

BU
Faculty of Engineering
Mechanical Engineering Department

Mechanical DRAWING

Introduction

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Course Topics

1st term

- Introduction
- Fasteners
 - Threaded Fasteners
 - Non-Threaded Fasteners
- Assembly drawing principles

2nd term

- Fits and Tolerances
- Surface Roughness
- Detail Drawing
 - Power Transmission
 - Clamps and vises
 - Valvesetc

Marks System

Power

- 100 marks semester works
- 150 marks final exam

Production

- 90 marks semester works
- 135 marks final exam

Working drawing

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graph TD; A[Working drawing] --> B[Assembly drawing]; A --> C[Detail drawing];
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Assembly drawing

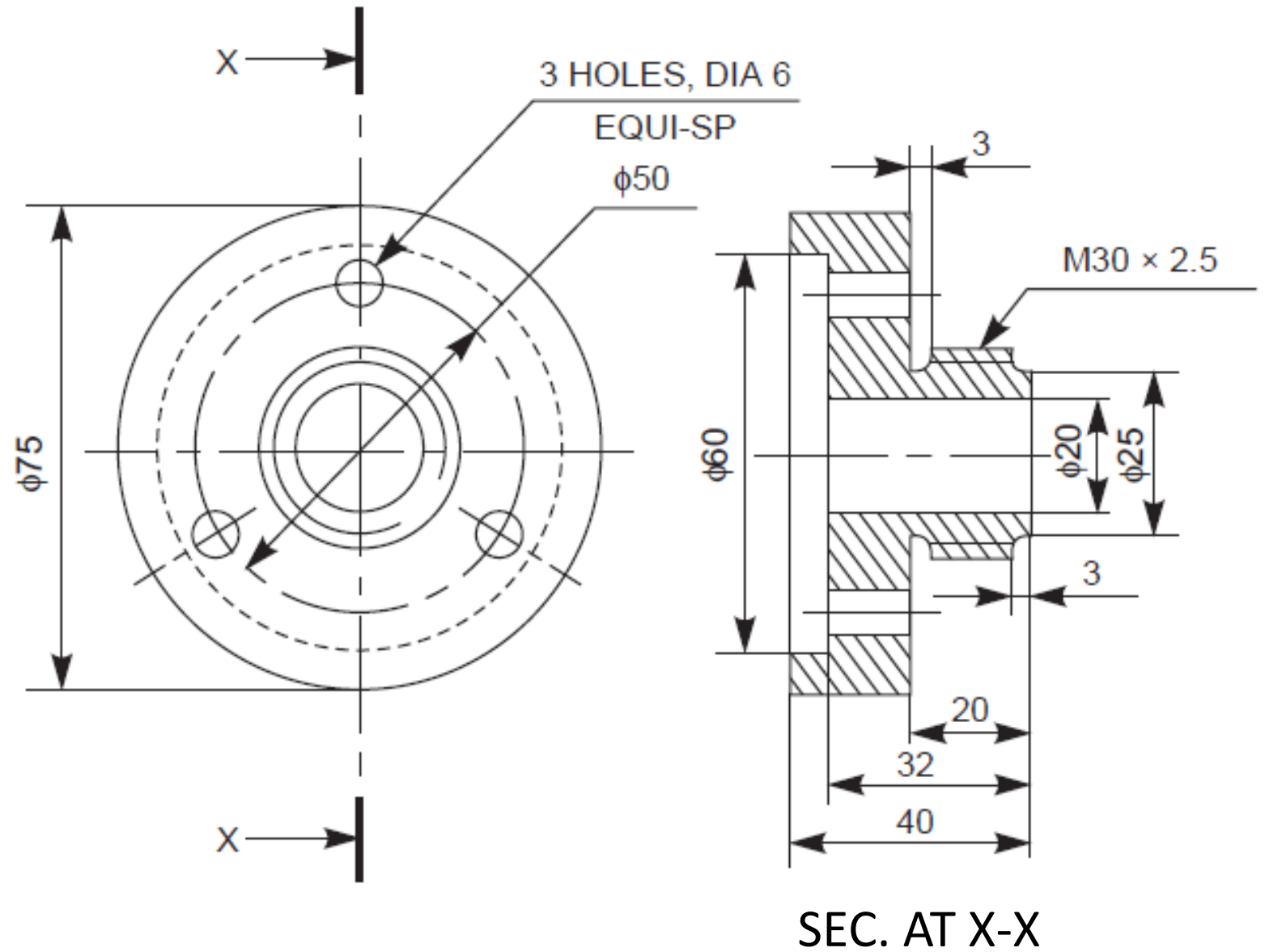
- *Assembly drawing* is a drawing of various parts of a machine or structure assembled in their relative working positions.

