

NovaPass Hardware

Assembly and Installation Guide

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Overview

NovaPass is a badge-reader access control system. It is used to control tools which require access control. The NovaPass hardware system consists of:

- Control Head Assembly
- Optional Pick-Off Assembly
- Optional Point-of-Power Assembly



Generic
RJ45
Terminated
Ethernet
Cable



Generic
RJ45
Terminated
Ethernet
Cable



CONTROL HEAD

- Always present
- Reader & Display
- Micro Controller w/WiFi
- Direct Machine Control via 2 x SPDT Relays
- Can operate independently
- 12..36VDC power

POINT OF SWITCHING

- Optional
- Exposes Tool Control Lines from Control Head
- Used in Series with Emergency Stop Buttons on Tools or other low-voltage enable/disable circuits

POINT OF POWER

- Optional
- Mains Power In
- 19VDC out for Control Head
- DPST 240VAC @ 40A Relay

Control Head

The Control Head houses a WiFi-enabled ESP8266 microcontroller along with a board to interface with an Badge Reader and an OLED display. It can take a wide-range of DC Power in (12..36V @ < ~150ma). It also has to small relays which can be used situations where the tool can be enabled/disabled by low voltage. It interfaces with the rest of the system via generic RJ45 Ethernet cable. Power can be supplied via the R45 or directly from any always-on DC wall wart.

Point of Switching

This Optional board exposes the low-voltage Tool Control signals from the Control Head. One Normally-Off Channel is usually connected in series with the Emergency Stop button of the tool

Point of Power

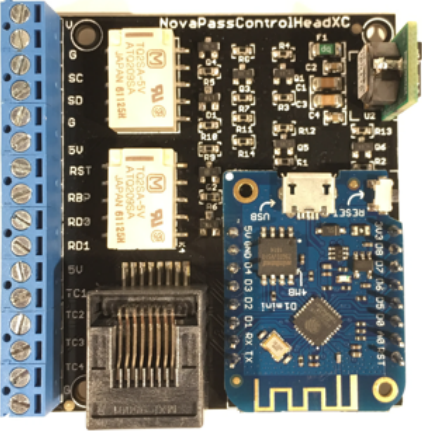
The Point of Power is optional. It is used for Switching High-Powered tools > 15A or multiphase. (for < 15A smaller relays can be used). It houses a 240VAC @ 40A contactor relay and a low-voltage DC power supply for the Control Head.

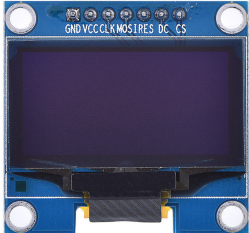
Control Head Detail

Control Head in 3D-printed Angle Mount case, and off-the-shelf case

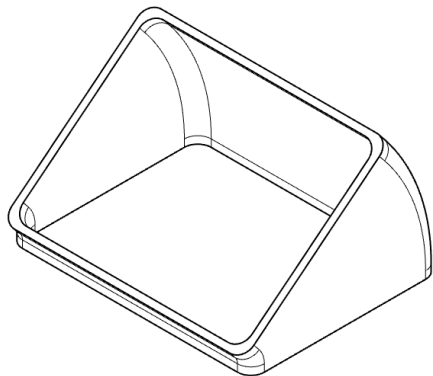


Control Head BOM

DESCRIPTION	PART#/LINK	COMMENT
NovaPassControlHead PC Board Assembly	NovaPassControlHead PCBA	Provided Assembled by Small Batch Assembly
		
HID ProxPoint Plus Badge Reader 6005B	https://www.google.com/search?q=hid+6005+b	Other HID Readers compatible. See NovaPass Hardware / Firmware Notes.

	+reader&oq=hid+6005+b+reader&aqs=chrome..69i57j69i60j0l2.4087j0j7&sourceid=chrome&ie=UTF-8	
1.3 inches SH1106 OLED Display Module IIC Interface 128x64 3.3-5V 	https://www.ebay.com/sch/i.html?from=R40&trksid=m570.l1313&nkw=SH1106+OLED&sa_cat=0	
115 x 90 x 55 mm Enclosure 	115 x 90 x 55mm enclosure	Amazon, Ebay, Ali-Express
The same with mounting tabs 115 x 90 x 55 mm Enclosure 	115x90x55mm Electronic ABS Plastic DIY Junction Box Enclosure Case w Clear Cover	Alternate with mounting tabs. Amazon, Ebay, Ali-Express
18-8 Stainless Steel Press-Fit Nut for Soft Metal & Plastic M4 x 0.7 mm Thread X4 	https://www.master.com/94100a130	Used with 3D Printed Angle-Mount enclosure

