Addressable
Damper Control System
HMI User Manual

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1. Preface

1.1. Notices

This manual contains notices you have to observe to ensure occupant and personal safety, as well as to prevent damage to equipment and property.
Important notices relating to safety and the prevention of hazards are highlighted throughout the documentation by a caution safety symbol with a heading identifying the degree of risk. Read notices and instructions carefully, failure to take proper precautions may result in death or severe personal injury and equipment or property damage.

DANGER:
A notice with instructions or information to reduce the potential risk of death or severe personal injury and reduce potential risks in a life safety scenario.

CAUTION:
A notice with instructions or information to reduce the potential risk of irreversible equipment and/or property damage.

IMPORTANT NOTICE:
A notice with instructions or information to address issues not relating to damage or injury.

A quick reference showing the sequence of HMI icons for users to navigate to the section or command.

Access to the section or command is password protected.

The product/system described in this documentation should be operated by competent personnel in the operation of fire & smoke damper control systems in accordance with the relevant documentation and guidance.
The installation and maintenance of these products shall only be by personnel competent in the operation and knowledge of electrical equipment, in particular its warning notices and safety instructions. Competent personnel are those who, based on their training and experience, are qualified and capable of identifying risks and avoiding potential hazards when working with these systems.
Systems that are deemed complex and fall outside the standardized design model require the services of a suitably qualified and competent fire engineer. Commissioning of such systems will need to be undertaken by an approved or qualified person.

All life safety systems with fire engineered solutions are subject to approval with the local authority with jurisdiction.

2. Introduction

2.1. Damper Control System

All fire safety systems must be maintained to ensure the safety of building occupants under the Regulatory Reform (Fire Safety) Order. It is important to regularly test and maintain fire and smoke dampers, to prevent the spread of fire, and smoke control dampers as part of the building life safety requirements. The addressable damper control system provides an automated centralised solution to operate life safety functions and help building owners and facility management meet their obligations.

The damper control system can be configured for two types of systems, fire & smoke damper monitoring or smoke control.

The system manages the operation of motorised fire and smoke control dampers via addressable EV-100 series damper interface panels. The system interfaces with a fire detection system to deliver zonal and complex cause & effects including the operation of smoke extract fans.

Testing of dampers within large buildings can be onerous. The system reports the status and position of each connected damper via a graphical user interface for the responsible persons to monitor and act on as part of their maintenance routines. The EV-100 damper interface panels have an automatic self-test function that can be used as part of a scheduled maintenance routine reporting operation by monitoring position feedback signals.

2.2. Fire & Smoke Damper System

Fire & Smoke dampers are installed in ventilation systems to prevent the spread of fire and smoke. In normal conditions the dampers are normally open and have a fail-safe mechanism to automatically close in the event of a fire.

Each damper can be assigned to multiple fire zones to automatically close in accordance with the cause & effect operation. The control system has the facility to test each fire zone for maintenance purposes or override a zone in alarm for critical ventilation control.

2.3. Smoke Control System

Smoke control systems are used for smoke clearance in the event of a fire for occupants to escape and help protect the building. Dampers will automatically open or close in accordance with the cause & effect to create a smoke extraction path with a fresh air supply with smoke extract and supply fans operating at preset speed.

The system has a lockout facility preventing multiple fire zones operating at any time. The primary fire alarm takes priority with any secondary alarms ignored. The control system has an override facility to switch off the fans or change smoke clearance zones.

3. HMI User Interface

The HMI is the user interface to the damper control system and provides system information and functions such as:

- System status, alarms, faults, and events.
- Override control and reset of the system.
- Configuration and operational settings.
- Diagnostics and maintenance features.

The HMI is located on the front of the damper control panel or remotely for easy access and operation for maintenance activities. For smoke control applications the HMI should be located at the firefighter's entrance or command location to provide status for firefighters.

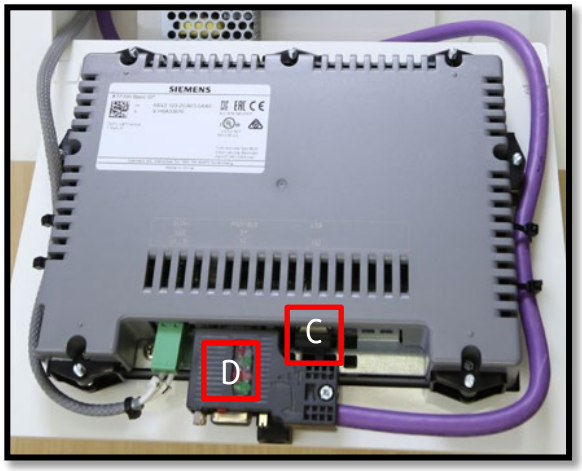
The HMI is a resistive type colour touch screen in landscape style. Operating the screen can be done by finger touch or by stylus/pointer.

A USB memory module is inserted at the rear of the HMI for storing event logs and backup files. To access the module for remote units, remove the screw located at the bottom of the bezel then open the hinged fascia door.

DANGER:
Risk of electrocution. Observe electrical safety procedures and check power supply has been isolated or disconnected safely before removing panel covers.

HMI User interface

HMI Rear



A.	Screen Buttons	User control for navigation and override commands. Activated by touching the icon or pressing the adjacent function button.
B.	Touch Display	Graphical display area of the system status. Additional user commands and inputs are indicated by 3D style touch buttons or icons.
C.	Memory Module	USB flash drive for storing event logs and backup files.
D.	Data Connector	Data communication connection adapter.

3.1. User Input

Command buttons on the touch screen are normally displayed in a 3D style or as an icon with a label. When prompted to enter a value, text or password a keypad will automatically pop up. The input range or limits are indicated by Max and Min values displayed above and below entry box. Enter the desired value and touch the RETURN key. Certain configuration inputs will have an option list to select from.

