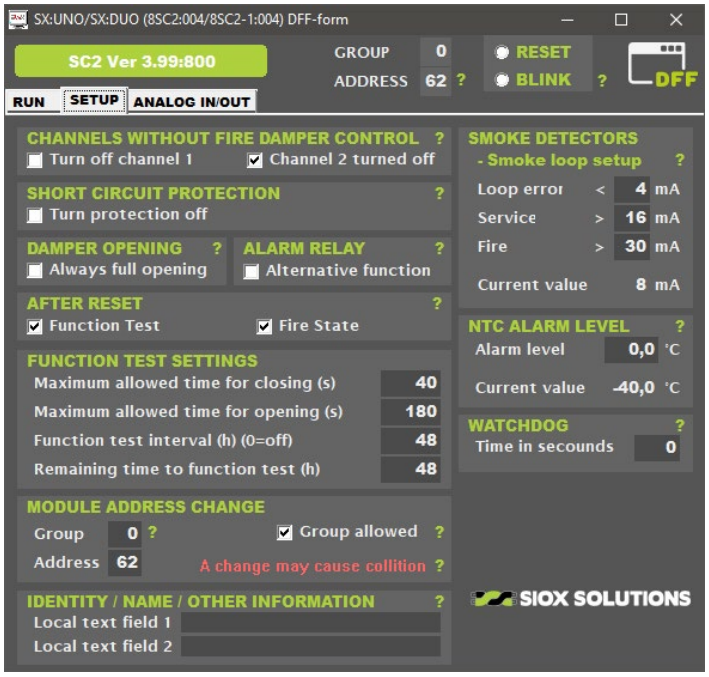


TIP

To find out more about an option, hover the mouse pointer over the green question mark.

EXAMPLE - SX:UNO / SX:DUO - SECOND TAB

The second tab allow you to switch off channels, to change function test variables, module addresses and smoke detector levels, and to set the watchdog function and much more.



NOTE!

If you are unsure, do not change any settings in the module. Incorrect settings can affect important functions.

LOCAL TEXT FIELD

There are three local text fields for the module, two of which are editable (see the bottom right of the figure on the previous page). The first is reserved for the PLC name in the module, but you can enter anything in the other two, up to 31 characters per field. You can enter the text at the bottom of the settings tab (see the figure on the left). This field is also searchable in SIOX TOOLS so you can search for modules with a particular string.

DEFAULT VALUE

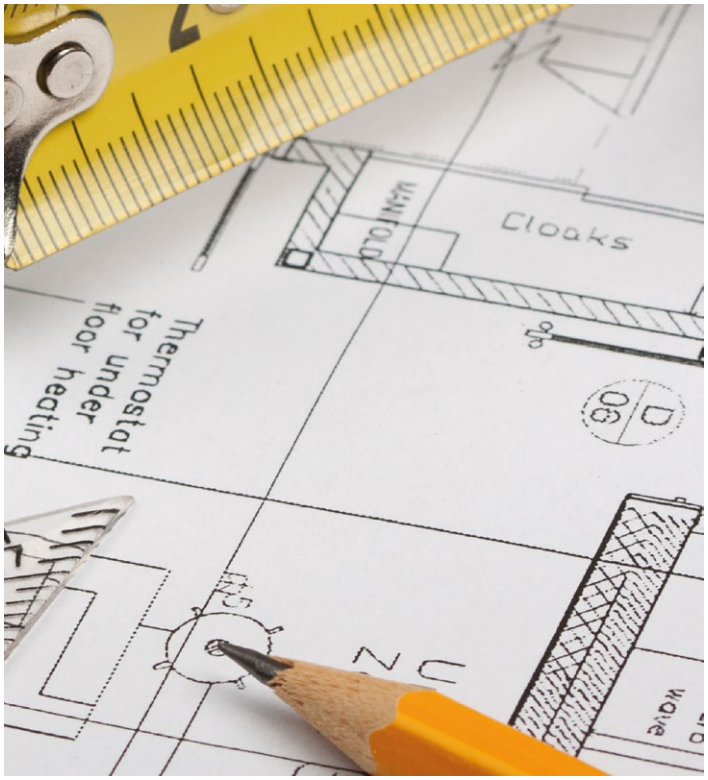
The figure on the left shows the default values for function test, smoke detector, NTC alarm and watchdog. 0 in the watchdog and NTC fields means that the function is switched off.

