

ABSOLUTE ROTARY ENCODER WITH CANOPEN INTERFACE

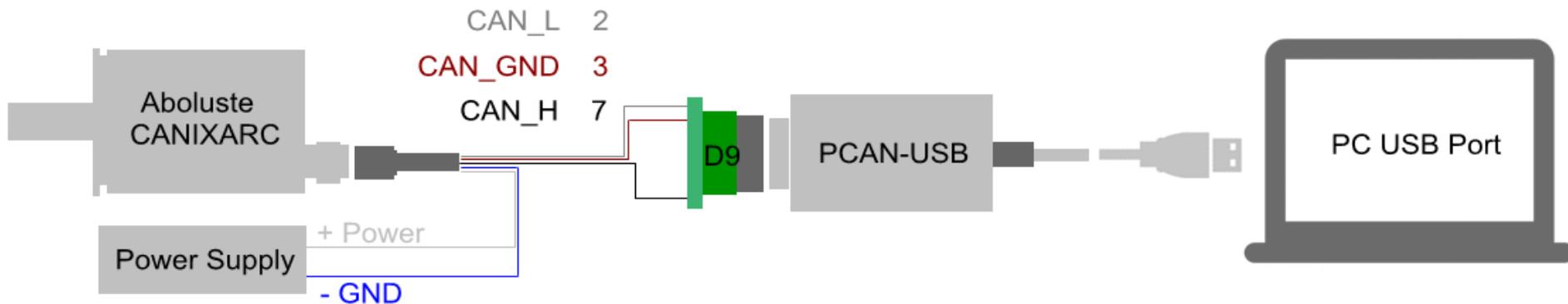


> Sample: MCD-CA00B-1212-R100-PAM

> Chapter1 Connections

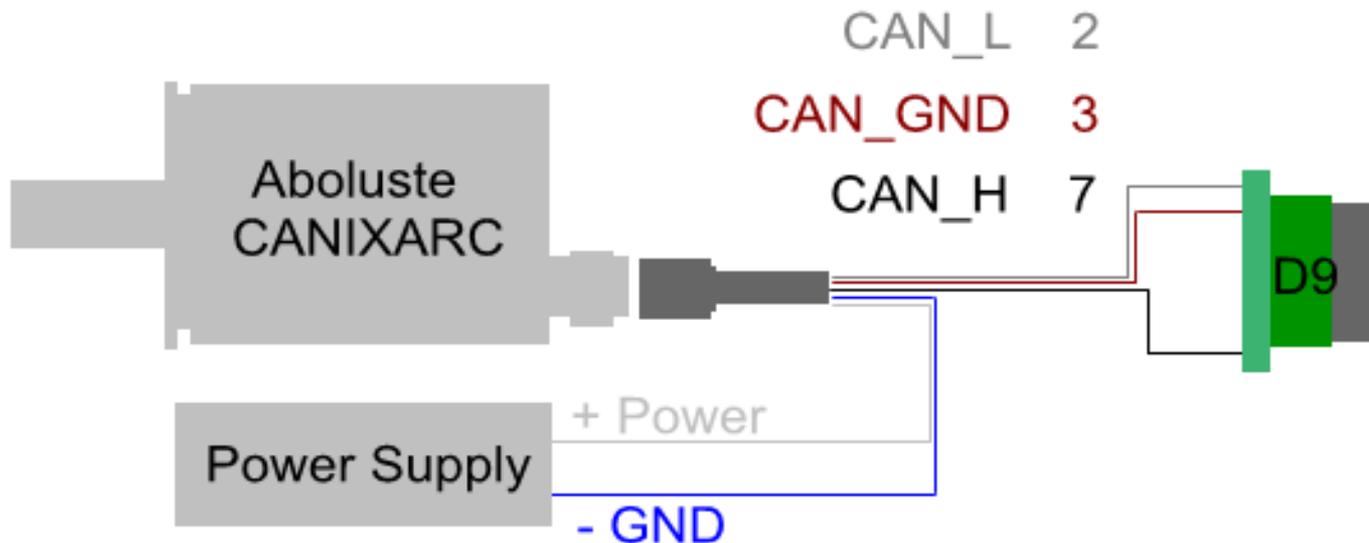
> 1.1 Setup

- > 1.1.1 Connect the encoder to Power Supply of 10-30 VDC.
- > 1.1.2 Connect cable pins to the terminal block.
- > 1.1.3 Plug the terminal block into the PCAN-USB module.
- > 1.1.4 Plug the USB port to a PC.
- > 1.1.5 Place a 100Ω resistance between CAN_H & CAN_L.
- > 1.1.6 Install an interface software in PC that supports PCAN-USB.



