



DRV-S3200 – EPSON
S3200/S1600/S800/I3200/I1600
PRINTHEAD DRIVER BOARD
HARDWARE USER GUIDE



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Version 1.2

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1 Overview

DRV-S3200 is AEWA printhead driver board for EPSON S3200, S1600, S800 and i3200 printheads. It connects to AEWA Print Manager Board (APMB) via optical fiber cable which makes the data transfer immune to electromagnetic interference. It can also be run in electrically noisy environments without concern as electrical noise will not affect fiber.

Features

- Supports 5 different printhead types from EPSON:
 1. S3200, 600 dpi, 3200 nozzles, single head.
 2. S1600, 600 dpi, 1600 nozzles, single or double head.
 3. S800, 600 dpi, 800 nozzles, single or double head.
 4. i3200, 600 dpi, 3200 nozzles, single head
 5. i1600, 600 dpi, 1600 nozzles, single or double head.
- Can print 2 colors (S3200, S1600, i1600) and 4 colors (i3200) with one printhead.
- Optical fiber interface for long distances, 600 Mbits/sec.
- Generates accurate printhead driving voltages which are factory programmed. Printhead voltages can be further adjusted for special ink types.
- Printhead voltage control with respect to the temperature.
- Correct voltage sequencing during power ON and power OFF.
- Gray scale printing, up to 4 levels.
- Printing waveform stored in the EEPROM.
- Tickling pulse generation logic to keep nozzles always active.
- Printhead temperature monitor, over temperature protection.
- Firmware update over optical interface.
- Single 48V input voltage with reverse polarity, over current and surge current protection.
- SHA Encryption for firmware copy protection.
- Small footprint, 100mm x 140mm.
- Easy software integration with APMB SDK which supports native C++ and .NET programming languages such as C# or Visual Basic.
- ApmbWave analog waveform designer support with drop watcher interface.
- Compatible with APRINT RIP and Print software.



2 Board Components

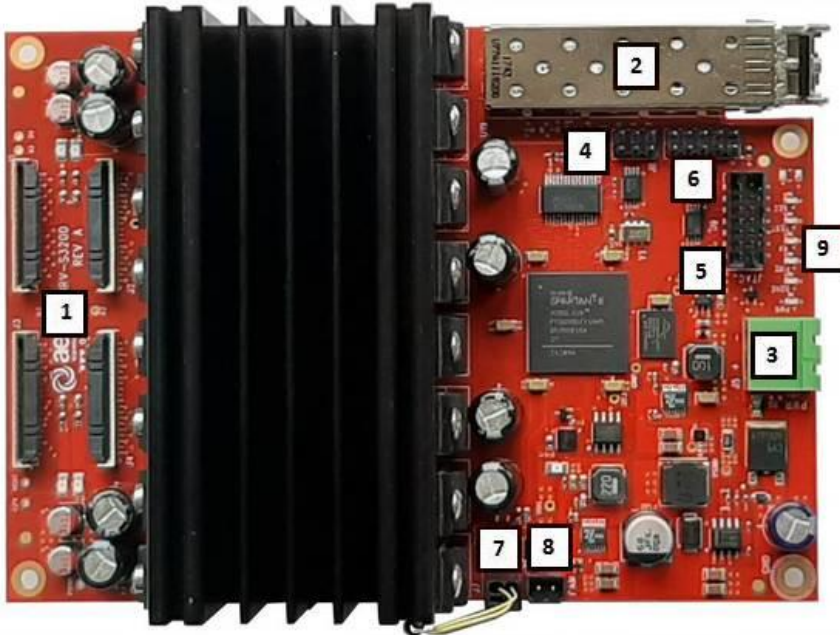


IMAGE 1 – DRV-S3200 BOARD COMPONENTS

2.1 Printhead Connector (J1, J2, J3 and J4)

DRV-S3200 connects to the printhead(s) with J1, J2, J3 and J4 connectors through 40 pin flat FFC cables. Other side of the FFC cables are connected to the printhead(s) with an adapter board. Following images shows three different connection scenarios.

