HEDSAM

Hedsam
Installation guide

HEDENGREN
Security

HEDSAM

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Before you start

Read this manual before using access control from Hedengren Security AB.

This manual describes the installation of the Hedsam access control.

What's new in this guide

Version 1.00

Introduction

This chapter describes Hedsam system components and shows a system overview.

Description

The NODE board is an endpoint in a Hedsam field network. It connects to its parent host, usually the Hedsam Server, by Ethernet (Fast Ethernet, 100Mbit/s) and the Hedsam protocol. The NODE board's main function is to react to messages, elapsed time and the data received from connected readers, sensors and actuators, according to configuration received from the parent host. Connected to the NODE board serial Modbus port there needs to be at least one DOOR board, which provides access to its readers, sensors and actuators.

System structure

A NODE subsystem consists of exactly one NODE board plus up to eight DOOR boards, up to four OUT12 boards and up to four IN12 boards. A NODE address consists of two octets, the unit address and the subunit address, both of which have their 7th bits set. 1 unit address 0,1-127 1 subunit address 0,1-8.

The unit address denotes the Hedsam address of the NODE unit; the value zero is reserved for broadcast messages. The subunit address is either the DOOR subsystem address 1-8 or 0 (zero) for NODE specific messages. Note that the Ethernet address of the NODE unit is a separate entity; however, it is recommended that the last octet of the IPv4 address and the NODE unit address should be of equal value. NODE subsystems need to have unique addresses within the field network. Initially, or after a Full Reset, a NODE unit has the Ethernet address 192.168.0.100/24 and Hedsam address 100. The default gateway address is 192.168.0.1.

Each NODE subsystem can address up to eight DOOR boards. A system with no DOOR boards is possible, but a system with no DOOR boards is not a functional system (it has no input/output capabilities). It is also possible to create a system with only IN12/OUT12 boards. There may be up to four boards each. The boards are numbered within their boardtype: the DOOR boards should be configured with unique addresses in the range [1 to 8], the OUT12 boards should be configured with unique addresses in the range [1 to 4] and the IN12 boards should be configured with unique addresses in the range [1 to 4].

The DOOR boards connect to the NODE board by the Door Bus, which is electrically RS-485.

NODE system H/W setup

There are three separate methods for the NODE board hardware setup.

1. The NODE board can be setup directly by the on-board menu system.
2. There exists also a web-based setup page at http://node-address/setup.html.
3. There is also a Hedsam message, through poller application to the NODE system.

Set IP-address, netmask length (eg.24=255.255.255.0) and GW(gateway).

Default settings
IP: 192.168.0.100
Netmask: 24 (255.255.255.0)
GW: 192.168.0.1
Port: 5000
Communication: UDP

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Change IP settings with key-nob/SET button and on-board menu

1. Double-click SET-button to enter settings
2. Turn S1-knob to IP.A (IP address AAA.BBB.CCC.DDD, 192.168.0.100)
3. Turn S2 and S3-knob to change first IP span (192).
4. Confirm change by pressing and hold SET-button for 1 second, the small circle will be filled when change is saved.
5. Repeat above step 2 to 4 for IP.B, IP.C and IP.D (192.168.0.100)
6. Turn S1-knob to GW.A (Gateway AAA.BBB.CCC.DDD, 192.168.0.1)
7. Turn S2 and S3-knob to change first GW span (192).
8. Confirm change by pressing and hold SET-button for 1 second, the small circle will be filled when change is saved.
9. Repeat above step 6 to 8 for GW.B, GW.C and GW.D (192.168.0.1)
10. Turn S1-knob to NETSZ/
11. Turn S2 and S3-knob to select Network mask (24 = 255.255.255.0)
12. Confirm change by pressing and hold SET-button for 1 second, the small circle will be filled when change is saved.
13. Turn S1-knob to ID, set the same ID as selected above IP.D setting
14. Turn S2 and S3-knob to change ID (192.168.0.**100** ID=100)
15. Confirm change by pressing and hold SET-button for 1 second, the small circle will be filled when change is saved.
16. Turn S1-knob to RESET
    Confirm reset by pressing and hold SET-button for 1 second, the node card restarts and accept the new settings.

S1 Menu system:

0=node:sys
1=ID (Set the same as IP.D)
2=VERSION
3=IP.A (192)
4=IP.B (168)
5=IP.C (0)
6=IP.D (100)
7=GW.A (192)
8=GW.B (168)
9=GW.C (0)
A=GW.D (1)
B=NETSZ/ (24)
C= -
D=FULL-RST
E=MASTER-RST
F=RESET

Components / Productcodes

Below is all the different products / components:

HEDSAM-NODE = 1 node card handles up to 8 door cards, 4 input cards and 4 output cards

HEDSAM-DOOR = Door card handles 2 readers, 4 relay outputs, 5 inputs. One two-sided door, or one one-sided door.

