

Brief Manual of EK-100SL

for CxHy-D3, S3, LD/LF series

Ver. 1.33

ELT SENSOR

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I. System Configuration and Pin-maps of EK-100SL

II. ELTWSD program's menu

II. ELTWSD menu for Firmware upgrade, Calibration,

➤ CxHy-S3(-3V) : Single channel sensor with LEL 100%

➤ CxHy-D3(-3V) : Dual channel sensor with LEL 100%

➤ CxHy-LD/LF-3V : Dual channel sensor with LEL 100%

or 5,000PPM

I. Usage

This user guide functions as a tutorial to introduce the various Sensor Module and tools that are part of the ELT SM(Sensor Module) development system.

The ELT SM parts and the evaluation boards referenced in this tutorial guide are shown in Table 1. The tools described in this user guide are listed in Table 2.

Table 1. ELT Sensor Module parts and Evaluation Boards

Parts (Sensor Module)			Evaluation Board
Type	(3.3VDC)	(5VDC)	
CxHy-S3(-3V) series	CxHy-S3-3V	CxHy-S3	EK-100SL
CxHy-D3(-3V) series	CxHy-D3-3V	CxHy-D3	
CxHy-LD/LF-3V series	CxHy-LD-3V, CxHy-LF-3V		

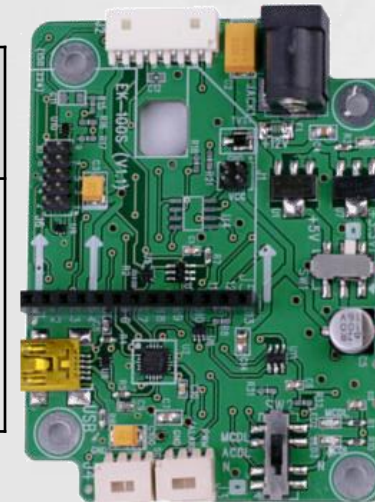


Figure 1. EK-100S Evaluation Board

Table 2. Software Tools

Tool	Executable	Function
Windows Serial Downloader (WSD)	ELTWSD_EK100.exe	The ELTWSD_EK100 is a Windows® software program developed by ELT SENSOR, Corp., that allows you to serially download standard Intel HEX files created by the ASM51 assembler to the Micro Converter while in circuit.

System Configuration

A. mini USB Cable

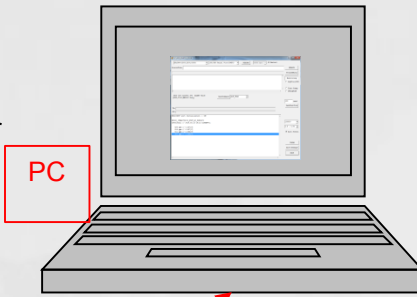
- A1. USB type A Plug
- A2. USB mini-B Connector