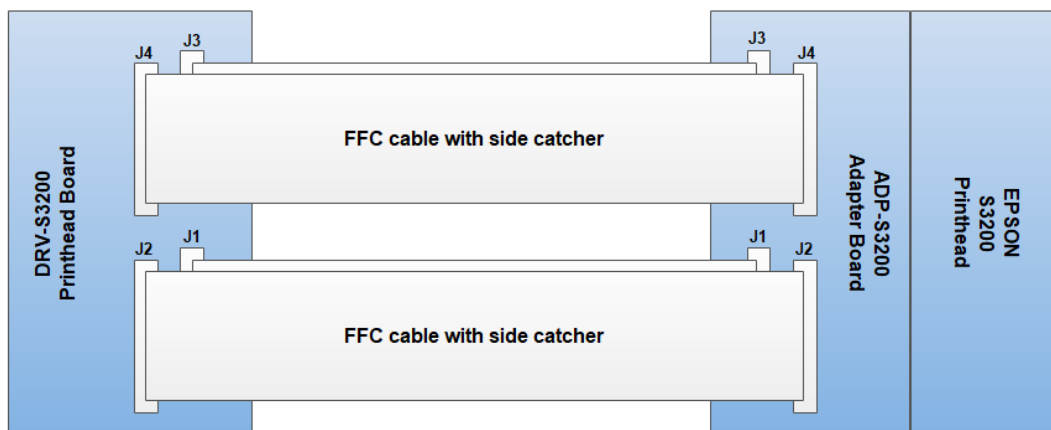


IMAGE 2 – S3200 PRINthead CONNECTION



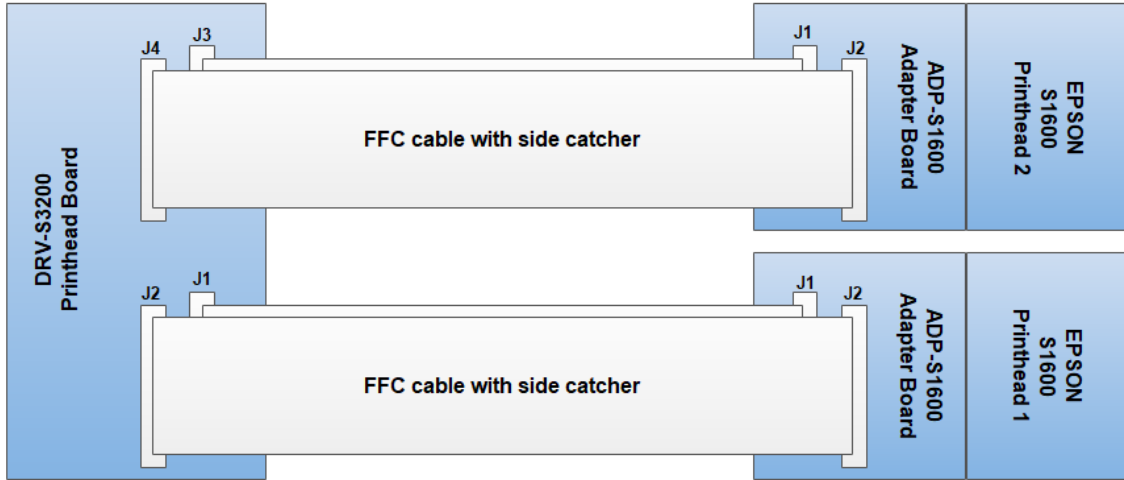


IMAGE 3 – S1600 PRINthead CONNECTION

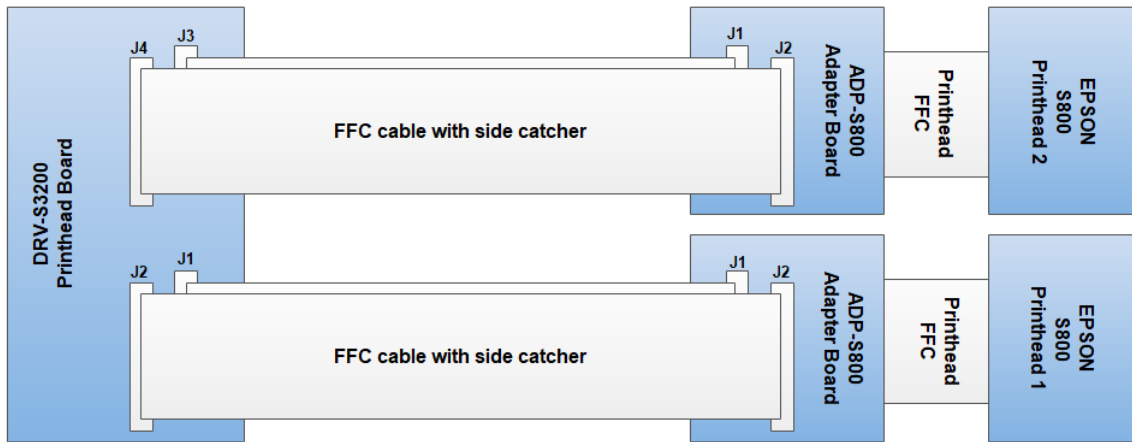


IMAGE 4 - S800 PRINthead CONNECTION

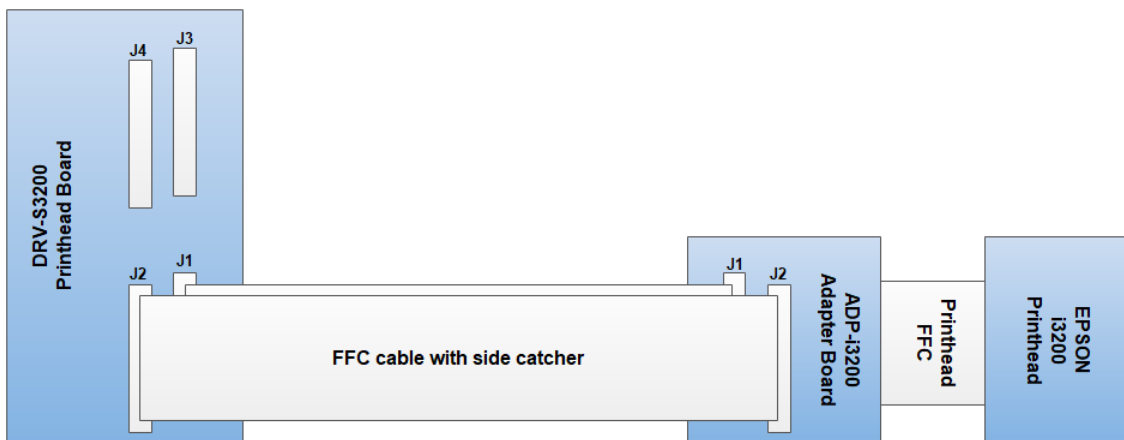