User input keypads

CAUTION:
Do not use hard pointed objects to operate the screen which may cause damage to the screen

3.2. Passwords

In normal conditions override & reset functions and system configuration require a password login to protect against tampering and unauthorised access. There are 3 different password levels. A login window will automatically pop up when requesting access or a command which is protected with a higher level than the current login level.
When the correct password is entered the associated user level will be appear in the User field within banner at the top of the screen. Unsuccessful entry will clear the User field and be recorded in the event log.

User Levels

User	Password	Logout Time	Permissions
ALARM	SMOKE	On Reset	Automatic login when alarm activated Allows override control and reset functions
OPERATOR	smoke	10 minutes	Allows override control and reset functions Access to service and system settings
ENGINEER	*******	10 minutes	Authorised engineer's access

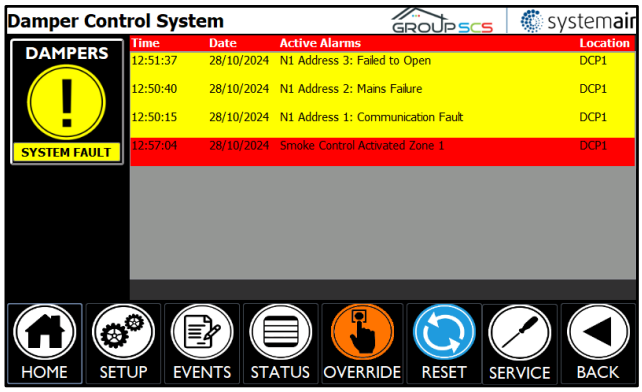
The user has an automatic logout after a period of inactivity or by a reset command.

4. Operation

4.1. Home Screen

The Home screen displays an overview of the current systems with their status and alarms.

The alarm view on the right displays the current critical alarms and faults with a time stamp when the event occurred. The location identifies which system the event was generated from.
Alarms are highlighted red.
Faults are highlighted yellow.
The history of alarms and events can be accessed by the EVENTS button.



Each system has a button indicating the current system state with an icon:

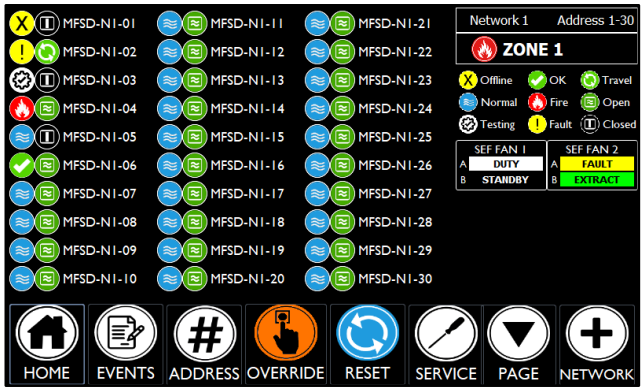
Table 1: System status

System healthy and in standby	Normal ventilation mode
Emergency condition active	In test mode
System fault active	

4.2. Status Screen

This screen shows the status of each damper located on the selected Network and Address range indicated at the top right of the screen with the primary fire zone activated.

Use the **PAGE** button to scroll to the next range of addresses.
Use the **NETWORK** button to view the next network of addresses.



Each EV-100 panel address is identified by its damper label shown in address order downwards left to right. Each damper has two icons indicating its status and position.

Table 2: Damper status

Damper Status (Icon 1)	Damper Position (Icon 2)
OK	Closed
Normal ventilation	Open
Emergency mode	Travelling
Self-test running	Unknown
Fault	
Offline	

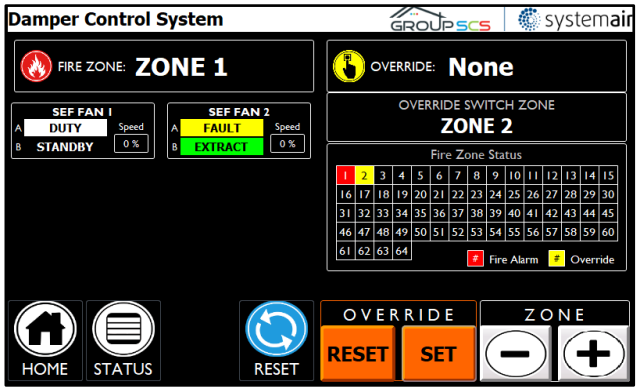
The status of each smoke fan set is indicated with the setpoint speed.

Table 3: Fan status

Fan State	Fan Condition
DUTY	Fan off and selected as the duty fan
STANDBY	Fan off and selected as the standby fan
EXTRACT	Fan running in extract (forward) direction
SUPPLY	Fan running in supply (reverse) direction
FULL SPEED	Fan running in fire-fighting or full speed
OFF	Fan in override off
FAULT	Fault present or fan failed to run

4.3. Override Screen

The override screen is automatically opened when a fire alarm condition is triggered.
It can be navigated to by pressing the OVERRIDE button from the overview screen.
In normal conditions override control is password protected. On a fire alarm condition the password protection is automatically removed.



This screen shows the status of fire zones and fans.
FIRE ZONE indicates the primary fire alarm activated.
OVERRIDE indicates the following for the type of system:

Fire & Smoke Damper System - The number of zones in override.
Smoke Control System - The zone in override.

Fire Zone Status indicates the status of each zone:
Zone in fire alarm # Zone in override

4.3.1. Override Control

Each fire zone can be overridden for fire-fighting purposes or maintenance activities.
Override control operates differently for the system types described below.

OVERRIDE SWITCH ZONE indicates the zone selected for override control. The selected zone can be changed by pressing the ZONE +/- buttons.
OVERRIDE SET button will set the override condition for the selected zone.
OVERRIDE RESET button will reset the override condition for the selected zone.

4.3.2. Override for Fire Damper Systems

Any zone can be selected and overridden at any time.
When setting an override to a zone in fire will reopen the dampers or return to their normal position.
In normal conditions, setting a zone in override will simulate an alarm condition and close the dampers.