Detail drawing

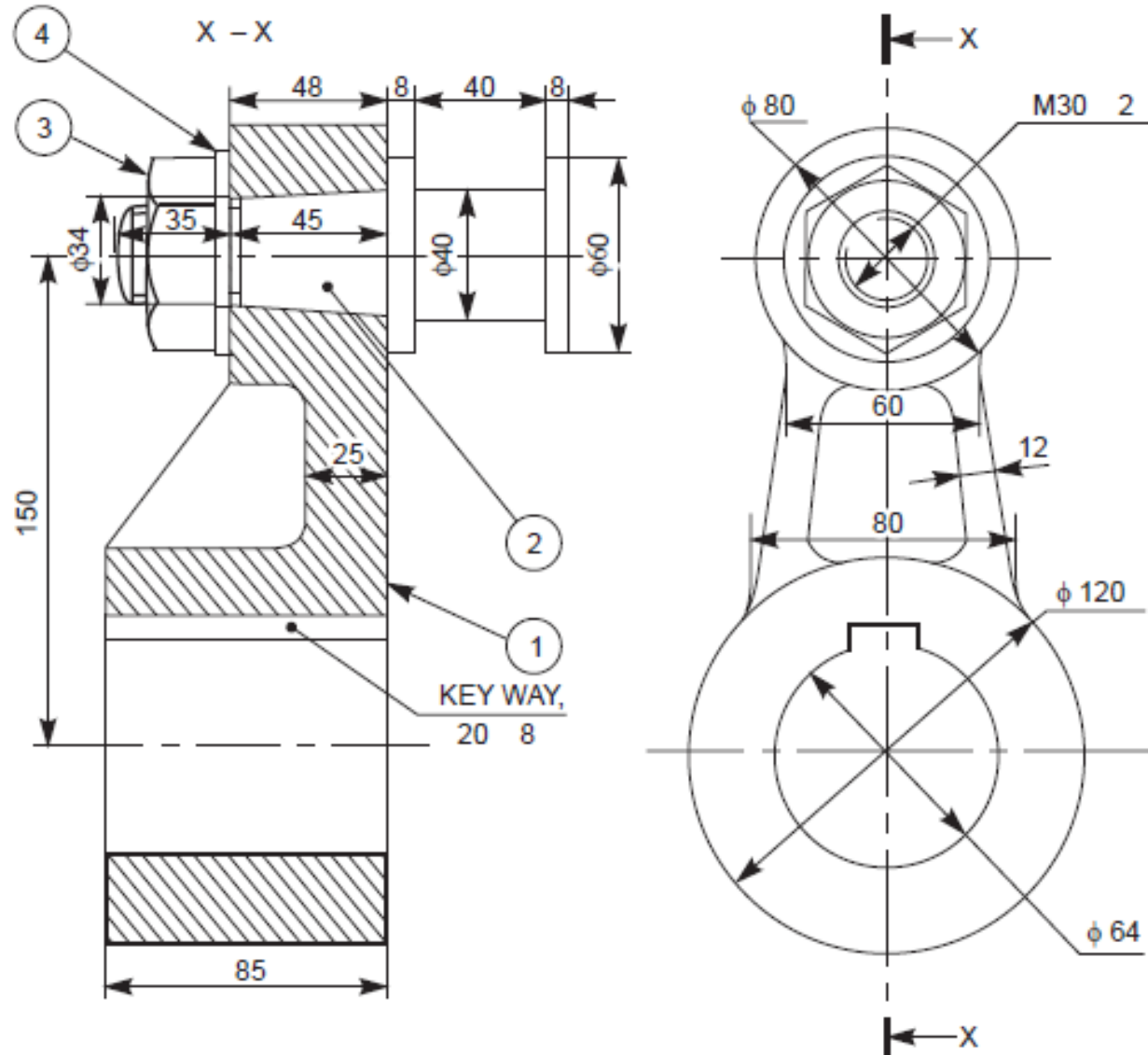
- *Detail drawing* is a set of drawing used during the work of making a product.