IMAGE 5 - I3200 PRINthead CONNECTION



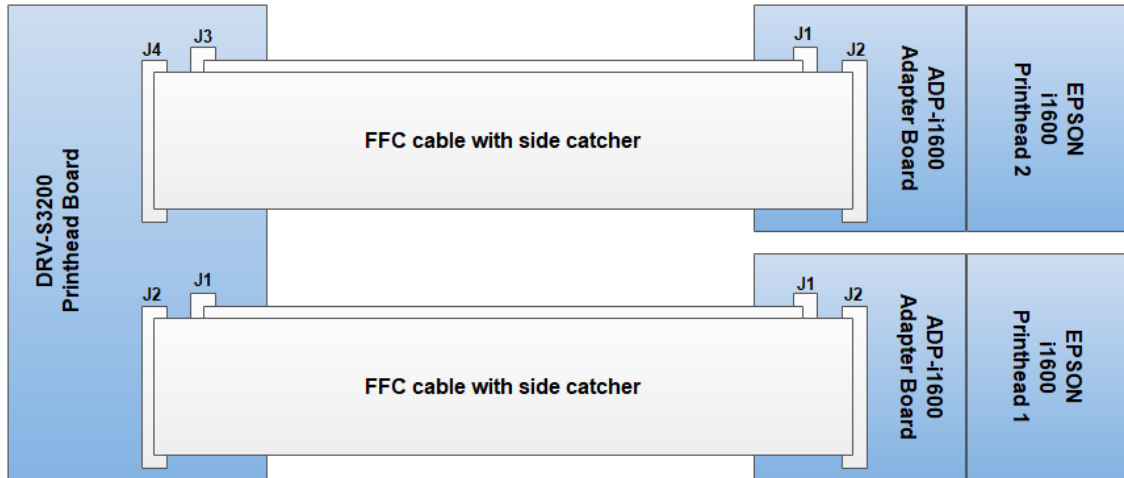


IMAGE 6 – I1600 PRINTHEAD CONNECTION

Following image shows S3200 printhead connection with ADP-S3200 adapter board.

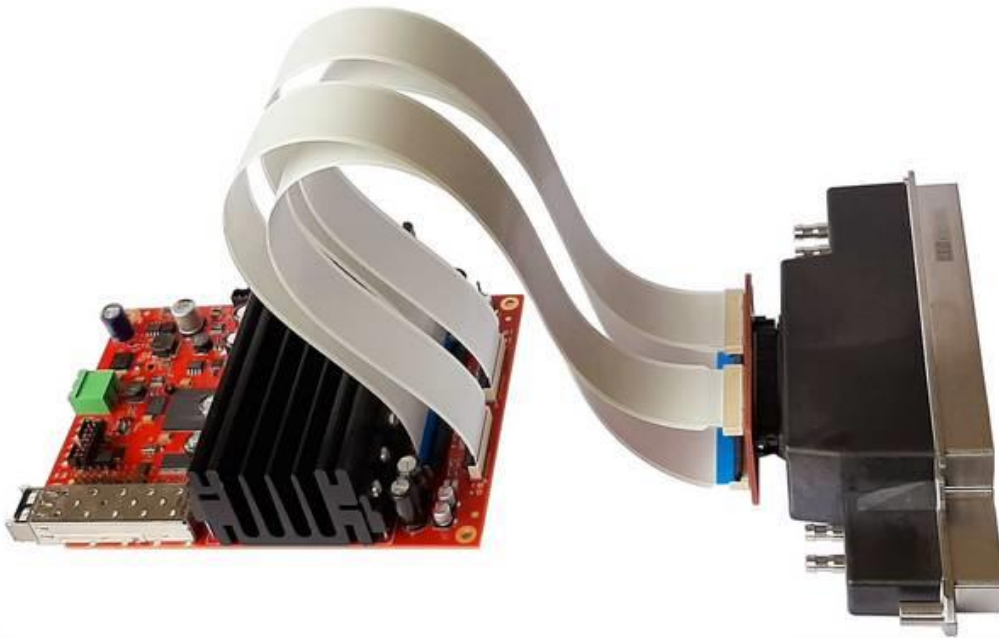


IMAGE 7 – DRV-S3200 WITH ADP-S3200 ADAPTER BOARD

Following image shows the adapter board side of i3200 printhead connection (similar for i1600). Connect connectors CN1 to CN4 of adapter board to the printhead's CN1 to CN4 connectors through 4x14 pin FFC cables. **Wrong connection may damage the printhead and/or printhead board.**