> 1.2 Pin Assignment

- > 1.2.1 White pin to power supply '+'. It is the power supply of the encoder.
- > 1.2.2 Blue pin to power supply '-'. It is the GND of the encoder.
- > 1.2.3 Grey pin to terminal 2 of the block. It is CAN_L.
- > 1.2.4 Brown pin to terminal 3 of the block. It is CAN_GND.
- > 1.2.5 Black pin to terminal 7 of the block. It is CAN_H.



> Chapter2 Configuration

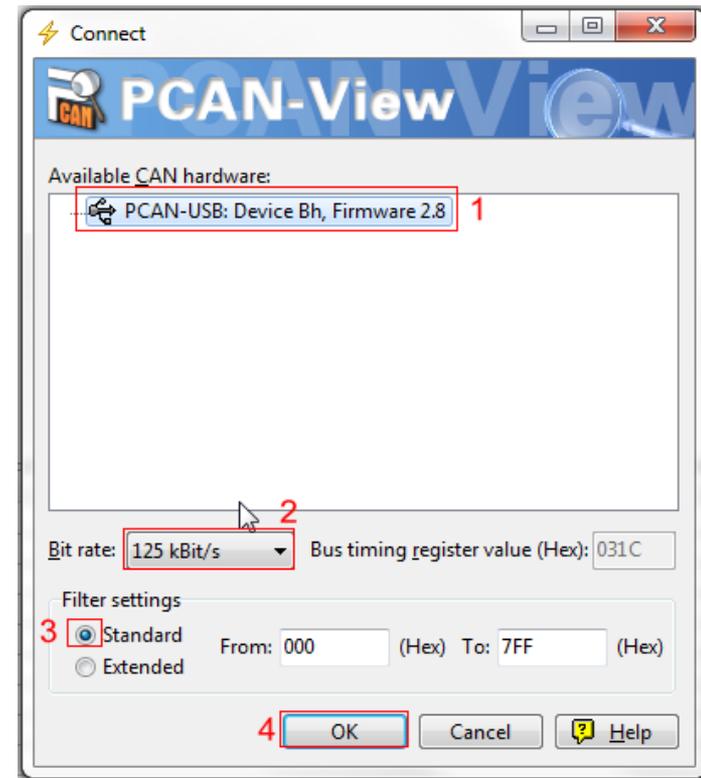
> 2.1 Start Up

> 2.1.1 Open the terminal software: 'PcanView.exe'.



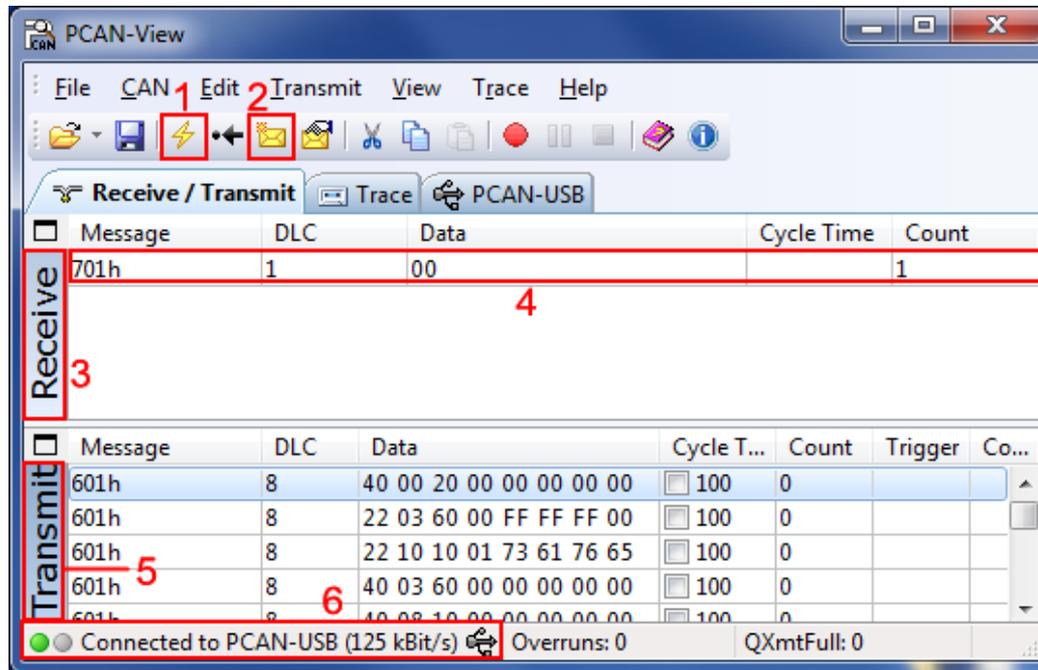
> 2.1.2 The initial figure, 'Connect' window.

