Introduction

Engineering Drawing & CAD

Lecture 01

Introduction

By

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About Me

Umer Farooq

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- **MSc –Mechanical Engineering Design**
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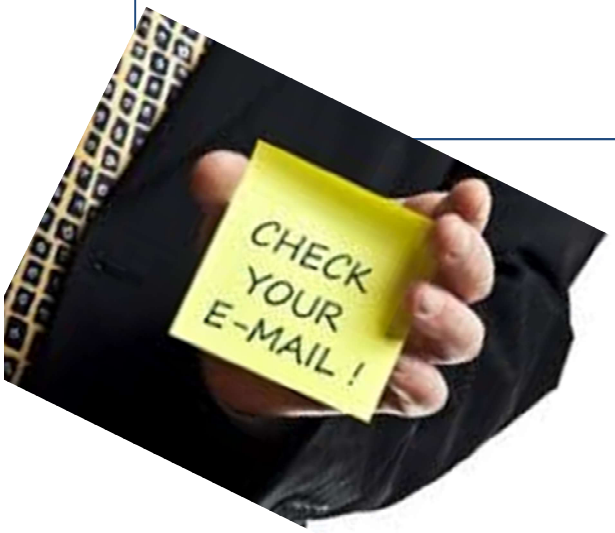
Communications

Check your e-mail/groups often for announcements related to the course



Marks Distribution……..

Sessional Work (25%)

Assignments	10%
Quizzes	10 %
Class Participation/ Presentation	5%

Assignments (10%)

Almost one every week

Late homework policy: Late submission of assignments will result in “zero” marks

Assignments (contd…)

Done on an individual basis

Collaboration is fine, but it should be you alone who writes up the answers.

Reading Assignments

Please make sure to read the assigned material for each week before the commencement of the corresponding week

Reading that material beforehand will help you greatly in absorbing with ease the matter discussed during the lecture

Quiz

Quiz may be announced or surprised

There will be class presentation
Topics will be assigned to each student and they will have to present it in front of the class

Midterm Exam (25%)

After 8th week

Duration: Two hours

Will cover all material covered during the first 8 weeks

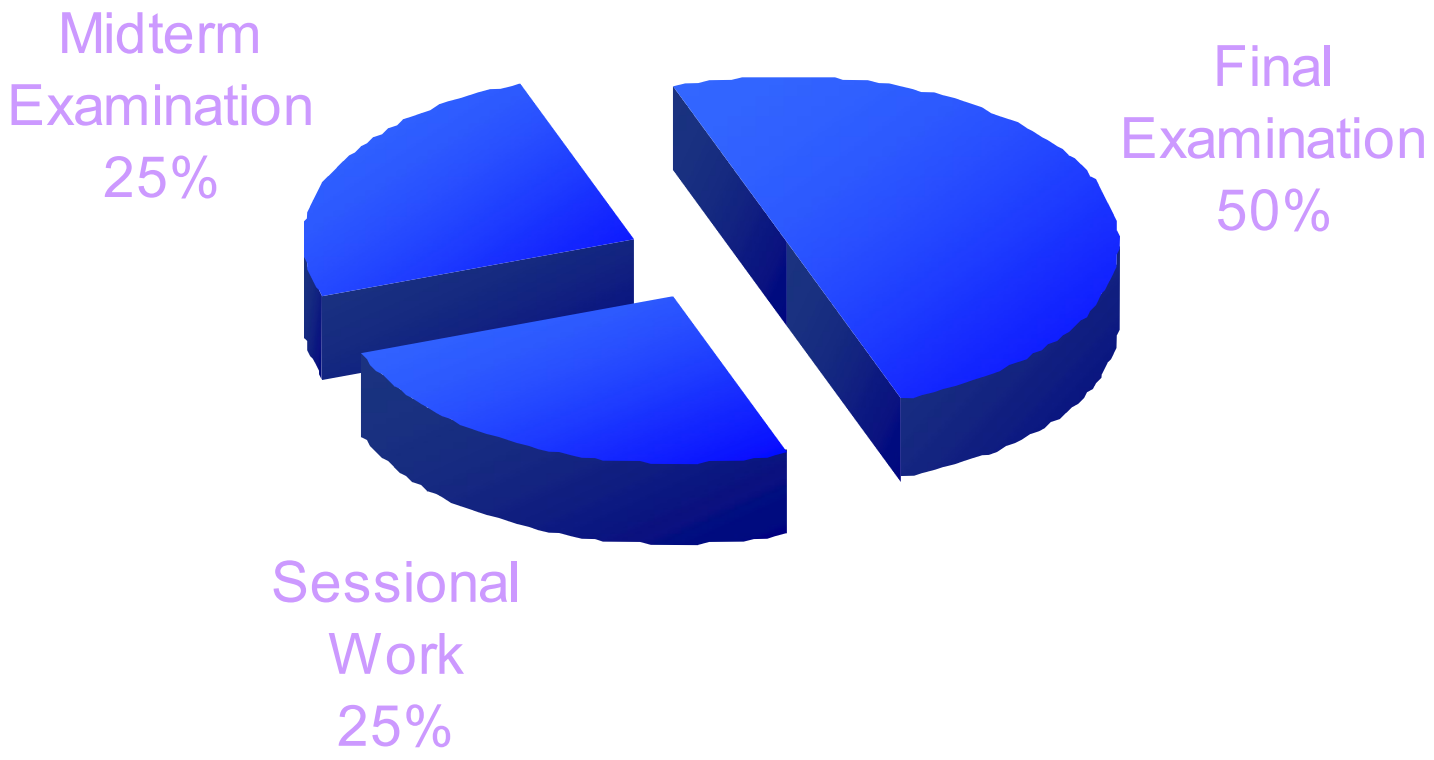
Final Exam (50%)

After 16th week

Will cover the whole of the course before and after midterm(May be changed later)

Duration: Two hours

Total Marks

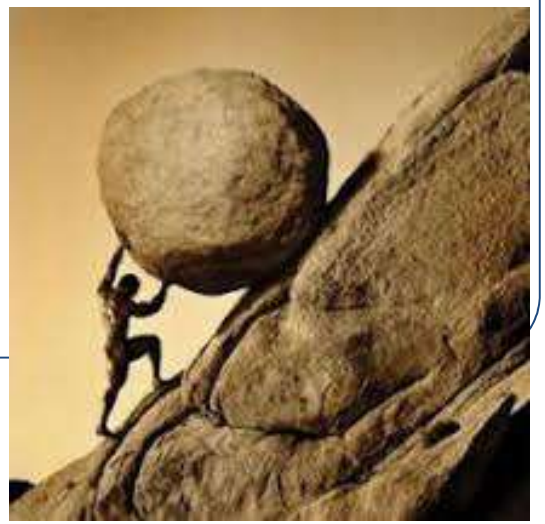

Midterm Examination 25%
Final Examination 50%
Sessional Work 25%

What we don't want?

That you fail such an easy course

Essential ingredient to pass

"HARD WORK"



Course Learning Objectives (CLO's)

- Students will be able to understand the role of engineering graphics in engineering design process.
- Students will demonstrate the ability to read and write engineering drawing.
- Students will be able to communicate, represent and document the design ideas.
- Students will be able to use modern CAD tools to basic design levels

- Credit hours: 02

Course Learning Objectives (CLO's)

- The CLO's are mapped to PLO's and are evaluated at the end of each course.

- You need to achieve at least 40% of each PLO.

- If you fail to achieve at least 40% in any of the 12 PLO's at the end of your 4 year program, necessary action may be taken against you.

Note: PLO's, PEO's and vision/mission of faculty and institute are available on the UET Peshawar's web site

Recommended Books

Text Book:

a. **'Elementary Engineering Drawing', Revised and Enlarged Edition by N. D. Bhatt.**

Reference:

a. **'Engineering Drawing and Graphic Technology', 14th Edition by Thomas E. French, Charles J. Vierck and Robert J. Foster.**