B. EK-100S Evaluation Board

- B1. mini USB Port
- B2. CO₂ ppm output to LCD display
- B3. DC Jack

C. AC/DC Adaptor

- C1. AC Plug
- C2. DC Plug



A1

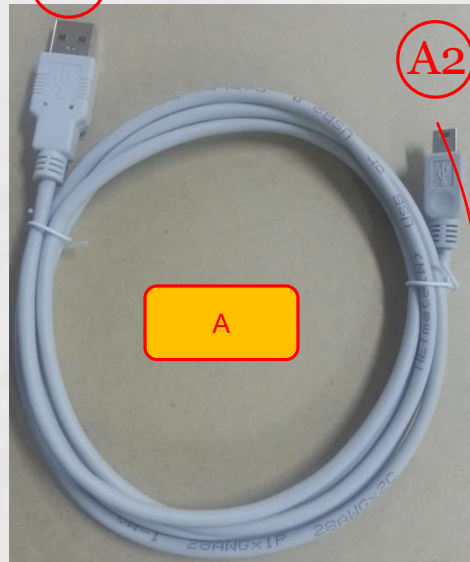
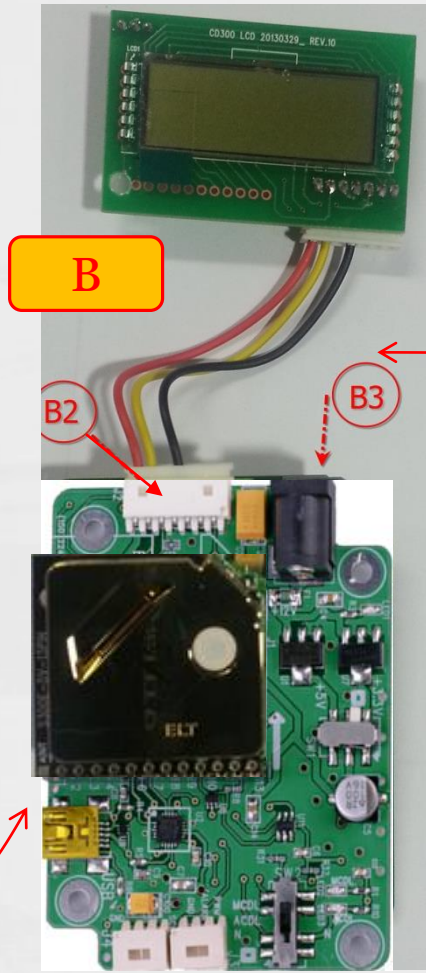


Figure 2. EK-100SL Evaluation Kit (for S-series)



B

B2

B3

C1

C2



C

AC/DC POWER Adaptor
(12VDC / over 0.5A)

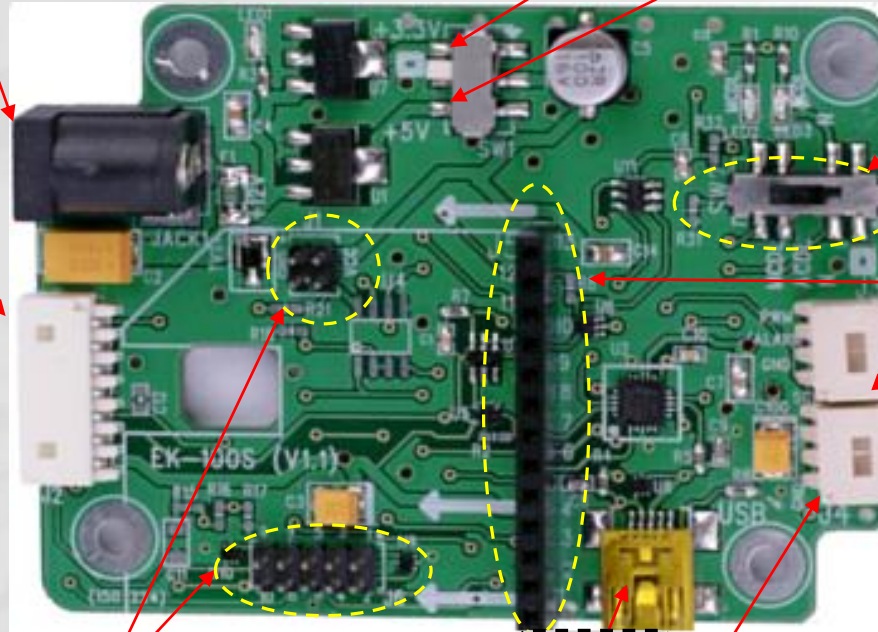
Pin-map of EK-100SL Board (Top Side)

< Operating Voltage selection switch (SW1) >

DCV	Position	Input Voatage
3.3V	Right	(DC12V)
5V	Left	(DC12V)

< Input Power (JACK1) >

Pin	remarks
1	GND
2	+12V



< Calibration Selection switch (SW2) >

SW2	Left	2nd	Right
Function	MCDL	ACDL	OFF

< LCD Connector (J2) >

Pin	remarks
1	AOUT
2	#RESET
3	#PSEN
4	GND
5	RXD
6	TXD
7	VCC

J5 } 13pin side hole Connector (J4) >

Pin	Remarks
1	AOUT or TTL 2 nd Alarm
2	1 st Alarm (Open Collector)
3	GND
4	V _{DD} (+5V VCC)
5	TTL TXD (→ CPU of Master B' d)
6	TTL RXD (← CPU of Master B' d)
7	2 nd Alarm or PWM
8	I2C SCL
9	I2C SDA
10	Reset (Low Active)
11	ACDL (or Ø_CAL for D300)
12	#PSEN
13	10 min. MCDL (Zero Calibration: 10min. or 2 min.)