Drawing Types

1. Engineering Drawing



Drawing Types

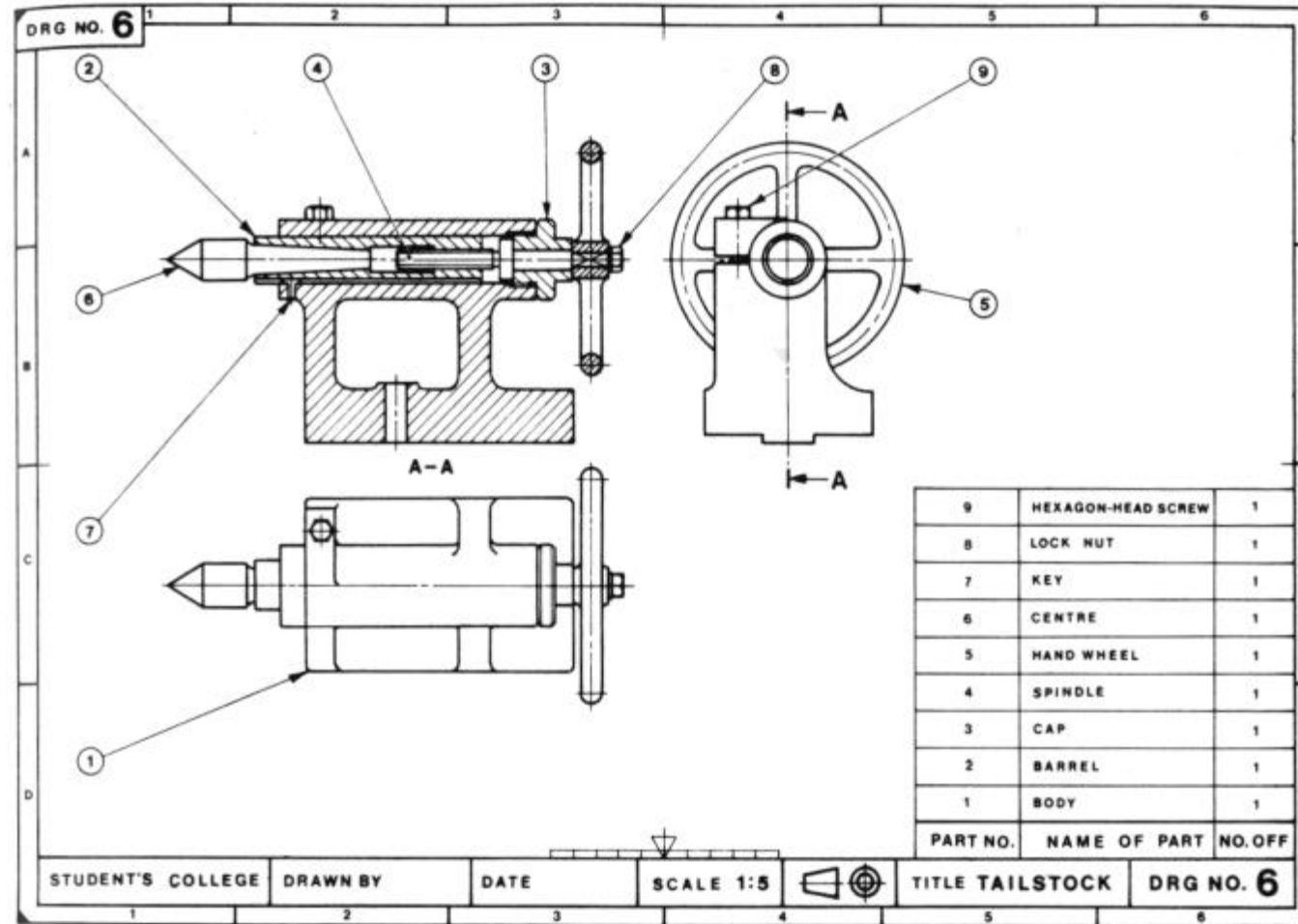


4.1 Assembly Drawing

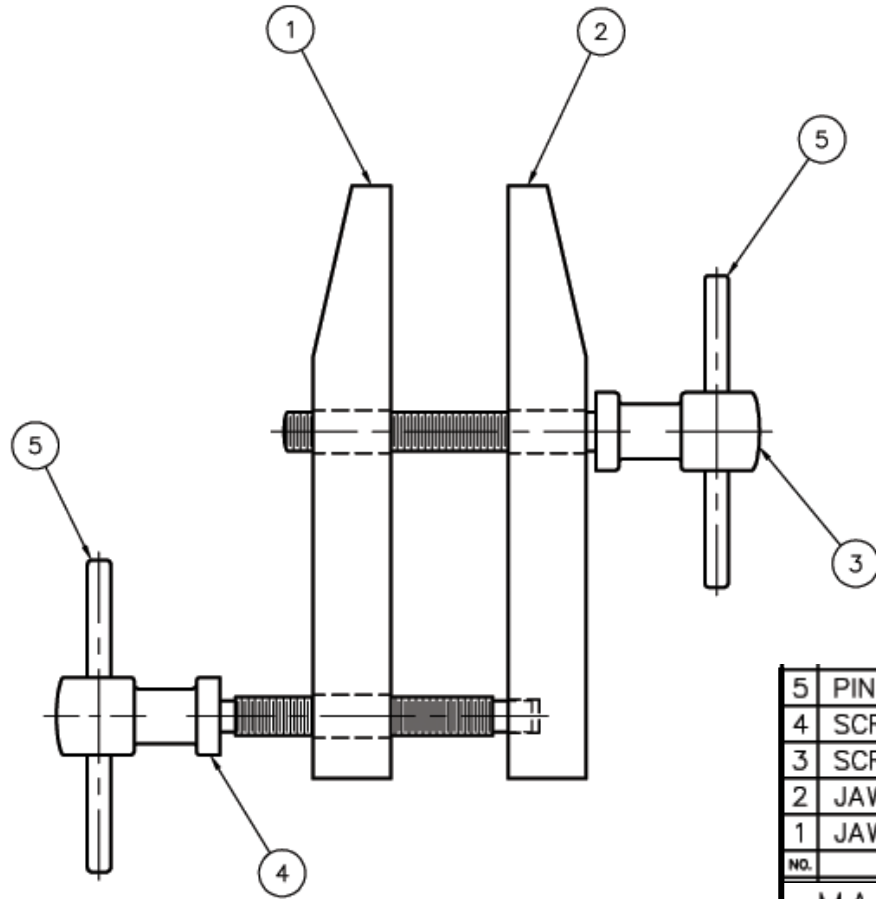
Parts List

Part No.	Name	Material	Qty
1	Crank	Forged Steel	1
2	Crank Pin	45C	1
3	Nut	MS	1
4	Washer	MS	1

Drawing Types



**General Assembly
Drawing**



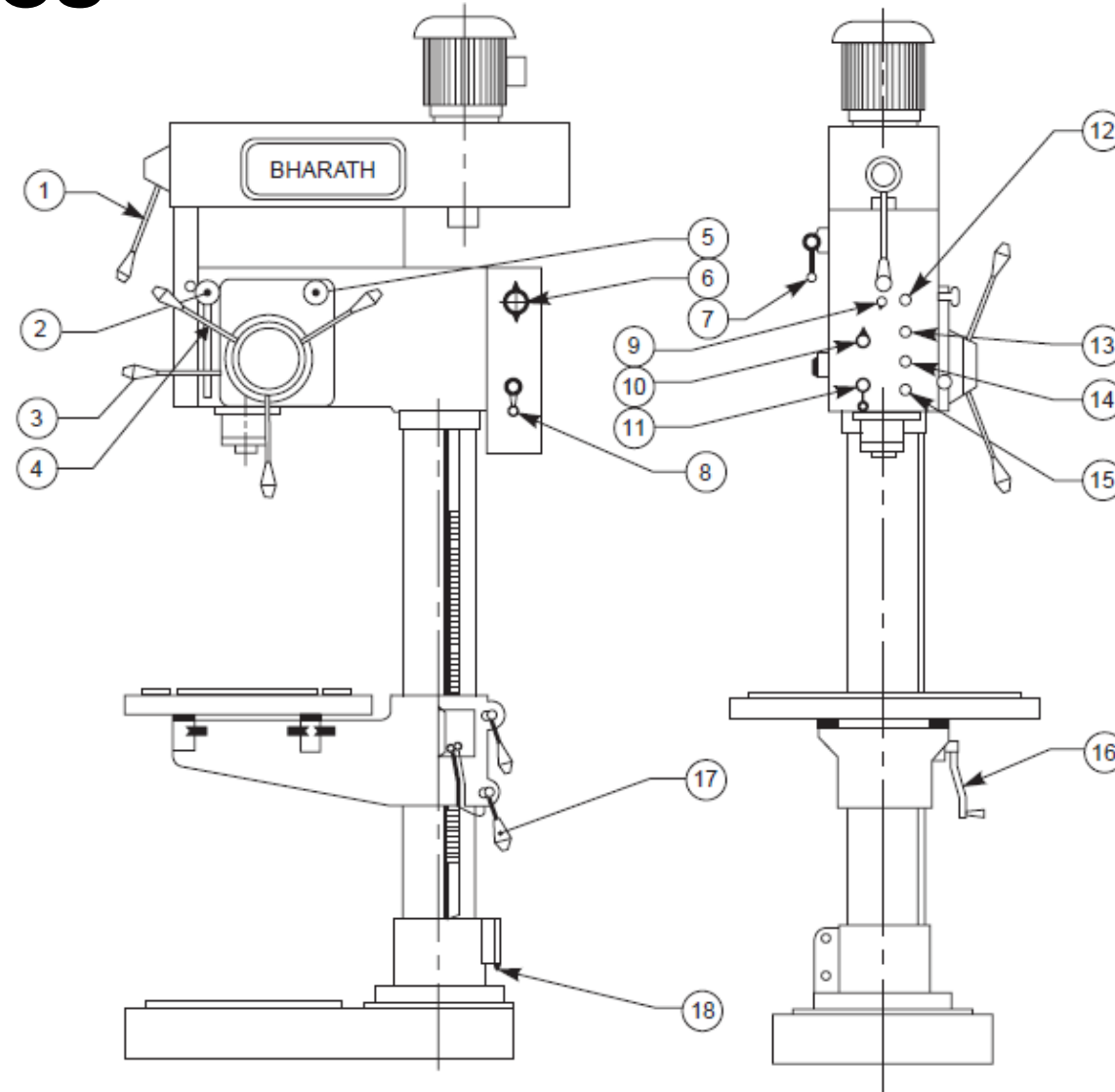
5	PIN	$\phi.188 \times 2.562$	2	CRS
4	SCREW, PILOT	$\phi.688 \times 3.88$	1	CRS
3	SCREW	$\phi.688 \times 3.87$	1	CRS
2	JAW	.625x.625x4.812	1	CRS
1	JAW	.625x.625x4.812	1	CRS
NO.	PART NAME	STOCK SIZE	REQD.	MATERIAL

