TAMBORA High Temp Extrusion Head

CONTENTS:

https://www.youtube.com/watch?v=tLHpaePTP-k&feature=youtu.be

Specifications:
Programmable start/stop dwell in millis
Programmable Prime/Unprime in nand
Weight 600 grams, plus payload
Material Capacity, 15cc
Power supply, 12v 2 amps max
Interface, CanBus or TTL

Linear Bearing Rail

Planetary Gear Drive
100:1 standard

Motivator Sled

Drive Socket

Drive Shaft

Heated Cylinder Clamp
with insulation and heat
shield.

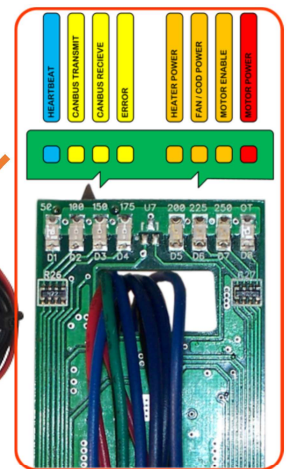DANGER EXTREMELY
HOT!!!

Smart controller

Standoffs

Material Cylinder

Optional UV LEDs

LED Array (KCD)

Luer Adapter

Luer Tip

Nozzles:

The dispensing end of the KRA-15 can be easily configured to meet the wide variety of materials that it can dispense.

From clay to silicone, the possibilities are limitless.

Using the Luer Kit, you can purchase adapter needles at low cost from local hardware suppliers, such as McMaster Carr.
Typical working diameters are from <250 microns for liquid like substances, to 1.6mm (14#) for very stiff materials such as clays.

Theory of Operation:

The TAM series of extruders is designed to allow materials that can be emulsified, to be dispensed (printed), in a controlled way at up to 300°C .
These use special High Temperature Seals, Kalrez tm, make sure you
use identical replacement orings or you will harm your head at the higher temperatures.

The number of actual possible materials is vast, but we will list a few of our favorite materials to give you an idea.

Clays, pastes, gels, custom emulsions and resins, hot glues (including 3M 3796).

While it is possible to print with food products, we do NOT recommend it, due to the difficulty of insuring sanitary conditions.

The TAMBORA was designed as a high temperature Krakatoa-Type Print head.
It achieves higher temperatures by using insulation, a stainless steel heat shield, and double the heat power.
This requires that your HYDRA or ENGINE Yoke fuses be upgraded to 8 amps
on your Yoke pcb. There will be a 8 amp fuse included with the print head, however you must install it on your yoke at the position that he head will be used.

The cylinder is loaded with the desired material, taking care not to get air inside the cylinder. The cylinder is loaded into the TAM cylinder heater/clamp with the bottom ring removed and the top ring loose, and then those rings are secured. The cylinder is held with moderate force (hand tight, firm but not so hard as to distort the cylinder).

The drive motor will turn at the desired rate when printing. The drive speed is controlled by head settings and the actual velocity of the print head, as set by the F argument in G1 commands.

Generally speaking, you can print with the same KCD that you print plastic with.

Make sure to clean your cylinders after using them, leaving material inside will almost certainly ruin the cylinders.

TAM Settings:
Used to manage control of the head.

Live Temperature:
In Celsius.

Heater:
On/Off and default value.

Motor:
On/Off and manual speed feed control.

Navigation:
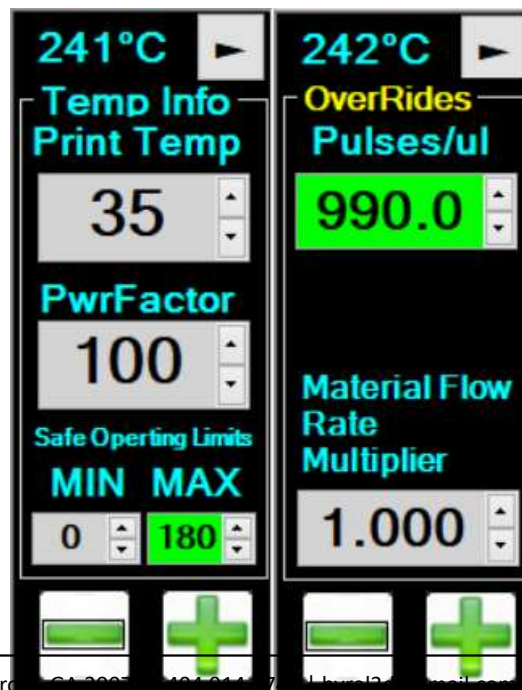Click to move to the next page.