J1&J6 : Sensor module install/de-install socket

< S-series Sensor Socket >
 (5Vdc) : CxHy-S3, D3
 (3.3 Vdc) : CxHy-S3/D3/LD/LF-3V

< I2C Connector (J4) >

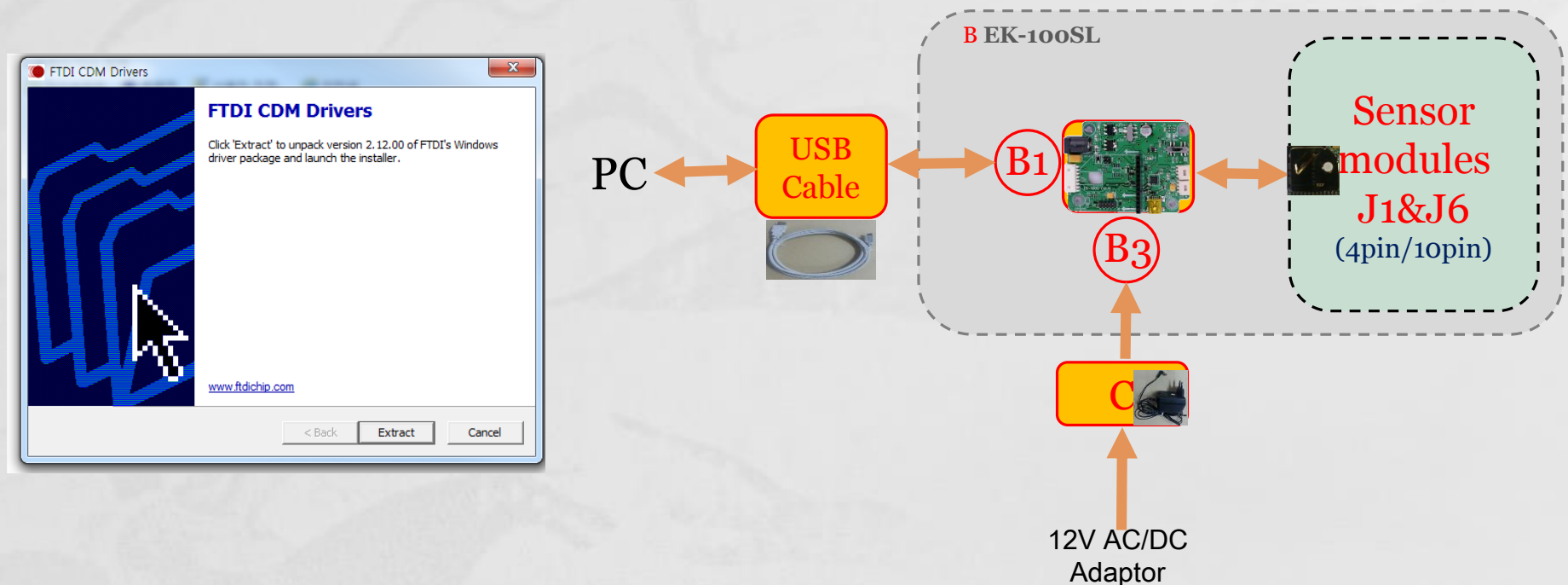
Pin	Signal
1	SCL
2	SDA
3	GND

< Output Connector (J3) >

Pin	Signal
1	PWM
2	/ALARM
3	GND

Sensor recognition on ELTWSD program

- ① Install SENSOR Module ([Ex.] CxHy-S3) on the EK-100SL **(B)**
- ② Set Switch **[SW1]** following **Sensor's Voltage** 3.3V/5VDC
- ③ Connect 12VDC adapter **(C)** to EK-100SL.
- ④ Turn on power and check if white-colored filter blinks
- ⑤ Connect USB Cable **(A)** between < PC & EK-100SL Evaluation Board **(B1)** >
- ⑥ Execute ELTWSD_EK100.exe. -> Install USB driver 'FTDI COM driver' when computer can't recognize EK-100 hardware.
-> Driver can be installed by executing 'CDM v2.12.06 WHQL Certified.exe (32bit or 64bit).



IV. Function of Windows

The screenshot shows the ELTWS configuration software interface. At the top, the window title is "ELTWSD_EK100_20181105_162138". Below the title bar, there are several controls: a dropdown menu for "ADuc848 (D300,H250,CH Seri:", a dropdown for "[3]EK100_V1.0 (SN000001)", a "RESCAN" button, a "38400 bps" dropdown, and a checked "Restart" checkbox. The "SourceFile:" field contains the text "Download S/W filename window (use when change F/W)". Below this is a large text area labeled "Command typing window (use to verify at Vendor)". Underneath the text area is a "SendCommand" button. The "[Offset Adjustment]" section includes a checked "Update" checkbox, "Current PPM:" and "Target PPM:" fields both set to "0", and buttons for "Write Value", "ReCalc RESET", and "Read Value". The "TX:" and "RX:" fields are both empty. The main log area displays the following text: "The EK100_V1.0 is initialized to 0x05", "MSG>COM3 port Initialization -- OK!", "C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4", "ID9530I991 // 2019.05.30 18:54 LOADER=91", and three lines of "0 ppm // 0.000[V]". The third line is highlighted in blue. A callout box labeled "Firmware download status windows" points to the TX and RX fields. Another callout box labeled "Monitoring windows for Users to verify" points to the log area. On the right side, there is a vertical toolbar with buttons for "SEARCH", "Programming", "Monitoring", "<LogInterval> All-Data", "LogFile (CSV)", "Time Stamp", "DebugMode", "SendTextFile", "5000", "0 - 5V", "Auto Scroll", "CLEAR", "Save Message", and "EXIT".

