

Specification

Contactless Card Reader (Type-A)

<i>KEC-4500ModBus</i>	<i>Mifare® & ISO-14443A</i>
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Kytronics Co.,Ltd

Overview

KEC-4500 are compact size of manual proximity type radio frequency card Read/Write module.

Features

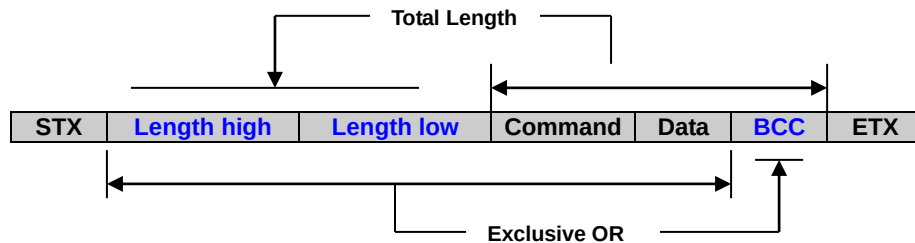
- Compact size module and ANT
- Card read/write frequency : 13.56 MHz
- Power consumption : DC 12 V
- Operating Temperature : -10°C ~ 70°C
- Storage Temperature : -25°C~ 80°C
- Serial communication controlled
RS485ModBus Communication Protocol :
(RS-485/9600/19200/38400/115200bps/8BIT/1STOP/NONE PARITY)
Default : 115200bps/8bit/none Parity.
RS232C ModBus Control Setting :
Default : 9600bps/8bit/none Parity.
- Based on ISO/IEC-14443A
- Available PICC (VICC) : Mifare® standard, ISO-14443A

1. RS232C Communication

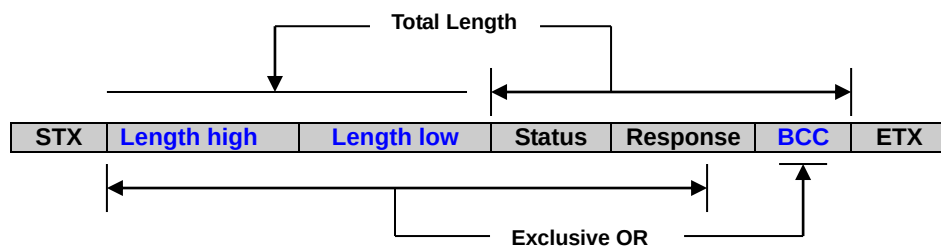
KEC-4500 initialization value is set using RS232C communication port.

Communication basic frame format

HOST → KEC-4500ModBus



KEC-4500ModBus → HOST



Response LIST

Status	Result	Remark
0x00	Command operating success	
0x01	Command operating error	
0x10	Command Undefined	
0x11	TimeOut	

Command LIST

Command	Hex	Remark
CmdGetVersion	0x30	
CmdSetDeviceAddress	0x31	
CmdSetRS485	0x32	
CmdCardDataHoldTime	0x33	
CmdGetInitValue	0x34	

1-1. CmdGetVersion

Host

STX	LEN HIGH	LEN low	0x30	BCC	ETX
1	1	1	1	1	1

Response

STX	LEN HIGH	LEN low	Status	KEC4500 Version	BCC	ETX
1	1	1	1	16Bytes	1	1

1-2. CmdSetDeviceAddress

Host

STX	LEN HIGH	LEN low	0x31	DeviceAddress	BCC	ETX
1	1	1	1	1Bytes	1	1

Response

STX	LEN HIGH	LEN low	Status	BCC	ETX
1	1	1	1	1	1

1-3. CmdSetRS485

Host

STX	LEN HIGH	LEN low	0x32	ModBusCommSpeed	BCC	ETX
1	1	1	1		1	1

RS484 CommSpeed	Speed	
0x00	2400bps	
0x01	4800bps	
0x02	9600bps	
0x03	19200bps	
0x04	38400bps	
0x05	115200bps	

Response

STX	LEN HIGH	LEN low	Status	BCC	ETX
1	1	1	1	1	1

1-4. CmdCardDataHoldTime

Host

STX	LEN HIGH	Length low	0x33	CardDataHoldTime	BCC	ETX
1	1	1	1	2Bytes	1	1

Response

STX	LEN HIGH	Length low	Status	BCC	ETX
1	1	1	1	1	1

 $((\text{CardDataHoldTime}[0]*256) + \text{CardDataHoldTime}[1])*10\text{msec}$
1-5. CmdGetInitValue