HEDSAM-IN12 = 12 inputs card

HEDSAM-OUT12 = 12 relay outputs card

HEDSAM-POW-5 = 24V / 5A backup

HED-BOX = Installation box for NODE, DOOR, IN12 and OUT12 cards

RPK-40SE = Mifare Wiegand keypad reader

RP-15SE-P = Mifare Wiegand reader

HEDSAM-NODE	HEDSAM-DOOR	HEDSAM-IN12
HEDSAM-OUT12	**HEDSAM-POW5**	**HED-BOX / 8000154**
RPK-40SE / 8002131	**RP-15SE-P / 8002513**	
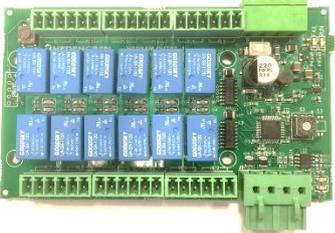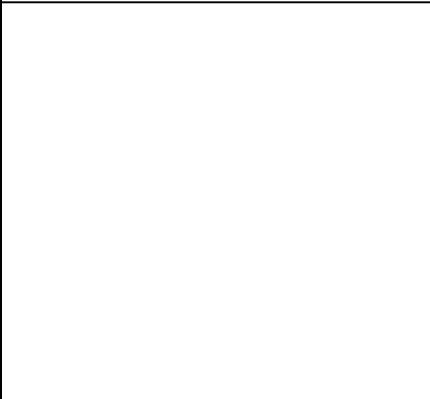
System overview
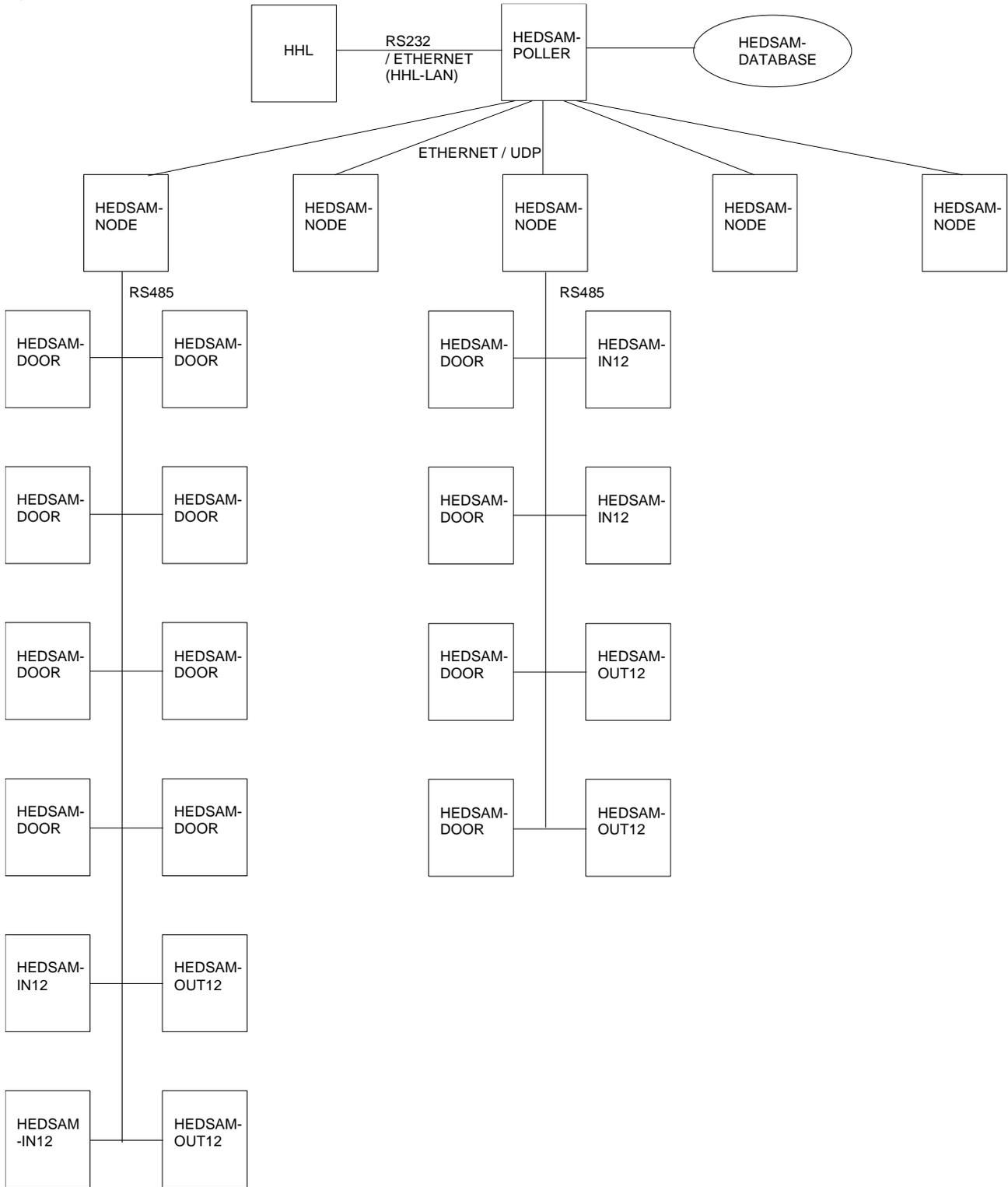
System Limits