IV. Function of Menu

The screenshot shows the ELTWS software interface with the following annotated components:

- S/W version**: Points to the window title bar.
- ADuc848 (D300, H250, CH Seri: [3]EK100_V1.0 (SN000001)**: Points to the device selection dropdown.
- RESCAN**: Points to the RESCAN button.
- 38400 bps**: Points to the Baud Rate dropdown.
- Restart**: Points to the Restart checkbox.
- SourceFile:**: Points to the SourceFile input field.
- select USB port**: Points to the USB port selection dropdown.
- Select Sensor module's MPU**: Points to the MPU selection dropdown.
- Baud Rate**: Points to the Baud Rate dropdown.
- Search F/W on PC**: Points to the SEARCH button.
- F/W Download CMD**: Points to the Programming button.
- Monitoring Sensing values**: Points to the Monitoring button.
- Set Monitoring Period**: Points to the <LogInterval> dropdown.
- measured data saving**: Points to the LogFile (CSV) checkbox.
- measured time record**: Points to the Time Stamp checkbox.
- only for Vendor's use**: Points to the DebugMode checkbox.
- SendCommand**: Points to the SendCommand button.
- Update**: Points to the Update checkbox.
- Current PPM: 0**: Points to the Current PPM input field.
- Target PPM: 0**: Points to the Target PPM input field.
- Write Value**: Points to the Write Value button.
- ReCalc RESET**: Points to the ReCalc RESET button.
- N/A**: Points to the N/A input field.
- Read Value**: Points to the Read Value button.
- SendTextFile**: Points to the SendTextFile button.
- TX:**: Points to the TX input field.
- RX:**: Points to the RX input field.
- ppm measurement range**: Points to the ppm measurement range dropdown.
- Analogue voltage proportional to output range**: Points to the Analogue voltage proportional to output range dropdown.
- automatic scroll down as monitors**: Points to the Auto Scroll checkbox.
- Clear monitored window**: Points to the CLEAR button.
- Manual saving the monitored data**: Points to the Save Message button.
- Close s/w**: Points to the EXIT button.

