

chapterthirteen

Projects

13-1 Introduction

This chapter presents two large projects: the Milling Vise and the Tenon Jig. The projects are intended to serve as group projects or as large individual projects.

13-2 Project 1: Milling Vise

Figure 13-1 shows a milling vise. The subassemblies, detailed drawings, and BOMs are included.

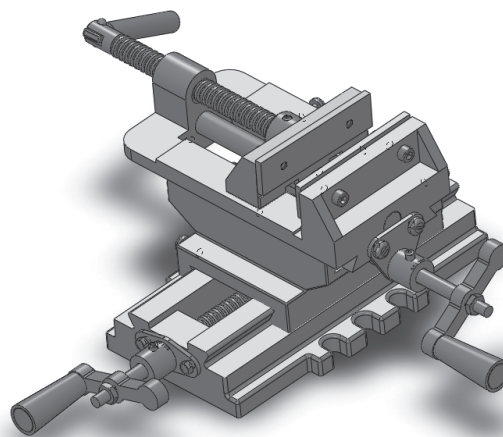
Complete the following or as it is assigned by your instructor.

1 The Milling Vise

See Figure 13-1.

- A. An assembly drawing.
- B. A BOM; include Item Numbers, Part Numbers, Descriptions, and Quantities

Figure 13-1
Milling Vise

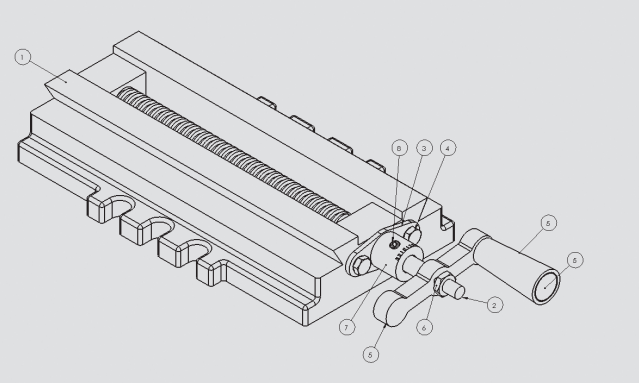


2 Base Subassembly

- See Figure 13-2.
- A. An assembly drawing
 - B. A BOM
 - C. Dimensioned drawings of each part that is used in the subassembly

Figure 13-2

Base Subassembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	BU2012-B	BASE	1
2	P100-20A	ACME, BASE	1
3	BU-313	PLATE, COVER, BASE	1
4	M6 × 1.0 ×16	SCREW, SLOTTED CAP	2
5	PN311-1A	HANDLE, SUBASSEMBLY	1
6	M8 ×1.25	NUT, HEX	1
7	ENG-2	COLLAR	1
8	M6 × 1.0 ×10	SET SCREW-CONE	1

Dimensioned and tolerance drawings of the parts that make up the base subassembly are as follows.