- > 1. It recognizes the port automatically.
- > 2. Choose the 'Bit rate'. Default 125 kBit/s.
- > 3. Switch the Filter settings to Standard.
- > 4. Press 'OK' to connect and start configuration.



> 2.1.3 PCAN-View Interface Introduction

- > 1. Click on the button to pop up the 'Connect' window. (Ctrl+B)
- > 2. Click on the button to pop up the 'New Message' window. (Ins)
- > 3. Received messages are displayed in the 'Receive' column.
- > 4. It is the boot up message of the encoder.
- > 5. Commands are displayed in the 'Transmit' column.
- > 6. Shows that the encoder is connected at the Baud rate of 125 kBit/s.



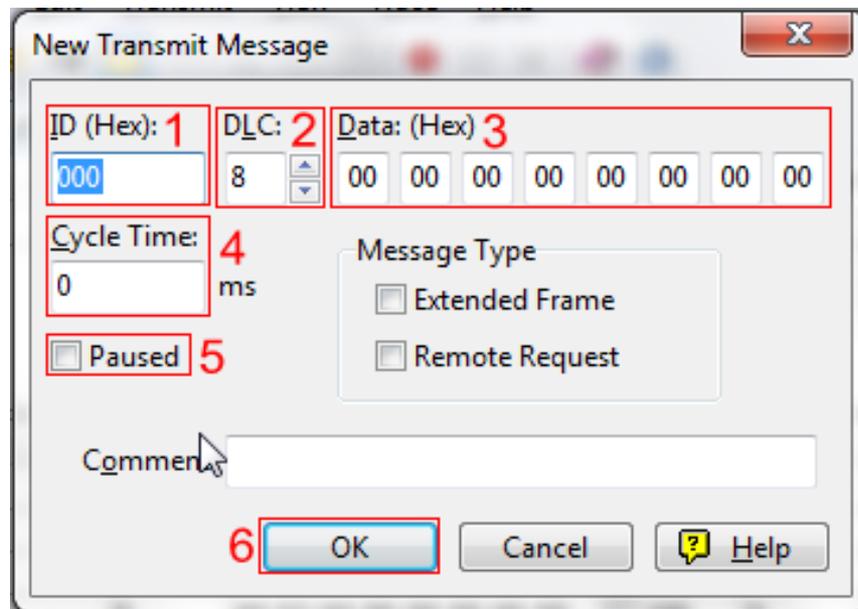
The screenshot shows the PCAN-View software interface. The menu bar includes File, CAN, Edit, Transmit, View, Trace, and Help. The toolbar contains icons for file operations and connection management. The main window is divided into two sections: 'Receive / Transmit' and 'Trace'. The 'Receive / Transmit' section is further divided into 'Receive' and 'Transmit' columns. The 'Receive' column shows a single message with ID 701h, DLC 1, and data 00. The 'Transmit' column shows multiple messages with IDs 601h and DLC 8. The status bar at the bottom indicates 'Connected to PCAN-USB (125 kBit/s)' and 'Overruns: 0'.

Message	DLC	Data	Cycle Time	Count
701h	1	00		1

Message	DLC	Data	Cycle T...	Count	Trigger	Co...
601h	8	40 00 20 00 00 00 00 00	100	0		
601h	8	22 03 60 00 FF FF FF 00	100	0		
601h	8	22 10 10 01 73 61 76 65	100	0		
601h	8	40 03 60 00 00 00 00 00	100	0		
601h	8	40 03 60 00 00 00 00 00	100	0		

Connected to PCAN-USB (125 kBit/s) Overruns: 0 QXmtFull: 0

- > 2.1.4 The 'New Transmit Message' window introduction
 - > 1. Type in '600 + NN'. E.g. 'NN=1', type in '601', which means '601h'.
 - > 2. DLC: means digital length, range 0~8.
 - > 3. Data: 2 bits each digital in Hex.
 - > 4. Cycle Time: type in figure, unit 'ms'. E.g. '100ms' means 10 times in 1 second.
 - > 5. Click on to pause message transmitting.
 - > 6. Click to add the message into the 'Transmit' column.