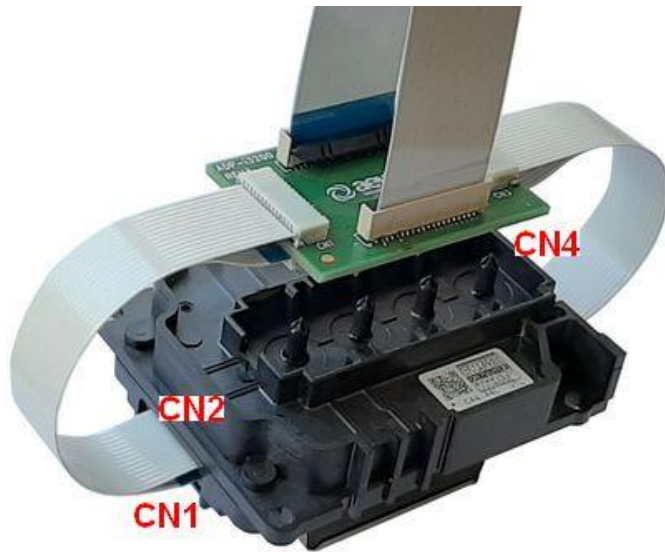


IMAGE 8 - DRV-S3200 WITH ADP-I3200 ADAPTER BOARD

DRV-S3200 is delivered with FFC cables and adapter board installed. FFC cables are 30cm long and have side catchers for easy insertion.

IMPORTANT: Don't connect or unconnect the printhead cable when the printhead board is powered on. This may damage the printhead and/or the printhead board.

2.2 Optical Interface (U19)

DRV-S3200 connects to AEWA Print Manager Board (APMB) over optical fiber cable. Fiber cable is connected to an SFP (small form factor pluggable) transceiver module and plugged into the SFP connector.

DRV-S3200 is delivered with SFP transceiver module, but the optical cable is not included since the distance from the DRV-S3200 to APMB differs from system to system.

Following table shows the fiber cables supported.

Fiber Cable Type	Distance between PHB and APMB
OM2, 62.5µm/125µm, Multimode fiber, with LC connectors	0.5-300m
OM3, 50µm/125µm, Multimode fiber, with LC connectors	0.5-500m

TABLE 1 - SUPPORTED OPTICAL FIBER CABLES





IMAGE 9 - OPTICAL FIBER CONNECTION WITH SFP MODULE

2.3 Power Input Connector (J5)

J5 is a 2-port terminal block connector for power input. Switching mode or analog AC/DC power converters can be used. Converters with PFC feature is recommended. Following table can be used to estimate the total current usage.

Parameter	Value
Input Voltage	48V (+/- 2V)
Max. current consumption, with 1x S3200 printhead connected	2.3A @48V
Max. current consumption, with 1x i3200 printhead connected	2.3A @48V
Max. current consumption, with 1x S1600 printhead connected	1.3A @48V
Max. current consumption, with 2x S1600 printhead connected	2.5A @48V
Max. current consumption, with 1x i1600 printhead connected	1.3A @48V
Max. current consumption, with 2x i1600 printhead connected	2.5A @48V
Max. current consumption, with 1x S800 printhead connected	0.8A @48V
Max. current consumption, with 2x S800 printhead connected	1.5A @48V
Max. current consumption, not printing	0.15A @24V

TABLE 2 -INPUT POWER SPECIFICATIONS

2.4 Jumper (J8)

J8 is a 3-port jumper. Jumper 0 and 1 selects between different printhead types as shown in the following table:



Jumper 1	Jumper 0	Printhead Type Standard Board	Printhead Type Modified Board
Open	Open	S3200	i3200
Open	Closed	S1600	i1600
Closed	Open	S800	i3200
Closed	Closed	Not defined	i1600

TABLE 3 – JUMPER J6, FUNCTION TABLE

To support i3200 printhead, a modified version of the DRV-S3200 board is needed. Modified boards have a small yellow label on the SFP-Module on which “i-Series only” is written.

Jumper port 2 is used only with i3200 printhead. If it is closed, printhead connectors J3/J4 can be used instead of J1/J2.