An override reset will remove the override condition and return the dampers to their normal or alarm state.

4.3.3. Override for Smoke Control Systems

Only a single zone can be operating at any time for smoke clearance. When an override condition is activated the fire alarms signals are ignored.

Overriding a zone in fire will set an 'Override Off' condition closing all the dampers and switching off the fans. Selection of a different zone is enabled when in this state.
Selecting and setting a different zone in override will run the fire scenario for that zone.

An override reset when in an 'Override Off' state will return to the primary fire alarm scenario.
An override reset on a zone operating in override will return the system to the 'Override Off' state.

4.4. Reset

The system will automatically reset when all the fire alarm inputs return healthy.

To manually reset the system press **RESET** button. When the system is in a reset condition the icon will turn yellow. The reset process can take up to 60 seconds and during this period the vents will return to their normal positions and any alarms and override commands will be ignored.

If a fire alarm signal exists following a reset the system will activate the first fire alarm scenario.

5. Servicing & Maintenance

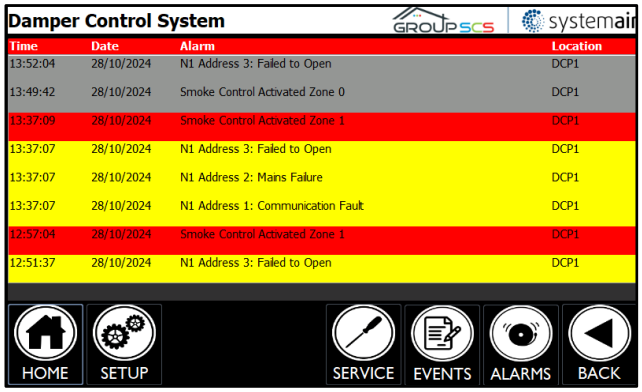
5.1. Event Logs

A history of events and alarms are logged and highlighted in a colour to identify its class.
The ALARMS button applies a filter to display critical alarm and faults only.

Table 4: Event status

RED	Emergency alarm event
YELLOW	Fault condition
BLUE	Daily ventilation event
GREEN	General operation event or change of state
WHITE	System event or error message
GREY	When the event has returned healthy, reset or deactivated

The logs are stored on a removable memory module with the last 10,000 events recorded. The last entry is always at the top of the list. Swipe your fingers up or down on the log screen to scroll through the entries. The time is 24 hour format displayed as hrs:min:sec and the date is displayed as day/month/year. Location references the main control panel the event was generated from.



IMPORTANT NOTICE:
Removal of the memory module will stop log recording and disable viewing of the alarm and event history.

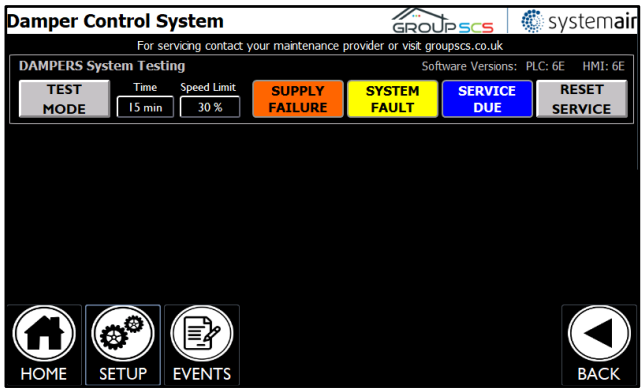
IMPORTANT NOTICE:
Event date & time are referenced to the system time set. Please check the system time is correct for accurate logging.

5.2. Servicing

The servicing screen provides a snapshot of the system's health with access to diagnostic features. The software versions need to match or be compatible.

Three indicators display general system health:

SUPPLY indicates the primary mains power supply state.
SYSTEM indicates when a system fault is present.
SERVICE indicates if a service is due or when the system requires maintenance.



5.3. Service Reminder

RESET SERVICE

A service reminder timer can be reset on completion of a service or routine inspection. The timer is set for 12 months and when it expires the system will indicate a fault and the SERVICE DUE alarm will activate.

IMPORTANT NOTICE:
Ensure the system time is set correctly before completing a service.
It is important for the date and time to be correct for logs and servicing activities.

5.4. Test Mode

TEST MODE

The system can be set into a test mode for isolated test activities. Test mode will limit the fan speeds to minimise disruption during routine tests and maintenance checks.

Adjust the test time and fan speed limit as required before activating test mode.
The button will flash yellow when test mode is enabled.

In test mode, the fan firemode and bypass functions are disabled to operate the fans with full motor protection by the inverters. The alarm & fault output signals are also disabled.

After the test time has expired the system will automatically perform a full system reset and return to normal operation. Test mode is automatically cancelled on a system or alarm reset.

5.5. Address Diagnostics

Diagnostics for each damper interface panel can be viewed. The panel addresses are scrolled by using the ADDRESS (+) and (-) buttons or by touching and setting the address number. The address damper label is displayed for reference. Change the network by touching and setting the network number.