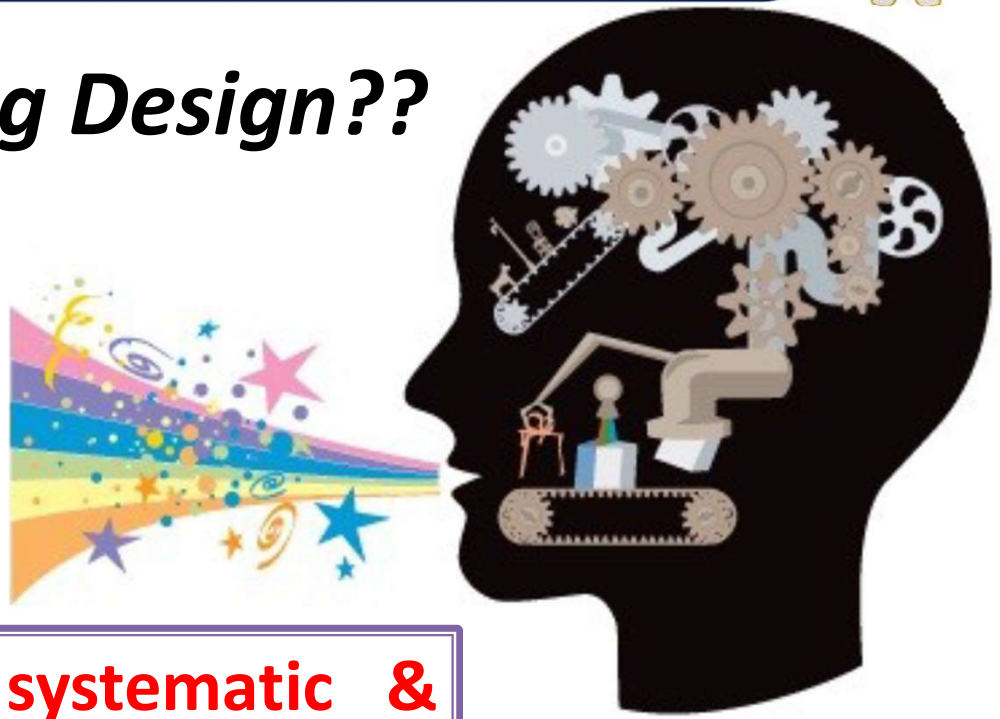
b. **'Technical Drawing', 7th Edition with Computer Graphics by Giesecke, Mitchell, Hill and Dygdon.**

Course Content:

- Introduction to Engineering Drawing and CAD
- Projection of Points
- Projection of Lines
- Projection of Shapes (Surfaces)
- Development of Surface.

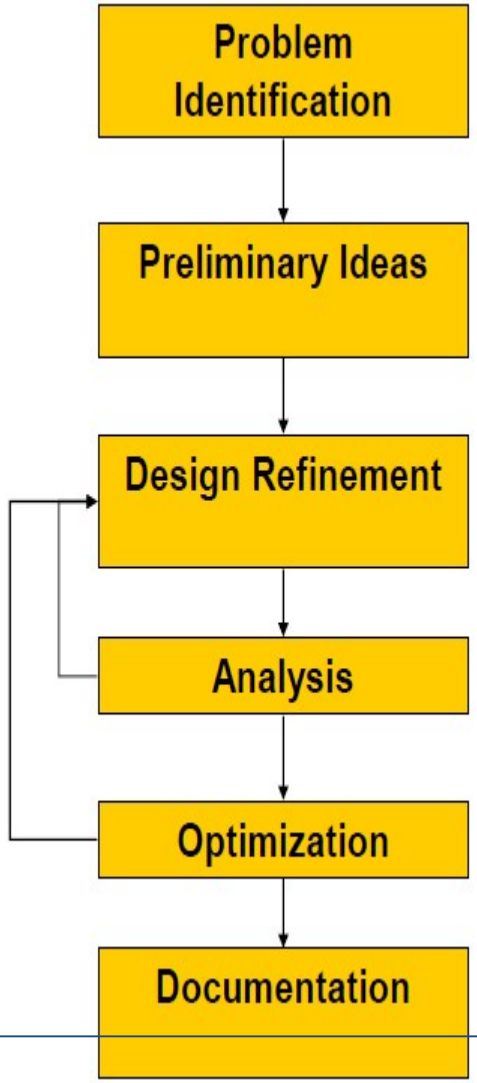
Introduction

What is Engineering Design??



Engineering design is a systematic & Iterative process in which designers generate, evaluate, and specify devices (products), systems, or processes whose functions are to achieve objectives while satisfying constraints.

Typical Engineering Design Cycle



Introduction

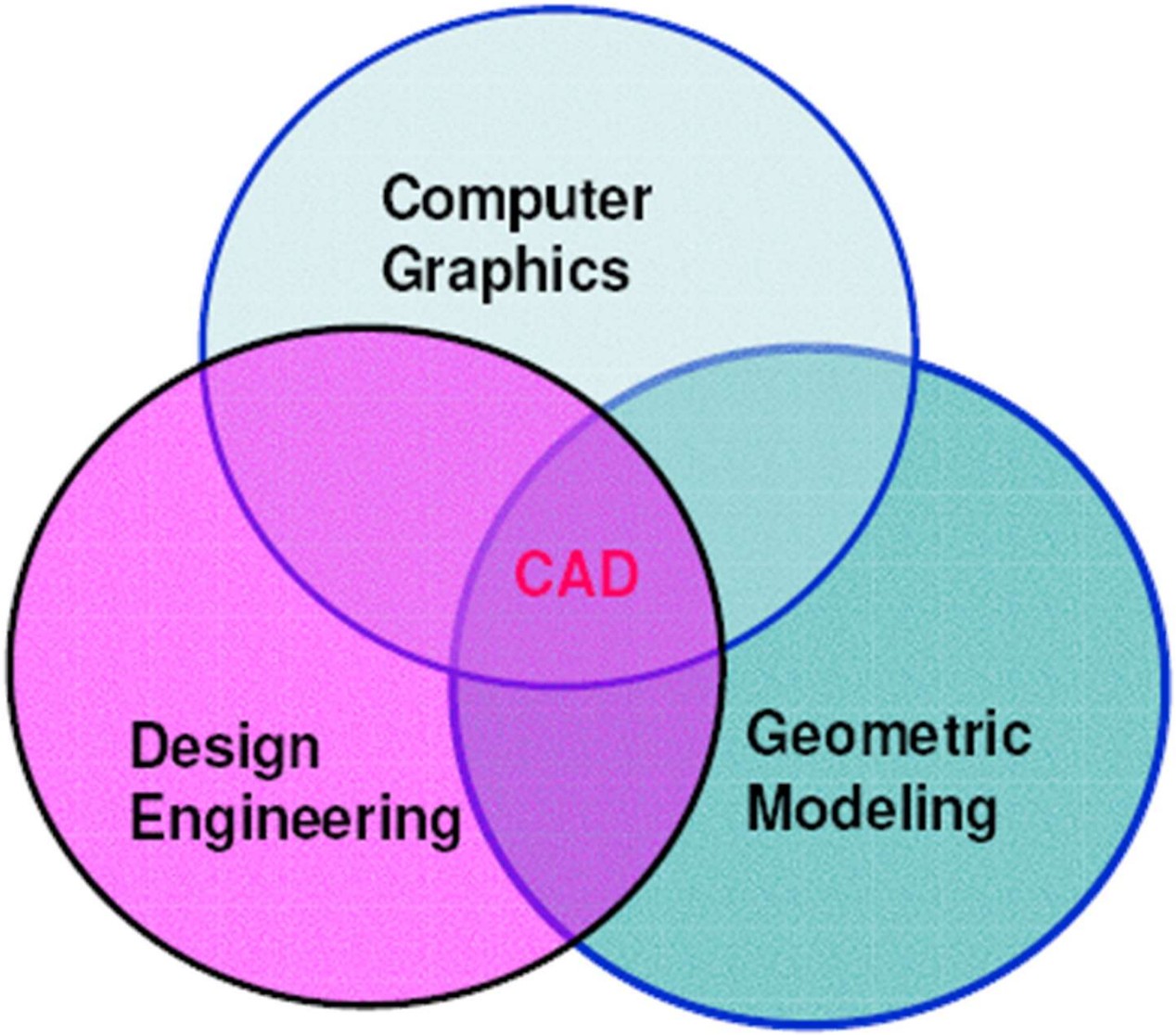
Engineering Drawing?

It refers basically to the use of Drawings/Sketches to represent design ideas, configurations & specifications and analysis for an engineering project.

CAD?

Computer aided design (CAD) is defined as any Design activity that involves the effective use of the computer to Create, Modify, Analyze & Document an engineering design.

Introduction



Introduction(Lecture 1 continued..)

1. Basic terminologies and its understanding:
    a. Shape
    b. Size
    c. Fit
    d. Finish
    e. Production Process and Specification
    f. Function
    g. Assembly

Introduction

2. TYPES OF DRAWING:

a. Production Drawings (Detailed and Assembly)

b. Exploded Assembly drawing

c. Schematic Assembly drawing

d. Drawing for instruction manual

e. Drawing for installation

f. Drawing for catalogue

g. Tabular drawing

h. Patent drawing

Introduction

3. TYPES OF MEASURING SYSTEMS:

a. English

- Feet and Inches

b. Metric

- Meters and Millimeters

DRAWING INSTUMENTS AND THEIR USES

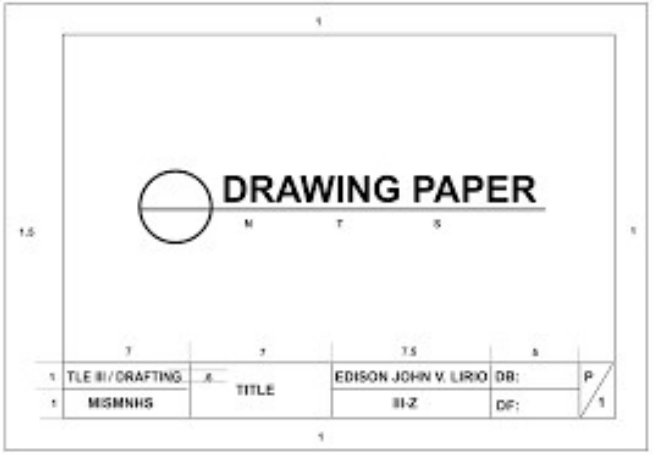
4. DRAWING INSTUMENTS AND THEIR USES:

a. Drawing Board.

