

# MCS-NX32 Next Generation Control Units

# Technical Specification



MCS-NX8



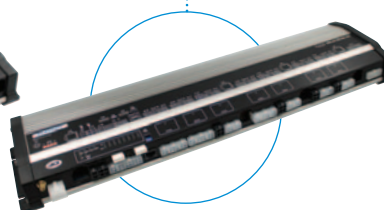
MCS-NX16



MCS-NX32



MCS-NX64





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## 1. Specification

### 1.1 Absolute Maximum Rating

	NX32-NS	NX32-S100	NX32-S200
Supply Voltage	32VDC	32VDC	32VDC
Supply Current	100A	100A	100A

### 1.2 Electrical Characteristics

Operating Voltage	12-24V	
Current Consumption	Running 13.8V	Maximum 112mA
	Sleeping 13.8V	Maximum 33mA
	External Shutdown 13.8V	Maximum 4mA
Temperature	Standby	-20°C ~ +50°C
	Operating	-20°C ~ +50°C

Note: For light commercial vehicles, no filter is required but is recommended for systems that are utilising large inductive loads.

### 1.3 Power

	NX32-NS	NX32-S100	NX32-S200
70Amp DC Pluggable Connector	2	2	2
Ground/Chassis Connections	2	2	2

## 1.4 Digital Inputs

	NX32-NS	NX32-S100	NX32-S200
Positive Switched	12	12	12
External Reset	1	1	1
External Standby	1	1	1

## 1.5 Universal Inputs

	NX32-NS	NX32-S100	NX32-S200
Universal Input	6	6	6

## 1.6 Analog Monitoring

Across All models:

- Supply Voltage sense
- Internal temperature monitor
- High Output channel current monitors
- Medium Output channel current monitors
- Siren system current monitor

## 1.7 Outputs

	NX32-NS	NX32-S100	NX32-S200
High Power 20A	8	8	8
Medium Power 8A	20	20	20
Low Power 2.5A	4	4	4
Siren Output	N/A	100W	200W
Supply Output Fused (5A)	1	1	1

## 1.8 Communications

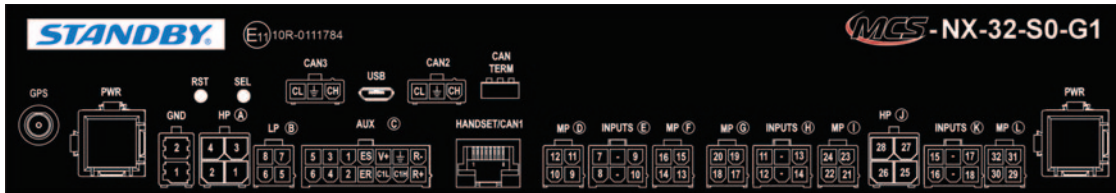
Across All models:

3 x CAN FD

## MCS-NX32 TECHNICAL SPECIFICATION

### 2. Connectors

#### MCS-NX32-NG0



#### MCS-NX32-NG1



#### MCS-NX32-NG2



#### 2.1 GPS

PIN	NAME	FUNCTION
1	GPS	Connection for Active Antenna for GPS function

#### 2.2 SPKR - Siren Output (S200 only)

PIN	NAME	FUNCTION
1	2A-	Siren Channel 2A Negative Output
2	2B-	Siren Channel 2B Negative Output
3	1A-	Siren Channel 1A Negative Output
4	1B-	Siren Channel 1B Negative Output
5	2A+	Siren Channel 2A Positive Output
6	2B+	Siren Channel 2B Positive Output
7	1A+	Siren Channel 1A Positive Output
8	1B+	Siren Channel 1B Positive Output

## 2.3 PWR - Power Connection

PIN	NAME	FUNCTION
1	Supply	12-24V supply for Connectors A-F

## 2.4 GND - Power Ground

PIN	NAME	FUNCTION
1	Ground A	Chassis ground
2	Ground B	Chassis ground

## 2.5 Connector A - High Power Outputs

PIN	NAME	FUNCTION
1	High Power Output 1	User Defined High Power Output (Positive Switched 20A)
2	High Power Output 2	User Defined High Power Output (Positive Switched 20A)
3	High Power Output 3	User Defined High Power Output (Positive Switched 20A)
4	High Power Output 4	User Defined High Power Output (Positive Switched 20A)