The NODE board in itself does not provide any sensors or actuators, nor can it address a reader. All the input and output is provided by the subordinate DOOR boards. The boards can be connected either connector-to-connector or by a cable. The communications speed is 38.4Kbit/s and the maximum total cable length is 500m. The longest span needs to be terminated at each end.

A DOOR board has five sensors (inputs), of which up to two may be designated as door releases. There are four actuators (relays). Two Wiegand readers can be attached, each of which can handle identifiers up to 64 bits. There is no imposed identifier structure.

An OUT12 board has twelve actuators (relays). For a NODE system (NODE+DOOR boards) there can be four OUT12 boards, since the shared output limit is forty-eight (48).

An IN12 board has twelve sensors (inputs). For a NODE system (NODE+DOOR boards) there can be four IN12 boards, since the shared input limit is forty-eight (48).

Each added DOOR board adds ten-twelve milliseconds to the total round time. It is recommended that the total round time should not exceed one hundred (100) milliseconds. With that kind of round time, the minimum response time of the system is slightly over 200 ms.

Example subsystem configurations

A minimal system with one DOOR board
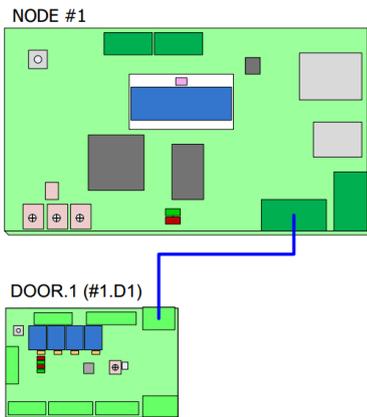
The single DOOR board connects to the NODE board by the Dooris Bus. The firmware supports up to two door release inputs. The firmware also supports separate programs for each of the readers. This type of configuration is able to handle either one two-sided door, or two one-sided doors. Within such an installation, there is a maximum of five sensors (inputs), four actuators (relays) and two readers.

A small system with one IN12 and one OUT12 board
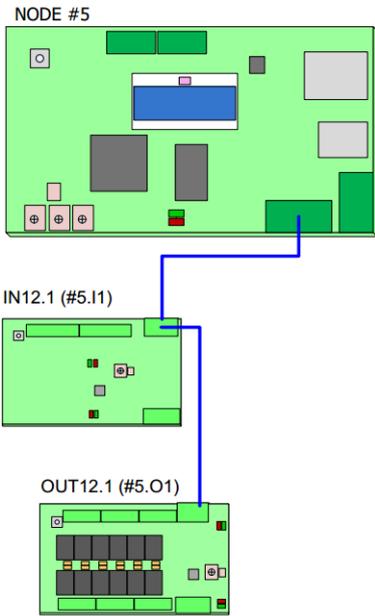
The IN12 and OUT12 boards connect to the NODE board by the Dooris Bus. This kind of a configuration can be used e.g. for an installation of up to twelve interior doors. There are twelve sensors on the IN12 board and twelve actuators on the OUT12 board.