Serves as a flat drawing surface to attach a paper to.

b. Drafting Media.

- Paper
- Film (Tracing Paper)



DRAWING INSTUMENTS AND THEIR USES

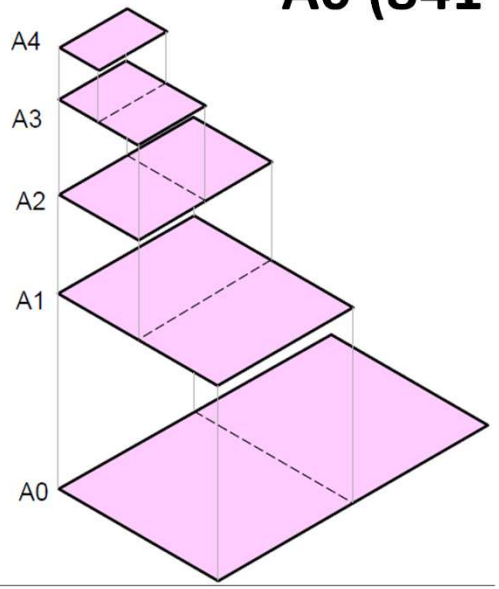
Standard Sizes are:

USA size, inches	Closest International size, mm
A (8.5 x 11.0)	A4 (210 x 297)
B (11.0 x 17.0)	A3 (297 x 420)
C (17.0 x 22.0)	A2 (420 x 594)
D (22.0 x 34.0)	A1 (594 x 841)
E (34.0 x 44.0)	A0 (841 x 1189)

- Trimmed paper of a size A0 ~ A4.
- Standard sheet size (**ISO**)

A4	210 x 297
A3	297 x 420
A2	420 x 594
A1	594 x 841
A0	841 x 1189

(Dimensions in millimeters)



DRAWING INSTUMENTS AND THEIR USES

c. **Pencils**

Classification according to lead hardness is:

Hard grades		Medium grades		Soft grades	
9H	Hardest	3H	Hardest	2B	Hardest
8H		2H		3B	
7H		H		4B	
6H		F		5B	
5H		HB		6B	
4H	Softest	B	Softest	7B	Softest

DRAWING INSTUMENTS AND THEIR USES

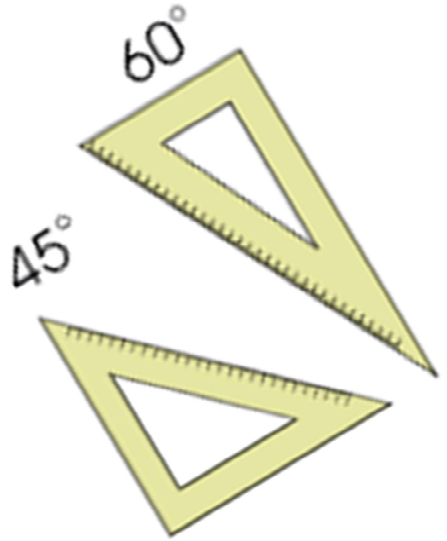
d. Eraser

e. T Square

For drawing horizontal lines and provide a supporting/sliding edge for set-squares and other stencils.

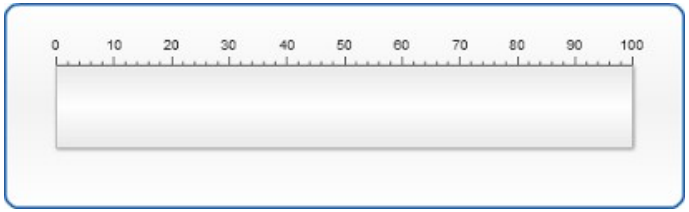
f. Set-Squares

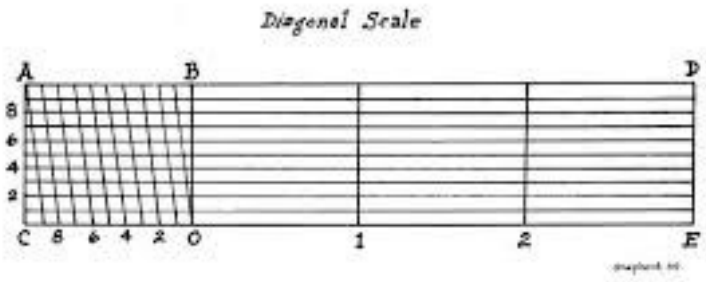
For drawing vertical and angular lines

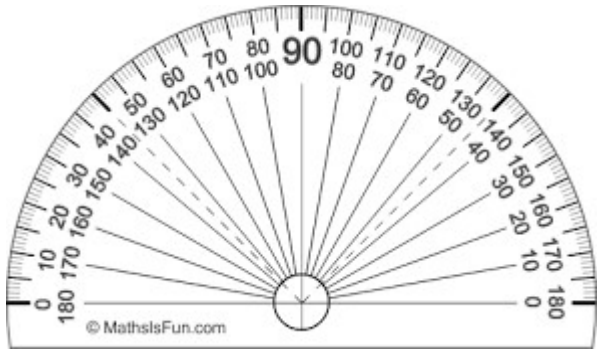


DRAWING INSTUMENTS AND THEIR USES

g. Scales
   i. Linear scales (English and Metric)
   ii. Vernier scales
   iii. Diagonal scales (For measuring fractions)
   iv. Comparative scales
   v. Protractor (For measurement of angles)







DRAWING INSTUMENTS AND THEIR USES

h. Compass with Extender

For drawing circles and circular arcs

i. Divider

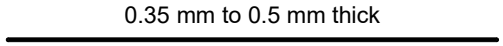
For transferring measurements and for dividing lines into and number of equal parts

Lines Used in drawing

5.TYPES OF LINES USED IN ENGINEERING DRAWING:

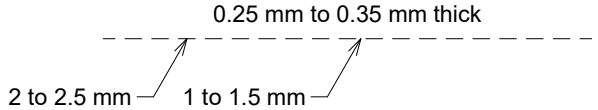
a) Visible Outline

For showing visible edges of an object



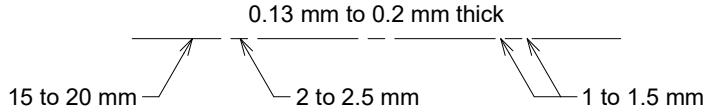
b) Hidden Outline

For showing hidden edges of an object



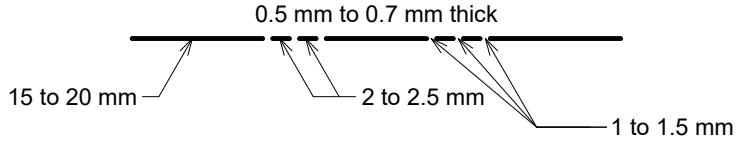
c) Center Line

For locating center of circles, arc and ellipses relative to the object.



d) Cutting Plane Line

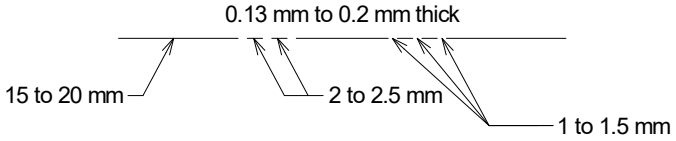
To show the location of the imaginary secion plane in the reference view.



Lines Used in drawing

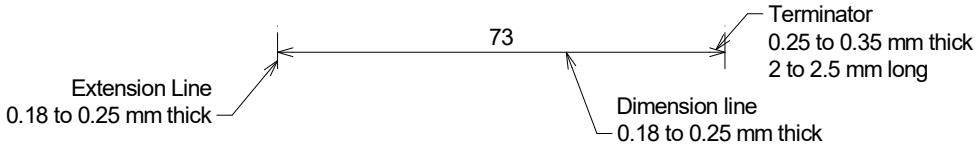
e) Phantom Line

For showing alternate position and/or adjacent part.



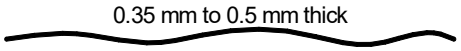
f) Extension Lines, Dimension Lines and Terminators

For extension of edges and placement of dimensions.