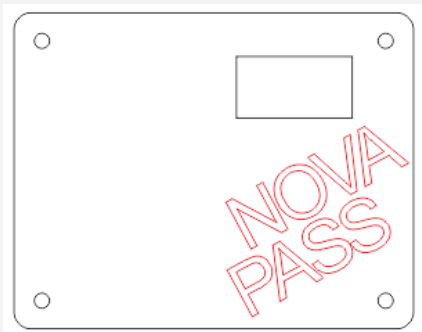
3D Printed Enclosure Parts



<https://github.com/nova-labs/NoVaPassHardware/tree/master/physical>

Angle-Mount As used on Laser Cutters

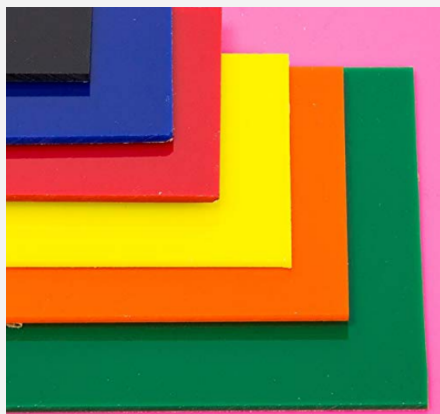
Laser-Cut Front Panel



<https://github.com/nova-labs/NoVaPassHardware>

Can be used on off-the-shelf enclosure or 3D printed ones

Material for laser cut front panel



[1/8 th Inch Thick Acrylic Plexiglass Sheet colored](#)

Amazon

Zinc-Plated Alloy Steel Socket Head Screw M4 x 0.7 mm Thread, 10 mm Long X4



<https://www.mcmaster.com/90128a212>

Used with Laser-Cut Front Panel

Zinc-Plated Steel External-Tooth Lock Washer for M4 Screw Size, 4.3 mm ID, 8 mm OD X4



<https://www.mcmaster.com/97985a530>

Used with Laser-Cut Front Panel

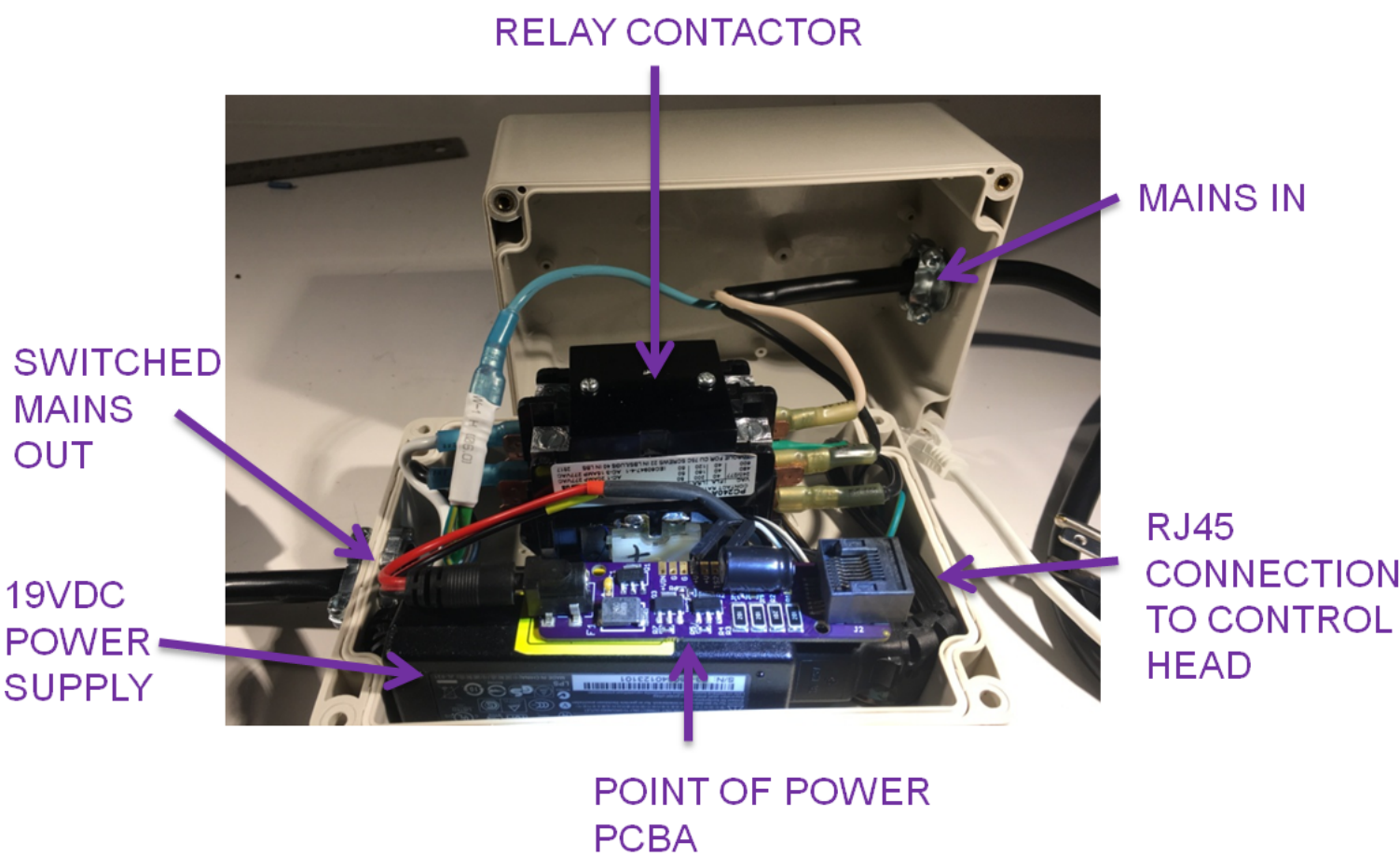
RJ45 Female to Female Coupler 	http://a.co/d/1OZ7RjQ	Optional used if a short length of RJ45 cable is used from inside to outside of box
Electrical Clamp Connector x 1 	http://a.co/d/hs_mj3p3	Strain Relief for RJ45 cable into and out of box.
Short RJ45 Ethernet Cable 	http://a.co/d/iAMhQDi	Short length of Ethernet cable inside to outside of box. A long length can be used if distance to tool is known.
Short USB Micro Cable 	http://a.co/d/cvXhure	Optional. Used for development. Latest firmware allows for over-the-air configuration and updates so this is not required.