Material:
Sources in defaults. *Note: gcode will override this setting.*

Nozzle Diameter in mm :
Crucial for flow calculations.

Layer Z in m:
Initial value. *Note: gcode will override this setting.*

242°C ►	242°C ►
Krakatoa	Material
0 ON	CUSTOM ∨
RUN	Nozzle Φ mm
	1.600
OFF UV COD	Layer Z in mm
	0.300
− +	− +

241°C ►	242°C ►
Temp Info Print Temp	OverRides Pulses/ul
35	990.0
PwrFactor	
100	Material Flow Rate Multiplier
Safe Operting Limits	
MIN MAX	1.000
0 180	
− +	− +

Prime Settings:
Used when starting the flow of filament.

Steps:
Number of steps to start the flow of filament.

Rate of Steps:
Default 10,000.

Dwell Time:
In milliseconds after the prime starts before starting motion.

After Tool Change:
Iterations to perform after a tool change.

UnPrime Settings:
Used when ending the flow of filament.

Steps:
Number of steps to stop the flow of filament.

Rate of Steps:
Default 10,000.

Dwell Time:
In milliseconds after the unprime starts before starting motion.

Before Tool Change:
Iterations to perform before a tool change.

Prime panel:
242°C | Prime | Steps 3000 | RATE 10000 | Time -Ms 400 | PRIME NOW!!!

UnPrime panel:
242°C | UnPrime | Steps 2500 | RATE 10000 | Time -Ms 400 | UN-PRIME NOW!!!

Offsets panel:
242°C | offsets | Setup As Master | X 0.000 | Y 0.000 | Z 0.000 | GOTO | Grab

Head Info panel:
242°C | Head Info | Model Volcano_2! | Clone Head OFF | RTD Type 1k PLAT_R

Offsets:
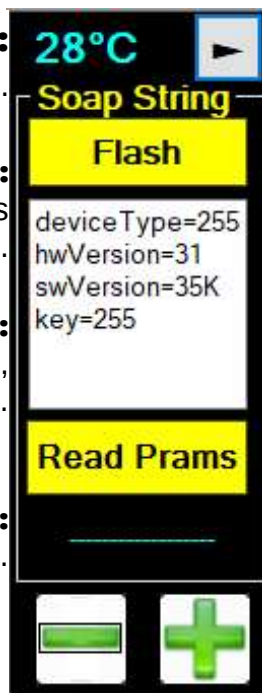
Soap String:
To store and read values.

Flash:
Right-click to store current values as defaults on this head.

Pin

Com Window :
For diagnostics, advanced status, and firmware version.

C

Read :
Returns firmware version info.

28°C ►

Soap String

Flash

deviceType=255
hwVersion=31
swVersion=35K
key=255

Read Prams

— ➕

Head Model:

Model:
Type of head.
TAMBORA_15

RTD TYpe:
For proper temperature table.
Most heads since 2015 should have 1K_PLAT selected.

Motor Current:
For drive motor.

Step Mode:
For microstep resolution.

Please note:

These values are all initial, default values.

Your gcode will overwrite some of these values, and *can, if you specify,* explicitly declare most of them.

The printer will keep the last value for each variable persistently in memory.

If a mouse click or a gcode entry subsequently provides a new value, *that new value* will be persistent until *another, newer* value is set for that parameter on that head.