## 2.6 Connector B - Low Power Outputs

PIN	NAME	FUNCTION
1	Low Power Output 5	User Defined Low Power Output (Positive or Negative 2.4A) *Note 1
2	Low Power Output 6	User Defined Low Power Output (Positive or Negative 2.4A) *Note 1
3	Low Power Output 7	User Defined Low Power Output (Positive or Negative 2.4A) *Note 1
4	Low Power Output 8	User Defined Low Power Output (Positive or Negative 2.4A) *Note 1

\* Note 1 : all low power outputs when placed in drive low mode have 800 $\mu$ A quiescent current. This may cause false triggering in very light loads. This can be remedied by placing a 1k $\Omega$  resistor across the load.



## 2.7 Connector C - Input Connector

PIN	NAME	FUNCTION
1	Radio In +	Positive input for Radio re-broadcast
2	CAN1 H	CAN bus High connection
3	CAN1 L	CAN bus Low connection
4	External Reset	Positive switched Reset input
5	Universal Input 2	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
6	Universal Input 4	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
7	Universal Input 6	User defined input (pull-up or pull-down through 10kΩ or analogue)
8	Radio In -	Negative input for Radio re-broadcast
9	Ground	Chassis
10	Supply Output (Fused)	Supply feed through for external devices (4A Fused)
11	External Standby	Negative switched Standby input
12	Universal Input 1	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
13	Universal Input 3	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
14	Universal Input 5	User defined input (pull-up or pull-down through 10kΩ or analogue)

## 2.8 HANDSET/CAN 1 - System Connector

PIN	NAME	FUNCTION
1	CAN1 L	CAN bus Low connection (CAN-FD)
2	CAN1 H	CAN bus High connection (CAN-FD)
3	MIC-	Negative Microphone input signal
4	Supply	Supply feed through for handsets (1A Fused)
5	Ground	Chassis
6	MIC+	Positive Microphone input signal
7	NC	No connect
8	PTT	Push to Talk

## 2.9 Connector D - Medium Power Outputs

PIN	NAME	FUNCTION
1	Medium Power Output 9	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 10	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 11	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 12	User Defined Medium Power Outputs (Positive Switched 8A)

## 2.10 Connector E - Input Connector

PIN	NAME	FUNCTION
1	Positive Input 10	User Defined input (pull-down through 11k $\Omega$ )
2	No Connection	-
3	Positive Input 9	User Defined input (pull-down through 11k $\Omega$ )
4	Positive Input 8	User Defined input (pull-down through 11k $\Omega$ )
5	No Connection	-
6	Positive Input 7	User Defined input (pull-down through 11k $\Omega$ )

## 2.11 Connector F - Medium Power Outputs

PIN	NAME	FUNCTION
1	Medium Power Output 13	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 14	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 15	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 16	User Defined Medium Power Outputs (Positive Switched 8A)

## 2.12 Connector G - Medium Power Outputs

PIN	NAME	FUNCTION
1	Medium Power Output 17	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 18	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 19	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 20	User Defined Medium Power Outputs (Positive Switched 8A)

## 2.13 Connector H - Input Connector

PIN	NAME	FUNCTION
1	Positive Input 14	User defined input (pull-down through 11k $\Omega$ )
2	No Connection	-
3	Positive Input 13	User defined input (pull-down through 11k $\Omega$ )
4	Positive Input 12	User defined input (pull-down through 11k $\Omega$ )
5	No Connection	-
6	Positive Input 11	User defined input (pull-down through 11k $\Omega$ )

## 2.14 Connector I - Medium Power Outputs

PIN	NAME	FUNCTION
1	Medium Power Output 21	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 22	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 23	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 24	User Defined Medium Power Outputs (Positive Switched 8A)

## 2.15 Connector J - High Power Outputs

PIN	NAME	FUNCTION
1	High Power Output 25	User Defined High Power Outputs (Positive Switched 20A)
2	High Power Output 26	User Defined High Power Outputs (Positive Switched 20A)
3	High Power Output 27	User Defined High Power Outputs (Positive Switched 20A)
4	High Power Output 28	User Defined High Power Outputs (Positive Switched 20A)