13. DIMENSIONS

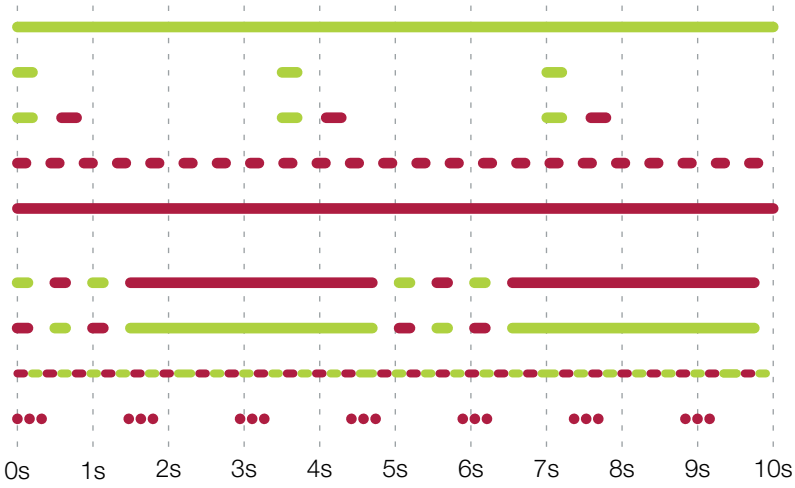
INFORMATION

For easier installation, the dimensions of our products in the system are presented below.

PRODUCT	DIMENSIONS
SX:ACCESS	160 X 105 X 58 mm
SX:NETLINK	71 X 108 X 58 mm
SX:UNO/DUO	122 X 80 X 40 mm
SX:ECHO	94 X 94 X 57 mm
SX:IMPERIO	140 X 81 X 25 mm
SX:EXIRIO	140 X 81 X 25 mm
SX:EXIRA	94 X 94 X 57 mm



14. SX:UNO/DUO - LED INDICATORS



Standby
Standby with communication
Standby with communication, watchdog not set
Fire
Damper fault / Motor short circuit / Service alarm in smoke detector / Button pressed
Function test - Damper closing
Function test - Damper opening
Flashing for identification
Sequential addressing taking place

The flashing sequences of the damper modules are shown above with their meaning.

15. TROUBLE SHOOTING

SYMPTOM	POSSIBLE CAUSES	ACTION
Damper modules or SX:ACCESS are completely dark	No power supply	Measure the voltage between the damper module ground and 24 VAC
Green SX LED off on SX:ACCESS or SX:NETLINK	SIOX bus short circuit	Remove the SX wire on SX:ACCESS and check that the LED goes on. Troubleshoot the SIOX wire. The voltage must be between 20 and 30 VAC.
Constant green light on some damper modules.	No communication with the damper module but the damper is working OK	Check that the SIOX wire is connected to all modules.
	The damper module is not included in the communication list of the central unit.	Start “Sequential Addressing” (without changing any addresses) and all damper modules should be called and start flashing red
	Cables too long	With very long cables (over 500 metres of 1.5 mm² cable), it may be necessary to add an SX:ECHO (bus amplifier). The voltage on the SIOX bus must be between 20 and 30 VAC (measured between GND and SIOX). Check that each bus section is connected to protective grounding at one point only, preferably at the central unit.
Constant red light on some damper modules	Damper fault / Motor short circuit / Service alarm in smoke detector / Button pressed	Check damper motor or whether damper is stuck. Press the button for the function test. Is the button stuck? If communication is working, run the DFF form to view the end position sensor statuses, the short circuit protection status and the smoke detector service alarm.
Red flashing on one or more damper modules.	Fire alarm	Check the smoke detector and temperature sensor connections. If communication is working, run the DFF form to view the sensor statuses and if necessary reset unused functions.

16. CONTACT

GOOD LUCK!

At SIOX Solutions we think it is very important that you, the customer, get the help you need. If there is anything you want to ask or are unsure about, or if you have any ideas, please do not hesitate to get in touch! You can call any time during office hours between 08:00 and 17:00 and you can also contact us by email.

CONTACT

Profcon AB, SIOX Solutions
Victor Hasselblads gata 9
S42131 VÄSTRA FRÖLUNDA
+46 031 - 40 30 60
support@siox.se