The main window content displays the following text:

```
The EK100_V1.0 is initialized to 0x05
MSG>COM3 port Initialization -- OK!

C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4
ID9530I991 // 2019.05.30 18:54 LOADER=91

0 ppm // 0.000[V]
0 ppm // 0.000[V]
0 ppm // 0.000[V]
```


IV. Target ppm usage

The screenshot shows the ELTWS software interface for device ELTWSD_EK100_20181105_162138. The interface includes a top bar with device information and a 'RESCAN' button. Below this is a 'SourceFile' field and a 'SendCommand' button. A dropdown menu is open, listing various commands such as 'CLEAR RECAL', 'CAL1_START(400 PPM)', 'CAL1_STOP', 'CAL2_START(0 PPM)', 'CAL2_STOP', 'SLEEP_START', 'SLEEP_AWAKE', 'ALM_READ', 'ALM_LOW', 'ALM_HIGH', 'Target_PPM', 'UART_SPEED', 'OUT_PPM', and 'OUT_LEL/%'. The 'Target_PPM' command is highlighted in blue. Annotations with arrows point to the 'SendCommand' button, the 'Target_PPM' command in the menu, and the 'Target PPM' input field in the 'Offset Adjustment' section. The 'Offset Adjustment' section also includes 'Update', 'Current PPM', 'Target PPM', 'Write Value', 'ReCalc RESET', and 'Read Value' buttons. The 'Target PPM' field is currently set to 0. The interface also features a 'SEARCH' button, a 'Programming' section with 'Monitoring' and '<LogInterval>' options, and a 'SendTextFile' button. The bottom section shows a terminal window with the following text: 'The EK100_V1.0 is initialized to 0x05', 'MSG>COM3 port Initialization -- OK!', 'C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4', 'ID9530I991 // 2019.05.30 18:54 LOADER=91', and three lines of '0 ppm // 0.000[V]'. The third line is highlighted in blue. On the right side, there are input fields for '5000' and '0 - 5V', a checked 'Auto Scroll' option, and buttons for 'CLEAR', 'Save Message', and 'EXIT'.

Command button Menu

Execute command

choose command to be executed

Present measurement

Insert Real value from reference sensor or standard gas value

Return to Factory calibration

Verify Factory Calibration

'Target PPM' should be chosen and executed by pressing 'Send Command' button

IV. ELTWSD_EK100.exe usage for CxHy-S3 / D3

The screenshot shows the ELTWSD_EK100_20181105_162138 application window. The interface includes a top toolbar with a 'RESCAN' button, a baud rate dropdown set to '38400 bps', and a 'Restart' checkbox. Below this is a 'SourceFile:' field. The main area contains a 'SendCommand' button and an 'Offset Adjustment' section with 'Update', 'Current PPM', and 'Target PPM' fields, along with 'Write Value', 'ReCalc RESET', and 'Read Value' buttons. A terminal window at the bottom displays initialization messages and real-time ppm data. On the right, a sidebar contains 'SEARCH', 'Programming', 'Monitoring', and 'LogFile (CSV)' options, along with 'LogInterval', 'Time Stamp', 'DebugMode', and 'Auto Scroll' settings.