Point Of Power Detail

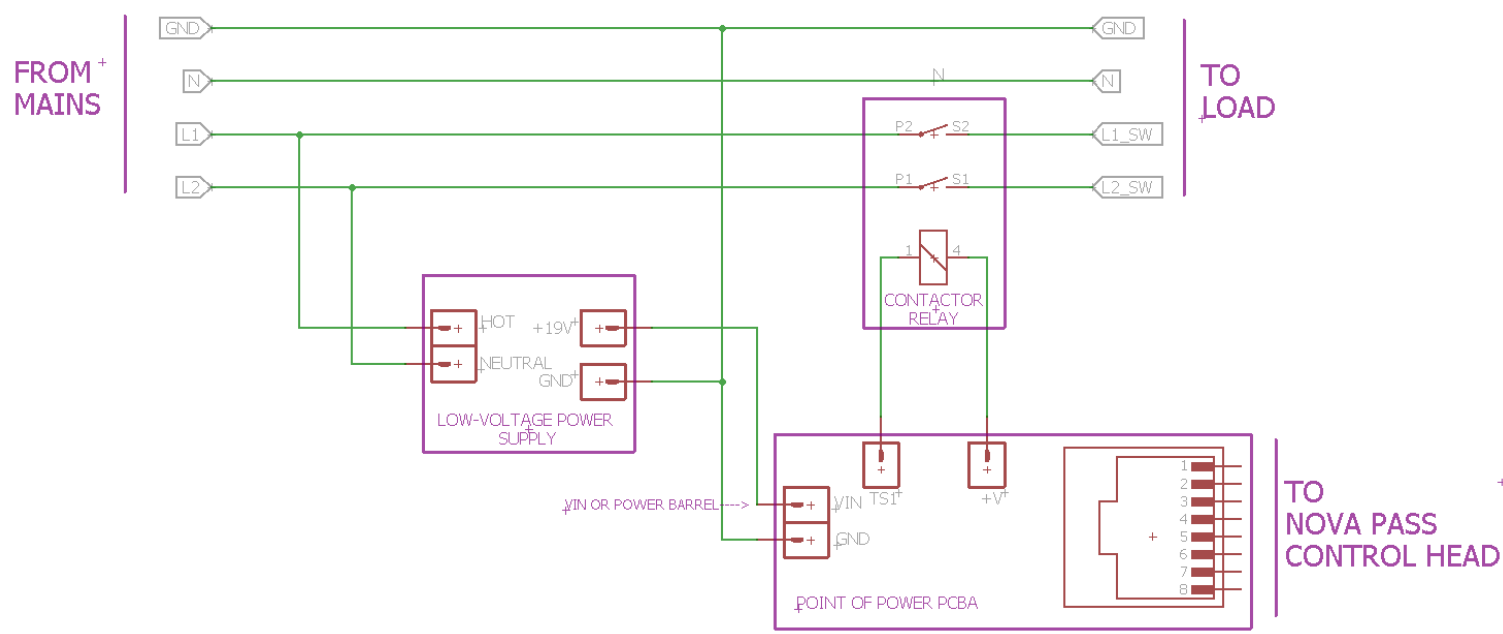
Assembled



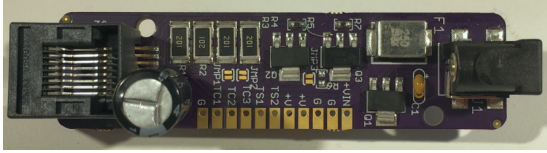
Disassembled



Wiring Diagram



Relay Contactor Box BOM

DESCRIPTION	PART#/LINK	COMMENT
NovaPass Point of Power PC Board Assembly 		Provided Assembled by Small Batch Assembly
Contactor Double Two Pole 40 Amp 24 Volts Air Conditioning PC240A 	https://www.ebay.com/sch/i.html?from=R40&trksid=m570.l1313&nkw=PC240A&sacat=0	Note these contactor's are commodity types used in outdoor residential air conditioner compressors. The contactor coils are designed for AC which current limits by impedance. We drive them with DC so we must provide one level of current to close them, then another lower level of current (~70ma) to keep them closed
Enclosure Option 1 	NEMA 1 Sheet Metal Junction Box Electrical Enclosure Project 6x6x4	
Enclosure Option 2 (with mounting tabs) 	Electrical Box, PVC, 6-3/4" x 6-3/4" x 4-1/8"	Ebay, Electrical Supply Distributor,
Enclosure Option 3 - Light duty.	(160mmx110mmx90mm) ABS Junction Box Universal Project Enclosure	Amazon, Ebay



19V Adapter



[Power Adapter for Laptop 19VDC](#)