Base

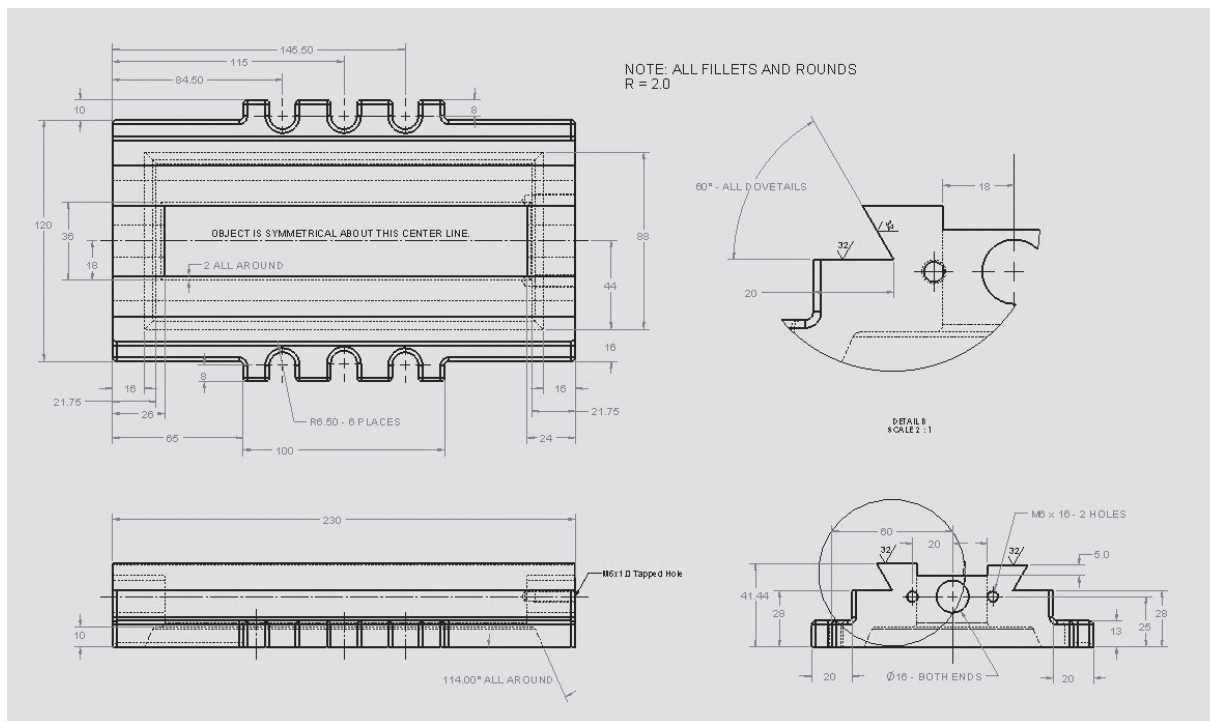


Figure 13-3

Figure 13-4

ACME, Base

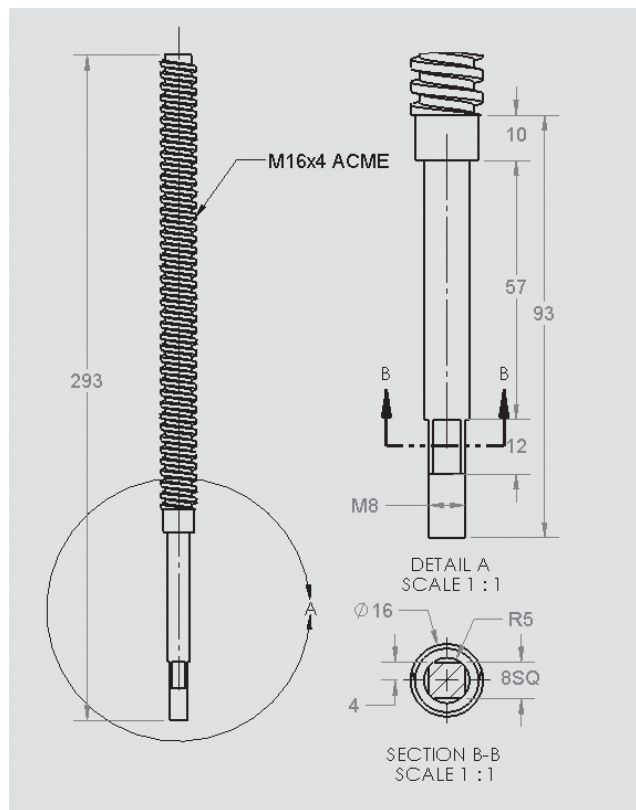


Figure 13-5

Collar

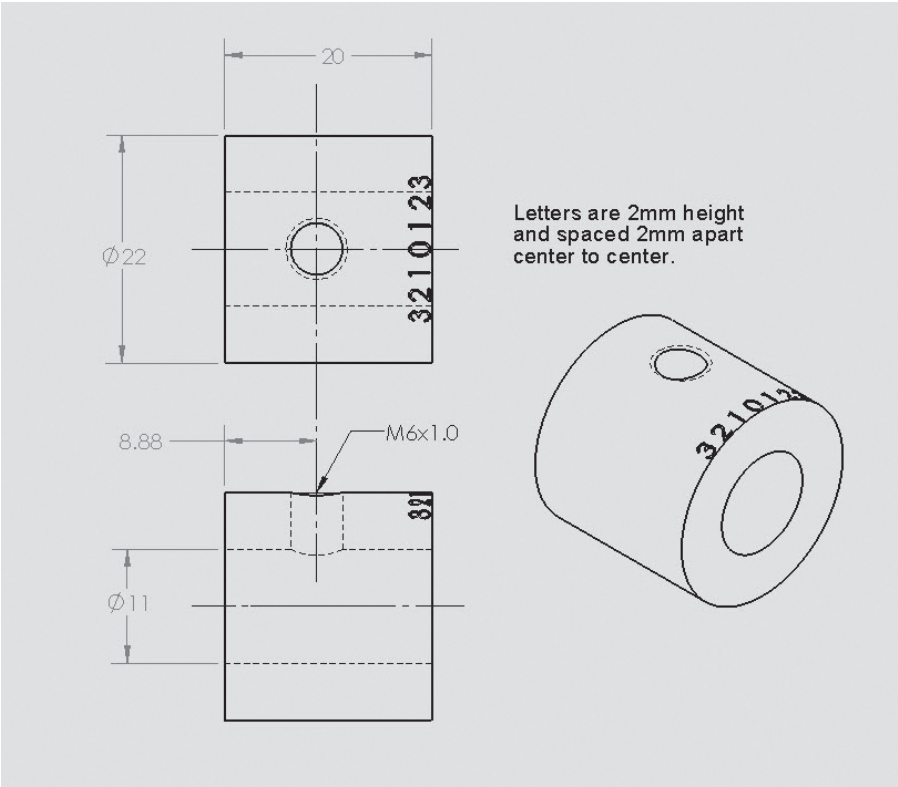


Figure 13-6

Plate, Cover, Base

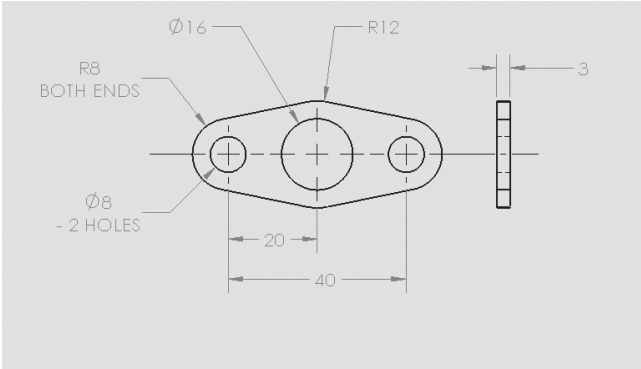
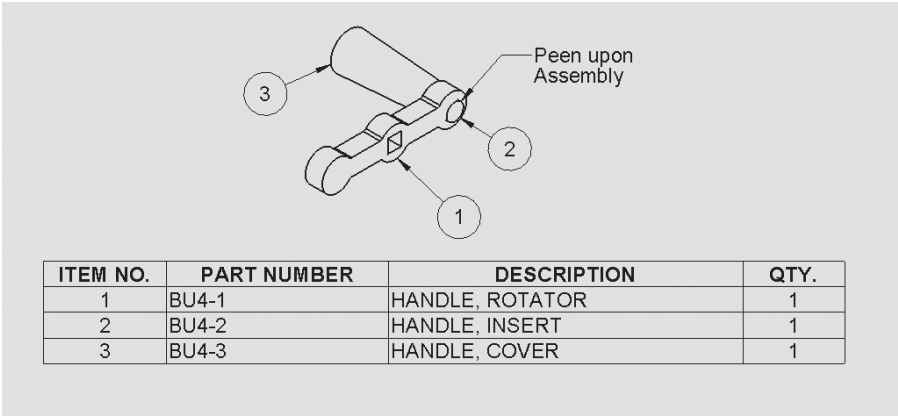


Figure 13-7

Handle Subassembly



Handle, Rotater

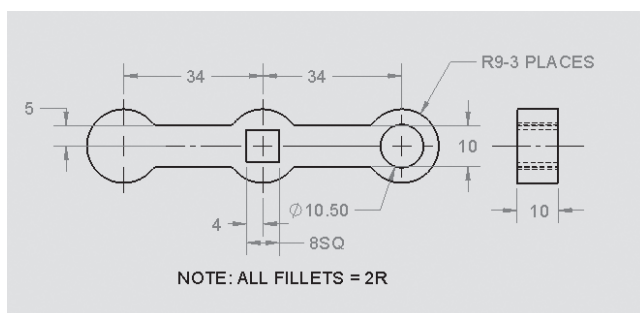


Figure 13-8

Handle, Insert

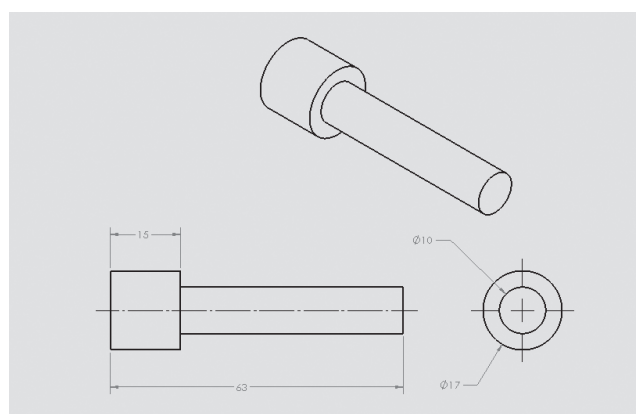
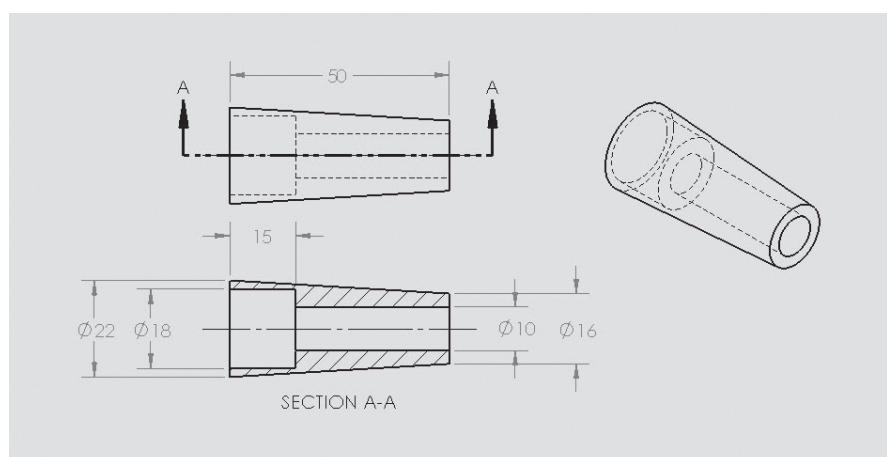


Figure 13-9

Figure 13-10

Handle, Cover

**NOTE**

Standard parts do not need drawings, but require manufacturer's part numbers listed in the BOM.