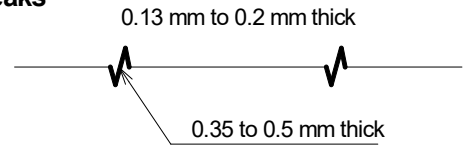
g) Short Break Line

For showing short breaks



h) Long Break Line

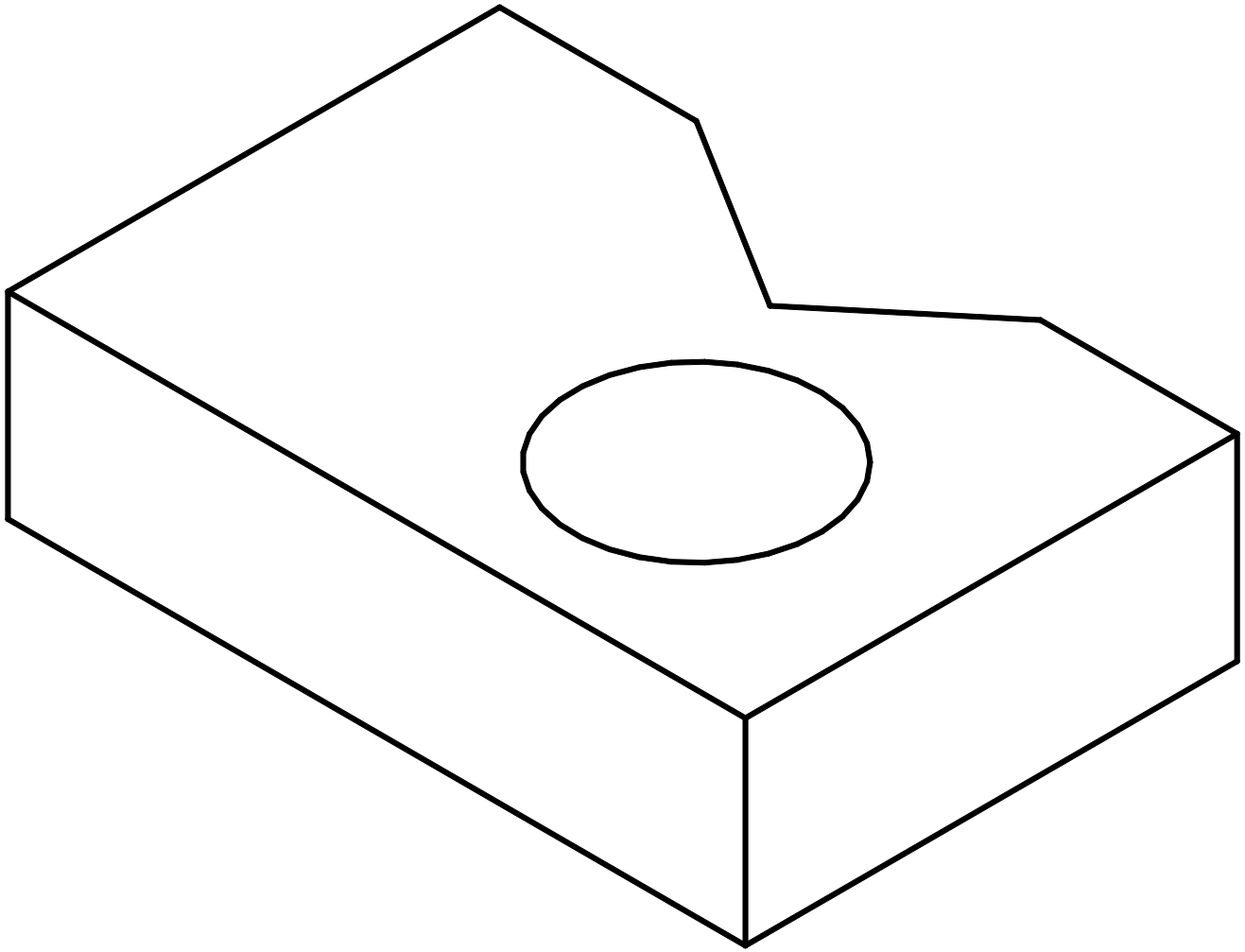
To show long breaks



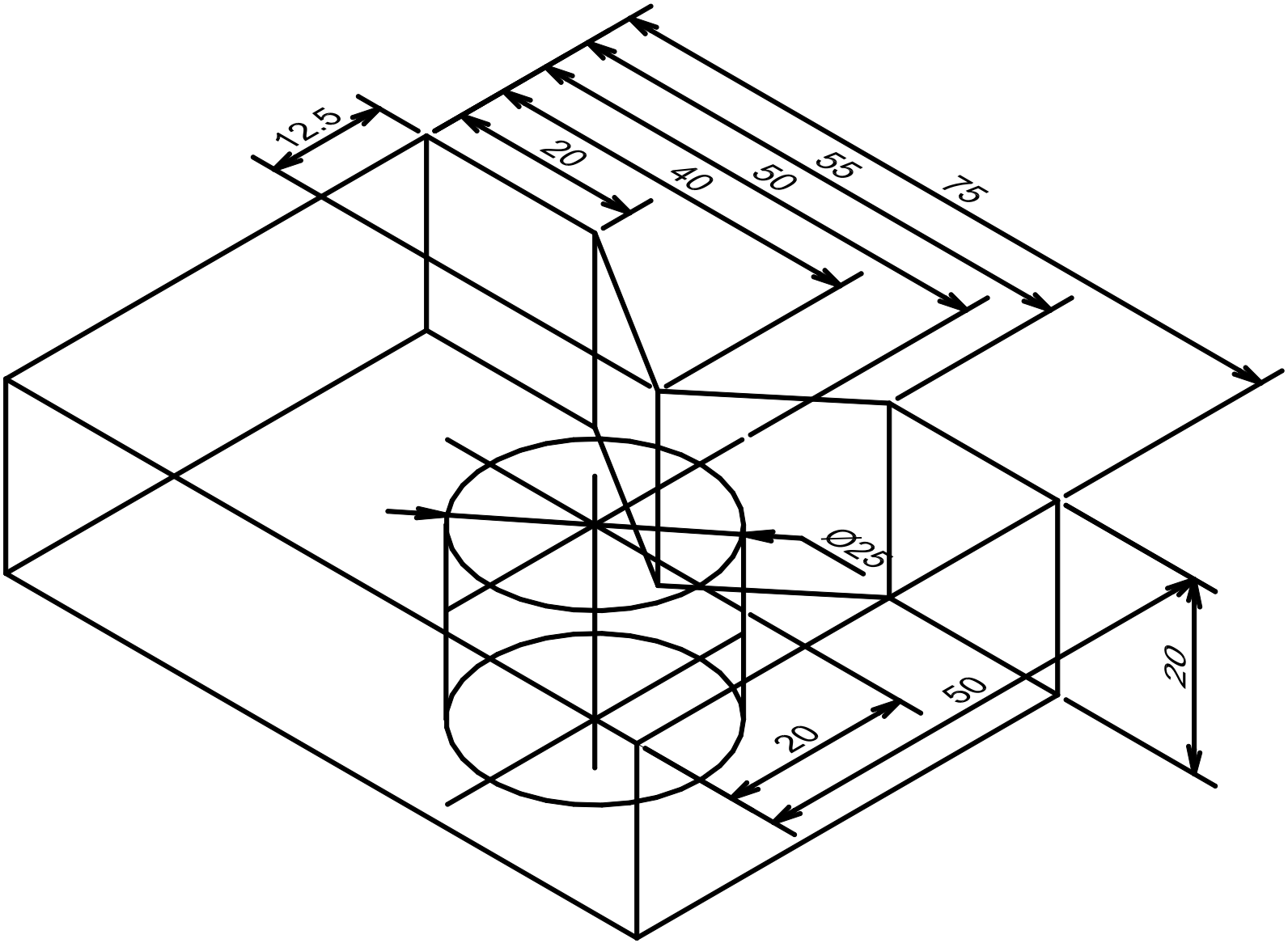
i) Section Lines

A pattern of thin lines 0.2 to 0.25 mm thick. The pattern and thickness is dependent on the material.