MACHINIST'S CLAMP ASSEMBLY

Edited by Dr. Mohamed Bayomy

Drawing Types

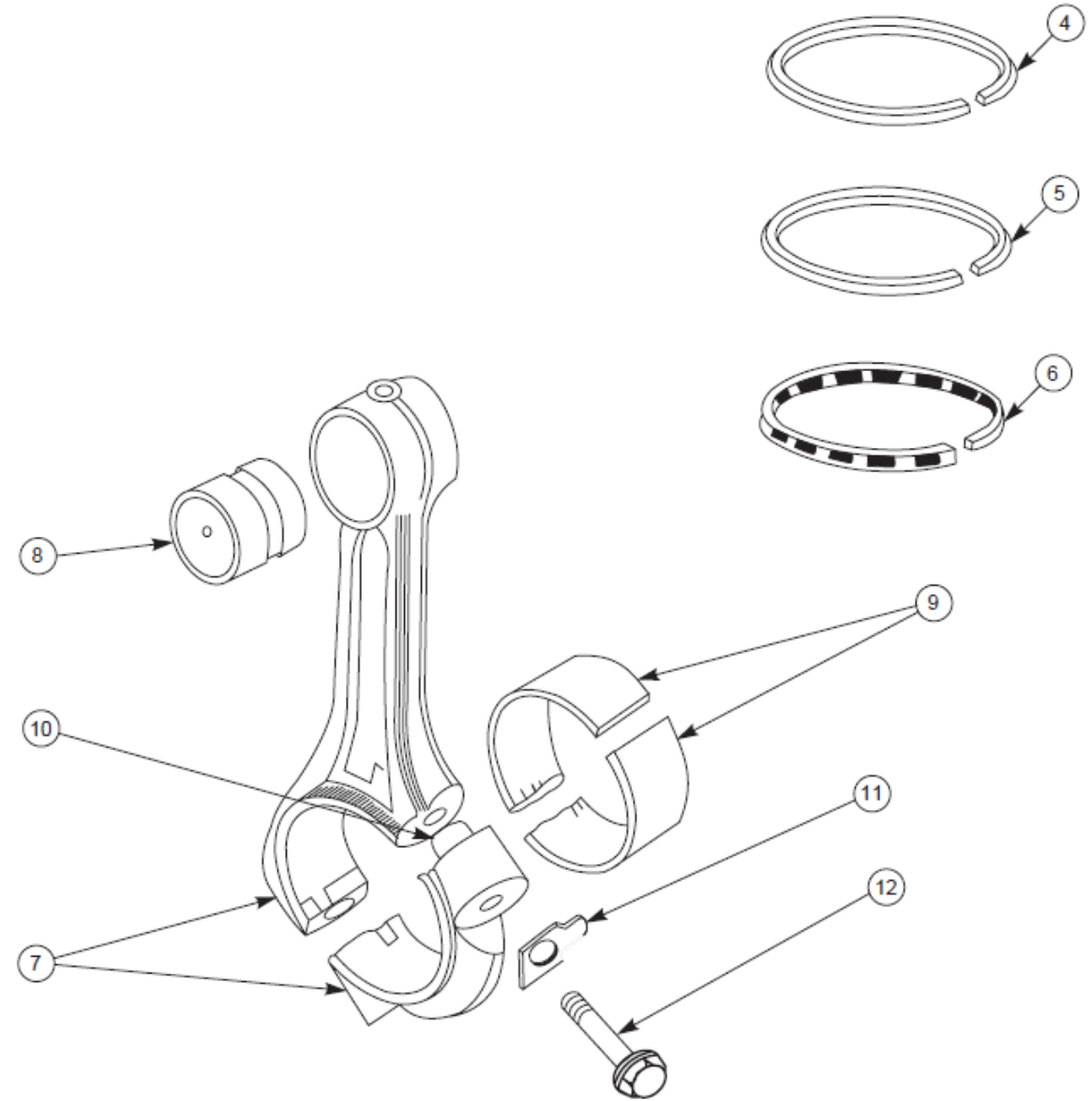
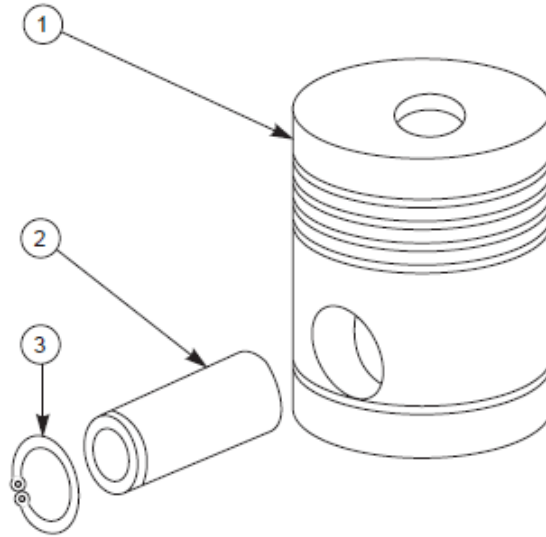
4.3 Assembly Drawing for instruction manuals