3 Middle Subassembly

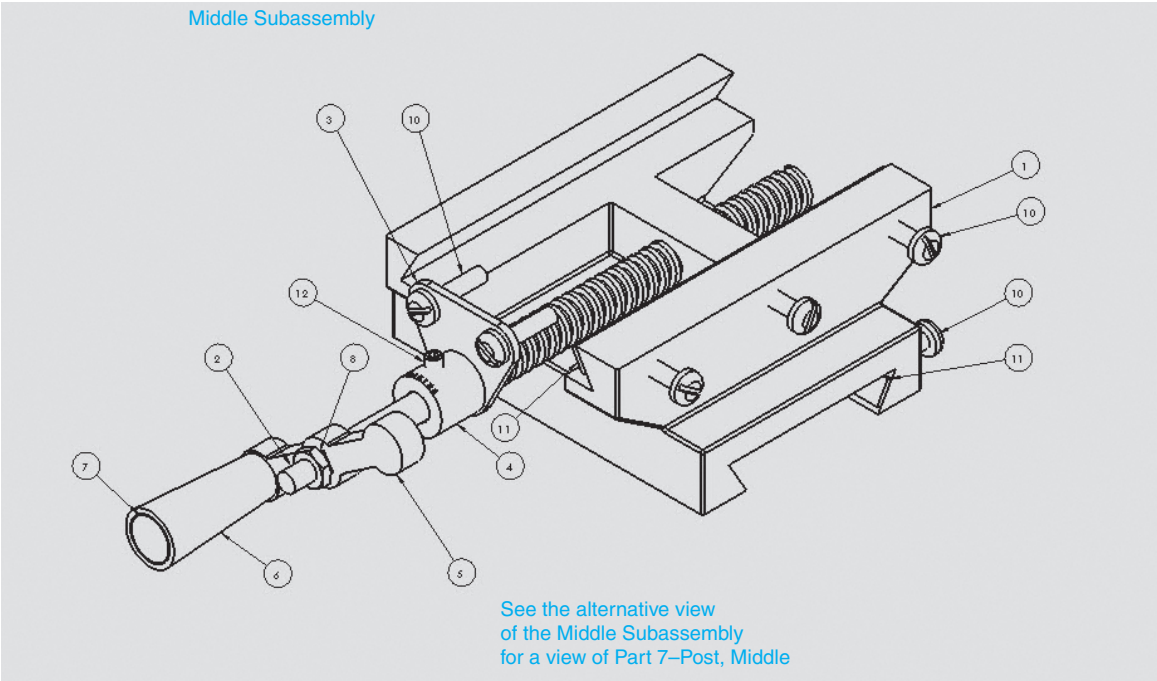
See Figure 13-11.

A. An assembly drawing

B. A BOM

C. Dimensioned drawings of each part that is used in the Subassembly

Middle Subassembly



Middle BOM

Middle Subassembly BOM

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	S51-2A	SUPPORT, MIDDLE	1
2	P200-24	POST, ACME, MIDDLE	1
3	WIT-130	PLATE, END	1
4	ENG-2	COLLAR	1
5	PN311-1A	HANDLE, SUBASSEMBLY	1
6	M8 X 1.25	NUT, HEX	1
7	P155B	POST, MIDDLE	1
8	M8 x 1.0 x 25	SCREW, PAN	8
9	SP-33	BAR, SPACER	2
10	M8 x 1.0 x 16	SET SCREW, SOCKET	1

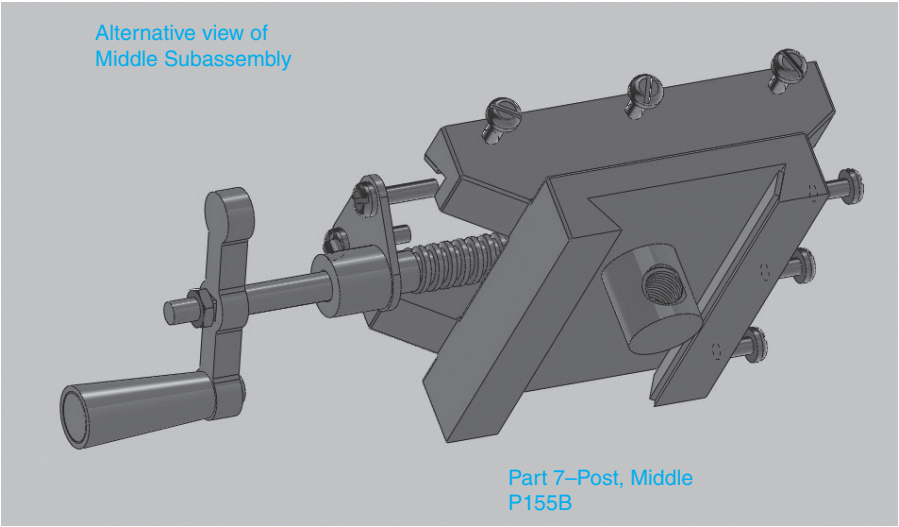


Figure 13-11

Dimensioned and tolerance drawings of the parts that make up the Base Subassembly are as follows:

Figure 13-12a and 13-12b Middle Subassembly

Note that Figure 13-12a shows a dimensioned drawing of the Support, Middle, but does not include any fillets. Fillets were omitted for clarity. Figure 13-12b is a 3D of the Support, Middle, that shows the fillets. Use the fillets shown in Figure 13-12b as a guide to applying fillets.

