

MEASURING DISTANCE TYPE
 OBSTACLE DETECTION SENSOR
 PBS SERIES
 COMMUNICATION PROTOCOL
 SPECIFICATIONS

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Symbol	Amended reason			Pages	Date	Corrector	Amended No.
Approved by	Checked by	Drawn by	Designed by	Title	Obstacle Detection Sensor, PBS Series Communication Protocol Specifications		
				Drawing No.	C-42-3168	1/4	

1. Notice

This is a communication protocol between PBS and PC for the purpose of making each setting of PBS. This specifications is inside agreement and we don't open this protocol to general users. Distance data from PBS is raw data without filtering process and this data is including miss-measuring data by outer factor or sudden data transformation. If using distance data, take proper measures in your own responsibility after considering PBS's characteristics carefully. Also, this specification is subject to change without notice. We don't guarantee and support about this protocol and communication data.

2. Communication specifications

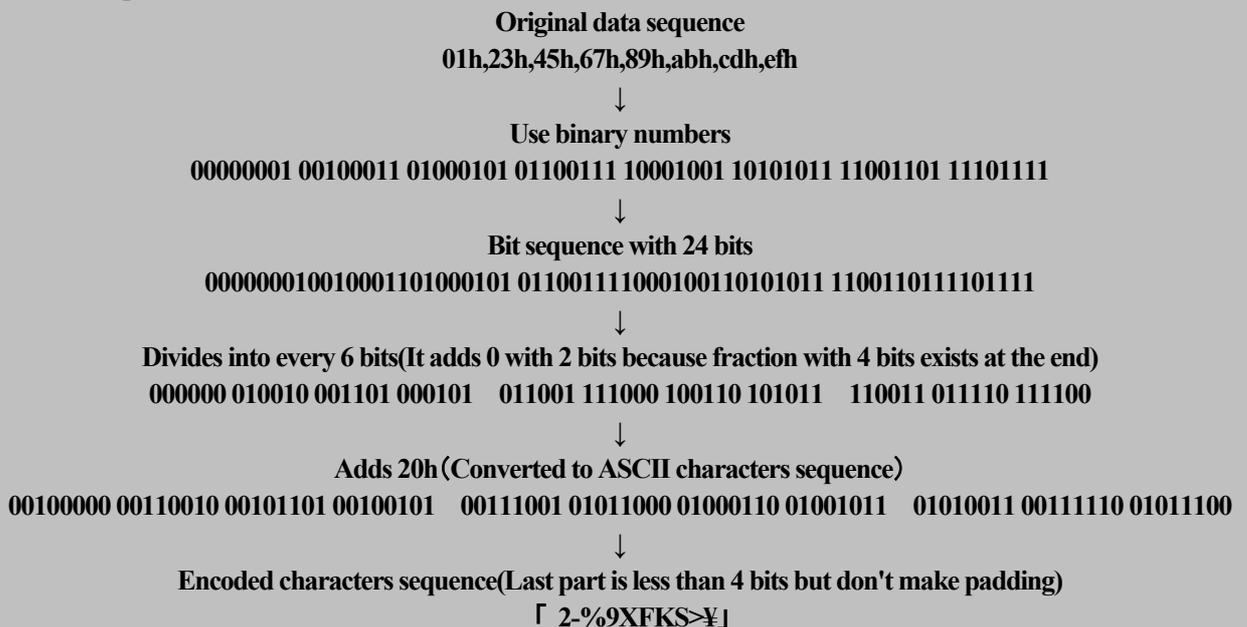
Communication system	RS-232C
Baud rate	57.6kbps
Parity	Non
Data bit	7 bit
Stop bit	1
Flow control	Non

3. Encoding

Due to communicate faster than PB9 series, PBS provides with higher baud rate and is encoding message with original system. This system is based on BASE64 and uuencode and encoding system is as follows:-

Binary 3 byte with 8 bits is thought to be bit sequence with 24 bits and this is divided into every 6 bits and it let be 4 byte of data. It adds 20h to each data and converts to characters sequence(ASCII). In case that binary data is less than 3 byte at encoding end, it adds 0 to the part with less than 6 bits of last data and after this data, don't make a padding such as BASE64 or uuencode

< For example >



Make a decoding by reverse procedure of encoding. It takes data with 3 byte out from 4 characters but in case of less than 4 characters at the data end, it takes only current numbers of characters including its numbers of characters out.(3 characters → 2 byte, 2 characters → 1 type)

4. Communication format

STX(02h)	Encoded message	ETX(03h)
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5. Message

* Link certified code acquisition

(PC ⇒ PBS)

Link command(A0h)	Acquisition(69h)	CRC(16 bits)
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(PBS ⇒ PC)

Link command(A0h)	Acquisition(69h)	Certified code generating data(8 byte)	CRC(16 bits)
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CRC(16 bits) of certified code generating data becomes link certified code

* Link certification

(PC ⇒ PBS)

Link command(A0h)	Setting(5ah)	Link level(1 byte)	Certified code(2 byte)	CRC(16 bits)
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(PBS ⇒ PC)

Link command(A0h)	Setting(5ah)	Link level(1 byte)	CRC(16 bits)
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Link level means 0 is interruption and 1 is usual

* Distance data acquisition

(PC ⇒ PBS)

Distance data command(A2h)	Acquisition(69h)	CRC(16 bits)
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(PBS ⇒ PC)

Distance data command(A2h)	Acquisition(69h)	Distance data 1(2 byte)	...	Distance data 121(2 byte)	← CRC(16 bits)

Unit of distance data : mm

F000h or more : Error(Error information on lower byte)

1 to 121 on distance data means one-line distance at each angle

6. CRC

A generating polynomial($X^{16} + X^{12} + X^5 + 1$) of CRC-CCITT is used for generation of CRC code. Also, it calculates as the LSB first.

7. Communication procedure

- First, it transmits link certified code acquisition command and receives certified code generating data. Then, it calculates CRC with 16 bits of this 8 byte data and let this be a certified code.
- After setting 1 as usual level to link level and numerical value which was calculated in item a) to certified code, it transmits link certified command. If link level for received link certified command is 1(Usual level), link is established. Due to keep link, it transmits link certified command with same certified code at a fixed interval again. PBS cuts link automatically when 3 sec. passed after receiving link certified command finally. In case that link is cut, redo acquisition of link certified code.

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c) If it transmits distance data acquisition command at the time of link established, it can receive distance data just before scanning. Even though it transmits distance data acquisition command at not link established, nothing from PBS transmit. Even though it transmits several distance data acquisition command within 1 scanning, PBS transmits distance data only once. Unit of distance data is mm. F000h or more is error and error information is stored into lower byte. 1 to 121 on distance data means one-line distance at each angle. When the angle looked at PBS from right above, rightmost of PBS becomes 0 degrees and in case that angle increases counter-clockwise, distance data 1 becomes -18 degrees and it increases with 1.8 degrees unit and distance data 121 Becomes 198 degrees.

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