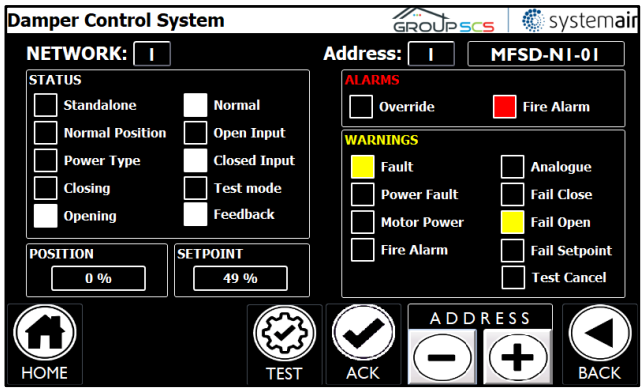


Table 5: Address status

ALARMS:

Override	Panel in an override condition
Fire Alarm	Panel in a fire alarm condition

WARNINGS:

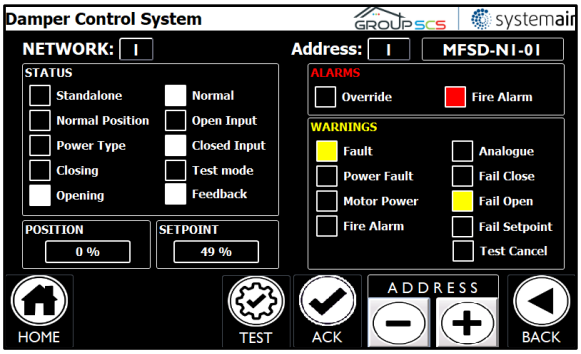
Fault	A general panel fault is present
Power Fault	Panel power supply failure
Motor Power	Motor output power supply fault
Fire Alarm	FAS alarm input in an alarm condition
Analogue	Analog position feedback out of range
Fail Close	Failed to close
Fail Open	Failed to open
Fail Setpoint	Failed to reach setpoint position
Test Cancel	Automatic test cancelled

STATUS:

Standalone	In standalone mode
Normal Position	Set to open in normal conditions
Power Type	Set to spring actuator type
Closing	Damper motor output is closing
Opening	Damper motor output is opening
Normal	Panel in normal state
Open Input	Open position feedback input state
Closed Input	Closed position feedback input state
Test mode	Automatic test sequence running
Feedback	Set for open & closed position input monitoring
Position	Analogue position feedback value
Setpoint	Normal position setpoint value

5.6. Automatic Damper Test

The automatic test function initiates the interface panel test sequence to check the damper operation. For a complete integrity check requires the position feedback signals to be connected and enabled. A test can only be performed whilst in a normal state. The test is immediately aborted when an alarm, override or lockout condition is activated.



The test sequence can be started locally at the damper interface panel or by a pressing the TEST button. A test can be cancelled with a reset command.

CAUTION:
A damper test will close the damper in normal conditions with the ventilation system running. A risk assessment should be done on the effect of closing the damper before running test sequences.

5.6.1. Test Sequence

The test will output the follow this sequence:

1. Drive the damper fully open
2. Drive the damper fully close
3. Return damper to normal position

For each step the feedback signals will be monitored. Failure to receive the correct feedback signals within the set time will report a fault.

5.6.2. Acknowledge Test Results

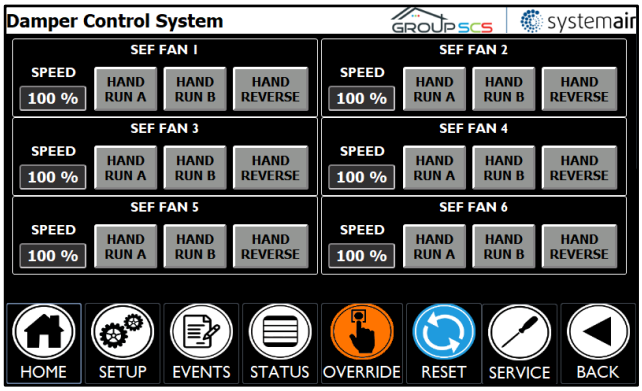
All test results are automatically cleared at the start of each test or on a reset command.
To acknowledge and manually reset failed test results press ACK button. Historic test results can be viewed in the event log.

5.7. Commissioning Tools

TEST MODE COMMISSION

5.7.1. Manual Fan Control

Hand control of the fans is available to assist with commissioning and testing activities. To enable the commands the system must be in test mode.



For manual control enter the desired fan speed and toggle the fan Start buttons to start/stop the selected fan. Toggle the Reverse button to change directions. The button will be highlighted when the hand command is activated.

The status of each fan is displayed and a failed to start condition can be reset to attempt a restart.

CAUTION:

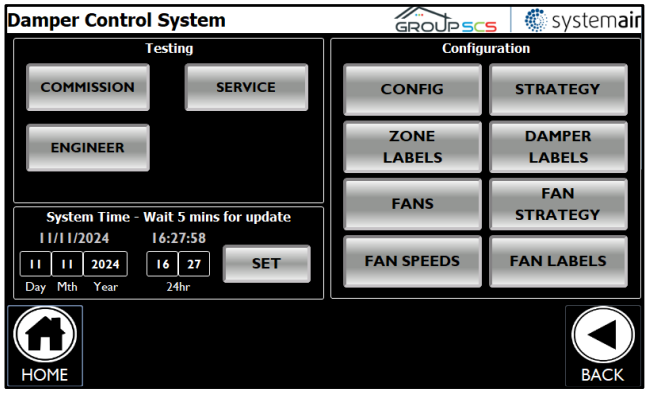
Starting fans in hand control will run fans without operation conditions in place. Measures should be taken to avoid running fans against a closed vents & dampers.

6. System Setup

DANGER:
Configuration shall be by a competent and qualified person with the system installed and operate in accordance with the fire strategy.

6.1. Setup Menu

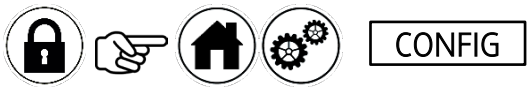
The setup menu provides access to system configuration settings and testing modes.



6.1.1. System time

To adjust the system clock, enter the desired date and time by touching the respective boxes. Press the **SET** button to apply the update. The actual system clock is displayed above the input boxes for reference.
Note: It can take up to 5 minutes to synchronise the displayed system time.