Host

STX	LEN HIGH	Length low	0x34	BCC	ETX
1	1	1	1	1	1

Response

STX	LEN HIGH	Length low	Status	ModBusInitalValue	BCC	ETX
1	1	1	1	4bytes	1	1

ModBusInitalValue

DeviceAddress	RS485 Speed	CardDataHoldTime
1bytes	1bytes	2bytes

2. KEC-4500 ModBus

2-1. ReadCardData (Read Input Register 0X04)

Host $\longrightarrow$ KEC-4500

DeviceAddress	FunctionCode	StartAddressHi	StartAddressLo	QuantityHi	QuantityLo	CRC
0x01	0x04	0x00	0x00	0x00	0x0a	0x70, 0xd

Ex) ** DeviceAddress= 0x01,

```
StartAddress= (StartAddressHi *256)+ StartAddressLo = 0x0000,
```

$$\text{Quantity} = (\text{QuantityHi} * 256) + \text{QuantityLo} = 0x000A$$

KEC-4500 **Host**

[illegible]
$$\text{ByteCount} = ((\text{QuantityHi} * 256) + \text{QuantityLo}) * 2$$

Ex) ** ** DeviceAddress= 0x01, Card UID 4Byte = 0x76,0x40,0x9b,0xf0

$$\text{PosSize} = (((\text{StartAddressHi} * 256) + \text{StartAddressLo}) * 2) + (((\text{QuantityHi} * 256) + \text{QuantityLo}) * 2)$$

```
if(PosSize >= 101){
```

```
// error handling
```

DeviceAddress	FunctionCode	ByteCount	CRC
0x01	0x84	0x02	0xC1, 0xC2

}

```
else{
```

```
// normal processing
```

```
ByteCount= (((QuantityHi*256) + QuantityLo) *2);
```

```
ModBusBufPos= (((StartAddressHi*256) + StartAddressLo)*2);    //ModBus Buffer Position
```

DeviceAddress	FunctionCode	ByteCount	Data	CRC
0x01	0x04	ByteCount	ModBusBuff[ModBusBufPos]	

}

[illegible]

Ex) UID 0X12, 0X34, 0X56,0X76

[illegible]

2-2. LED Red On(Write Single Coil 0X05)**LED Red On/ LED Blue Off**

Host → KEC-4500

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x01	0xff	0x00	0xdd,0xfa

KEC-4500 → Host

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x01	0xff	0x00	0xdd,0xfa

2-2. LED Blue On(Write Single Coil 0X05)**LED Red Off/ LED Blue On**

Host → KEC-4500

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x01	0x00	0x00	0x9c,0x0a

KEC-4500 → Host

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x01	0x00	0x00	0x9c,0x0a

Status= (OutValueHi*256)+ OutValueLo;

If(Status!=0){

RedLED_On_BlueLED_Off();

}

else{

BlueLED_On_RedLED_Off();

}

2-3. Buzzer On(Write Single Coil 0X05)

Host → KEC-4500

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x00	0xff	0x00	0x8c,0x3a

KEC-4500 → Host

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x00	0xff	0x00	0x8c, 0x3a

2-4. Buzzer On(Write Single Coil 0X05)

Host → KEC-4500

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x00	0x00	0x00	0xcd,0xca

KEC-4500 → Host

DeviceAddress	FunctionCode	OutPutAddressHi	OutPutAddressLo	OutValueHi	OutValueLo	CRC
0x01	0x05	0x00	0x00	0x00	0x00	0xcd, 0xca

2-5. Case Sensor On (Read Discrete Input 0X02)

Host → KEC-4500

DeviceAddress	FunctionCode	StartAddressHi	StartAddressLo	OutValueHi	QuantityLo	CRC
0x01	0x02	0x00	0x00	0x00	0x01	0xb9,0xca

KEC-4500 → Host

Case Open

DeviceAddress	FunctionCode	ByteCount	Data	CRC
0x01	0x02	0x01	0x01	0x60, 0x48

Case Close

DeviceAddress	FunctionCode	ByteCount	Data	CRC
0x01	0x02	0x01	0x00	0xa1, 0x88

2-6. DeviceAddressSet (Write Single Register 0X06)

Host → KEC-4500

DeviceAddress	FunctionCode	RegisterAddrHi	RegisterAddrLo	OutValueHi	OutValueLo	CRC
0x01	0x06	0x00	0x00	0x00	0x01	0x48,0x0a