2.5 JTAG Connector (J9)

This connector is for internal use by AEWA for testing, debugging and updating the firmware. DRV-S3200 firmware can also be updated over optical interface using ApmbDiag or APRINT software.

2.6 Test Connector (J10)

Test header. Only for AEWA internal usage.

2.7 Amplifier temperature sensor connector (J7)

An external NTC thermistor is already installed here and connected to the amplifier heat-sink.

2.8 Amplifier fan connector (J6)

Optional connection to a 5V (max 200 mA) fan to cool down the amplifier. Reserved for future use.

2.9 LEDs

There are 6 diagnostics LEDs on the DRV-S3200 PCB.



PWR LED is connected to the 3.3V voltage rail. It is ON when board power is OK.

DONE LED is ON when FPGA firmware is loaded correctly, otherwise none of the features of DRV-S3200 is available.

FIRE LED is ON when printhead nozzles are active and printing. It switches OFF when printing is stopped.

RX LED is ON when AEWA Print Manager Board is sending printing data to DRV-S3200 board, otherwise it is OFF.

SEC LED is OFF when SHA Encryption keys programmed into the device is correct. If this LED is ON, printing functions of the DRV-S3200 board are disabled.

TEST LED is error indicator LED. Following table shows errors reported by TEST LED.

TEST LED Behavior	Meaning
OFF	No error. Image data stream is counting data.
ON	No error. Image data stream is not counting data.
Blink once, than OFF for 1 second	Checksum Error. Incoming data packages from Print Manager Board have CRC checksum errors.
Blink 2 times, than OFF for 1 second	Data packaging error. Incoming data packages from Print Manager Board have wrong number of bytes.
Blink 3 times, than OFF for 1 second	Speed error. Printing speed or row to row delay setting is too high.
Blink 4 times, than OFF for 1 second	Waveform error. Either no waveform is loaded or the loaded waveform has errors.
Blink 5 times, than OFF for 1 second	No meaning. Reserved for future use.
Blink 6 times, than OFF for 1 second	Printhead voltages are switched off due to an over temperature or voltage error condition.

TABLE 4 –TEST LED FUNCTIONS

Same errors can also be read by APMB software. More error types might be added in future with firmware updates.