6.2. System Configuration

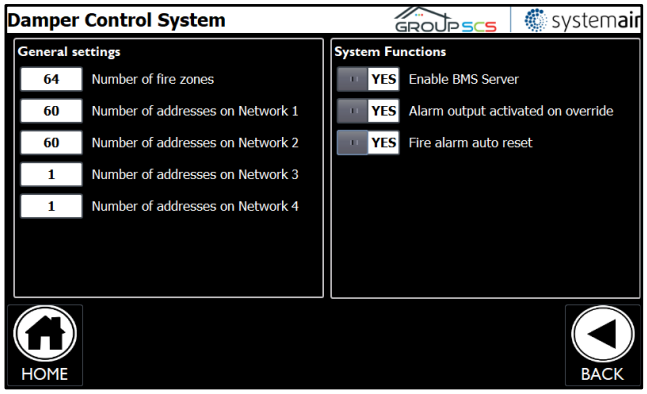


6.2.1. General Settings

The system to automatically start communicating to connected devices when adjusting general settings.

Number of fire zones
Adjust the number of fire alarm inputs connected.

Number of addresses on Network
Adjust the number of addresses or damper interface panels connected for each network installed.



6.2.2. System Functions

Smoke Control
Sets the system mode of operation
YES = Operates for smoke control functions
NO = Operates for fire & smoke dampers only

Enable BMS Server
Enable the connection to an EV-BMS option module for BMS/third-party systems interface.

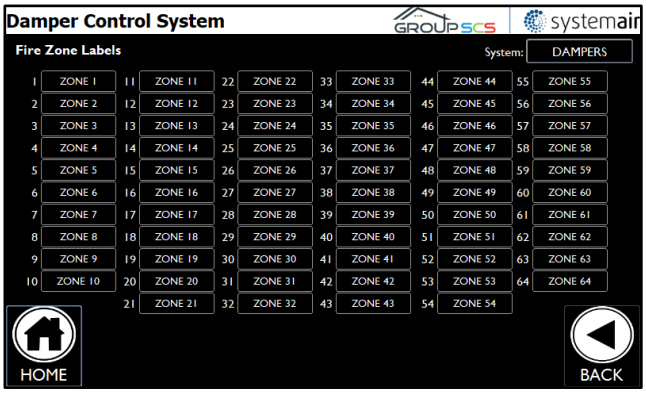
Alarm output activated on override
Behaviour of the main control panel alarm output contact signal for external interfaces.
YES = Signal operates when in a fire alarm and override conditions.
NO = Signal operates on a fire alarm input condition only.

Fire alarm auto reset
Enables an automatic reset when the fire alarm or smoke detection inputs returns healthy.
When disabled a manual reset is mandatory for every alarm condition.

Fire alarm input type
Sets the fire alarm input signal configuration
N/C = Fire alarm inputs are normally closed (break contact for alarm)
N/O = Fire alarm inputs are normally open (make contact for alarm)

6.2.3. Zone Labels

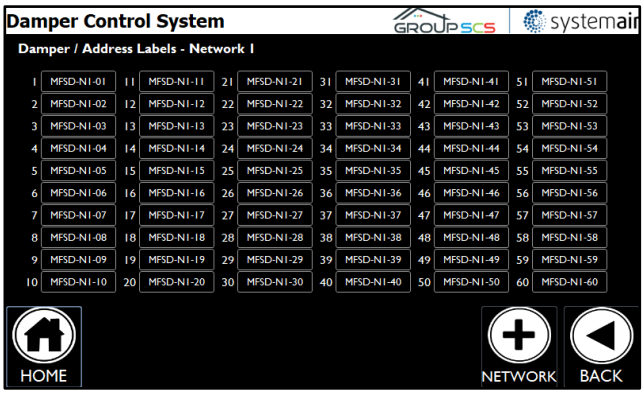
The system name and each fire zone label can be changed to easily identify its location or zone.



Touch the label to edit and enter a maximum of 12 characters including spaces with the pop-up keypad.

6.2.4. Damper Labels

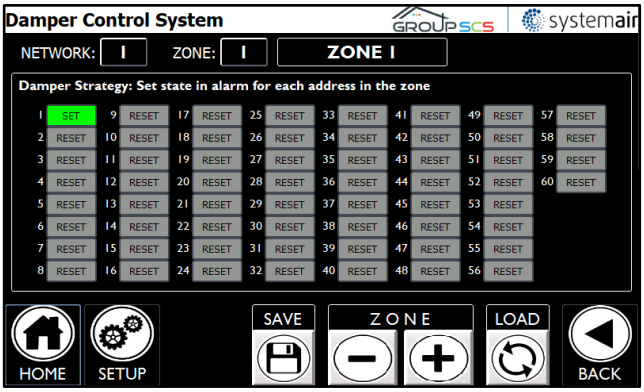
Each interface panel address name can be changed to easily identify the damper.

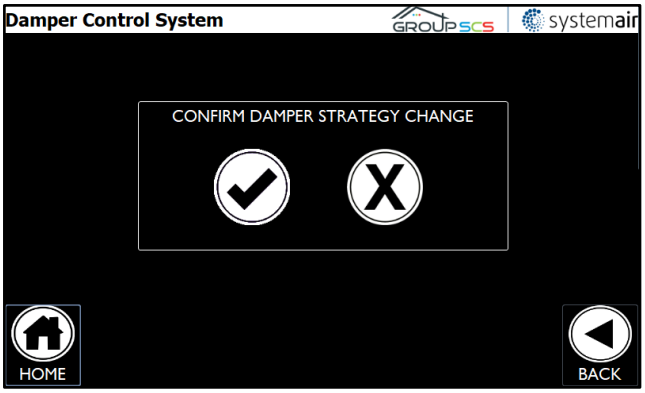


Touch the label to edit and enter a maximum of 12 characters including spaces with the pop-up keypad.
Scroll through the network addresses by pressing the **NETWORK** button

6.3. Strategy

The operation of each damper address must be applied to each fire zone it serves. Scroll through the fire zones for each network and set the state of each address in accordance with the fire strategy.