DeviceAddress= OutValueLo;

** OutValueHi is always 0x00

KEC-4500 → Host

DeviceAddressSet Ok

DeviceAddress	FunctionCode	RegisterAddrHi	RegisterAddrLo	OutValueHi	OutValueLo	CRC
0x01	0x06	0x00	0x00	0x00	0x01	0x48,0x0a

DeviceAddress Fail

DeviceAddress	FunctionCode	ExceptionCode	CRC
0x01	0x86	0x02	0xc3, 0xa1

Changed values take effect immediately

2-7. RS485 Communication Speed (Write Single Register 0X06)

Host → KEC-4500

DeviceAddress	FunctionCode	RegisterAddrHi	RegisterAddrLo	OutValueHi	OutValueLo	CRC
0x01	0x06	0x00	0x01	0x00	0x05	0x18,0x09

Communication Speed= OutValueLo;

** OutValueHi is always 0x00

OutValueLo	Speed	
0x00	2400bps	
0x01	4800bps	
0x02	9600bps	
0x03	19200bps	
0x04	38400bps	
0x05	115200bps	

KEC-4500 → Host

DeviceAddressSet Ok

DeviceAddress	FunctionCode	RegisterAddrHi	RegisterAddrLo	OutValueHi	OutValueLo	CRC
0x01	0x06	0x00	0x01	0x00	0x05	0x18,0x09

DeviceAddress Fail

DeviceAddress	FunctionCode	ExceptionCode	CRC
0x01	0x86	0x02	0xc3, 0xa1

Changed values take effect immediately

2-8. Card Data Hold Time(Write Single Register 0X06)

Host → KEC-4500

DeviceAddress	FunctionCode	RegisterAddrHi	RegisterAddrLo	OutValueHi	OutValueLo	CRC
0x01	0x06	0x00	0x02	0x00	0x64	0x29,0xe1

CardDataHoldTime= (OutValueHi*256)+OutValueLo;

10msec/unit

Ex) 1 second when CardDataHoldTime=100

KEC-4500 → Host

DeviceAddressSet Ok

DeviceAddress	FunctionCode	RegisterAddrHi	RegisterAddrLo	OutValueHi	OutValueLo	CRC
0x01	0x06	0x00	0x02	0x00	0x64	0x29,0xe1

DeviceAddress Fail

DeviceAddress	FunctionCode	ExceptionCode	CRC
0x01	0x86	0x02	0xc3, 0xa1

Changed values take effect immediately

3. Input/Out Signal

3-1. BEEP

Input signal

When Low, Buzzer is On.

3-2. Tamper

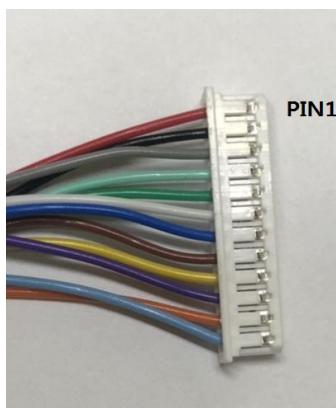
Output as LOW when Tamper Sensor is detected.