A large system with eight DOOR boards, four IN12 boards and four OUT12 boards

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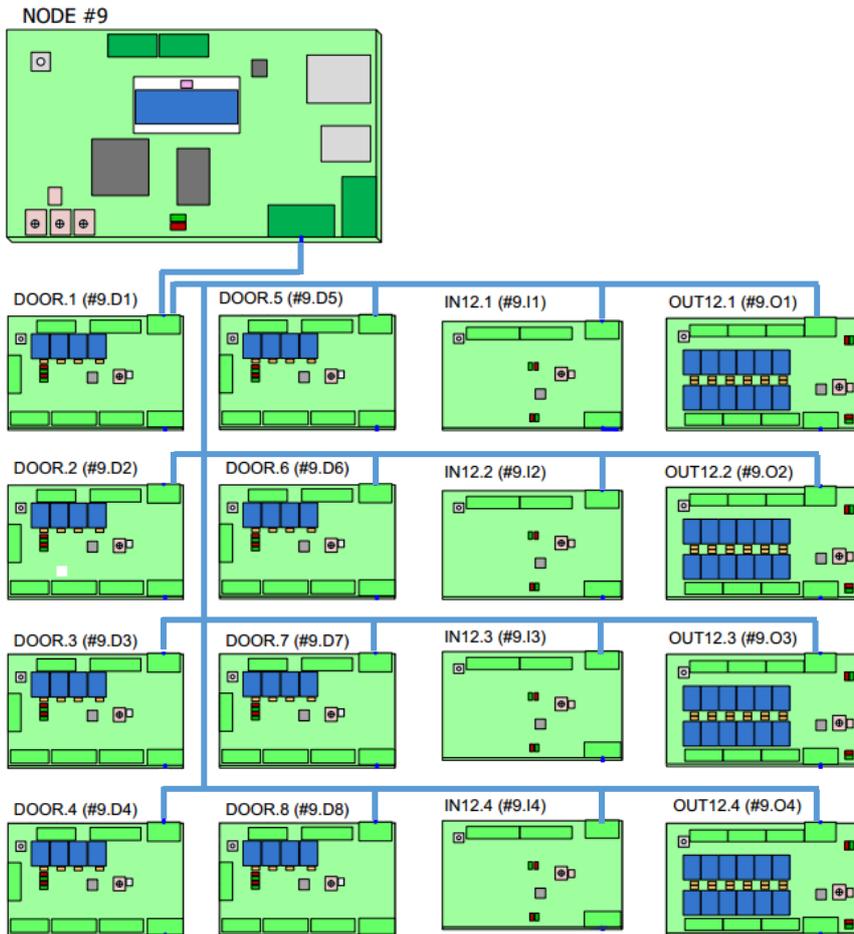
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Technical data

Data	HEDSAM-NODE
Operating voltage	14 – 40 VDC, nominal is 24VDC
Current consumption @ 24VDC	Nominal 62 mA, Max 75 mA
Maximum Humidity	95%RH Non Condensing (at 40°C)
Operating Temperature Range	+5 °C to +50 °C
Measurements (L x W x D)	130 x 69 x 26 mm (without connectors)
Weight	60 g

| Data	HEDSAM-DOOR
Operating voltage	14 – 40 VDC, nominal is 24VDC
Current consumption @ 24VDC	Nominal 15 mA, Max 150 mA
Inputs 1-5	Digital or Analogue (when analogue 10kOhm terminal resistor needs to be used)
Fuse F1 - J2 (+) / (-)	1A (fast)
Relay Contact Rating (max)	30 VDC, 1 A
Maximum Humidity	95%RH Non Condensing (at 40°C)
Operating Temperature Range	+5 °C to +50 °C
Measurements (L x W x D)	110 x 71 x 18 mm (without connectors)
Weight	65 g

Data	HEDSAM-IN12
Operating voltage	14 – 40 VDC, nominal is 24VDC
Current consumption @ 24VDC	Nominal 15 mA, Max 20 mA
Inputs 1-12	Digital or Analogue (when analogue 10kOhm terminal resistor needs to be used)
Maximum Humidity	95%RH Non Condensing (at 40°C)
Operating Temperature Range	+5 °C to +50 °C
Measurements (L x W x D)	110 x 71 x 13 mm (without connectors)
Weight	40 g

Data	HEDSAM-OUT12
Operating voltage	14 – 40 VDC, nominal is 24VDC
Current consumption @ 24VDC	Nominal 15 mA, Max 220 mA
Maximum Humidity	95%RH Non Condensing (at 40°C)
Operating Temperature Range	+5 °C to +50 °C
Measurements (L x W x D)	120 x 71 x 15 mm (without connectors)
Weight	90 g