Middle Subassembly

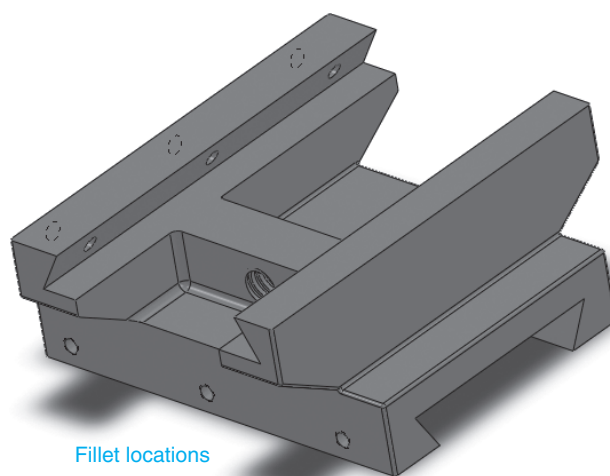
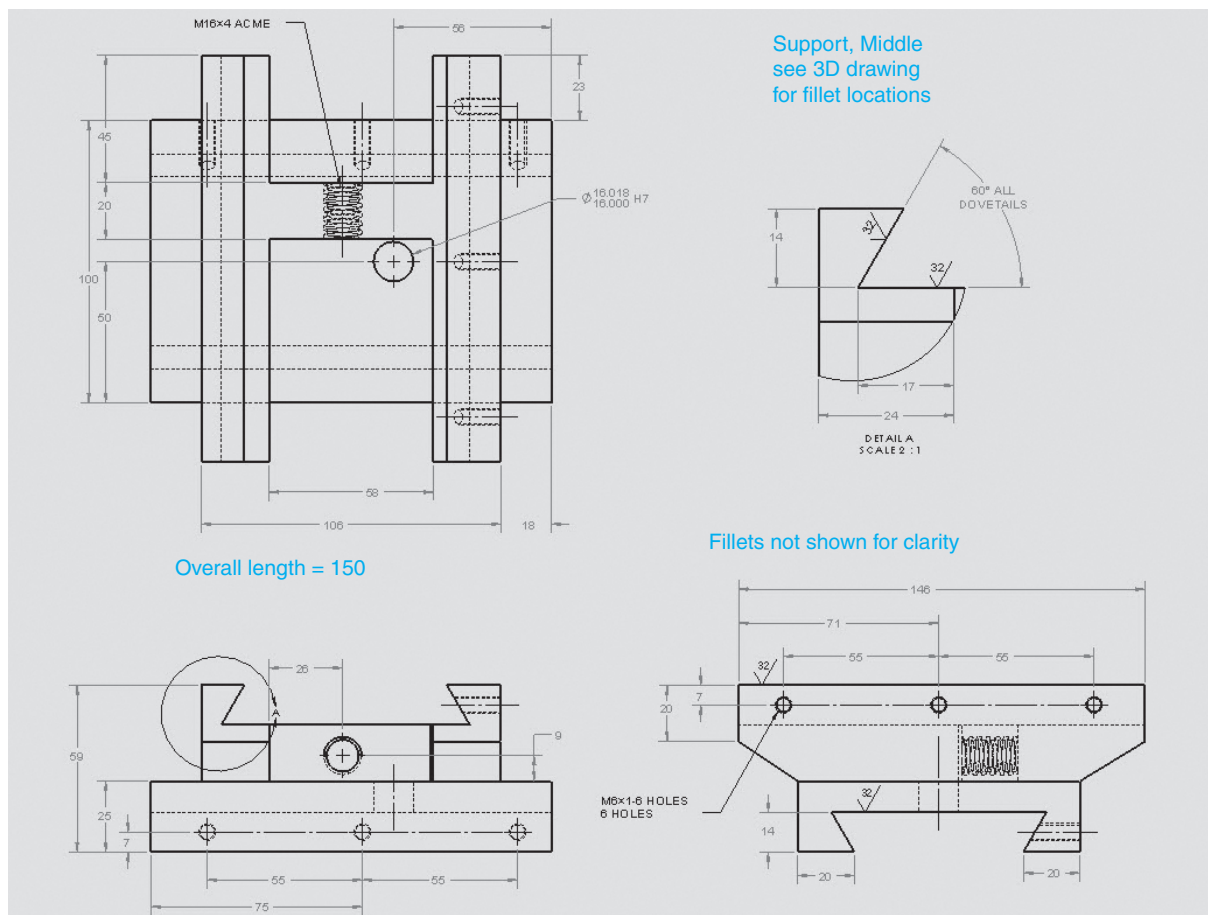


Figure 13-12

Post, Acme, Middle

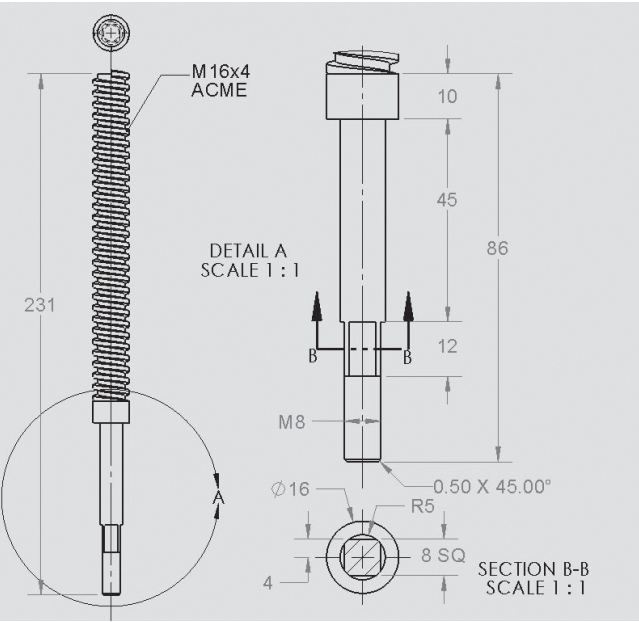


Figure 13-13

Plate, End

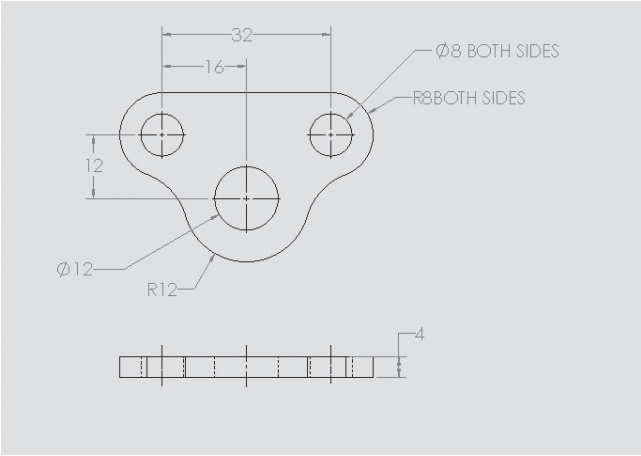
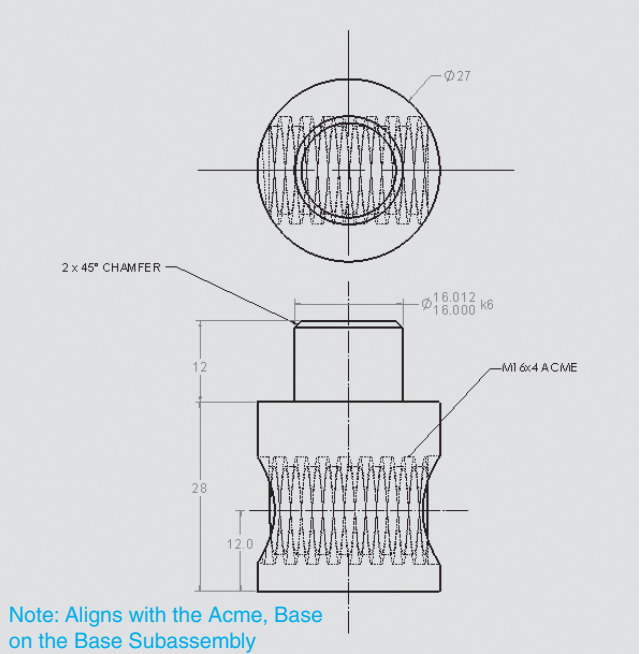