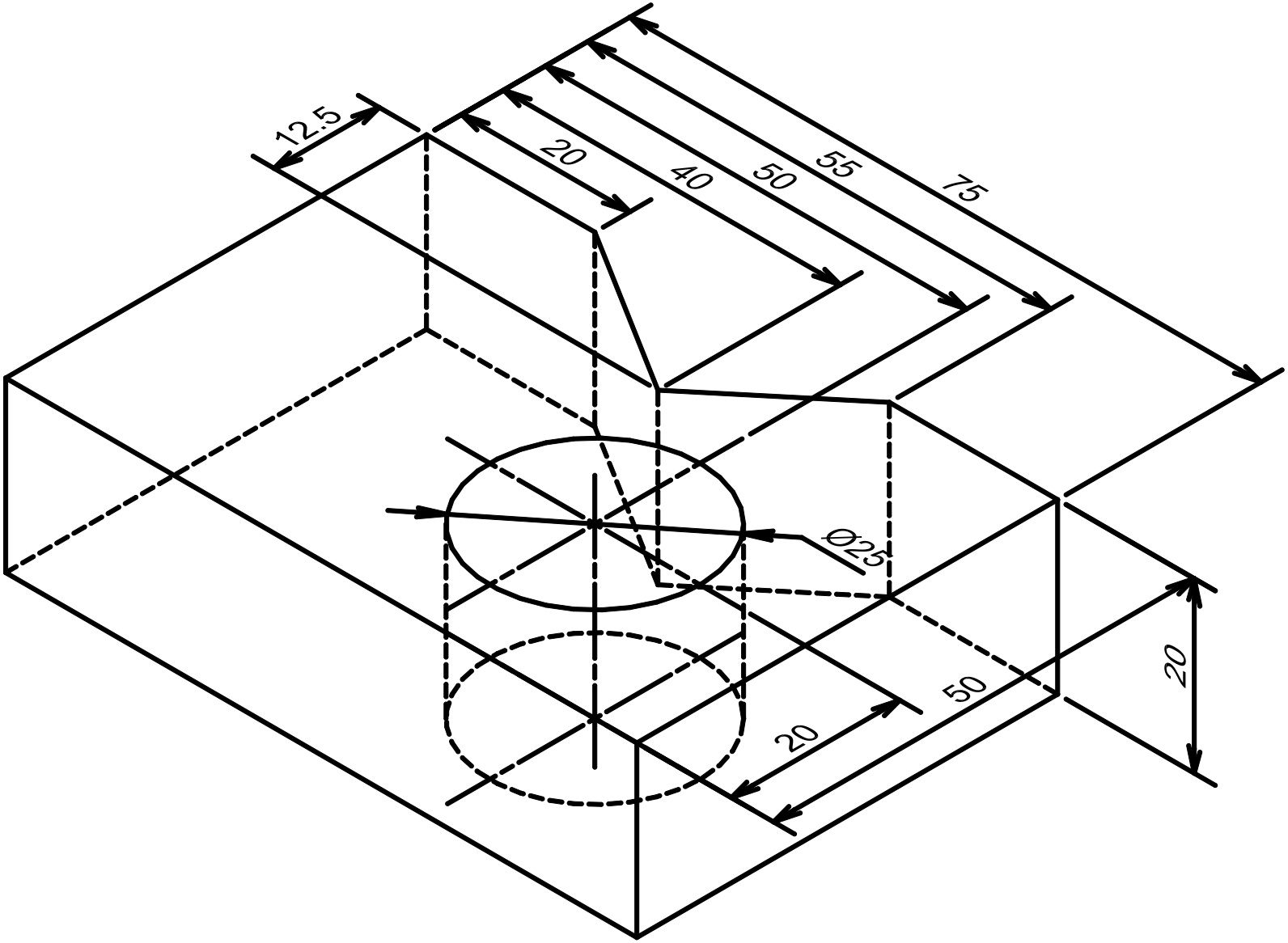
Lines Used in drawing



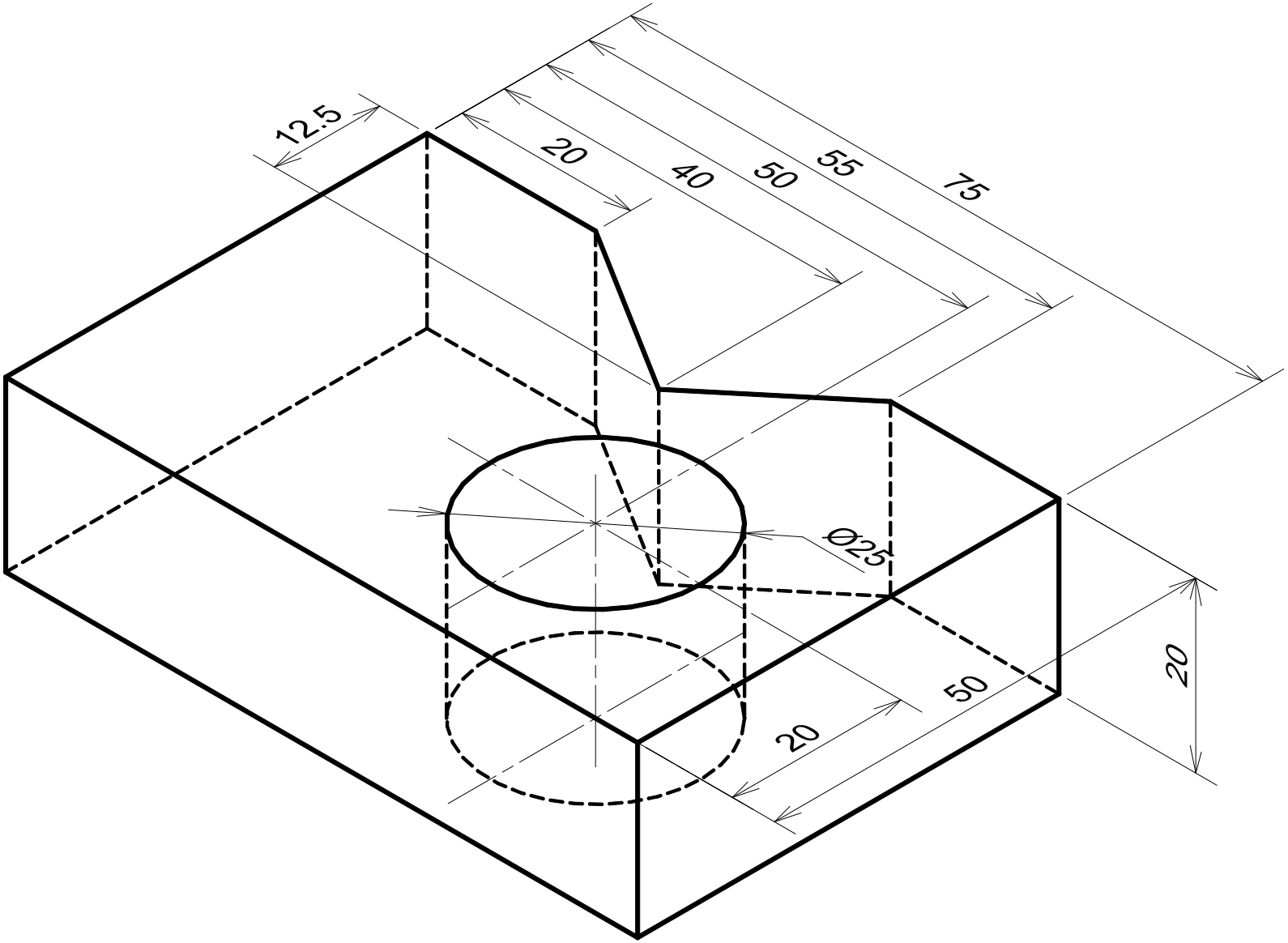
Lines Used in drawing



Lines Used in drawing

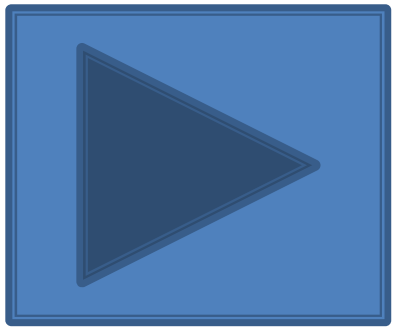


Lines Used in drawing



Please have a look

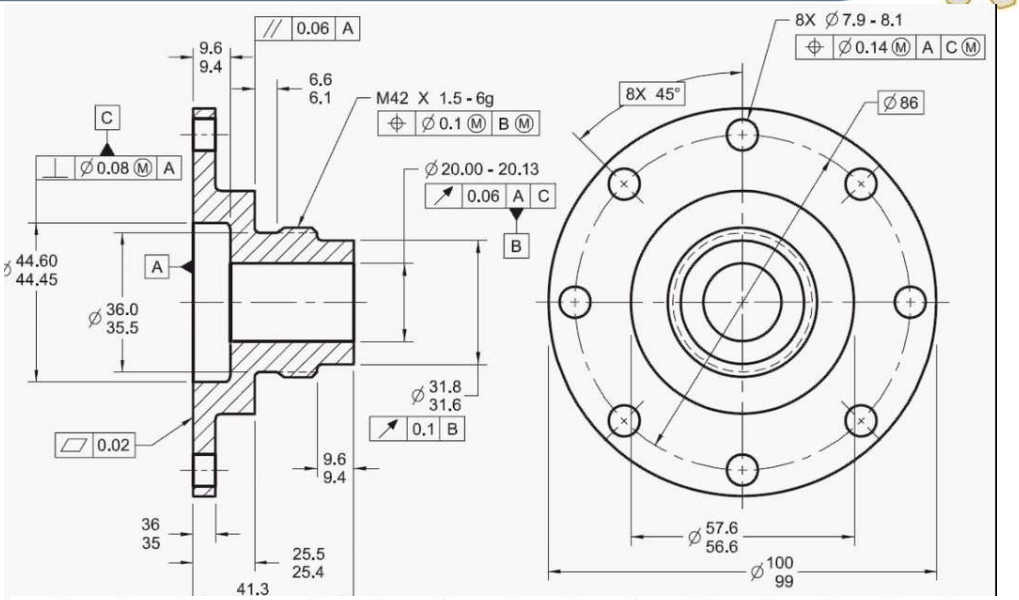
Video 1: https://www.youtube.com/watch?v=z4xZmBpXIzQ
Video 2: https://www.youtube.com/watch?v=JVw5lIl7dCE