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Connections

HEDSAM-NODE	LOCAL NETWORK
Ethernet UDP	Local network
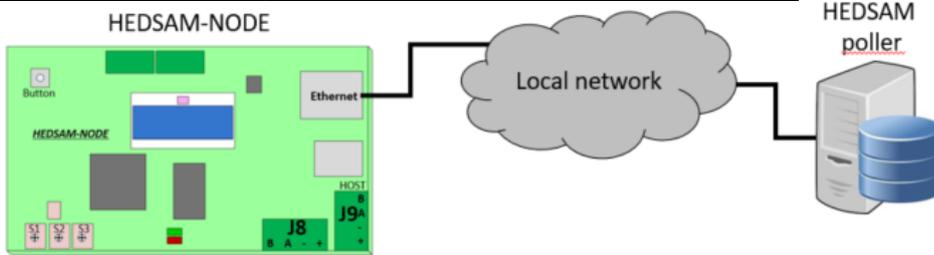
HEDSAM-NODE	HEDSAM-POW5
J9 / HOST (-)	OUTPUT (–) 24VDC
J9 / HOST (+)	OUTPUT (+) 24VDC
HEDSAM-NODE	HEDSAM-DOOR
J8 – B	J3 - B
J8 – A	J3 - A
J8 - (-) 24VDC	J3 - (-) 24VDC
J8 - (+) 24VDC	J3 - (+) 24VDC

HEDSAM-NODE
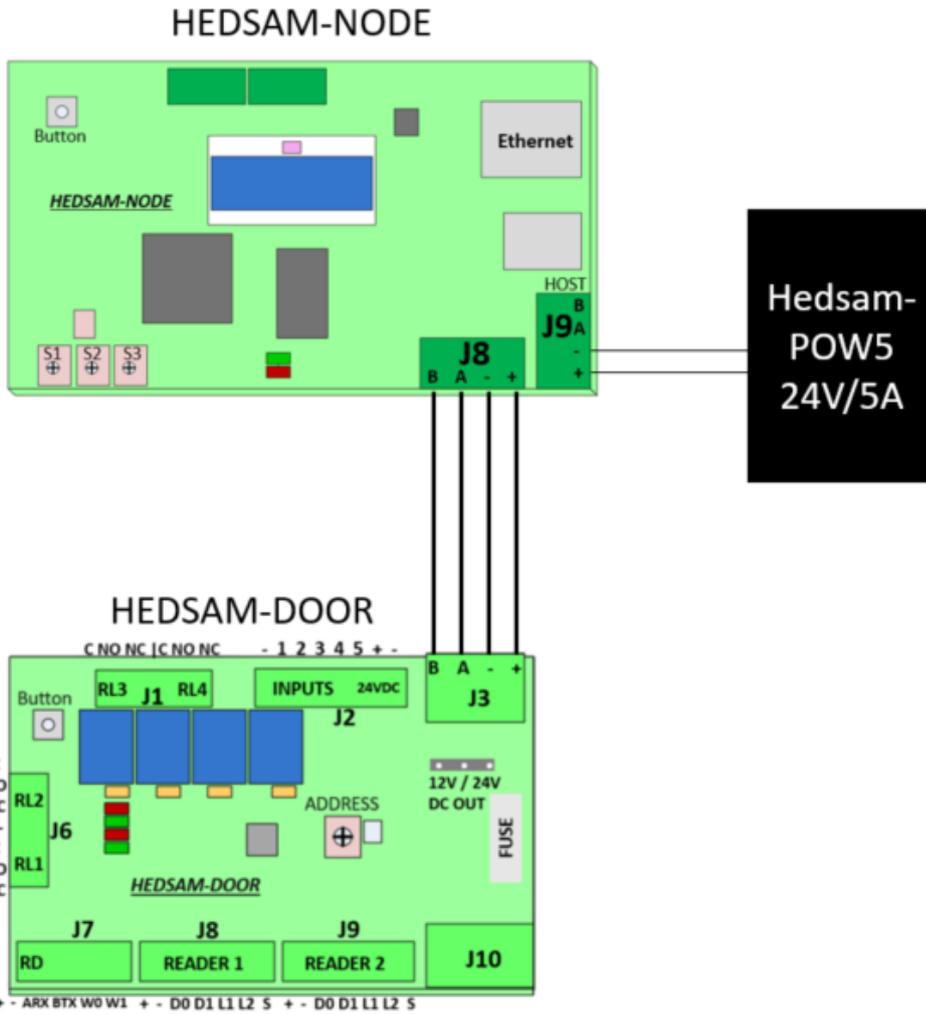
HEDSAM-DOOR

HEDSAM-NODE	HEDSAM-DOOR, -IN12, HEDSAM-OUT12
J8 – B	J3 - B
J8 – A	J3 - A
J8 - (-) 24VDC	J3 - (-) 24VDC
J8 - (+) 24VDC	J3 - (+) 24VDC

