

Open Autoclave Parts List

by David Hartkop, Idea Propulsion Systems 2018

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OVEN PARTS -----

Full Sheet Aluminum Sheet Pan

Used for: The base of the system

Quantity: 1

Details: 18" x 26" Commercial 18 Gauge Aluminum Sheet Pan

Ceramic Fiber Insulation

Used for: Insulating the autoclave oven

Quantity: 1 roll of material: (1" x 24" x 36")

This is enough to cut three shapes:

9.5" x 30" (24cm x 76cm) rectangle

12" (31cm) circle

18" x 18" (46cm x 46cm) square

Details: One roll of Ceramic Fiber Blanket

8# Density, 2300°F

Stainless Stock Pot (with handles cut off)

Used for: The body of the autoclave oven

Quantity: 1

Details: 12-quart Stainless stock pot

(Mfg. #:MS14-042-420-45)

Size: (LxWxH): 10.04 x 10.04 x 9.45 Inches

Heavy Aluminum Foil Roll

Used for: Wrapping and protecting the insulation

Quantity: 1

Details: Reynolds Wrap Heavy-Duty Aluminum Foil (75 sq. ft)

Aluminum Furnace Tape Roll

Used for: Sealing the foil wrapped around the insulation

Quantity: 1

Details: Scotch aluminum foil furnace tape 2-inch width.

HEAER RACK PARTS -----

Cartridge type heating elements

Used for: heating elements for the autoclave

Quantity: 4

Details: Set of 6mm dia. x 20mm long elements, rated 12V 40W These are Ceramic Cartridge Heaters for 3D Printer "Reprap Prusa" (4 are required, best to purchase a pack with some extras.)

Aluminum heater blocks

Used for: mounting the heating elements

Quantity: 4

Details: Aluminum Heater Block Specialized for MK7 MK8 3D Printer Extruder (purchase as a pack with extras)

Iron pipe floor flange

Used for: heat radiator within the autoclave oven

Quantity: 1

Details: 1/2-inch black malleable iron threaded floor flange pipe fitting

Aluminum pizza screens

Used for: Supporting the heating elements and wrapped medical instruments inside the autoclave

Quantity: 2

Details: American Metalcraft 8 in (20 cm) diameter expanded metal (seamless) aluminum pizza screen or similar

Automotive cigarette lighter cable

Used for: providing power to the system from a 12-volt source

Quantity: 1

Details: 12V Heavy Duty 16 AWG 15A Male Plug Cigarette Lighter Adapter Power Supply Cord with 1 Meter (3.3 Feet) Cable Wire or similar. System pulls 7.5 amps at 12 volts.

Wire nuts

Used for: easily wiring together parts of the power system

Quantity: 5

Details: Twist-on wire nuts suitable for 12-18 Gauge wire

Long bolts for heater rack

Used for: the legs of the heater rack

Quantity: 4

Details: 1/4-20 x 4 in long (M6 x 10 cm) stainless carriage bolt

Nuts & washers for heater rack

Used for: securing pizza screens to leg bolts

Quantity: 16 of each

Details: 1/4-20 (M6) stainless nuts & stainless washers. (Zinc coatings can burn, releasing toxic fumes!)

CONTROLLER BOX PARTS -----

Electrical enclosure

Used for: Holding all the electronics for the control system

Quantity: 1

Details: 6.2"x3.5"x2.3" ABS Waterproof Junction Box Universal Project Enclosure with Transparent PC Cover

Arduino Uno R3 microcontroller

Used for: monitoring temperature and time of autoclave exposure

Quantity: 1

Details: Arduino Uno R3 Microcontroller or similar

(Spend at LEAST \$12 USD on this or it will be total junk!)

Controller mounting bracket

Used for: mounting the Arduino into the electrical enclosure

Quantity: 1

Details: Arduino Uno plastic mounting bracket, comes with official Arduino Uno, or can be ordered separately.

12-volt automotive relay

Used for: controlling the heating elements to prevent overheating

Quantity: 1

Details: RLS125 12-VCD Automotive Relay SPDT 30/40A or similar

MOSFET module

Used for: Arduino control of the Auto Relay

Quantity: 1

Details: IRF520 MOSFET driving module or similar N-Channel FET for driving a relay with ~5V (PWM) controller pin outs.

LCD screen module

Used for: displaying temperature and alerts from the Arduino

Quantity: 1

Details: 1602 16x2 Serial HD44780 Character LCD Board Display 5V with IIC/I2C Serial Interface Adapter Module for Arduino

Thermocouple with amplifier module

Used for: measuring temperature inside the autoclave

Quantity: 1

Details: HiLetgo DC 3-5V MAX6675 Module + K Type Thermocouple Temperature Sensor Thermocouple Sensor Set M6 Screw for Arduino

(Other types can be used but will require changes to Arduino code.)

Heater power switch

Used for: power switch to heaters elements

Quantity: 1

Details: Heavy-Duty Electrical Toggle Switch, SPST, ON-OFF, 20 A/125V AC, Spade Terminal or similar

Micro speaker

Used for: alert sounds to signal autoclave status

Quantity: 1

Details: Motherboard Computer PC Internal Speaker Buzzer Computer Case Buzzer for Arduino (Mfg. #: CYT1090) or similar

Momentary push button

Used for: restarting the autoclave-cycle timer

Quantity: 1

Details: 12mm SPST NO Reset Switch Push Button Switch

Model EK1922 or similar

Hook up pin connector wires

Used for: Connecting various components to the Arduino controller

Quantity: 13

Details: M to F (M/F) Breadboard jumper wires AKA Dupont pin connector jumper wires, 10 cm length.

Total needed: 13, see details below:

x4 for LCD

x2 for Speaker

x2 for Push Button

x3 for MOSFET module

x2 for Power Supply

Female spade crimp connectors

Used for: Connecting wires to the automotive relay and also to the heater power switch.

Quantity: 6

Details: For automotive relay hookup, power switch; Female Spade Crimp Wire cable connector blue (6.3 mm) for 14-16 gauge wire

Short screws

Used for: mounting Arduino to Bracket, MOSFET to Enclosure

Quantity: 5

Details: 4-40 x 0.25" (M3 x 6 mm) zinc coated machine screw

Medium screws

Used for: mounting Arduino bracket, through enclosure, to aluminum tray

Auto Relay to Enclosure

Quantity: 5

Details: 4-40 x 3/8 (M3 x 10mm) zinc coated machine screw

Long screws

Used for: LCD to box lid

Quantity: 4

Details: 4-40 x 0.75" (M3 x 20 mm) zinc coated machine screw

Nuts

Used for: securing LCD to box lid, Auto relay to enclosure, Arduino bracket through enclosure to aluminum tray

Quantity: 13

Details: 4-40 (M3) zinc coated nuts

Tiny washers

Used for: mounting auto relay to enclosure, Arduino bracket through enclosure to aluminum tray

Quantity: 5

Details: 4-40 (M3) zinc coated washers

USB printer cable

Used for: programming the Arduino, Downloading data.

Quantity: 1

Details: 36-inch USB 2.0 cable male-male A to B