Figure 13-14

Figure 13-15

Post, Middle



4 Top Subassembly

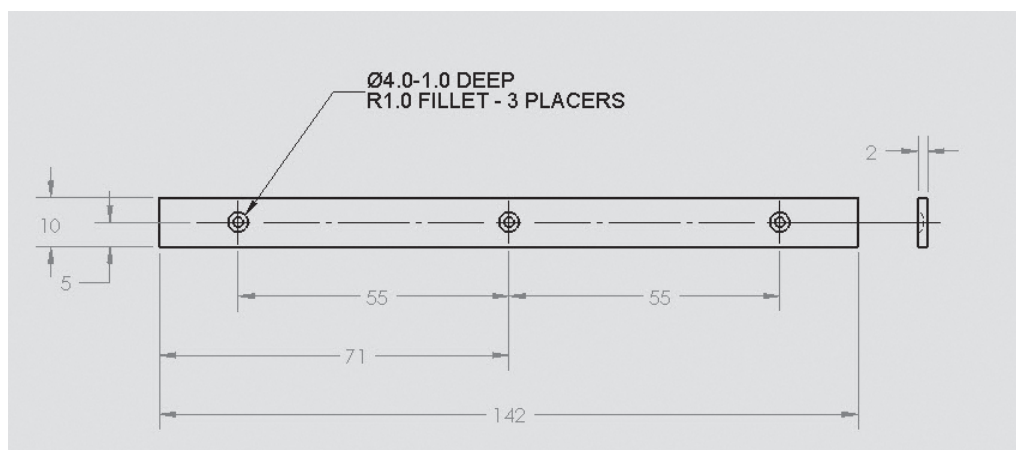
- A. An assembly drawing
- B. A BOM
- C. Dimensioned drawings of each part that is used in the Subassembly

NOTE

Standard parts do not need drawings, but require manufacturer's part numbers listed in the BOM.

Figure 13-16

Bar, Spacer



Dimensioned and tolerance drawings of the parts that make up the base subassembly are as follows:

Figure 13-17a and Figure 13-17b Top Subassembly

Figure 13-19

Post, Acme, Top

Post, Acme, Top

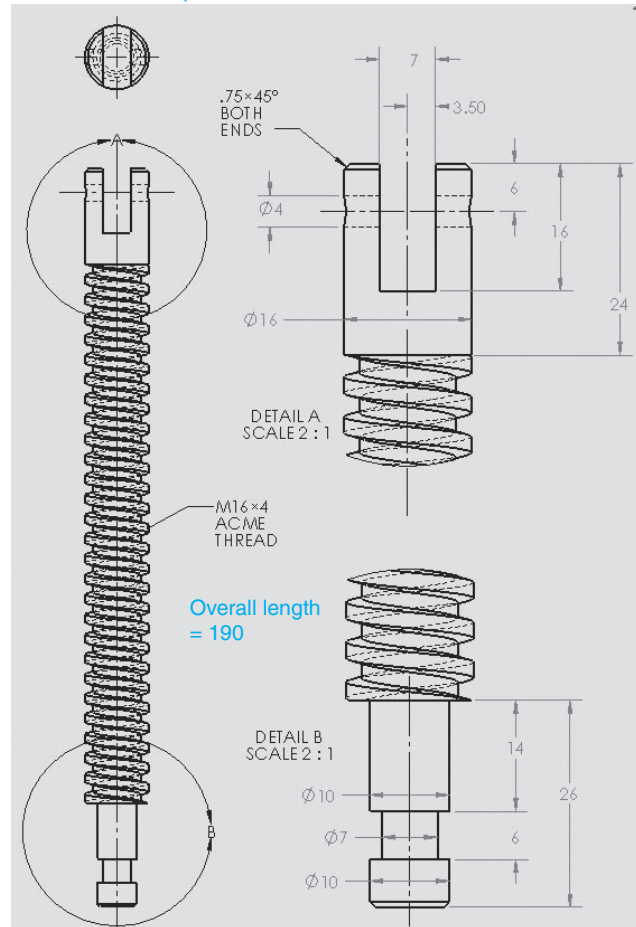


Figure 13-20

Post, Guide

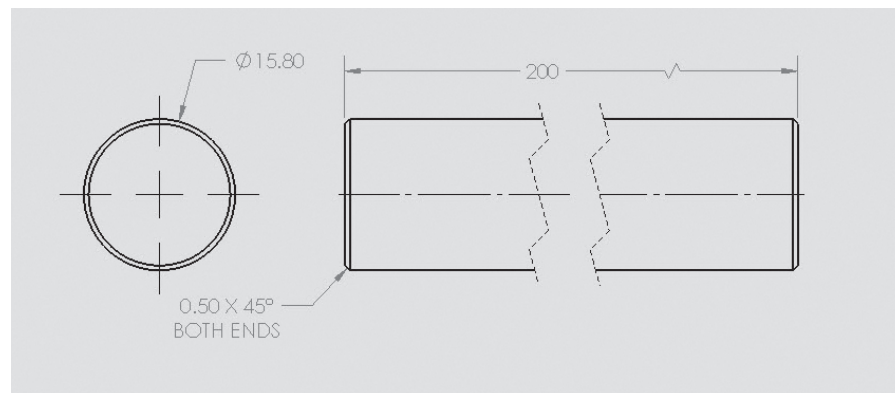


Figure 13-21a and 13-21b Jaw, Movable

Note that Figure 13-21a shows a dimensioned drawing of the Jaw, Movable, but does not include any fillets. Fillets were omitted for clarity. Figure 13-21b is a 3D of the Jaw, Movable, that shows the fillets. Use the fillets shown in Figure 13-21b as a guide to applying fillets.