Communication J3 – B/A and power (-)/(+) is connected in series and/or in star cabling. If a HEDSAM-DOOR, -IN12 or -OUT12 is unplugged with the J3 connector all the other cards will still have communication and power!
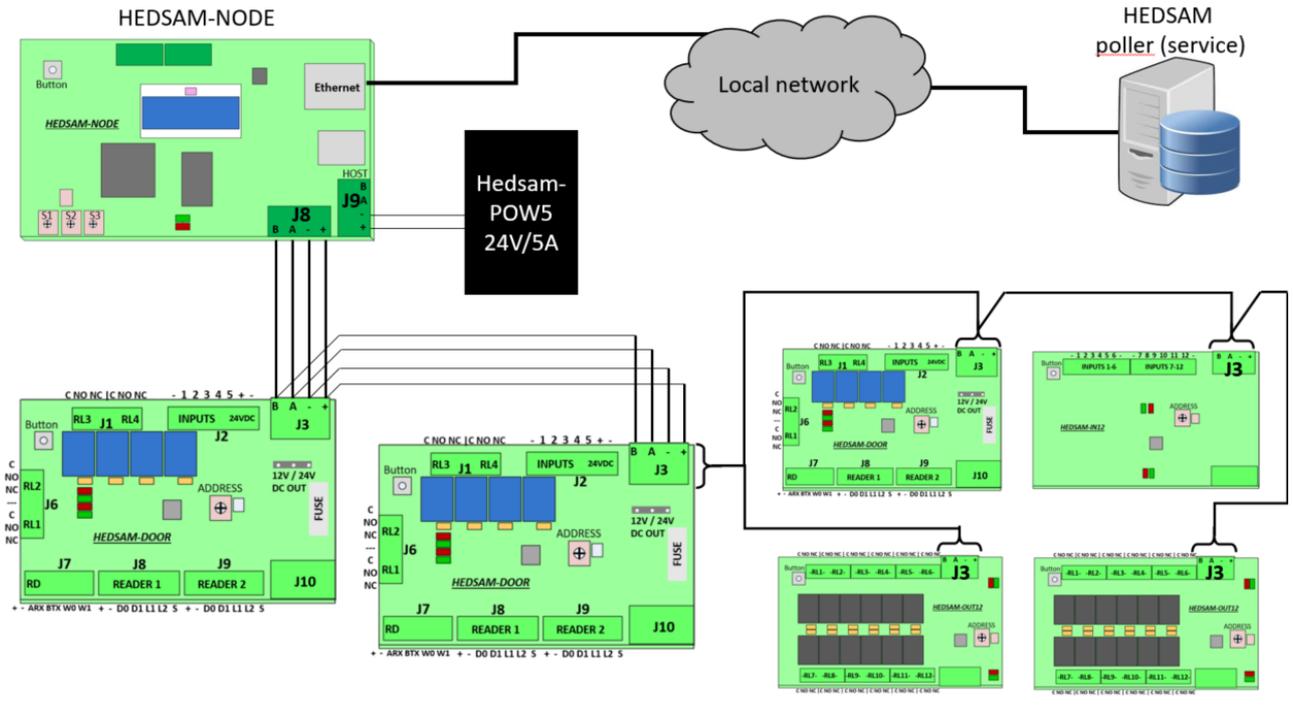
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Mifare / Wiegand reader connection