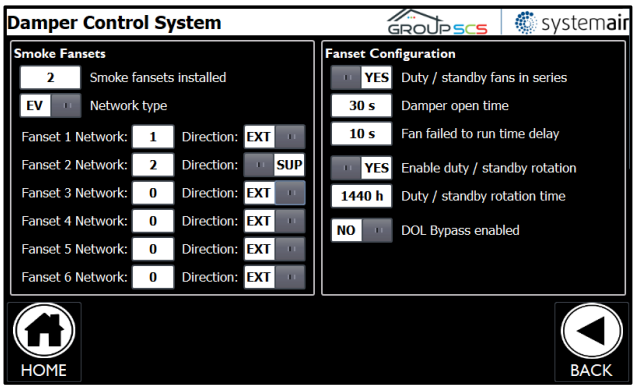


Always press **LOAD** first each time you change zones or networks to refresh the screen with the current saved configuration.

Touch to toggle the state. After making changes you must press **SAVE** and confirm to apply them.

6.4. Fan Configuration

Set the parameters for the smoke control fans.



6.4.1. Fanset Parameters

6.4.1.1. Smoke Fansets installed

Set the number of fansets installed. A combined duty & standby fan count as one fanset.

6.4.1.2. Network Type

(Applicable when remote fansets are connected)

Set the data link protocol between the master control panel and remote fan panels.

EV = Connected on the EV interface panel data network

IP = Connected by a LAN Ethernet network

6.4.1.3. Fanset Network

(Applicable when network type is set to EV)

Set the network the fanset is connected to.

6.4.1.4. Fanset Direction

Set the fanset direction:

EXT = Extract

SUP = Supply

6.4.1.5. Duty / Standby fans in series

For series configuration there is no delay starting the standby fan.

YES = Duty & standby fans are installed in a series configuration

NO = Duty & standby fans are installed in a parallel configuration

6.4.1.6. Damper open time
Set the fan start delay time to allow dampers to open. Set the time in seconds.

6.4.1.7. Fan failed to run time delay
Set the fan failure delay time before starting initiating the standby fan. Set the time in seconds.

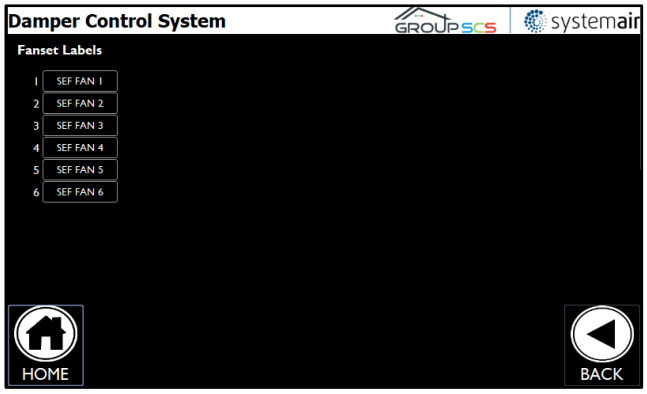
6.4.1.8. Enable duty/standby rotation
Enable the duty & standby fans to automatically swap and share duty after a preset running time.

6.4.1.9. Duty/standby rotation time
(Only applicable when duty/standby rotation enabled)
Set the fan running time to swap duty of the fans. Set the time in hours.

6.4.1.10. DOL Bypass enabled
(Only applicable if DOL Bypass installed)
This will enable DOL bypass of the fan variable speed drive (VSD) and run the fan at full speed for smoke clearance operation.

6.4.2. Fan Labels

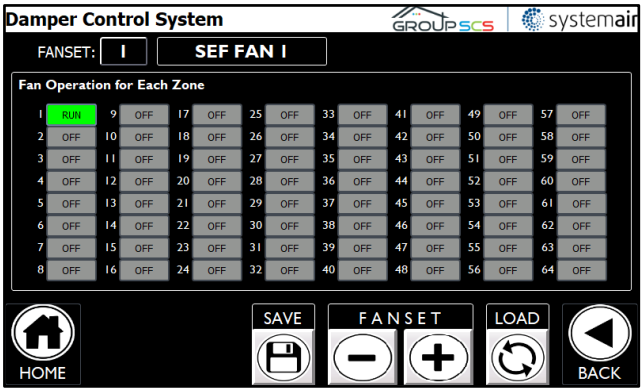
Each fanset name can be changed to easily identify its location or function.

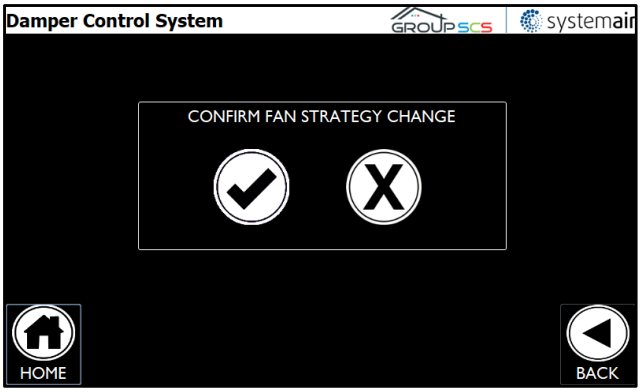


Touch the label to edit and enter a maximum of 12 characters including spaces with the pop-up keypad.

6.4.3. Fanset Strategy

Set the fire zones for each fanset will run in accordance with the cause & effect.