The screenshot shows the 'New Transmit Message' dialog box with the following fields and controls:

- ID (Hex):** 1. A text box containing '000'.
- DLC:** 2. A spinner box set to '8'.
- Data: (Hex):** 3. A row of ten text boxes, each containing '00'.
- Cycle Time:** 4. A text box containing '0' with 'ms' below it.
- Paused:** 5. A checkbox that is currently unchecked.
- Message Type:** A group box containing two checkboxes: 'Extended Frame' and 'Remote Request', both of which are unchecked.
- Comments:** A text area at the bottom.
- Buttons:** 'OK', 'Cancel', and 'Help' (with a question mark icon) are located at the bottom right.

Red boxes and numbers 1 through 6 are overlaid on the image to highlight these specific elements.

> 2.2 Type in Message

Data: (Hex)

00	00	00	00	00	00	00	00
0	1	2	3	4	5	6	7

> 2.2.1 Bit 0

- > 1. '40': Read commands.
- > 2. '22': Write commands.

> 2.2.2 Bit 1 & 2

- > 2000h: Read Position Value. Bit 0: 40. Bit 1: 00. Bit 2: 20. (Same function with '6004h')
- > 2101h: Read Resolution Per Revolution. Bit 0: 40. Bit 1: 01. Bit 2: 21.
- > 2102h: Read Total Resolution. Bit 0: 40. Bit 1: 02. Bit 2: 21.
- > 650Bh: Read Serial Number. Bit 0: 40. Bit 1: 0B. Bit 2: 65.
- > 6003h: Read Preset Value. Bit 0: 40. Bit 1: 03. Bit 2: 60.
- > 3000h: Change Node Number. Bit 0: 22. Bit 1: 00. Bit 2: 30. Bit 4: NN.
- > 3001h: Change Baud Rates. Bit 0: 22. Bit 1: 01. Bit 2: 30. Bit 4: BR.
- > 2300h: Save. Bit 0 ~7: 22 00 23 00 55 AA AA 55

> 2.3 Receive Message

> 2.3.1 Resolution Per Revolution

```
43 01 21 00 00 10 00 00
```

Bit 4 ~ Bit 7 are the message, '00 10 00 00'. You should read in big Endian.
It is '00 00 10 00' in Hex, also '10 00' in Hex. Equals '4096' in Dec, also '2¹²'.

> 2.3.2 Total Resolution

```
43 02 21 00 00 00 00 01
```

Bit 4 ~ Bit 7 are the message, '00 00 00 01'. You should read in big Endian.
It is '01 00 00 00' in Hex, also '1 00 00 00' in Hex. Equals '4096*4096' in Dec,
also '(2¹²)*(2¹²)', Resolution*Revolution.

> 2.3.3 Position Value

```
43 00 20 00 80 DE FF 00
```

Bit 4 ~ Bit 7 are the message, '80 DE FF 00'. You should read in big Endian.
It is '00 FF DE 80' in Hex, also 'FF DE 80' in Hex. Equals 16764928 in Dec, also 4093*4096.
The exact position is calculated: $360^\circ / 4096 * 4093 = 359.74^\circ$
So the position value is: 359.74° at 4096 round.

> 2.4 Programmable Parameters

> 2.4.1 Preset Function

- > Preset function enables to set any position as the initial position. Input message of the preset value in the red block, range from '00 00 00 00' to 'FF FF FF 00' in big Endian .

Data: (Hex)

22	03	60	00	AA	BB	CC	00
----	----	----	----	----	----	----	----

601h	8	22 03 60 00 AA BB CC 00
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> 2.4.2 Change Node Number

- > Input the message of Change Node Number like below. Type in the NN you want to change to in the red block in Hex. E.g. '00h' means NN=00+01=01 in decimal. And save after change.

Data: (Hex)

22	00	30	00	00	00	00	00
----	----	----	----	----	----	----	----

601h	8	22 00 30 00 00 00 00 00
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> 2.4.3 Change Baud Rate

- > Input the message of Change Baud Rate like below. Type in the BR code of the specific baud rate you want to change to in the red block in Hex. See table on the right. And please save after change.

Data: (Hex)

22	01	30	00	03	00	00	00
----	----	----	----	----	----	----	----

601h	8	22 01 30 00 03 00 00 00
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Baudrate in kBit/s	Byte
20	00h
50	01h
100	02h
125	03h
250	04h
500	05h
800	06h
1000	07h

> Chapter3 Tips

- > 3.1 Please save after programmable parameters changed with the command of 2300h.
- > 3.2 Please re-power the encoder after new baud rate set and node number changed.
- > 3.3 Please re-connect in the software after the encoder restarted.
- > 3.4 Messages are required in big Endian.
- > 3.5 Read the position value and other data in big Endian.
- > 3.6 Check the baud rate, if the bus is active but no boot up message.
- > 3.7 Start-operational mode and Pre-operational mode, please refer to the [Manual](#), on page 10.