① Choose 'ADuc848 (D300,H250,CH series)'

② Rescan and choose 'EK100_V1.0(SNxxxxxxx)'

③ Click 'Monitoring'

④ Measured data comes and scroll down

✓ ⑤ check 'LogFile(CSV) ; default saving directory is where execute 'ELTWSD_EK100.exe'

IV. ELTWSD_EK100.exe usage for Zero ppm Calibration

The screenshot shows the ELTWSD_EK100 software interface. At the top, there are dropdown menus for 'ADuc848 (D300,H250,CH Seri...' and '[3]EK100_V1.0 (SN000001)', along with a 'RESCAN' button and a '38400' value. Below this is a 'SourceFile:' field. A central panel displays a list of commands: CLEAR_RECAL, CAL1_START(400 PPM), CAL1_STOP, CAL2_START(0 PPM), CAL2_STOP, SLEEP_START, SLEEP_AWAKE, ALM_READ, ALM_LOW, ALM_HIGH, Target PPM, UART SPEED, OUT PPM, and OUT LEL/%. A 'SendCommand' button with a hand icon is positioned to the right of this list. To the right of the interface, there are buttons for 'Programming', 'Monitoring', '<LogInte...', 'All-Data', and 'SendTextFile'. Below these are checkboxes for 'LogFile (CSV)', 'Time Stamp', and 'DebugMode'. At the bottom right, there is a '0 - 5V' dropdown, a checked 'Auto Scroll' checkbox, and buttons for 'CLEAR', 'Save Message', and 'EXIT'. The bottom section of the interface shows a terminal window with the following text: '[Offset Adjustment]', 'Update' checked, 'Current PPM: 0', 'Target PPM: 0', 'Write Value', 'ReCalc RESET', 'N/A', 'Read Value', 'TX:', 'RX:', 'The EK100_V1.0 is initialized to 0x05', 'MSG>COM3 port Initialization -- OK!', 'C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4', 'ID9530I991 // 2019.05.30 18:54 LOADER=91', and three lines of '0 ppm // 0.000[V]'. The third line is highlighted in blue.

② Locate EK-100SL into chamber (like CMB-10L) and connect to USB port of PC. and insert CxHy standard gas. then, click to open combo-box and chose 'CAL2 START (0 PPM)'

③ Press 'SendCommand' button and wait 3 minutes.

① Click 'Monitoring'

⑤ As measured value became '0 ppm', press 'CAL2_STOP' button.

⑥ unpress and press 'Monitoring' button to verify if '0 ppm' comes,again.

V. ELTWSD_EK100.exe Target ppm without STD gas (#1)

The screenshot shows the ELTWSD_EK100 software interface. The window title is "ELTWSD_EK100_20181105_162138". The interface includes a top menu bar with "ADuc848 (D300,H250,CH Seri..." and "[3]EK100_V1.0(SN000001)", a "RESCAN" button, and a "384" value. Below this is a "SourceFile:" field. A central panel displays a list of commands: CLEAR_RECAL, CAL1_START(400 PPM), CAL1_STOP, CAL2_START(0 PPM), CAL2_STOP, SLEEP_START, SLEEP_AWAKE, ALM_READ, ALM_LOW, ALM_HIGH, Target_PPM, and UART_SPEED. A "SendCommand" button is located to the right of this list. Below the command list is a "SendCommand" dropdown menu with "OUT PPM" and "OUT LEL/%" options. A "Present measurement" label points to a "SendCommand" button. A "Write Value" button is located below the "SendCommand" dropdown. The interface also features a "Target PPM:" field with a value of "0" and a "Read Value" button. A "TX:" and "RX:" field is present. The bottom section shows a terminal window with the following text: "The EK100_V1.0 is initialized to 0x05", "MSG>COM3 port Initialization -- OK!", "C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4", "ID9530I991 // 2019.05.30 18:54 LOADER=91", and three lines of "0 ppm // 0.000[V]". On the right side, there are several buttons: "SEARCH", "Programming", "Monitoring", "All-Data", "LogFile (CSV)", "Time Stamp", "DebugMode", "SendTextFile", "5000", "0 - 5V", "Auto Scroll", "CLEAR", "Save Message", and "EXIT".

① Click 'Monitoring'

② click to open combo-box and choose 'OUT PPM' and Press 'SendCommand' button.

③ Locate EK-100SL where CxHy gas-free area and type-in '0 ppm' and press 'Write Value' button.