For current default parameters for Hot Flow heads, see
http://hyrel3d.net/wiki/index.php/Hot_Flow

Settings for Cold and Warm Flow Heads with METAL Reservoirs

Settings	EMO, VOL, KRA, COD, VCD, KCD Heads *and New KR2* (17mm Tubes, Various Gear Ratios)				
	19:1 Ratio	27:1 Ratio	51:1 Ratio	100:1 KRA	100:1 KR2
Material					
Type	Custom	Custom	Custom	Custom	Custom
Color	(any)	(any)	(any)	(any)	(any)
Nozzle	1.600	1.600	1.600	1.600	1.600
Layer	0.300	0.300	0.300	0.300	0.300
Temp Info					
Print Temp	35	35	35	35	35
Power Factor	100	100	100	100	100
Minimum	0	0	0	0	0
Maximum	0/100/200	0/100/200	0/100/200	0/100/200	0/100/200
Overrides					
Pulses: v2.x	*1.6*	*2.3*	*4.7*	*9.0*	*15.0*
Pulses: v3.x	*176*	*256*	*517*	*1000*	*825*
Feed Rate %	1.000	1.000	1.000	1.000	1.000
					2.000
Prime					
Please note that Prime values will vary greatly from those shown, depending on the compressibility of your material.					
Steps	600	800	1000	3000	6000
Rate	10,000	10,000	10,000	10,000	10,000
Dwell Time (ms)	100	100	100	300	600
Before Tool Change	1	1	1	1	1
Unprime					
Please note that Unprime values will vary greatly from those shown, depending on the compressibility of your material.					
Steps	500	650	800	2500	5000
Rate	10,000	10,000	10,000	10,000	10,000
Dwell Time (ms): v2.x	*100*	*100*	*100*	*250*	*500*
Dwell Time (ms): v3.x	*-100*	*-100*	*-100*	*-250*	*-500*
After Tool Change	1	1	1	1	1
Offsets					
Clone Head	Off	Off	Off	Off	Off
X	0,000	0,000	0,000	0,000	0,000
Y	0,000	0,000	0,000	0,000	0,000
Z	0,000	0,000	0,000	0,000	0,000
Head Info					
Model	(varies)	(varies)	(varies)	(varies)	(varies)
RTD Type	1k PLAT_RTD	1k PLAT_RTD	1k PLAT_RTD	1k PLAT_RTD	1k PLAT_RTD
Motor Current	High	High	High	High	High
Step Mode	Sixteenth	Sixteenth	Sixteenth	Sixteenth	Sixteenth
	19:1 Ratio	27:1 Ratio	51:1 Ratio	100:1 Ratio	100:1 KR2

(17mm Tubes, Various Gear Ratios)

Using the TAMBORA:

The TAM-15 is one of the best print heads for learning the basics of 3D printing. Many of the materials, such as plasticine can be used over and over again. This head was designed especially for material science experimentation where they would like to mix Plastic materials that have been ground into fine powder, them mixed dry as a powder to create a alloy.

Basically mount the TAM head on your printer yoke, load the material cylinder, and print...

Because of the high temperature the Tambora can operate at, we STRONGLY RECCOMMEND using gloves when handling the TAMBORA HEAD, and also letting the head cool off before attempting to change the Material Cylinder.

Additional Help:

Check our **YouTube** channel
https://www.youtube.com/channel/UCT-48K-0Y4xoTvbJCjyDFXA/videos
and look for key words;
"Hyrel", "KRA", "Clay", "Silicone", "Porcelain"

You will find many examples of how to use your TAM.

Loading material on the EMO:

1. Remove head from printer.

2. Remove reservoir from head. Allow to cool if needed.

* If needed, invert reservoir now (nozzle up), and keep inverted until nozzle is reattached.

3. Remove nozzle collar and nozzle.

4. Remove plunger collar, but do not remove plunger.

5. Add material from the bottom, displacing the plunger as material is added, to avoid air pockets.

6. Attach plunger collar.

7. Attach nozzle collar and nozzle.

8. Purge any air introduced between nozzle and reservoir.

9. Load reservoir into head.

10. Load head into printer.

Changing nozzles on the EMO:

1. Remove head from printer.

2. Remove reservoir from head. Allow to cool if needed.

* If needed, invert reservoir now (nozzle up), and keep inverted until nozzle is reattached.

3. Remove nozzle collar and nozzle.

4. Insert new nozzle into nozzle collar.

5. Attach nozzle collar and nozzle.

6. Purge any air introduced between nozzle and reservoir.

7. Load reservoir into head.

8. Load head into printer.

For Luer Tips:

1. Remove head from printer.

2. Remove reservoir from head. Allow to cool if needed.

* If needed, invert reservoir now (nozzle up), and keep inverted until nozzle is reattached.