Jaw, Movable

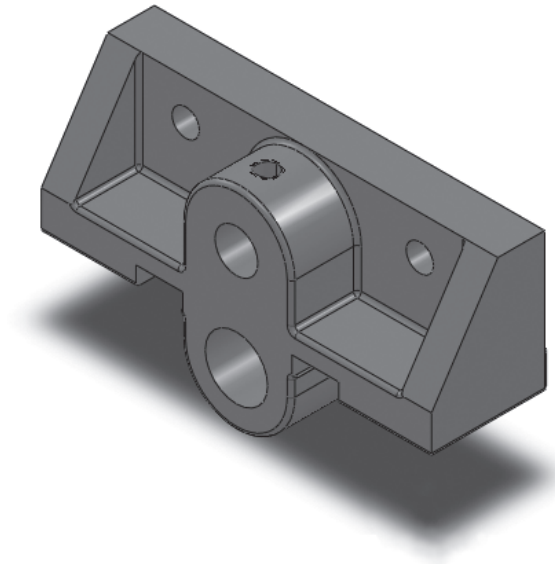
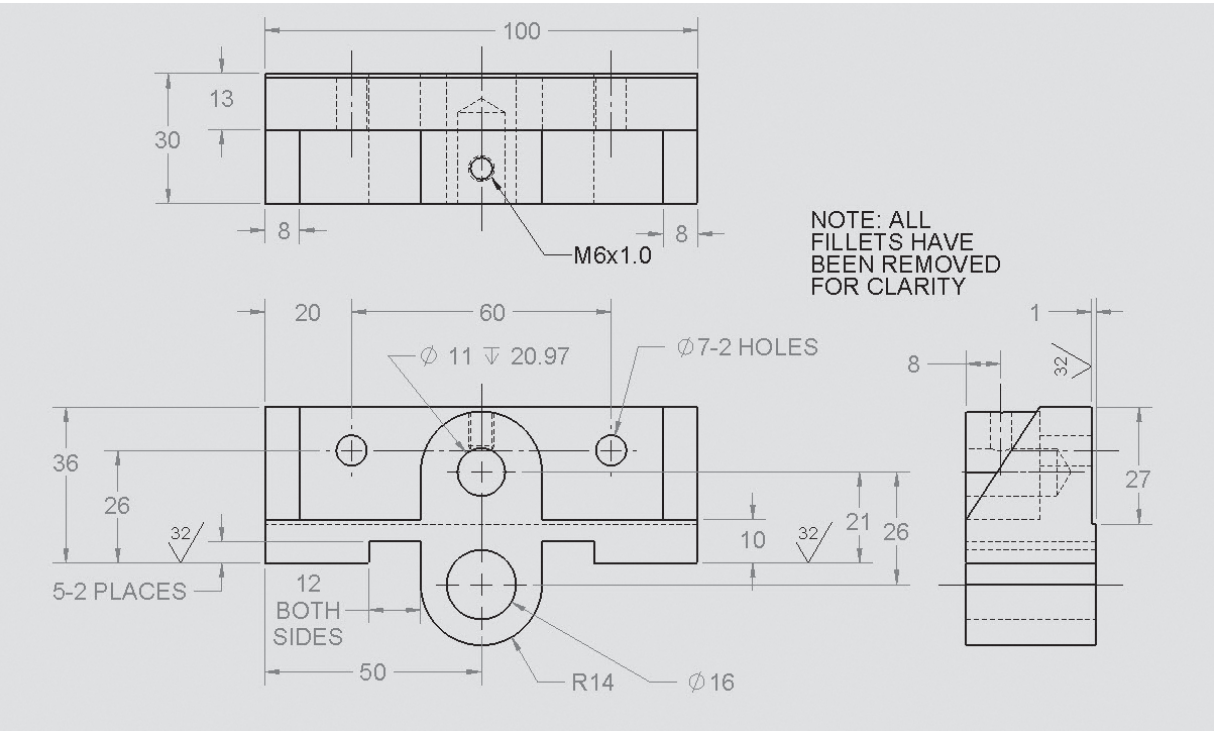


Figure 13-21

Figure 13-22

Handle

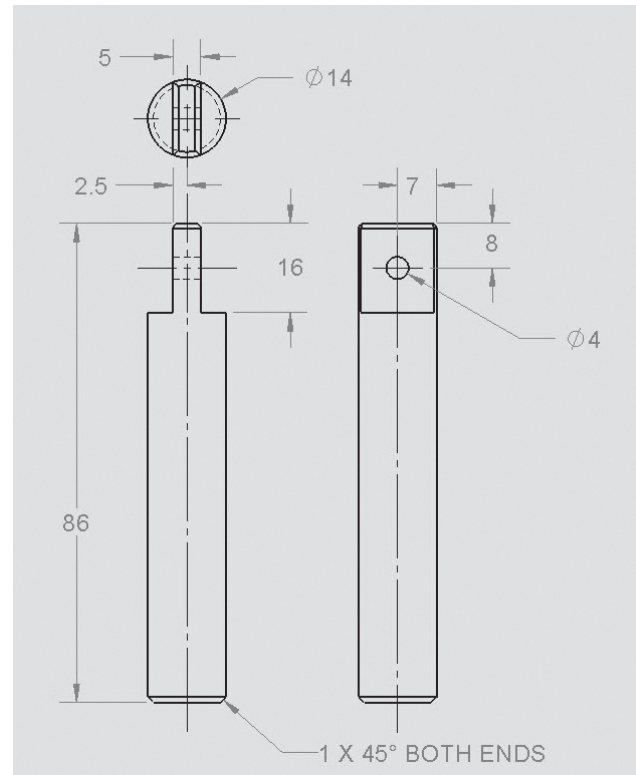
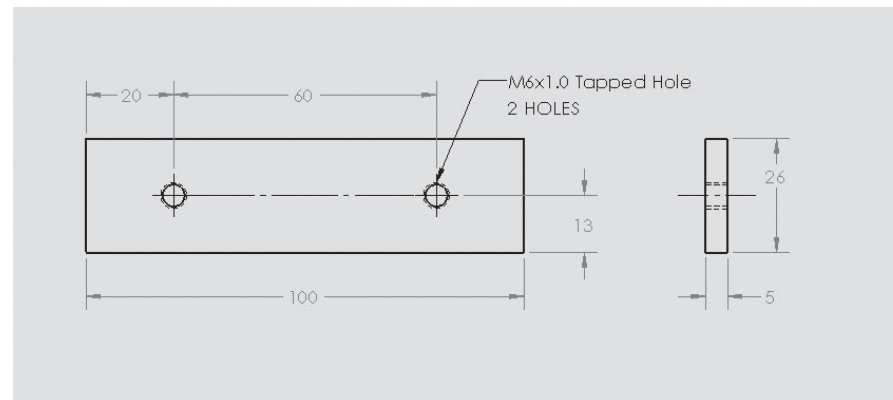


Figure 13-23

Plate, Jaw



13-3 Project 2: Tenon Jig

The Tenon Jig has four main subassemblies: Clamping, Vertical, Base Plate, and Guide Plate. There are other parts that are used in the final assembly. This is intended to be a group project, but could be done by one person. Complete the following assignments:

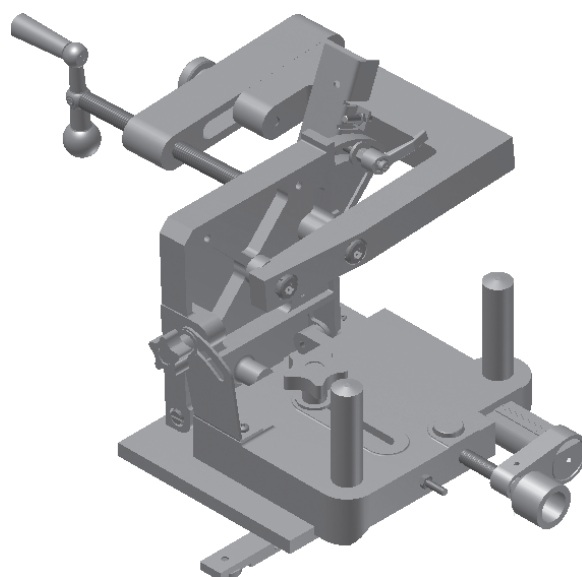
A. Draw the Clamping Subassembly.

- 1 Create a BOM for the Clamping Subassembly.
- 2 Complete drawings for each part.
- 3 Create dimensioned drawings of each part.
- 4 Create an Exploded Assembly drawing with balloons referencing each part to the BOM.

- B. Draw the Vertical Subassembly.
- 1 Create a BOM for the Vertical Subassembly.
 - 2 Complete drawings for each part.
 - 3 Create dimensioned drawings of each part.
 - 4 Create an Exploded Assembly drawing with balloons referencing each part to the BOM.
- C. Draw the Base Plate Subassembly.
- 1 Create a BOM for the Base Plate Subassembly.
 - 2 Complete drawings for each part.
 - 3 Create dimensioned drawings of each part.
 - 4 Create an Exploded Assembly drawing with balloons referencing each part to the BOM.
- D. Draw the Guide Plate Subassembly.
- 1 Create a BOM for the Guide Plate Subassembly.
 - 2 Complete drawings for each part.
 - 3 Create dimensioned drawings of each part.
 - 4 Create an Exploded Assembly drawing with balloons referencing each part to the BOM.
- E. Create an Assembly drawing of the Tenon Jig.
- 1 Create a BOM for the Tenon Jig.