④ click to open combo-box and choose 'OUT LEL%' and Press 'SendCommand' button

V. ELTWSO_EK100.exe Target ppm without STD gas (#2)

The screenshot shows the ELTWSO_EK100_20181105_162138 application window. The interface includes a top menu bar with 'RESCAN' and a '384' indicator. Below the menu bar, there are dropdown menus for 'ADuc848 (D300,H250,CH Seria...' and '[3]EK100_V1.0(SN000001)'. A 'SourceFile:' field is present. The main area contains a list of commands: CLEAR_RECAL, CAL1_START(400 PPM), CAL1_STOP, CAL2_START(0 PPM), CAL2_STOP, SLEEP_START, SLEEP_AWAKE, ALM_READ, ALM_LOW, ALM_HIGH, Target_PPM, UART_SPEED, OUT_PPM, and OUT_LEL/%. A 'SendCommand' button is located to the right of this list. Below the command list, there are input fields for 'Current PPM:' (value 0) and 'Target PPM:' (value 0), with 'Write Value', 'ReCalc RESET', and 'Read Value' buttons. The bottom section shows a terminal window with the following text: 'The EK100_V1.0 is initialized to 0x05', 'MSG>COM3 port Initialization -- OK!', 'C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4', 'ID9530I991 // 2019.05.30 18:54 LOADER=91', and three lines of '0 ppm // 0.000[V]'. On the right side, there are buttons for 'SEARCH', 'Programming', 'Monitoring', 'All-Data', 'LogFile (CSV)', 'Time Stamp', 'DebugMode', 'SendTextFile', '5000', '0 - 5V', 'Auto Scroll', 'CLEAR', 'Save Message', and 'EXIT'. Five numbered callouts are overlaid on the interface: 1. 'Click 'Monitoring'' points to the 'Monitoring' button. 2. 'click to open combo-box and choose 'OUT PPM' and Press 'SendCommand' button.' points to the 'SendCommand' button and the 'OUT PPM' option in the command list. 3. 'Check Present measurement' points to the 'Current PPM:' field. 4. 'Locate EK-100SL where CxHy gas-free area and type-in '0 ppm' and press 'Write Value' button.' points to the 'Target PPM:' field and the 'Write Value' button. 5. 'click to open combo-box and choose 'OUT LEL%' and Press 'SendCommand' button' points to the 'SendCommand' button and the 'OUT LEL/%' option in the command list.

V. ELTWSO_EK100.exe Target ppm with STD gas

The screenshot shows the ELTWSO_EK100 software interface. At the top, the window title is "ELTWSO_EK100_20181105_162138". Below the title bar, there are several input fields and buttons: "ADuc848 (D300,H250,CH Seri...", "[3]EK100_V1.0(SN000001)", "RESCAN", and "38400". A "SourceFile:" field is also present.

The main interface is divided into several sections. On the left, there is a small image of the EK-100SL device connected to a chamber. Below this, there is a "SendCommand" button. In the center, there is a "Target PPM" field set to "0" and a "Write Value" button. To the right, there is a "SendCommand" button and a "SendTextFile" button. At the bottom, there is a "TX:" and "RX:" section, a status message "The EK100_V1.0 is initialized to 0x05 MSG>COM3 port Initialization -- OK!", and a list of sensor data: "C2H4_LD3_A2VR314_P2KV_MC_S2L#0FA4 ID9530I991 // 2019.05.30 18:54 LOADER=91" followed by three lines of "0 ppm // 0.000[V]".

Five numbered callouts are overlaid on the screenshot, providing instructions:

- ① Click 'Monitoring'
- ② Locate EK-100SL into chamber (like CMB-10L) and connect to USB port of PC. and insert CxHy standard gas value.
- ③ Check Present measurement
- ④ Locate EK-100SL into chamber (like CMB-10L) and connect to USB port of PC. and insert CxHy standard gas value. then, click to open combo-box and chose 'Target ppm' and 'Write Value' button.
- ⑤ click to open combo-box and choose 'OUT LEL%' and Press 'SendCommand' button



Thanks for Reading

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