3. Remove old luer tip by twisting counter-clockwise.

4. Attach new luer tip by twisting clockwise.

5. Purge any air introduced between luer tip adapter and luer tip.

6. Load reservoir into head.

7. Load head into printer.

TIPS:

Keep your cylinders CLEAN. Material that dries inside the cylinder is the number one cause of failures.

NO AIR should be inside the TAM-15, pack your cylinders carefully, it will make the material delivery spongy and sharp start and stop will be impossible.

NEVER put flammable material, such as Gasoline in your TAM, the cylinder can achieve several hundred PSI in pressure, and this could case self ignition.

ALWAYS USE good ventilation when using the TAM, many of the interesting materials will emit toxic fumes.

Note that portions of this head can reach 300°C, so care must be used when handling the head!

Maintenance:

Keep your TAM clean, do not allow material to get in the linear bearing.

CLEAN your cylinders IMMEDIATELY after use, this will insure that you have trouble free operation.

Use care when installing the head into the yoke, due to its long format, it is possible the connection may be canted.
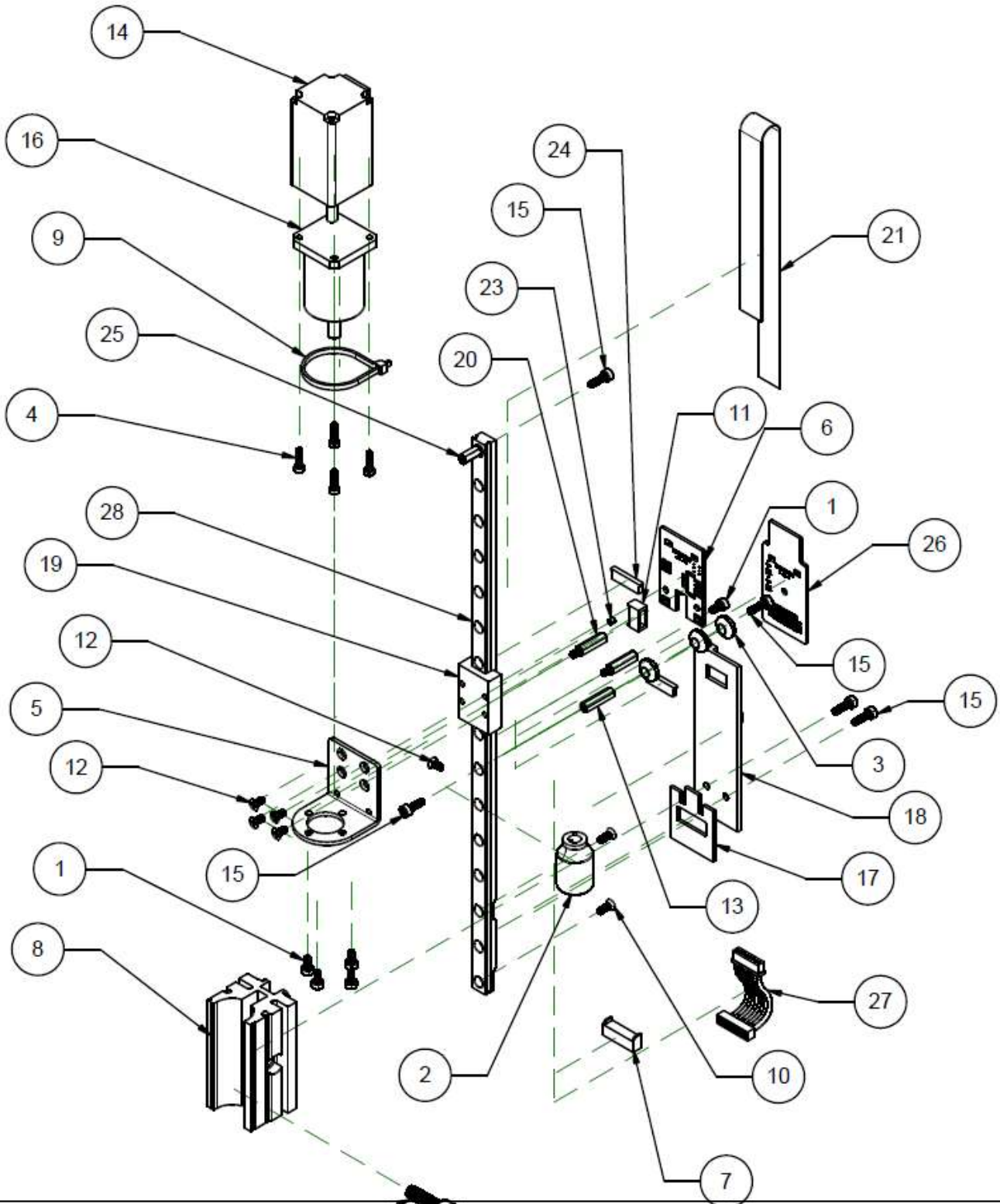
DISCLAIMER:

!!!Use at your own risk.!!!

No warranty or guarantee is offered for the application of this product, the user agrees to be ENTIRELY responsible for safe operation of this product.

Item #	Qty.	Part Number	Part Name
1	6	200303-6	200303-6.M3x6mm.SocketHead
2	1	102428	102428.EMO25.ShaftHead.GR
3	3	200223	200223.RubberStop
4	4	200091-10	200091-10.M2.5x10.Socket.91292A014.
5	1	102527.EMO25.GR.Body	102527.EMO25.GR.Body
6	1	102265	102265
7	1	300282-8	300282-8
8	1	102080-99	102401-6.FEED.MOUNT.GRIPPER.V5.EMO.H3D
9	1	200224	200224.CableTie..1x6inch
10	2	200086-8	200086-8.Screw,M3x8mm.FlatPhil
11	1	300282-4	300282-4
12	5	200086-6	200086-6.Screw,M3x6mm,Flat
13	1	200101-18	200101-18.STANDOFF - M3X15, HEX, FF, BRASS
14	1	300311	300311.Motor.Stepping.0.8A28x28x52mm
15	5	200303-10	200303-10.M3x10.SocketHead.Screw.SS.91292A113
16	1	300315-27	300315-27.GearReduction27
17	1	102508	102508.PCBSpacerStop.H3D
18	1	500207	500207.EXTRUSIONHEADCIRCUITBOARDMODELREPRESENTATION
19	1	102409	102409-6.5.BEARINGRAILTRUCK.EXTRUSIONHEAD
20	2	203166	203166.M3x16+6.STANDOFF
21	1	300053	300053_Cable Flat Flex 12x1mm x 10
22	1	200072-20	200072-20.M6x20.Socket.Head.Screw
23	1	200706	200706.Magnet.2.5x2.5.Neo
24	2	300202-12	300202-12
25	1	200101-10	200101-10.M3x10.Hex.Standoff.FF.Brass
26	1	102266	102266.EMO.HotHeadSide.Board
27	1	420034	420034
28	1	102408-2	102408-6.5.BEARINGRAIL.EXTRUSIONHEAD

Photoinitiated Crosslinking: the KRA (Emulsion On demand) becomes the KCD (Crosslinking On Demand).

The M106 command, used to control the fan which cools deposited material on the MK-series heads, controls the UV LED array on crosslinking heads. This functionality is the same on all KCD heads, as well as the CSD, COD, and KCD heads.

M106 T# S0 ; sets the KCD LEDs (or fan) to 0% (off)

M106 T# S25 ; sets the KCD LEDs (or fan) to 25%

M106 T# S100 ; sets the KCD LEDs (or fan) to 100%

Note: T#, where # can be any of the following:

    10 for yoke 1, ALL heads; or

    11 for yoke 1, head 1; or

    12 for yoke 1, head 2; or

    13 for yoke 1, head 3; or

    14 for yoke 1, head 4; or

    15 for yoke 1, head 5; or

    Left blank, to address the "currently active" head.

Item #	QTY	Part #	Part Name
1	1	102203	102203 COD Led board
2	2	200049-8	200049-8_Screw 6-32 x .50 PanHd
3	2	203059-075	203059-075.6-32x0.75+.25 Standoff M-F
4	1	404042	404042.Krakatoa.EB.ASSEMBLY.H3D
5	1	420044	420044 COD Cable Assembly