- Speed change lever (1)
- Depth adjusting knob (2)
- Mech. feed engagement lever (3)
- Hand feed lever (4)
- Feed change knob (5)
- Switch for tapping (6)
- Gear shifting lever (7)
- Main switch (8)
- Lamp switch (9)
- Selector switch (10)
- Forward/reverse switch (11)
- Pilot lamp (12)
- Feed disengagement push button (13)
- Start push button (14)
- Emergency stop (15)
- Elevating handle (16)
- Clamping handle (17)
- Supply inlet (18)

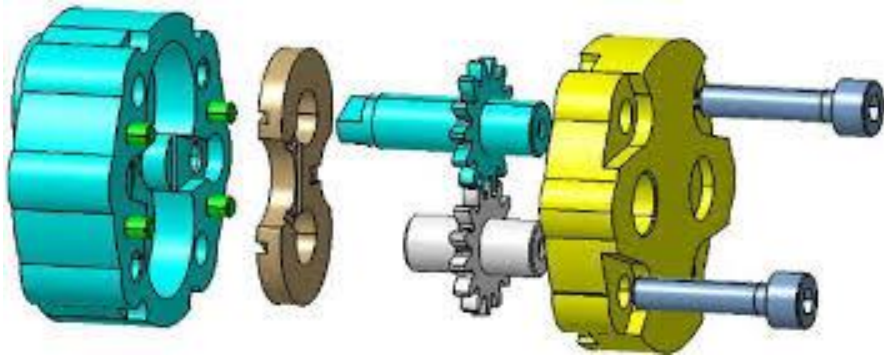
Drawing Types

4.4 Exploded Assembly Drawing

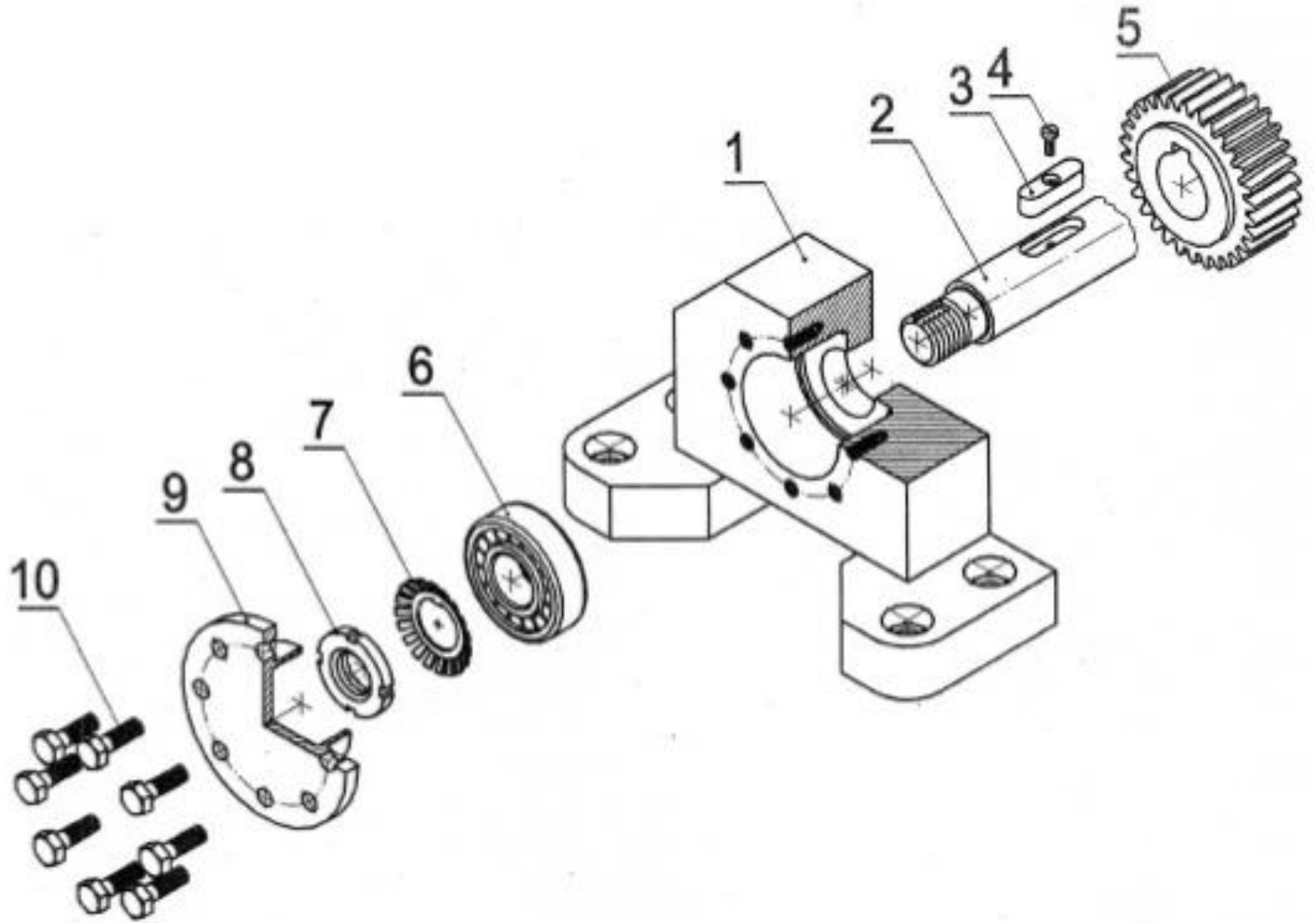


Drawing Types

4.4 Exploded Assembly Drawing