## 2.16 Connector K - Input Connector

PIN	NAME	FUNCTION
1	Positive Input 18	User defined input (pull-down through 11k $\Omega$ )
2	No Connection	-
3	Positive Input 17	User defined input (pull-down through 11k $\Omega$ )
4	Positive Input 16	User defined input (pull-down through 11k $\Omega$ )
5	No Connection	-
6	Positive Input 15	User defined input (pull-down through 11k $\Omega$ )

## 2.17 Connector L - Medium Power Outputs

PIN	NAME	FUNCTION
1	Medium Power Output 29	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 30	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 31	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 32	User Defined Medium Power Outputs (Positive Switched 8A)

## 2.18 Power Connection

PIN	NAME	FUNCTION
1	Supply	12-24V supply for Connectors G-L

## 2.19 CAN3/RS485 Connector

PIN	NAME	FUNCTION
1	CAN3H/RS485A	CAN3 High (CAN-FD) or RS485A connection
2	No Connection	-
3	CAN3L/RS485B	CAN3 Low (CAN-FD) or RS485B connection

## 2.20 USB Micro

Used with the MCS Configurator for programming the device.

<https://mheupdate.blob.core.windows.net/mcsc3/Install/setup.exe>

## 2.21 CAN2 Connector

PIN	NAME	FUNCTION
1	CAN2H	CAN2 High (CAN-FD)
2	No Connection	-
3	CAN2L	CAN Low (CAN-FD)

## 2.22 RST - Reset Button

Button for resetting the unit.

## 2.23 SEL - Select Button

Button for selecting what information is displayed by the LEDs on the unit. Also used to force the unit into bootloader mode.

## 2.24 DIP SELECT - CAN Termination

SWITCH	NAME	FUNCTION
1	CAN3 Termination	Activates a termination resistor on CAN Bus 3 (120Ω)
2	CAN2 Termination	Activates a termination resistor on CAN Bus 2 (120Ω)
3	CAN1 Termination	Activates a termination resistor on CAN Bus 1 (120Ω)

## 2.25 SD - SD card slot

SD Card slot for insertion of an SD.

### 3. System Description

#### 3.1 Siren

The siren module supports up to 2x100W (8 Ohm) output speakers.

- NS - no siren module
- S100 - 1x100W or 100W split between both channels
- S200 - 2x100W

With the use of the powerful MCS-NX-CONFIG the siren module can be customized to suit the user's requirements.

The Siren module can be configured to perform the following functions.

- PTT (Handheld Microphone Broadcast)
- Radio Rebroadcast
- HRT (Horn Ring Transfer) to enable and disable siren tones.
  - Single Tap or Double Tap to Start modes.
- 4 (Minimum) industry standard siren tones, playable in any order
  - Wail, Yelp, Two-Tone and Pulsar
- Air Horn
- Low Frequency "BASS" mode

The Siren module also supports the following modes.

- Auto Scroll (Automatically cycles through all selected tones)
- Auto Start (Automatically plays tone when siren is enabled)
- Bass Enable (Run a low frequency tone)
- Bass Time (limit the low frequency to a set time)
- Volume Control (Allowing for low volume output for use in testing without being harmful to the naked ear)

### 3.2 Inputs

The External Reset input on pin 4 of connector C is used to force the processor in to reset state and is active high. The External Standby input on pin 11 of connector C is used to power down the entire system by forcing the internal regulators to turn off completely, this is an active low signal.

Connector & Pin	Analogue Range	Frequency	Pull-Up	Pull-Down
Input 1 (C12)	10V	✓	Configurable	Configurable
Input 2 (C5)	10V	✓	Configurable	Configurable
Input 3 (C13)	10V	✓	Configurable	Configurable
Input 4 (C6)	10V	✓	Configurable	Configurable
Input 5 (C14)	30V		Configurable	Configurable
Input 6 (C7)	30V		Configurable	Configurable
Input 7 (E6)	30V			Fixed
Input 8 (E4)	30V			Fixed
Input 9 (E3)	30V			Fixed
Input 10 (E1)	30V			Fixed
Input 11 (H6)	30V			Fixed
Input 12 (H4)	30V			Fixed
Input 13 (H3)	30V			Fixed
Input 14 (H1)	30V			Fixed
Input 15 (K6)	30V			Fixed
Input 16 (K4)	30V			Fixed
Input 17 (K3)	30V			Fixed
Input 18 (K1)	30V			Fixed

### 3.3 High Power Outputs

Each of the High Power outputs is independently capable of switching 20 Amps, but the overall current capability of the system is limited to the total specified for the selected device.

