



Electromagnet - Objectives and Outcomes

Drafting/CAD

Objectives:

- Define the components required in the design of an electromagnet.
- Identify the necessary fasteners and thread information as applied to the project.
- Examine the functionality of 2D and 3D CAD software.
- Research the necessary information used in engineering drawings.

Outcomes:

- Upon completion of this project, the student will be able:
- To identify the components required in the design of an electromagnetic relay.
- To specify correctly the fasteners and thread requirements of the project.
- To create 2D drawings or 3D models of all necessary parts.
- To create a working drawing necessary for manufacture of a machined part.
- To create an assembly drawing necessary to assemble the electromagnetic relay.

Machine Tool

Objectives:

The student will:

- Examine the information available on engineering drawings.
- Identify commonly used components used in fixturing parts.
- Determine the necessary fixture used to manufacture project parts.
- Define necessary information in operation of a modeling machine center.
- Become familiar with assembly procedures used in manufacturing.

Outcomes:

Upon completion of this project, the student will be able:

- To read and interpret an engineering drawing.
- To fixture the blank material on a modeling machining center.
- To manufacture, using faceted information, a scale model of the required components.
- To assemble, according to the print, the project device.

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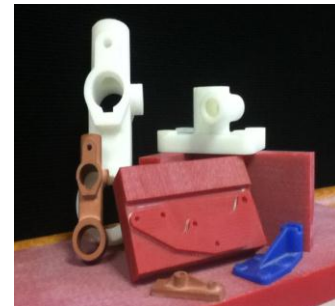
Rapid Prototyping

With the increase in demand for consumer goods, the need to quickly design and produce them has greatly increased the practice of rapid prototyping.

Rapid prototyping is the production of scale models, from various materials such as plastics to metals, of products designed for particular applications. These applications can include consumer goods such as cell phones, computer hardware, gaming consoles and controllers and other products.

The models pictured to the right were produced using various prototyping machines. Each machine produces a specific type of model from a specific material.

The models produced were designed using a 3-D computer design software and then output to a rapid prototyping machine.



The models designed using 3-D soft wares are commonly used in industry. Alfred State Drafting/CAD programs use this type of software every day in our labs.

If you are interested in participating in a seminar for modeling and prototyping, feel free to contact: Steven J. Martinelli at martinsj@alfredstate.edu. Or call (607) 587-3127.

"We hire graduates from Alfred State because they arrive with the technical skills needed to design our product."

Jerry Falkowski – Engineering Manager, Praxair Inc.





Electromagnet Relay Project

The block, strips of galvanized sheet metal, copper terminals, and bobbin, along with needed fasteners, are included in the kit. Please refer to the following for helpful advice in assembling your electromagnet.

Terminal Block

The terminal block is machined to specifications, but will require the tapping of the holes for the contacts, as well as, the match-drilling and tapping for the terminals. The drawings supplied with the packet specify the tap sizes needed.

Coil

The 30 AWG wire for the coil is specified on the drawings.

We have found that if the bobbin is filled with the wire, the coil works best.

Wrapping with electrical tap secures the coil and protects from damage.

Contact Strips

We have included the material necessary to bend the contacts to their proper dimensions. The drawings included with the packet will help in achieving these proper dimensions. (Rubber cement is helpful in holding the terminals in place when drilling the holes in the terminal block. The rubber cement can then be easily removed after drilling.)

Terminals

The copper terminals must be match-fitted and drilled to the terminal block, as the drawings show. Once the terminals are drilled and matched to the blocks, the block can be tapped.

Wiring the Project

We have included a wiring diagram to assist you in wiring the project.

The assembly drawing will supply the necessary information to fine tune your electromagnet.

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Electromagnet Relay Switch Project for DCAD & Machine Tool

Assignment	Task (DCAD)	Task (MATT)
Modeling of block body using CAD	Design block body	Machine block
Modeling terminal strip using CAD	Design terminal strip materials	Machine terminal strips
Model switching strips using CAD	Design switching strip	Machine strip
Model common contact using CAD	Design contact configuration	Fabricate contact
Assembly drawing requirements	Assembly drawing	Assemble switch
Draft schematic	Draft schematic	Verify operation

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