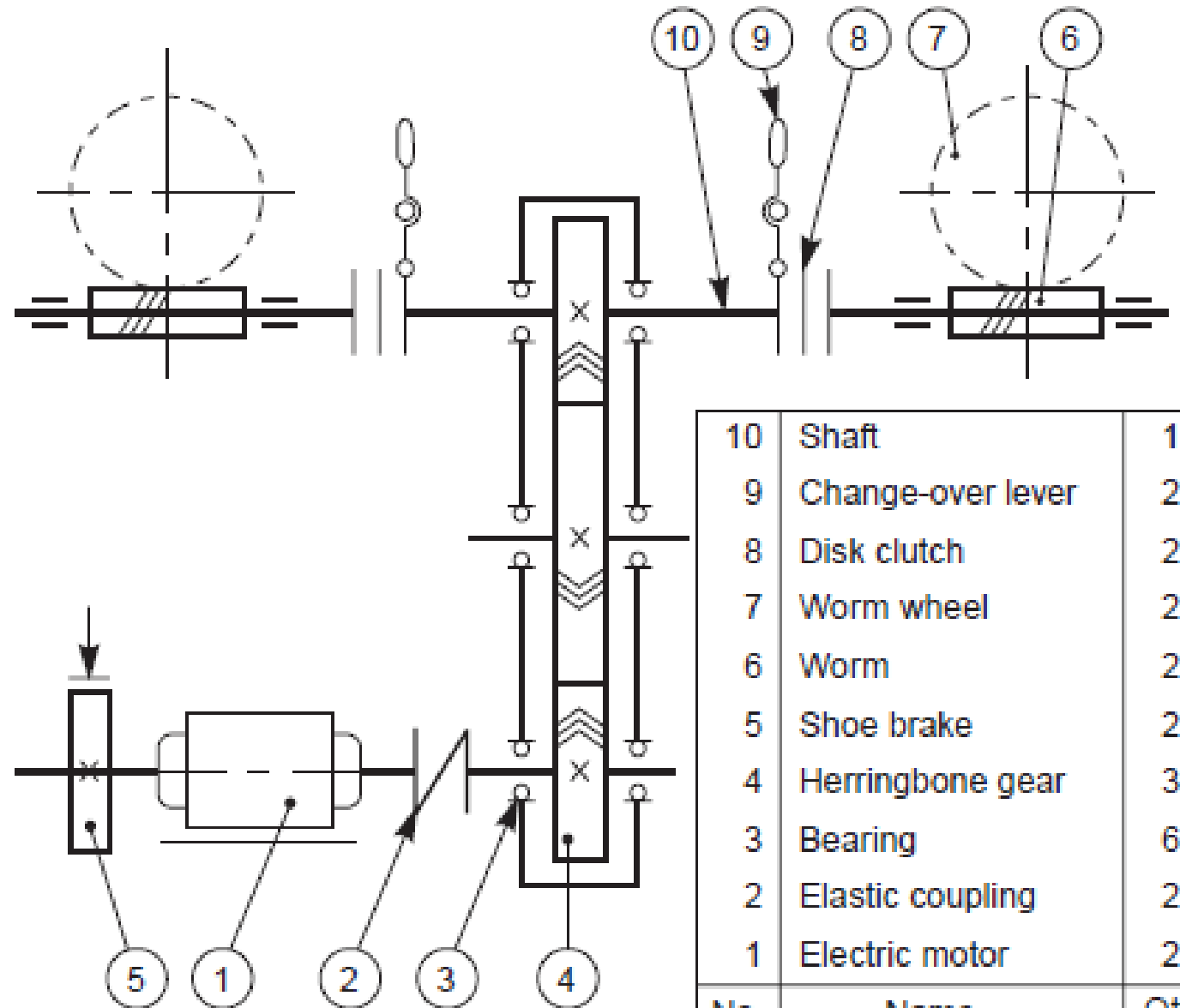


Solidworks Assembly Drawing



Drawing Types

4.5 Schematic Assembly Drawing



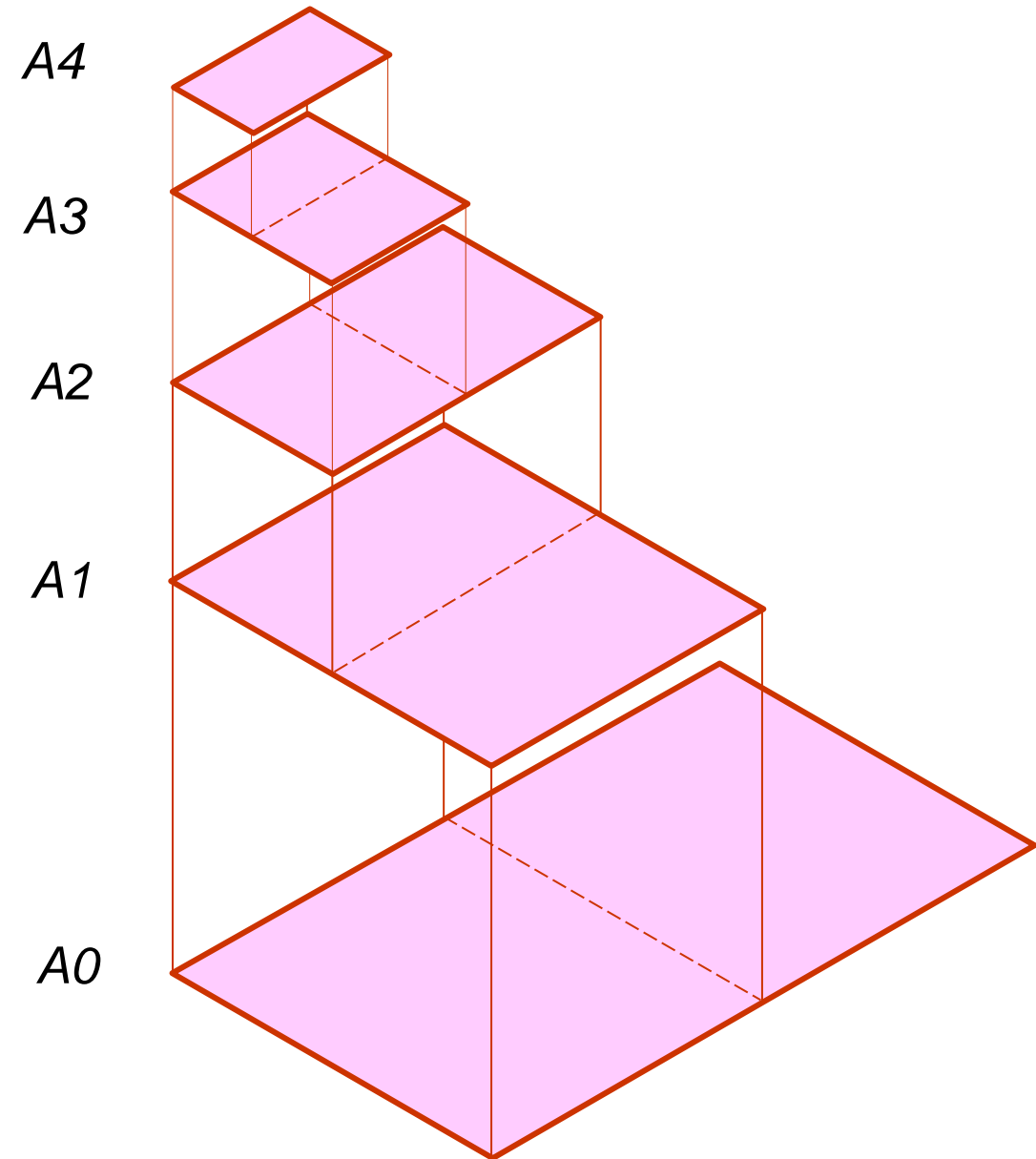
10	Shaft	1
9	Change-over lever	2
8	Disk clutch	2
7	Worm wheel	2
6	Worm	2
5	Shoe brake	2
4	Herringbone gear	3
3	Bearing	6
2	Elastic coupling	2
1	Electric motor	2
No.	Name	Qty

Drawing Sheet

■ *Standard sheet size (ISO)*

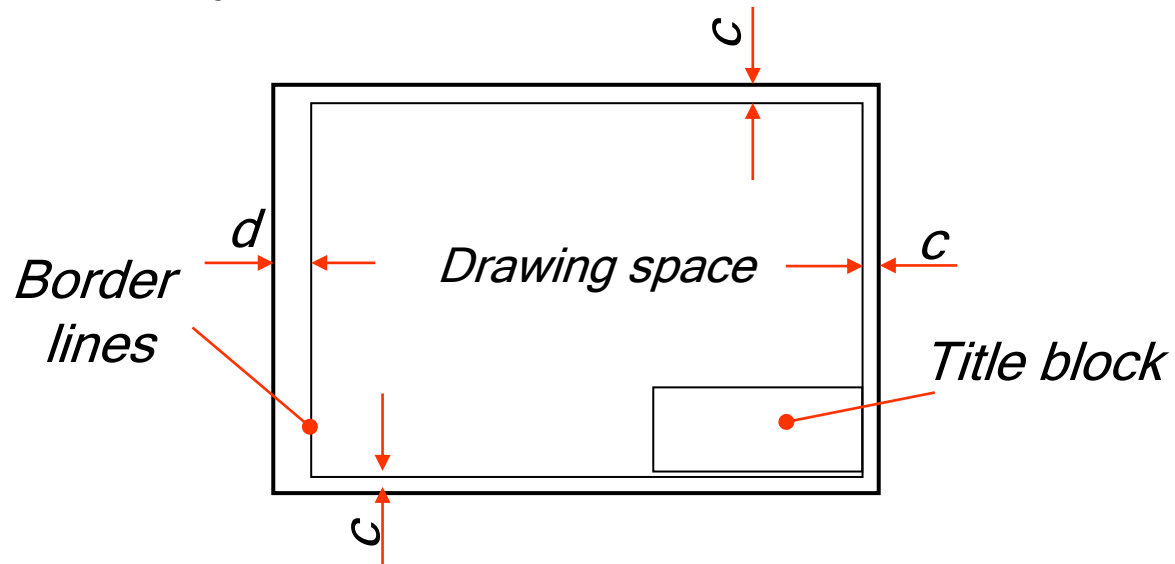
<i>A4</i>	<i>210 x 297</i>
<i>A3</i>	<i>297 x 420</i>
<i>A2</i>	<i>420 x 594</i>
<i>A1</i>	<i>594 x 841</i>
<i>A0</i>	<i>841 x 1189</i>

(Dimensions in millimeters)

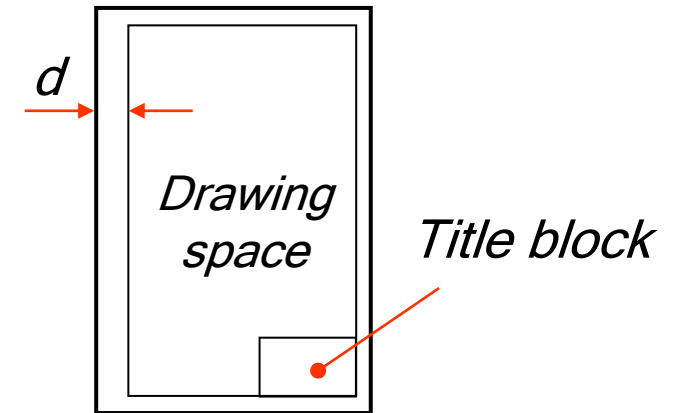


Orientation of drawing sheet

1. Type X (A0~A4)



2. Type Y (A4 only)



Drawing Scales مقياس الرسم

Length, size

- **Scale** is the ratio of the linear dimension of an element of an object shown in the drawing to the real linear dimension of the same element of the object.
- *Designation of a scale consists of the word “SCALE” followed by the indication of its ratio, as follow*
 - SCALE 1:1 for full size*
 - SCALE X:1 for enlargement scales ($X > 1$)*
 - SCALE 1:X for reduction scales ($X > 1$)*
- *Dimension numbers shown in the drawing are correspond to “true size” of the object and they are independent of the scale used in creating that drawing.*