Using the MCS-CONFIG Software, the outputs can be configured for:

- Minimum Voltage Dropout. (Disables the output when the supply voltage drops below the set level)
- Maximum Current Protection (Disabled the output when the output current exceeds the set current level for a period of time)
- Output Function - A selection of flashing patterns is available.
  - Steady On
  - Alternating
  - Multi Flash
  - Penta Pulse
  - Penta Pulse (With Pause)
  - Cyclic
  - Arrow/Direction
  - Double Flash
    - Priority Levels - each output function has a user defined priority level to determine function takes precedence.
    - Enable Inputs - Each output function can have multiple inputs. If **ANY** of the enable inputs is active, the output can turn on.
    - Inhibit Inputs - Each output function can have multiple inhibit inputs. If **ANY** of the inhibit inputs is active, the output will not be turned on. Inhibits take precedence over Enables.

### 3.4 Medium Power Outputs

Each of the Medium Power Outputs is independently capable of switching 8 Amps, but the overall current capability of the system is limited to the total specified for the selected device.

The features and configuration setup are exactly the same as for the High Power Outputs.

See Above for more information.

### 3.5 Low Power Outputs

There are 4 positive or negative switching outputs. Each output is independently capable of switching 2.4 Amps, but the overall current capability of the system is limited to the total specified for the selected device.

With the exception of current limiting (there are none for the low power outputs), the features and configuration setup are exactly the same as for the High Power Outputs. See Above for more information.

See Note 1 above in section 2.6 for information of negative switching quiescent current.

### 3.6 CANBus Serial Interface

The MCS-NX has three CAN FD full speed interfaces. The first interface is designated for local control using suitable MCS compatible remotes. CAN two is used for communications with the Vehicle and CAN three will be nominally used for telematics and other 3rd party applications.

### 3.7 Diagnostics and Troubleshooting



**Modes of operation denoted by PWR LED.**

- Steady Red - Running (normal operation)
  - FAULT
    - Steady Red - Global fault present
    - Off - No Faults present
  - DROPOUT
    - Steady Amber - Dropout detected
    - Off - No Dropouts present
  - CAN1,CAN2,CAN3
    - Green - Communications healthy
    - Amber -At least one CAN device not responding
    - Red - No devices responding
    - Off - CAN channel not used
  - OUTPUTS
    - Green - Active
    - Off - Inactive
    - Red - Over current fault
    - Amber - Voltage dropout present
  - INPUTS
    - Green - Active
    - Blue - Frequency Input Active
    - Off - Inactive
    - Input 7 LED
  - Purple Fast flashing- establishing GPS lock
  - Purple Slow Flash - one second timepulse
    - Input 8 LED
  - Red flashes faster the closer the unit gets to syncing with other MCS-NX units
  - Blue Steady once synced
- Steady Blue - Updating Slaves
  - FAULT
    - N/A
  - DROPOUT
    - N/A
  - INPUTS
    - White - Overall update progress increasing from left to right
- Steady Cyan - Loading Configuration
  - FAULT
    - N/A
  - DROPOUT
    - N/A
  - INPUTS
    - Cyan - Overall Config loading progress increasing from left to right
  - OUTPUTS.
    - N/A
- Steady Purple - Boot Loader
  - FAULT
    - Green - Application CRC valid
    - Red - Application CRC invalid
  - DROPOUT
    - N/A
  - INPUTS
    - Red - Erase progress increasing from left to right
    - Green - Programming progress increasing from left to right
- Steady Orange - Idle
- Steady Green - Going to Sleep
- Flashing Red - Unit is asleep

### 3.8 USB Connector

The USB connector is a standard USB micro connector which allows programming of the device using the MCS-NX-CONFIG application. No external power is required when using the USB cable as this supplies the logic circuitry with the necessary power to program.