Figure 13-24a

Tenon Jig



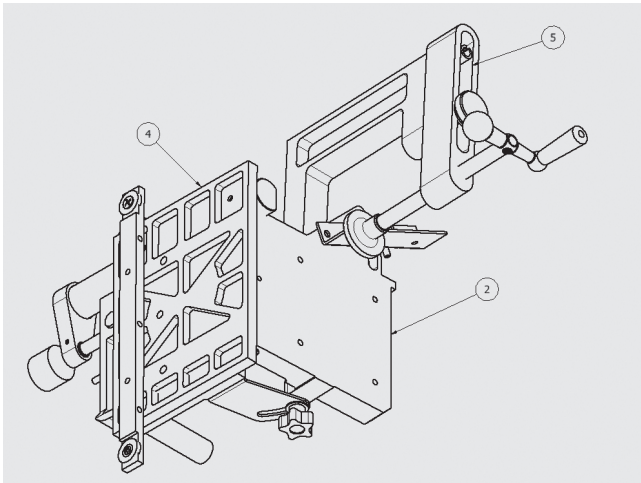


Figure 13-24b

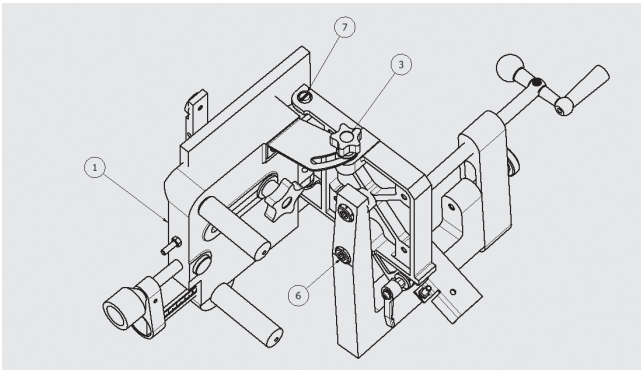


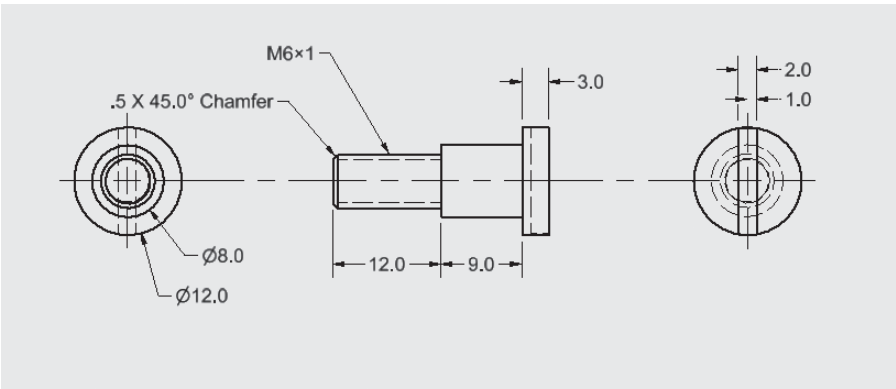
Figure 13-24c

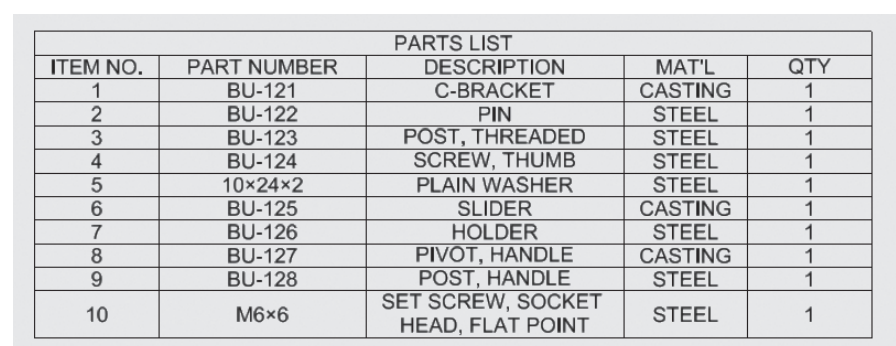
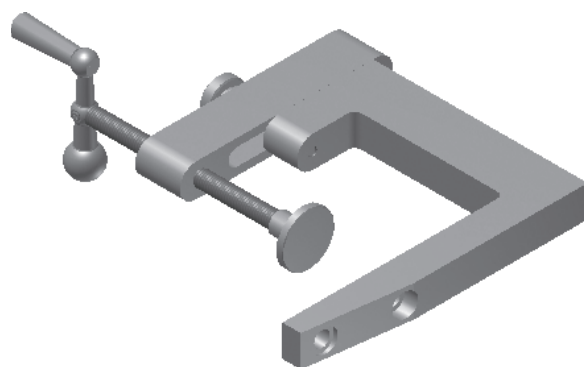
Figure 13-24d

PARTS LIST				
ITEM	PART NUMBER	DESCRIPTION	MATERIAL	QTY
1	SA-1	BASE SUB-ASSEMBLY		1
2	SA-2	VERTICAL SUB-ASSEMBLY		1
3	SA-3	ADJUSTER SUB-ASSEMBLY		1
4	SA-4	GUIDE SUB-ASSEMBLY		1
5	SA-5	CLAMP SUB-ASSEMBLY		1
6	M10x1.5 x 25	DRILLED FORGED HEAXAGON SOCKET HEAD CAP SCREW	MILD STEEL	2
7	SA-6B	SLOTTED HEAD MACHINE SCREW	MILD STEEL	2

Figure 13-24e

Slotted Head Machine Screw
PN: SA-6B



[illegible]