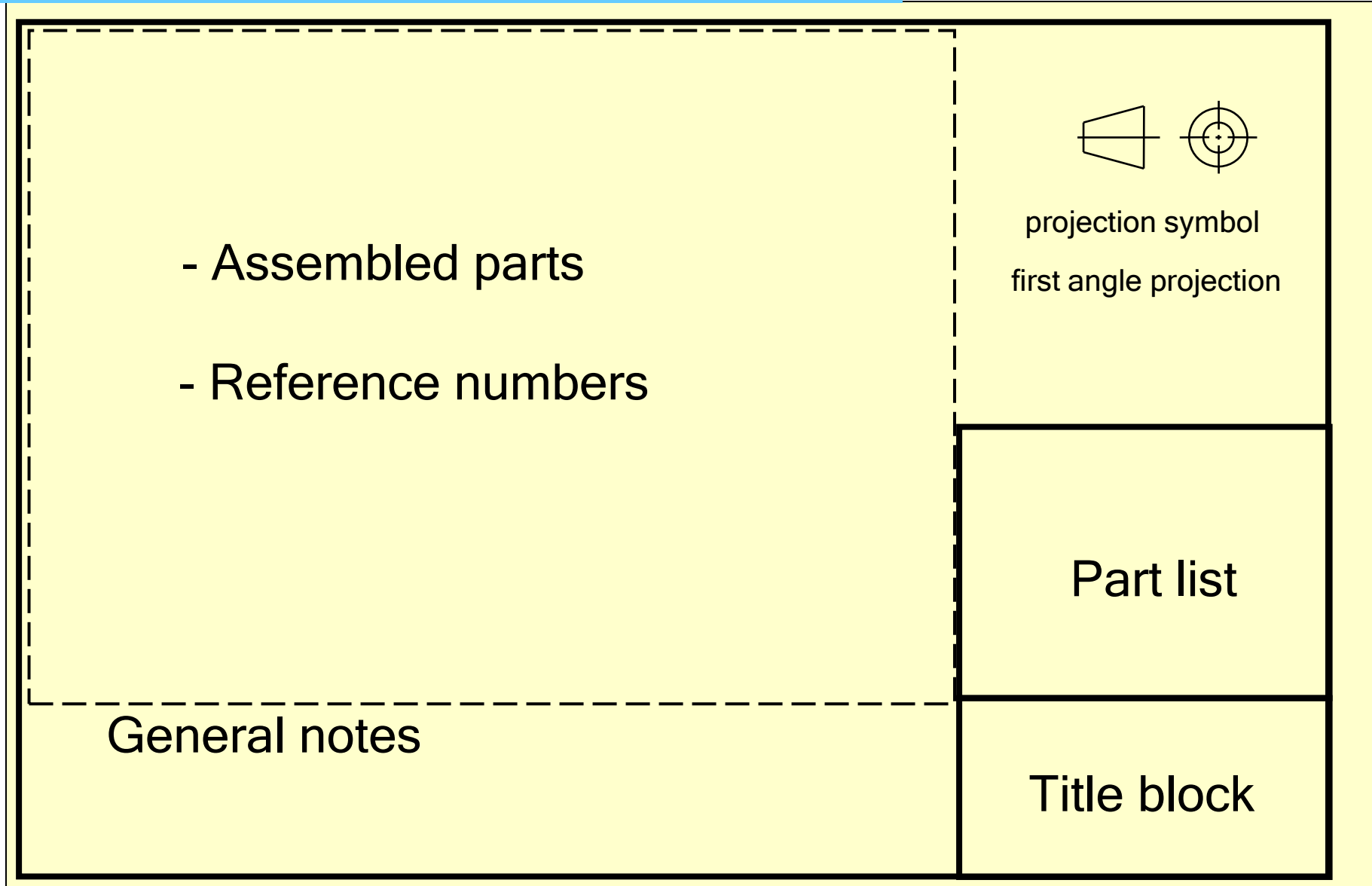
Abbreviation الإختصارات

Abbreviation	Term	Abbreviation	Term
A/F	Across Flat	HEX HD	Hexagonal head
A/C	Across Corner	LH	Left-hand
CRS	Centers	MAX	Maximum
CL	Center line	MIN	Minimum
CHAM	Chamfered	NO	Number
CYL	Cylinder or Cylindrical	PCD	Pitch-circle diameter
DIA	Diameter	R	Radius
∅	Diameter	RH	Right-hand
S ∅	Diameter (Spherical)	RD HD	Rounded head
DRG	Drawing	SCR	Screw
EQUI SP	Equally spaced	SH	Sheet
EXT	External	□ or ☒ or SQ	Square
FIG.	Figure	STD	Standard
HEX	Hexagon	◁	Taper

Required Information In Assembly Drawing

1. All parts, drawn in their operating position.
2. Part list (or bill of materials, BOM)
 1. Item number
 2. Descriptive name
 3. Material, MATL.
 4. Quantity required (per a unit of machine), QTY.
3. Leader lines with balloons around part numbers.
4. Machining and assembly operations and critical dimensions related to operation of the machine.

Placing Information (This Course)



PARTS LIST (BOM) (This course)

- Locate above or beside the title block.
- Fill the table from the bottom.

3	SET SCREW	1	Stainless Steel,
2	SHAFT	1	Stainless Steel
1	SUPPORT	2	Cast Iron
NO.	PART NAME	NO. OFF	MATERIL

Next
Threaded fasteners