## 4. Product Information

### 4.1 Technical Specification

#### Connections

- 70A Anderson power connection x 2
- All connections on one side of enclosure

#### Inputs

- Enhanced inputs
  - Narrow Range x 4  
Pull up or pull down (configurable), 10V range
  - Wide Range x 2  
Pull up or pull down (configurable), 30V range
  - Inputs used for data input i.e. temperature sensors for dog kennels
- Digital inputs inputs
  - x 12

#### Outputs

- High power 20A x 8
- Medium power 8A x 20
- Low power 2.4A x 4

#### Multi-Way Switch Options

- CAN handsets/switch units
  - Programmable button configuration

- 64 colour choices
- Multiple handset/switch unit setup
- Touch screen switch panel
  - Screen acts as a CAN switch unit
  - 4 x backup buttons
  - On screen buttons interact as per a standard switch unit
  - Fully configurable button/graphic layouts

#### CAN bus

- CAN-FD x 3
  - CAN-FD x 2
  - CAN-FD/RS485 x 1
- Vehicle CAN bus
  - Supports over 260 vehicle profiles
- MCS CAN
  - Handsets/switch units
  - Touch screen
  - Expansion modules
  - StandbyRSG CAN devices

#### Siren

- 100W Class D Siren
  - Differential mic input
  - Full digital audio pathing allowing for full volume control

- Full dynamic range - standard siren tones and low frequency 'Rumbler Tones'
- Two optional channels (user defined)
- 200W Class D Siren
  - Differential mic input
  - Full digital audio pathing allowing for full volume control
  - Full dynamic range - standard siren tones and low frequency 'Rumbler Tones'
  - Two optional channels (with selectable outputs)
  - Playback and recording from an SD card
  - Speed based volume

#### Approvals

- ECE R10 Approved
- Home Office Spec 5 approved
- VCA approved manufacturing facility