3-3. LED

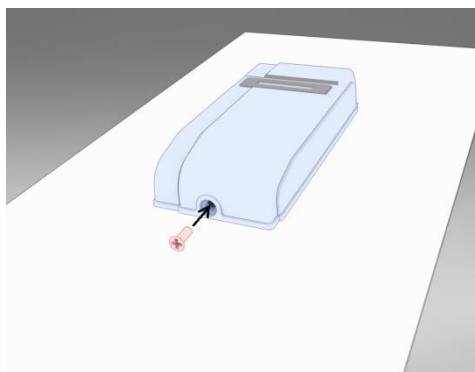
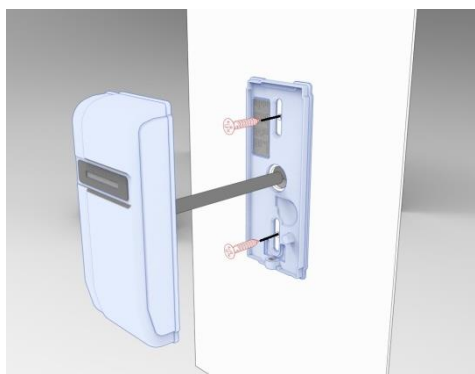
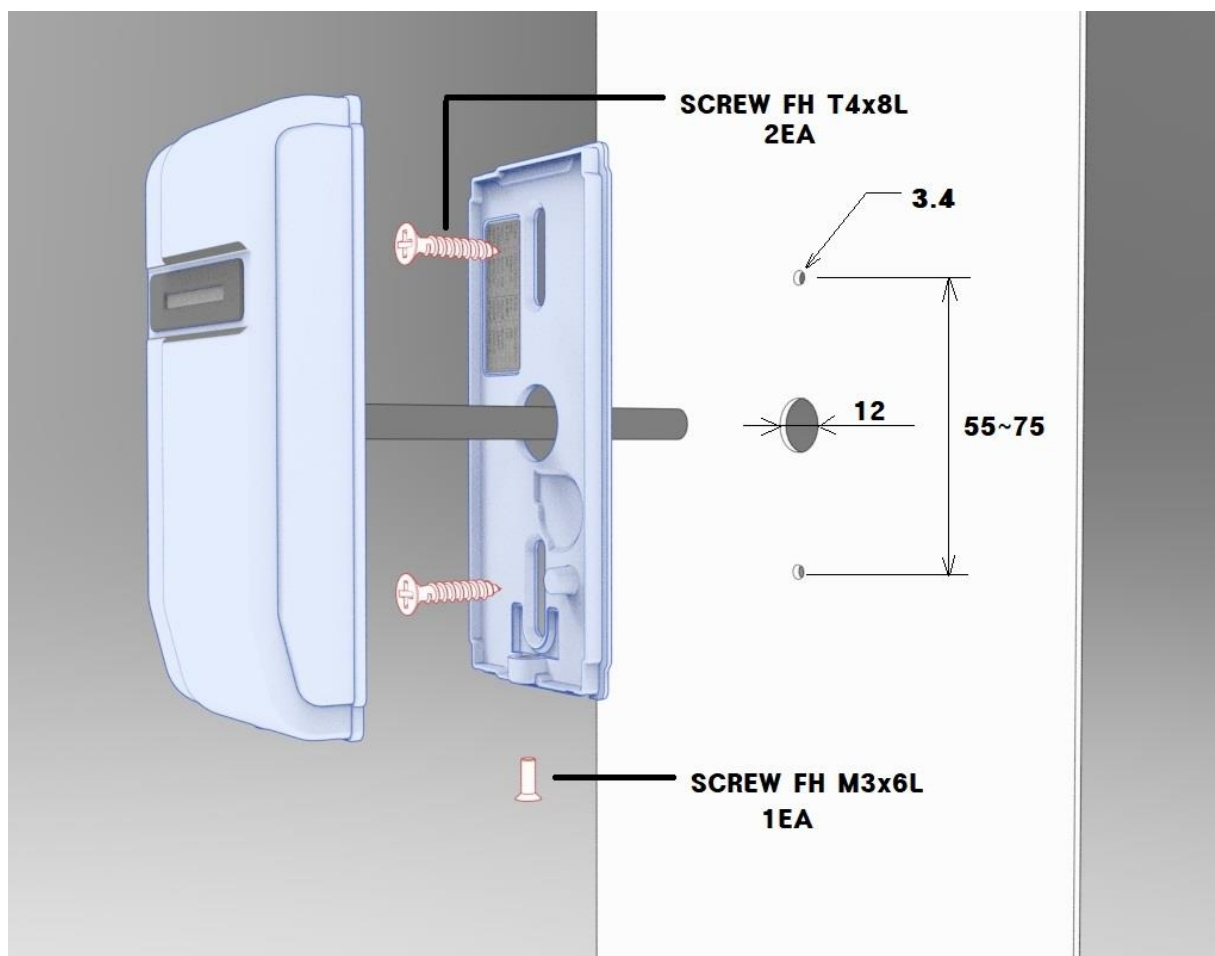
Input signal**When Low, Blue LED/ Red LED Blinking**

4. Connection

Color	PIN NO	Description		
Red	1	Power In	7~24VDC	
Black	2	GND		
Grey	3	RS232 RXD		RS232C Communication
White-Green	4	RS232 TXD		
Green	5	WIEGAND DATA0	5VDC HIGH:1mA	Output(no function)
White	6	WIEGAND DATA1	5VDC HIGH:1mA	Output(no function)
Blue	7	GND		
Brown	8	LED		
Yellow	9	BUZZER		
Purple(Violet)	10	TAMPER		
Orange	11	RS485+(A)		RS485 Communication
Sky Blue	12	RS485-(B)		



5. INSTALL GUIDE



FCC Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE:**FCC RF Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.