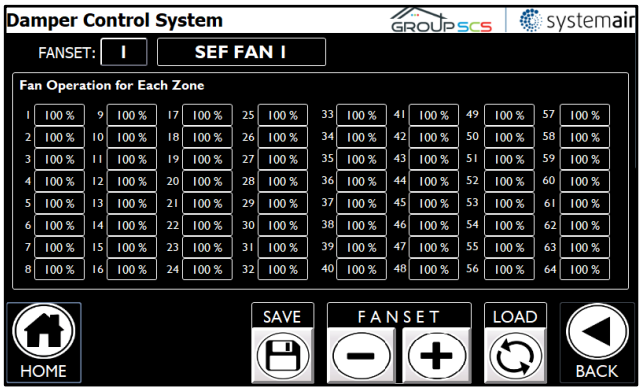


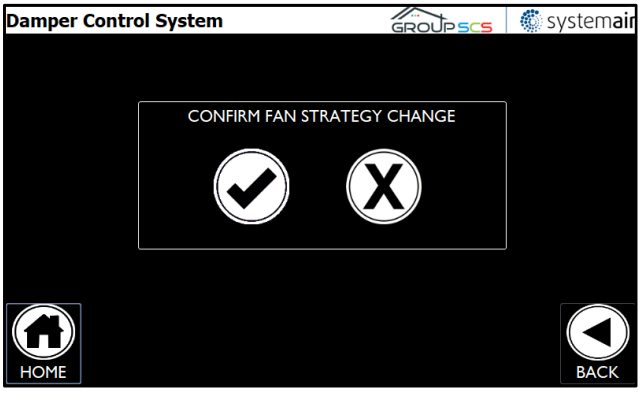
Always press **LOAD** first and each time you change the fanset to refresh the screen with the current saved configuration.

Touch to toggle the state. After making changes you must press **SAVE** and confirm to apply them.

6.4.4. Fan Speeds

Fan speeds can be adjusted to meet the required fire strategy air flow volumes for each zone.





Always press **LOAD** first and each time you change the fanset to refresh the screen with the current saved configuration.

Touch the speed to adjust it. After making changes you must press **SAVE** and confirm to apply them.

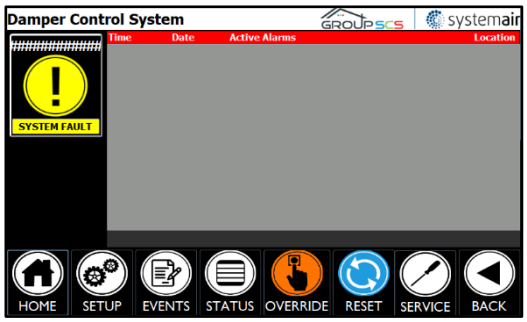
7. Troubleshooting

The alarm and event logs provide descriptions of the system faults. All critical faults are displayed on the home screen alarm list and the fault icon displayed.

7.1. System Faults

7.1.1. HMI Communication Error

In the event of communication loss between the HMI and master panel the HMI will display the system fault icon with hashes for the labels. A "*Connection disconnected*" entry will be reported in the event log.



Fault	*Possible Cause & Action*
Master panel communication failure	Check master panel power supply healthy. Check data cabling, terminations and polarity are correct. Check port adapters at the HMI and PLC are connected tightly. Check PLC & HMI software versions match on service page.

7.1.2. Missing Events Log

The events & alarm logs should always show historical events. If they are empty the HMI memory module is missing or corrupt. See section the User Interface section for the location of the module.

The module can be replaced with the following USB flash drive with the following specification.

Maximum storage size	16GB
File System Format	FAT32
USB Type	USB-A

Power the HMI off before removing & inserting the memory module. On boot-up the log files should be automatically generated and restarted.

7.1.3. System Errors

Active Alarms
System Error
Primary Supply Failed
Remote Fanset (n) System Error
Service Due

Fault	*Possible Cause & Action*
System error	Check master panel PLC has memory card inserted and in run. Recycle power to panel. Check master panel for missing PLC modules or disconnections and faults.
Power Supply Fault	Internal battery backup power supply fault. Check battery health. System on a secondary supply source. Reinstate primary power supply. Check ATS is healthy and in normal / automatic mode. Refer to ATS manual for further information. Check ATS monitoring signal is connected correctly.
Remote Fanset system error	Check remote panels PLC has memory card inserted and in run. Recycle power to panels. Check remote panels for missing PLC modules or disconnections and faults.
Service Due	Service timer elapsed. Reset service.

7.2. Address Faults

Addressable interface panel faults are repeated to the HMI and location identified by the panel address. The faults are also indicated at the local interface panels.

Active Alarms
Address (n): Communication Fault
Address (n): Power Failure
Address (n): Actuator Fault
Address (n): Feedback Fault
Address (n): Failed to Close
Address (n): Failed to Open
Address (n): Position Failure
Address (n): Backup Aux Power Fault

Fault	*Possible Cause & Actions*
Communication fault	Address disconnected from master panel. Check interface panel is healthy. Check data cabling, terminations and polarity are correct. Check interface panel has the correct address set.
Power failure	Interface panel supply failure detected. Check panel power supply is healthy. Check panel mains fuse. Check panel power supply connection and wiring.
Actuator Fault	Check actuator output fuses. Check actuator output cabling for disconnection or damage. Check failure of damper motor.
Feedback Fault	The modulating position feedback input is out of range. Check position feedback input U is connected. Check the actuator feedback range is correct. Check the actuator feedback cabling for disconnection or damage.
Failed to Close	Failed to receive a closed feedback signal. Check mechanical operation of the damper. Check correct output polarity to the damper. Check interface panel position feedback setting is correct. Check damper closed position feedback input connection and wiring.
Failed to Open	Failed to receive an open feedback signal. Check mechanical operation of the damper. Check correct output polarity to the damper. Check interface panel position feedback setting is correct. Check damper open position feedback input connection and wiring.
Position Failure	Failed to receive the correct modulating feedback signal. Check mechanical operation of the damper. Check interface panel position feedback setting is correct. Check damper open position feedback input connection and wiring.
Back Aux Power Fault	Interface panel auxiliary power supply failure detected. Check panel power supply is healthy. Check panel power supply connection and wiring.

7.2.1. Interface Panel Indications

Three onboard coloured LED's indicate the status of the panel.