#### Specification

- Dimensions
  - 335 x 142 x 57mm (with siren)
- Weight
  - 2.38kg

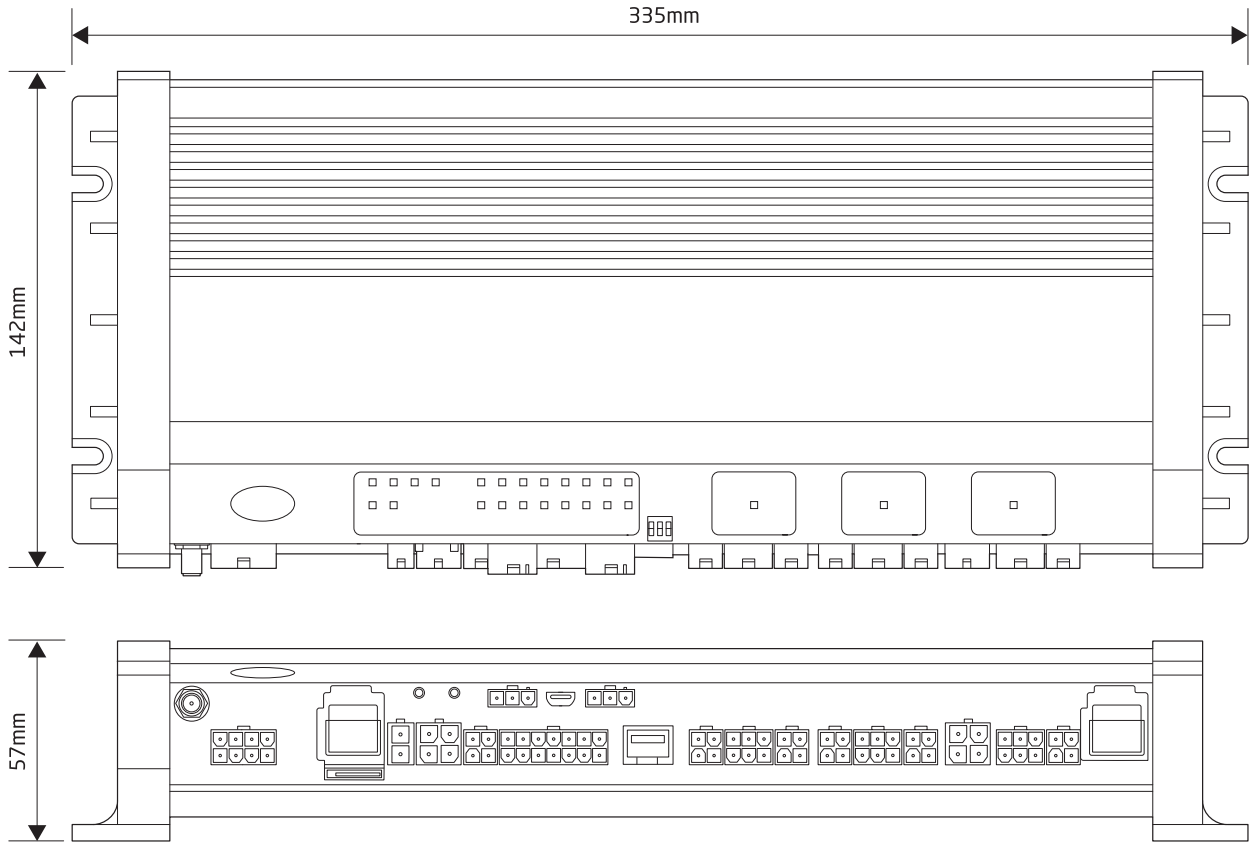
### 4.2 Comparison Chart

NX RANGE				
	NX8	NX16	NX32	NX64
High Power Outputs	4 x 20A	4 x 20A	8 x 20A	20 x 20A
Medium Power Outputs	N/A	8 x 8A	20 x 8A	40 x 8A
Low Power Outputs	4 x 2.4A	4 x 2.4A	4 x 2.4A	4 x 2.4A
Weight	1.38kg	1.46kg	2.38kg	3.64kg
Dimensions	201x142x57mm	240x142x57mm	335x142x57mm	561x142x57mm

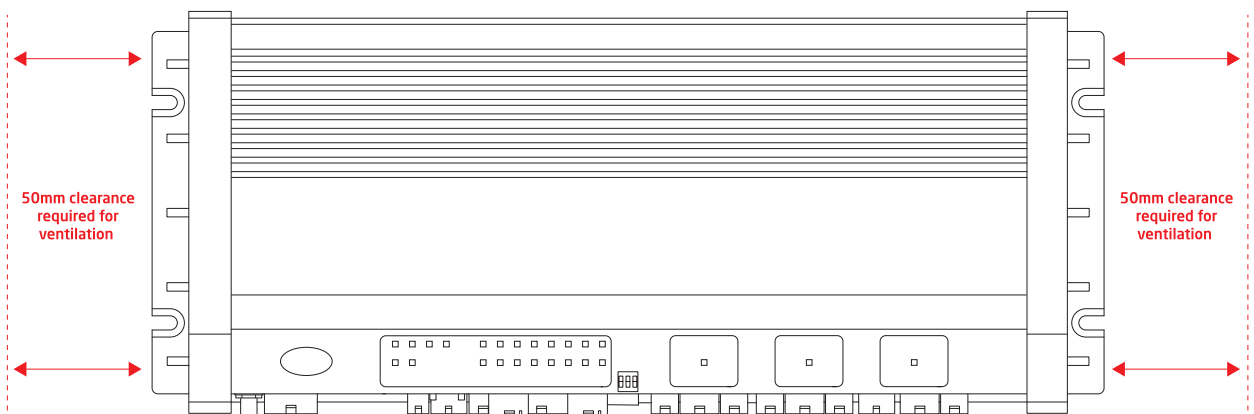
Note: Units without a siren are 29mm shorter in width.

## MCS-NX32 TECHNICAL SPECIFICATION

### 4.3 Dimensions - with siren



### 4.4 Ventilation Clearance



## 5. Component Part Numbers

Component Description	Part Number
MCS-NX32 Complete Kit - without siren	MCS-NX32-NG0
MCS-NX32 Complete Kit - with 100W siren	MCS-NX32-SG1
MCS-NX32 Complete Kit - with 200W siren	MCS-NX32-SG2
MCS-NX32 Replacement Pin/Connector Kit - without siren	ACC-NX32-CP1
MCS-NX32 Replacement Pin/Connector - with siren	ACC-NX32-CPS1

## 6. Revision History

REVISION	COMMENTS	BY	DATE
1V0	Initial release	KJVR	16/03/2023
1V1	Updated with all variants	KJVR	28/03/2023
1V2	UK re-brand	HW	21/08/2023