| WIEGAND READERS 1	HEDSAM-DOOR
RED CABLE (+)	J8 – (+) 12VDC
BLACK CABLE (-)	J8 – (-) 12VDC
GREEN CABLE DATA 0	J8 – D0
WHITE CABLE DATA 1	J8 – D1
ORANGE CABLE GREEN LED	J8 – L1 (Green Led)
BROWN CABLE RED LED	J8 – L2 (Red Led)
YELLOW CABLE BUZZER	J8 – S
WIEGAND READERS 2	HEDSAM-DOOR
RED CABLE (+)	J9 – (+) 12VDC
BLACK CABLE (-)	J9 – (-) 12VDC
GREEN CABLE DATA 0	J9 – D0
WHITE CABLE DATA 1	J9 – D1
ORANGE CABLE GREEN LED	J9 – L1 (Green Led)
BROWN CABLE RED LED	J9 – L2 (Red Led)
YELLOW CABLE BUZZER	J9 – S
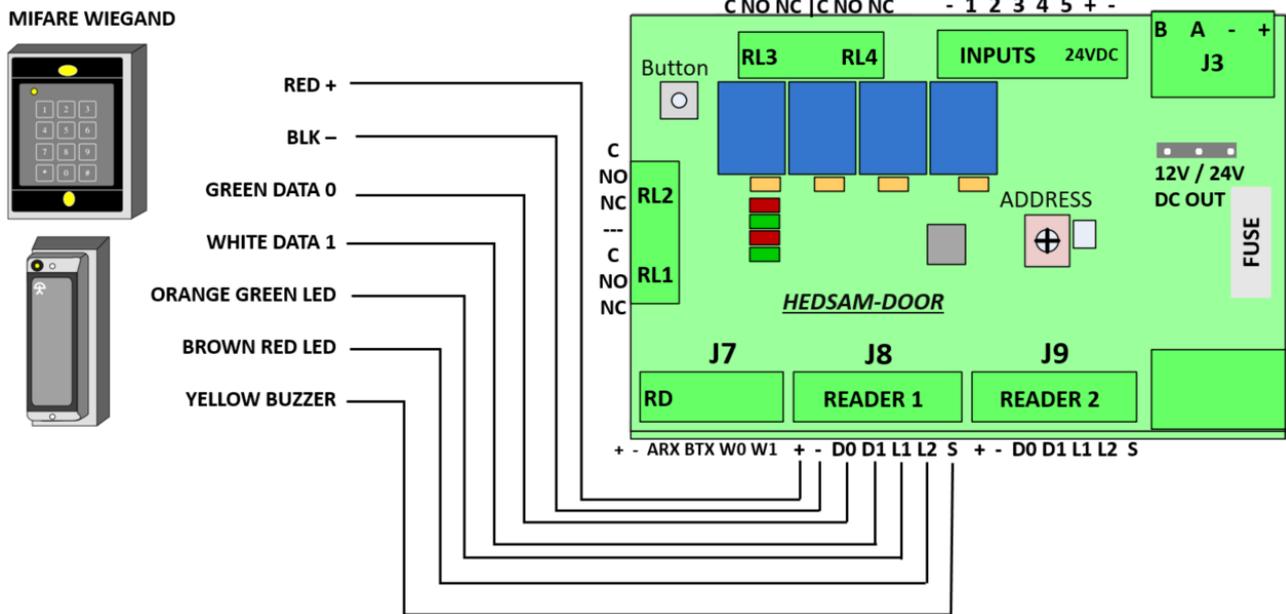
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Outputs / inputs connection

INPUTS	HEDSAM-DOOR
Activate input by shorten J2 (-) to J2 input 1 or 2 or 3 or 4 or 5:	J2 – (-) COMMON
	J2 – 1 INPUT
MAGNETIC CONTACT	J2 – 2 INPUT
LOCK BOLT	J2 – 3 INPUT
SAFTY LOCK BOLT	
MICRO SWITCH	J2 – 4 INPUT
OPEN DOOR BUTTON	J2 – 5 INPUT
LOCK	HEDSAM-DOOR RELAY 1-4
LOCK (+) 24VDC	J2 – (+) 24VDC (1A FUSE)
J6 – RL1 C	J2 – (-) 24VDC (1A FUSE)
J2 (-) 24VDC (1A FUSE)	J6 – RL1 C
LOCK (-) 24VDC	J6 – RL1 NO
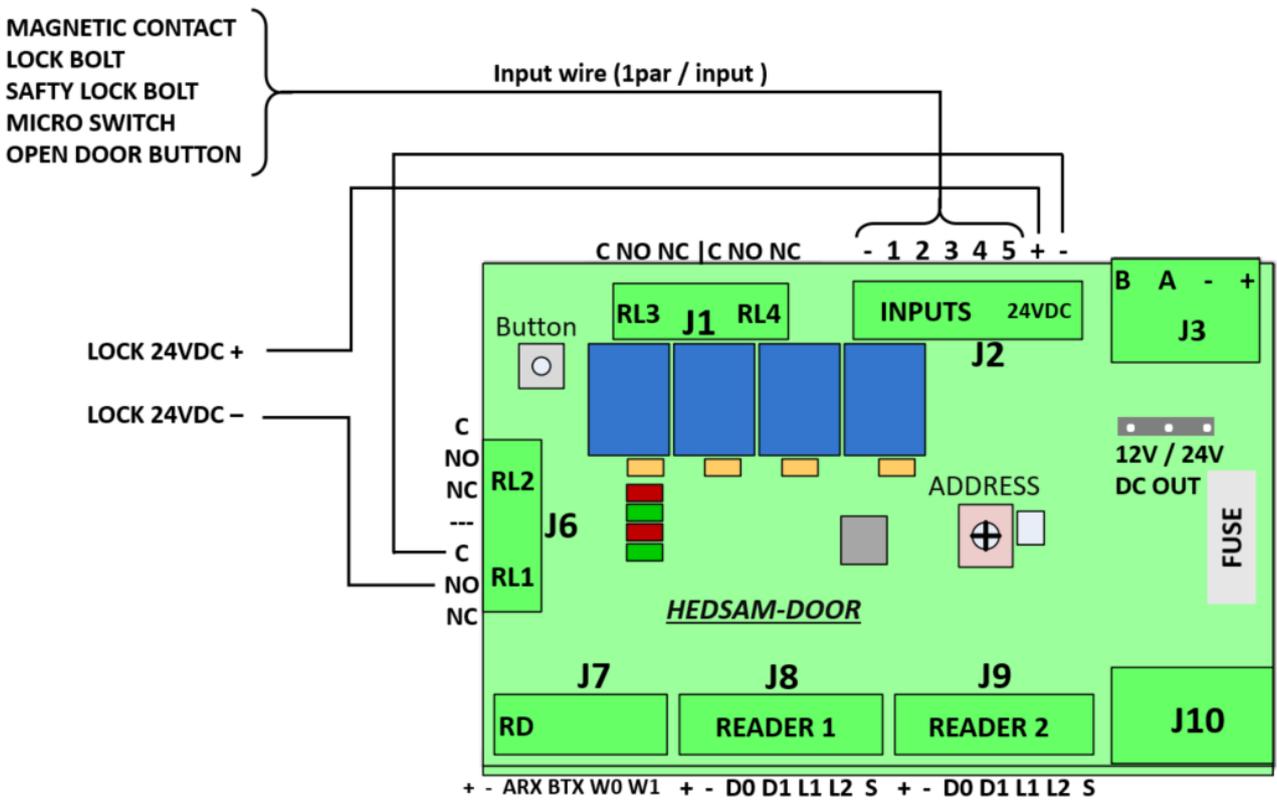
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Settings