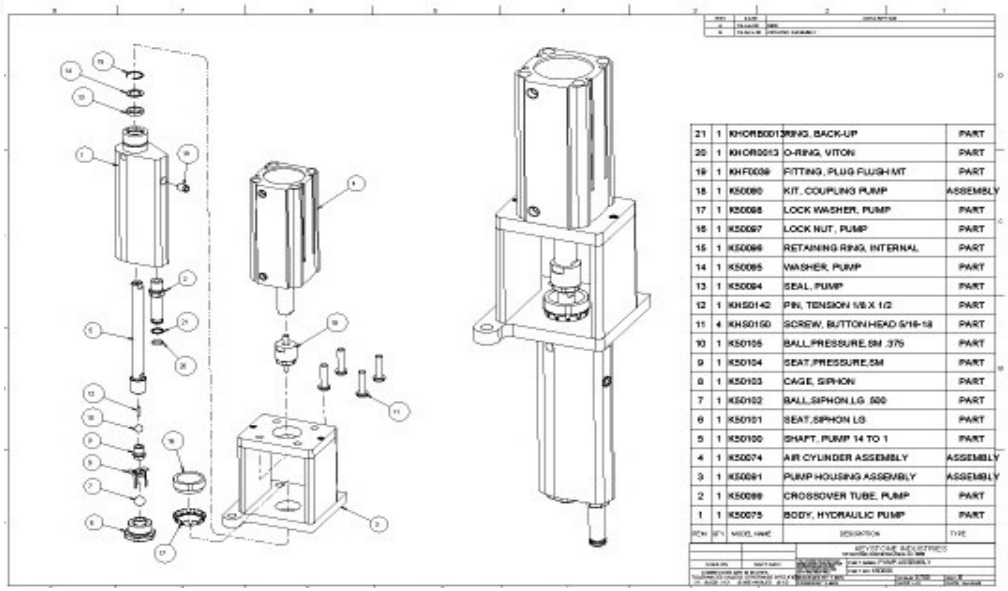


Video 2

"Muslims who possess better morals are the most perfect in faith ." (Mishkat)

Production Drawing





21	1	KHOR0013	RING, BACK-UP	PART
20	1	KHOR0013	O-RING, VITON	PART
19	1	KHF0039	FITTING, PLUG FLUSH MT	PART
18	1	K50090	KIT, COUPLING PUMP	ASSEMBLY
17	1	K50098	LOCK WASHER, PUMP	PART
16	1	K50097	LOCK NUT, PUMP	PART
15	1	K50096	RETAINING RING, INTERNAL	PART
14	1	K50095	WASHER, PUMP	PART
13	1	K50094	SEAL, PUMP	PART
12	1	KHS0142	PIN, TENSION 1/8 X 1/2	PART
11	4	KHS0150	SCREW, BUTTON HEAD 5/16-18	PART
10	1	K50105	BALL,PRESSURE,SM .375	PART
9	1	K50104	SEAT,PRESSURE,SM	PART
8	1	K50103	CAGE, SIPHON	PART
7	1	K50102	BALL,SIPHON,LG .500	PART
6	1	K50101	SEAT,SIPHON LG	PART
5	1	K50100	SHAFT, PUMP 14 TO 1	PART
4	1	K50074	AIR CYLINDER ASSEMBLY	ASSEMBLY
3	1	K50091	PUMP HOUSING ASSEMBLY	ASSEMBLY
2	1	K50099	CROSSOVER TUBE, PUMP	PART
1	1	K50075	BODY, HYDRAULIC PUMP	PART
ITEM	QTY	MODEL NAME	DESCRIPTION	TYPE