3 Mechanical Dimensions

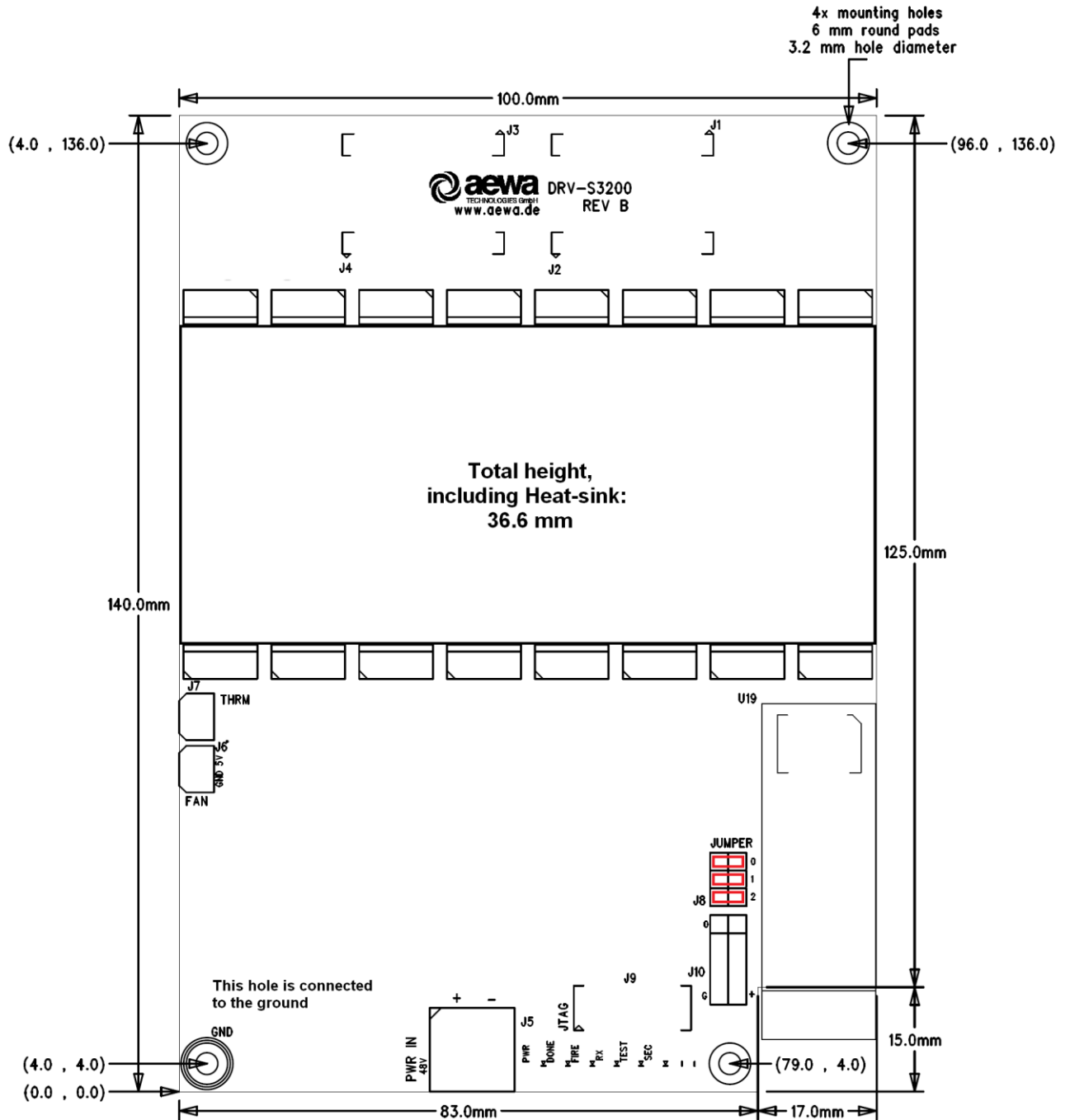


IMAGE 10 – DRV-S3200 MECHANICAL DIMENSIONS



4 Connectors and Cables

DRV-S3200 is assembled with very high quality industrial terminal blocks and connectors for power and input/output. Following table lists the PCB connectors and their mating cable connectors.

Description	PCB Side	Mating Side
J5, Power input connector	PCB header, 5.08 mm raster, 2 poles, MSTBA 2,5/ 2-G-5,08 Manufacturer: Phoenix Contact Order No: 1757242	Plug, 5.08 mm raster, 2 poles, MSTB 2,5/ 2-ST-5,08 Manufacturer: Phoenix Contact Order No: 1757019 or equivalent
J6, J7	PCB header, 2.5mm raster, 2 poles Manufacturer: Phoenix Contact Order No: 1778557	Plug, 2.5mm raster, 2 poles Manufacturer: Phoenix Contact Order No: 1778832 or equivalent

TABLE 5 – CONNECTORS AND CABLES

5 Ordering Information

Order No	Item
DRV-S3200	DRV-S3200 board
DRV-S3200-CC	DRV-S3200 board with conformal coating for harsh environments.
ADP-S3200	EPSON S3200 printhead adapter board with 4x FFC cables.
ADP-S1600	EPSON S1600 printhead adapter board with 2x FFC cables.
ADP-S800	EPSON S800 printhead adapter board with 2x FFC cables.
ADP-i3200	EPSON i3200 printhead adapter board with 2x FFC cables.
ADP-i1600	EPSON i1600 printhead adapter board with 2x FFC cables.

TABLE 6 – ORDERING INFORMATION