HEDSAM-NODE

See above chapter "Change IP settings with key-nob/SET-button and on-board menu"

Key-nob hex dial S1	HEDSAM-NODE
To enter menu, double-click on SET-button.	
S1 – 0 to F	*0=node:sys* *1=ID (Set the same as IP.D)* *2=VERSION* *3=IP.A (192)* *4=IP.B (168)* *5=IP.C (0)* *6=IP.D (100)* *7=GW.A (192)* *8=GW.B (168)* *9=GW.C (0)* *A=GW.D (1)* *B=NETSZ/ (24)* *C= -* *D=FULL-RST* *E=MASTER-RST* *F=RESET*
S2 – 0 to F	Change settings
S3 – 0 to F	Change settings

Switch S4	HEDSAM-NODE
S4 – 1 / OFF	-
S4 – 2 / OFF	-
S4 – 3 / OFF	-
S4 – 4 / OFF	-

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HEDSAM-DOOR

Switch S2	HEDSAM-DOOR
S2 – 1 / OFF	Wiegand readers
S2 – 1 / ON	Serial readers
S2 – 2 / OFF	Wiegand data is byte-swapped
S2 – 2 / ON	Wiegand data is not byte-swapped

Key-nob hex dial S3	HEDSAM-DOOR
S3 – 0	Test Mode*
S3 – 1	Door address 1
S3 – 2	Door address 2
S3 – 3	Door address 3
S3 – 4	Door address 4
S3 – 5	Door address 5
S3 – 6	Door address 6
S3 – 7	Door address 7
S3 – 8	Door address 8

Test Mode:

The test mode is only applicable for the DOOR board, and may be specified by setting the hex dial to position zero (0). When the unit is run in this mode, inputs 1-4 are indicated by pulled relays 1-4 (and their associated LEDs). Input 5 is indicated by simultaneously pulled relays 1+2+3+4 (and their associated LEDs). A Wiegand identifier successfully read from reader #1 is indicated by pulled relays 1+2 and an identifier from reader #2 is indicated by pulled relays 3+4. Running in the test mode, the unit does not have a valid address, so the unit does not respond to requests from the NODE.

Jumper J4 12V/24V	HEDSAM-DOOR
J4 – 12V*	J7 DC OUT is 12VDC
J4 – 24V*	J7 DC OUT is 24VDC

NOTE:

The 24V/12V is printed wrong on HEDSAM-DOOR version 6 boards. The correct way is when jumper is set to 24V(to the left) = DC OUT is 12VDC and when jump is set to 12V(to the right) = DC OUT is 24VDC. This will be corrected in later versions!

HEDSAM-IN12

Key-nob hex dial S3	HEDSAM-IN12
S3 – 1	Door address 1
S3 – 2	Door address 2
S3 – 3	Door address 3
S3 – 4	Door address 4

HEDSAM-OUT12

Key-nob hex dial S3	HEDSAM-OUT12
S3 – 1	Door address 1
S3 – 2	Door address 2
S3 – 3	Door address 3
S3 – 4	Door address 4