Exploded Assembly Drawing

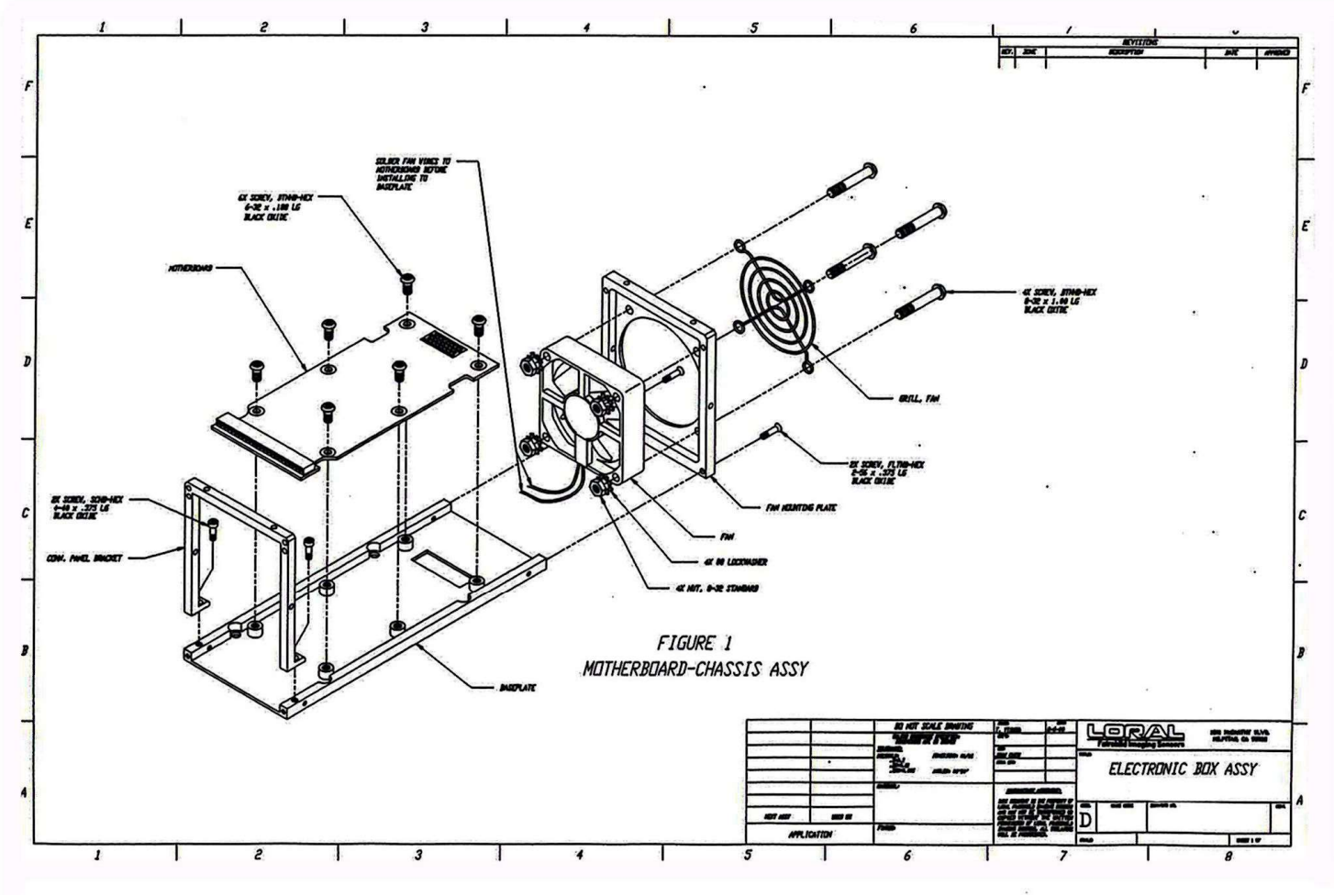
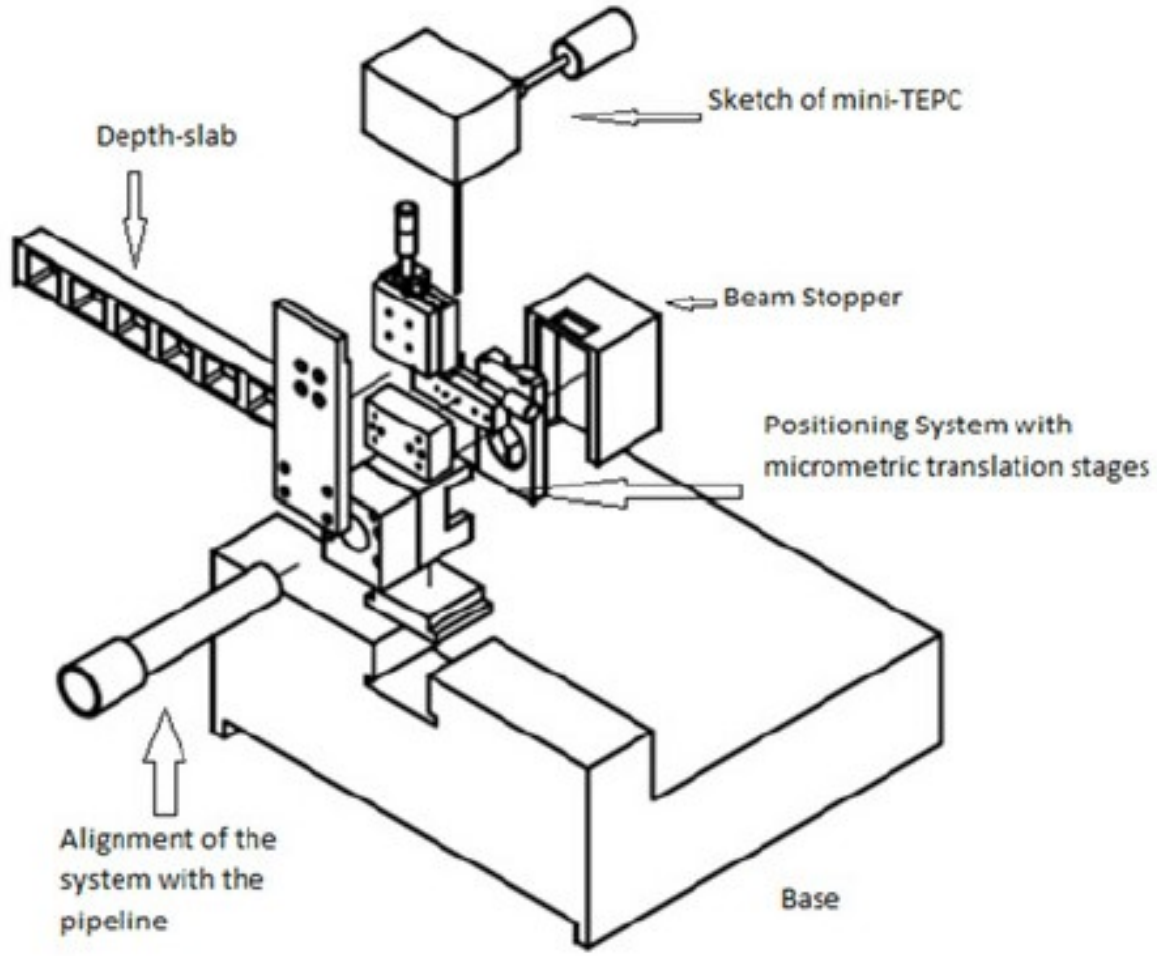
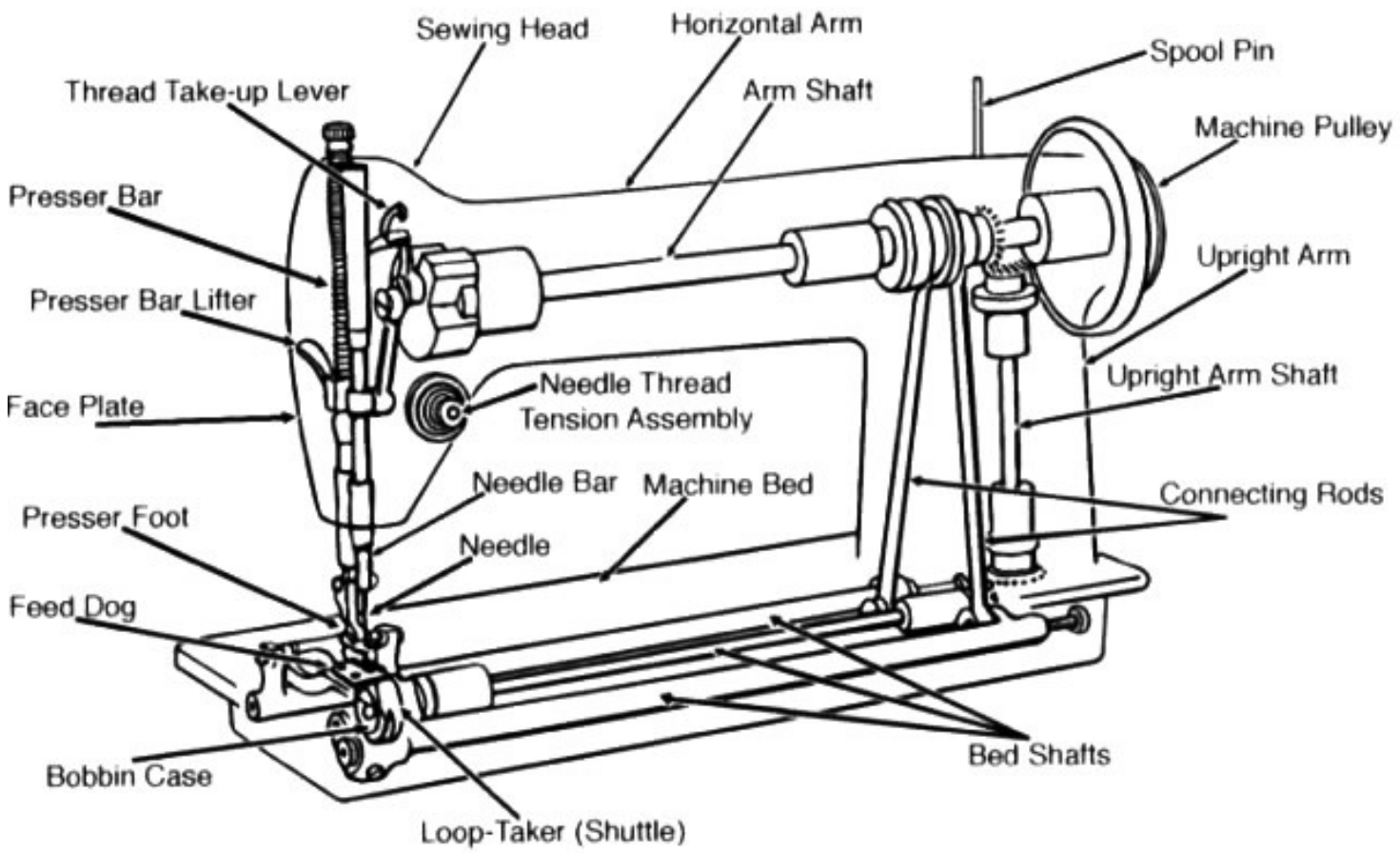