NovaPass Control Head + Contactor Box requires only ~1A. Any 19VDC generic laptop adapter that will fit inside the enclosure will suffice.

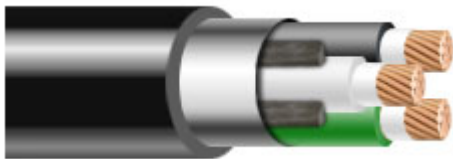
Electrical Clamp Connector x2



http://a.co/d/hs_mj3p3

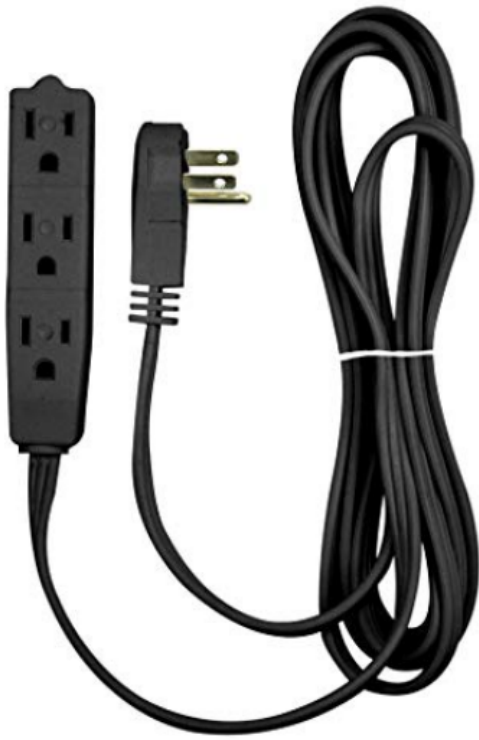
Strain Relief for RJ45 cable into and out of box. Salient feature is that you can thread a cable with an RJ45 connector attached through it.

Power Cord and Connectors



[Guide for selecting gauge](#)
[Bulk Power Cord](#)
[Extension Cord](#)

Select wire gauge and number of conductors appropriate for tool. Options include purchasing extension cords with ends and cutting in the middle, or purchasing bulk.



Heat Shrink Seal Butt Splice Connectors
Quick Disconnect Crimp Terminals



For internal splices if you wish to crimp. You can alternately solder and heat-shrink.

Select gauge appropriate for power requirements of tool



Heat-Shrink
12-10ga female
quick
disconnect

Indicator Lights Green LED, Flush Panel
Mount 7/8" 22mm

<http://a.co/d/5ufEHvE>

Cheaper on EBay or Ali Express. Be sure to pick 110V or 220V as appropriate