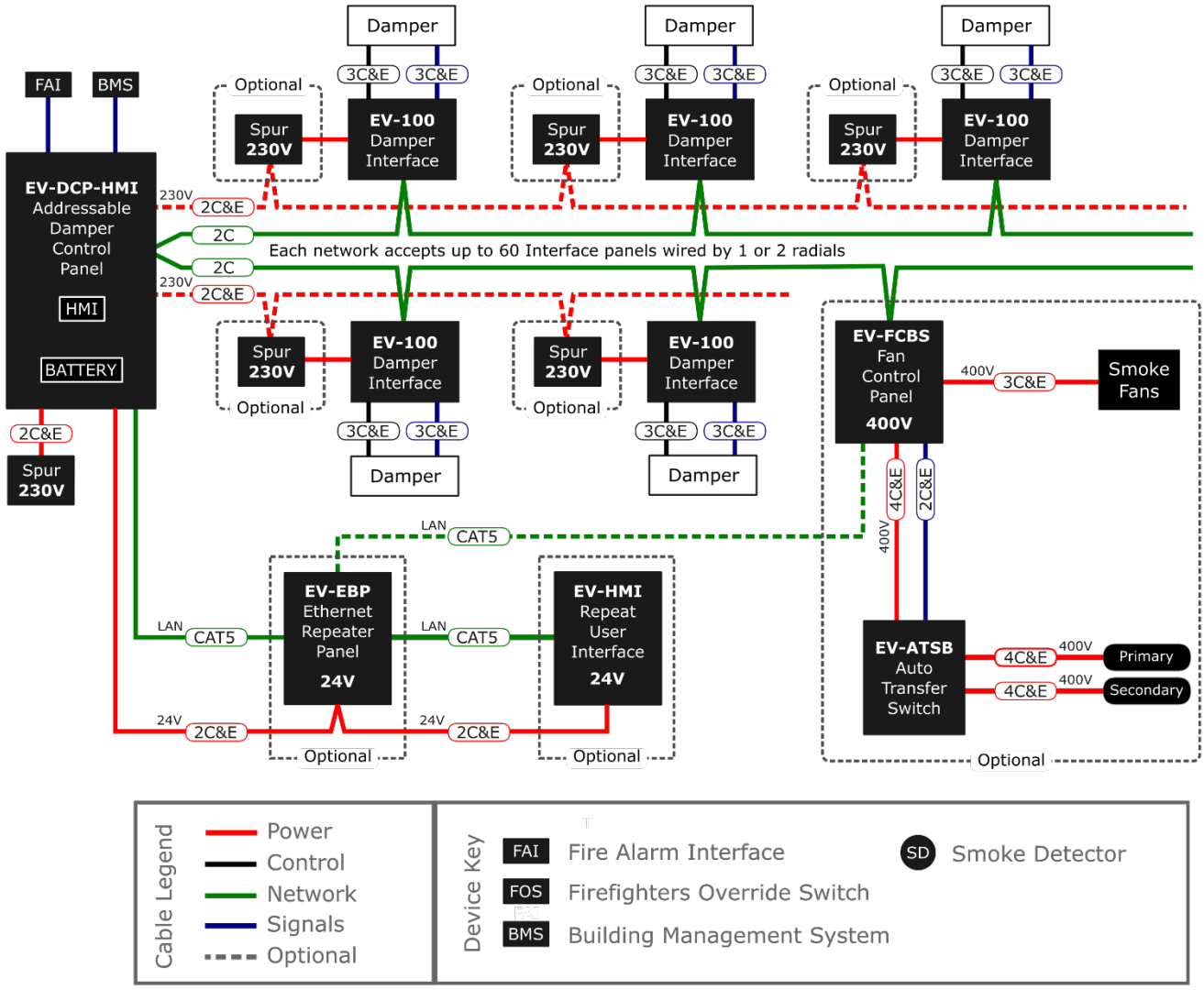
LED (*Colour*)	Condition
OK (Green)	Panel healthy and in operation A flashing LED indicates the panel is running a test sequence.
ALARM (Red)	Alarm condition active.
FAULT (Amber)	Fault condition is active.

To reset the panel, press and hold the **TEST/RESET** function button for more than 5 seconds.

7.3. Fanset Faults

Faults with the fan inverters are reported on the HMI. Additional fault codes will be displayed on the inverter and referenced in the inverter manual for more information.

Active Alarms
Fanset (n): Fan A Fault
Fanset (n): Fan A Failed to Start
Fanset (n): Fan B Fault
Fanset (n): Fan B Failed to Start
Fanset (n): Fan A Damper Failed to Open
Fanset (n): Fan B Damper Failed to Open
Fanset (n): Communication Fault

Fault	*Possible Cause & Action*
Fan Fault	Fan inverter in fault or supply failure. Check fan circuit breaker is on. Check inverter for fault codes and refer to inverter manual. Recycle power on inverter and reset fault on keypad. Check inverter motor data correct to fan motor rating plate. Check the inverter ramp up and ramp down time are not too short. Check fan blades are free of movement with no mechanical obstruction. Check vents and dampers open to provide free movement of air. Check fan running in correct direction. Check fan motor cabling, connections and windings.
Fan Failed to Start	Fan running feedback signal not detected. Check fan motor isolators are switched on. Check fan motor cable for disconnections or damage. Check fan motor for winding failures or disconnections. Check fan inverter configuration and operating mode is set to Auto.
Fan Damper Failed to Open	Fan shut-off damper open position feedback signal not received. Check fanset damper feedback installed setting is correct. Check mechanical operation of the damper. Check correct motor supply wiring to the damper. Check damper open position feedback input connection and wiring.
Communication Fault	Remote fanset disconnected from master panel. Check remote fanset panel is healthy. Check data cabling, terminations and polarity are correct. Check remote fanset panel has the correct address set. Check remote fanset configuration is correct.

8. Appendix A - Example Single Line Diagram