FIGURE 1
MOTHERBOARD-CHASSIS ASSY

Schematic Assembly Drawing

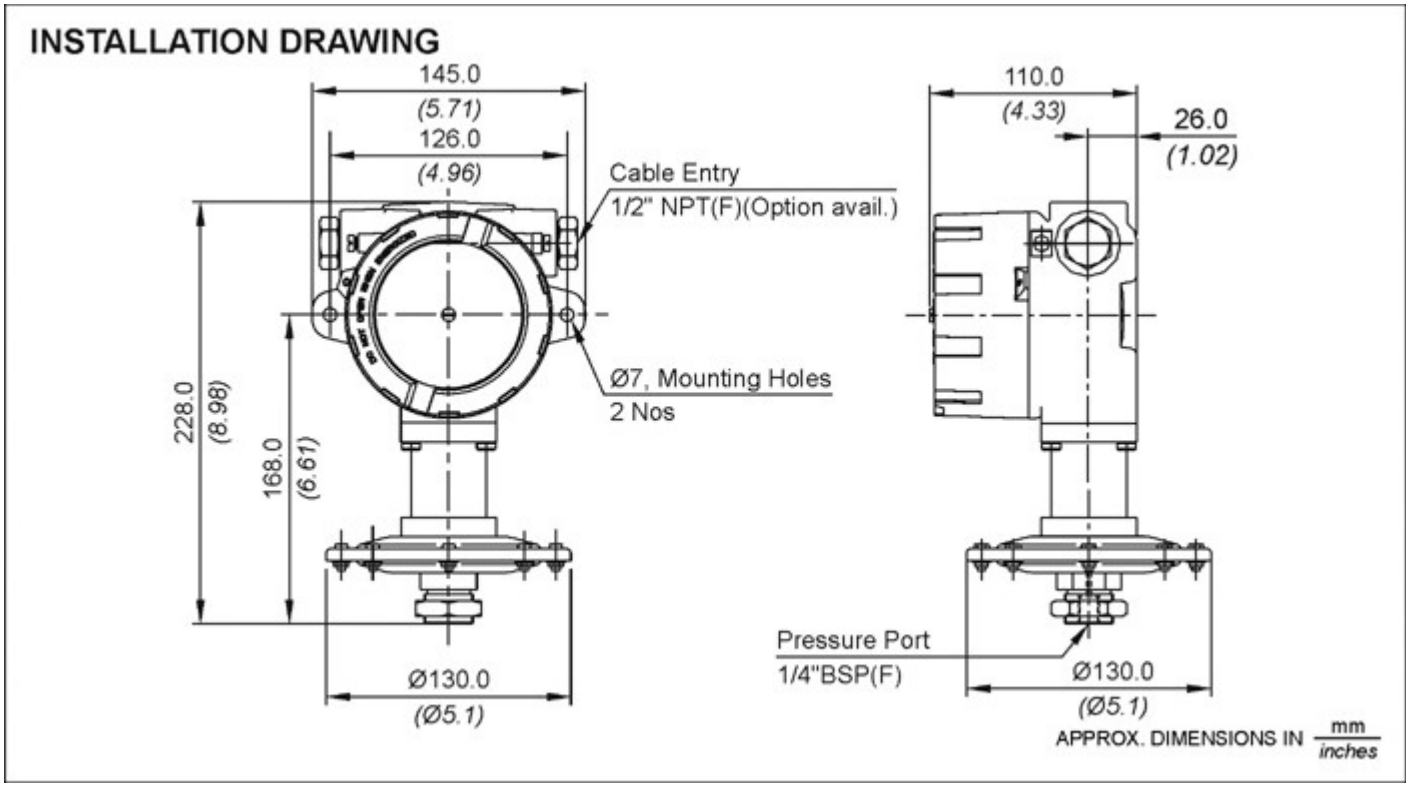


Drawing For Instruction Manual

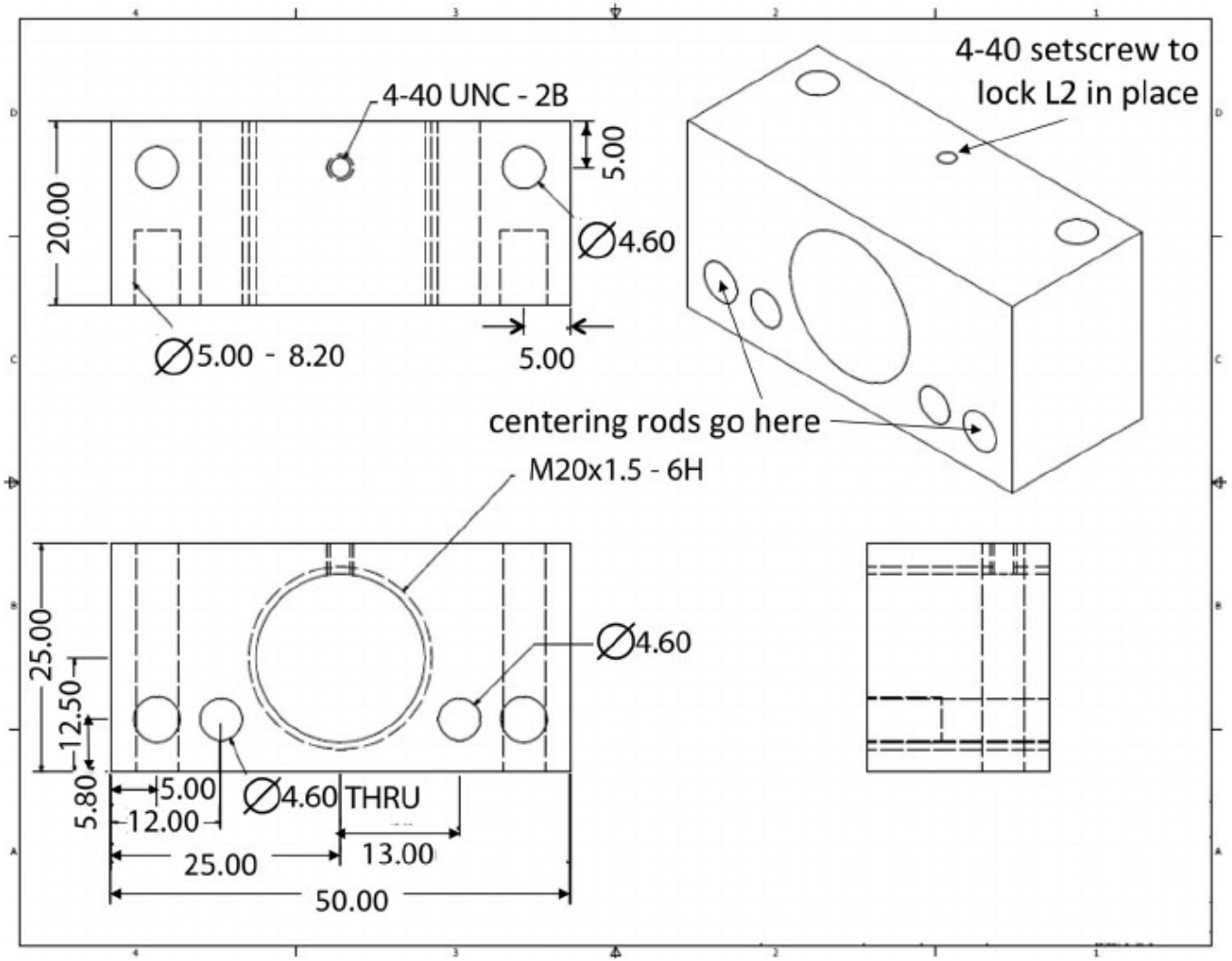


HEAD (Front View)

Drawing For Installation

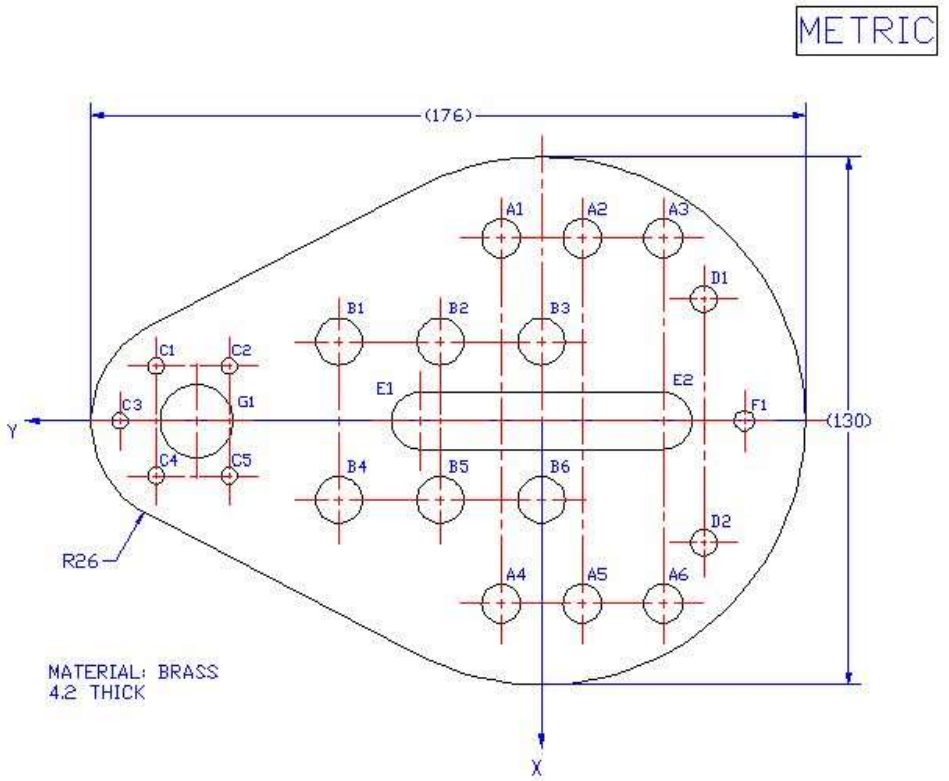


Drawing for catalogue



Tabular Drawing

HOLE	DIAM	X	Y	Z	NOTES
A1	9.5	-10	45	THRU	
A2	9.5	10	45	THRU	
A3	9.5000	30	45	THRU	
A4	9.5	-10	-45	THRU	
A5	9.5	10	-45	THRU	
A6	9.5	30	-45	THRU	
B1	11.5	-50	19.5	THRU	RC-6
B2	11.5	-25	19.5	THRU	RC-6
B3	11.5	0	19.5	THRU	RC-6
B4	11.5	-50	-19.5	THRU	RC-6
B5	11.5	-25	-19.5	THRU	RC-6
B6	11.5	0	-19.5	THRU	RC-6
C1	4	-95	13.5	THRU	
C2	4	-77	13.5	THRU	
C3	4	-104	0	THRU	
C4	4	-95	-13.5	THRU	
C5	4	-77	-13.5	THRU	
D1	6.5	40	30	THRU	
D2	6.5	40	-30	THRU	
E1	7	-30	0	THRU	
E2	7	30	0	THRU	
F1	5	50	0	THRU	
G1	18	-85	0	THRU	FN-2



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Patent Drawing