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Pin
PN: BU-122

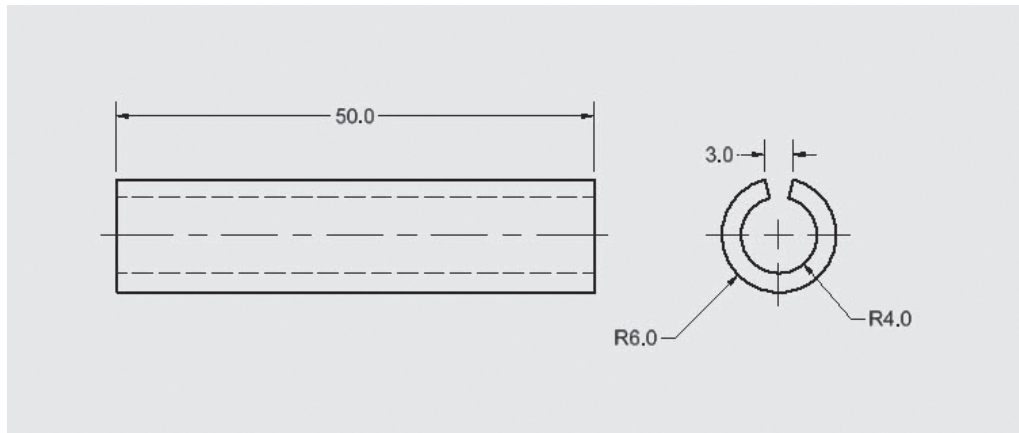


Figure 13-27

Post Threaded
PN: BU-123

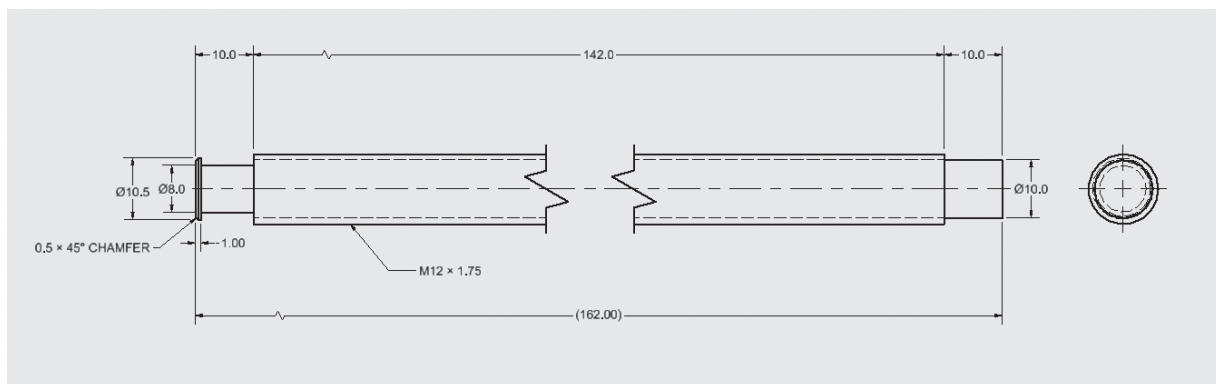


Figure 13-28

Screw, Thumb
PN: BU-124

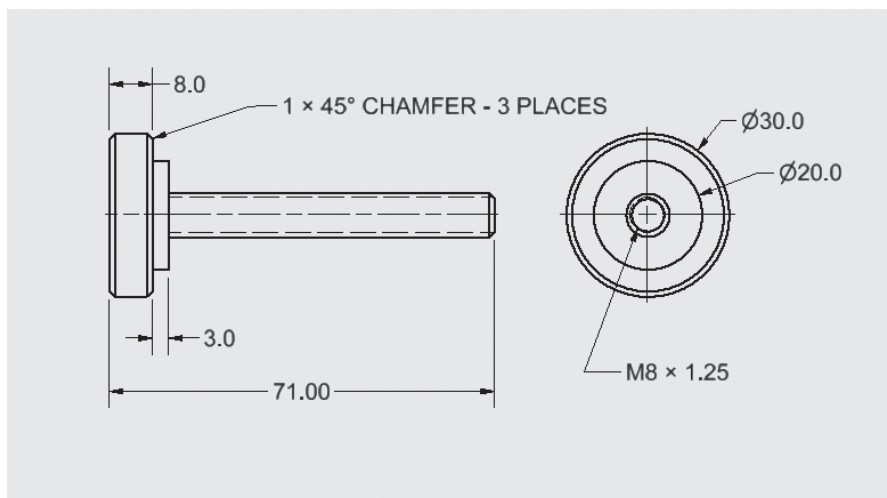


Figure 13-29

Slider
PN: BU-125

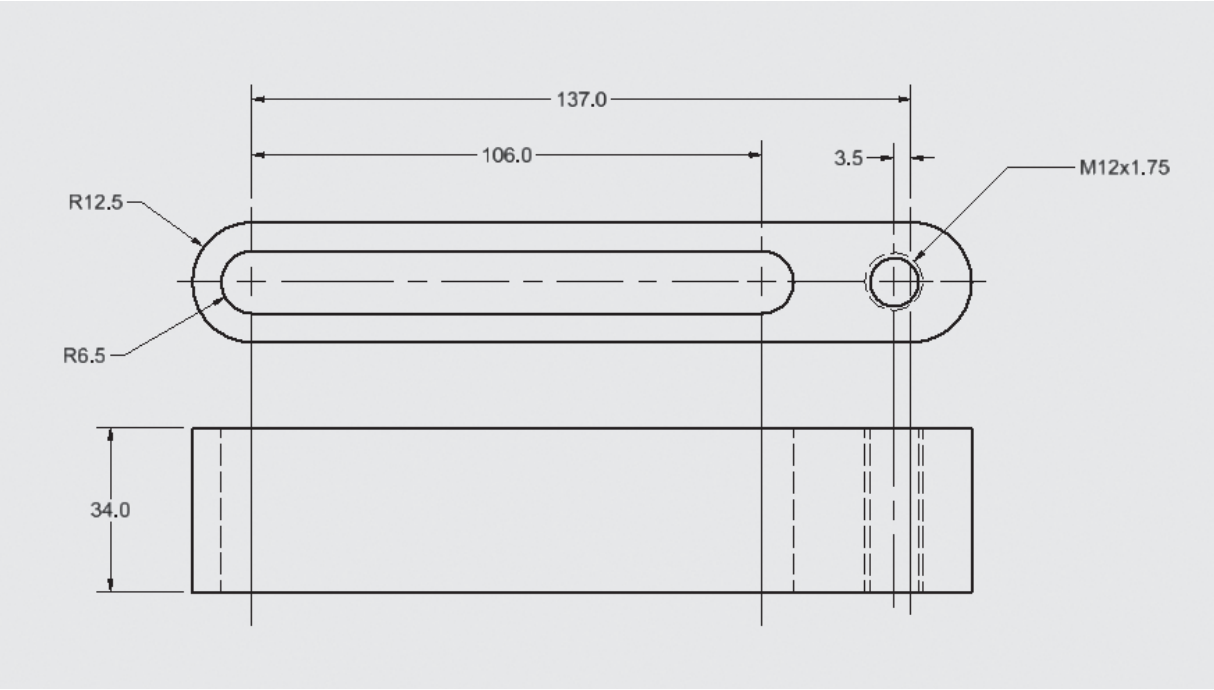


Figure 13-30

Figure 13-31

Holder
PN: BU-126

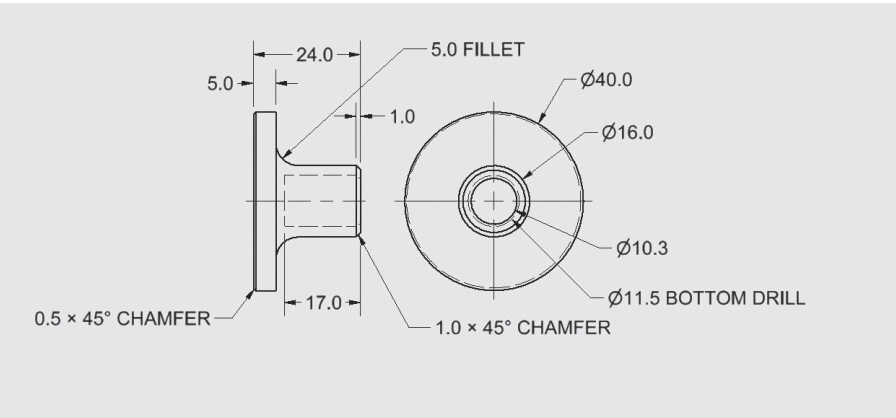
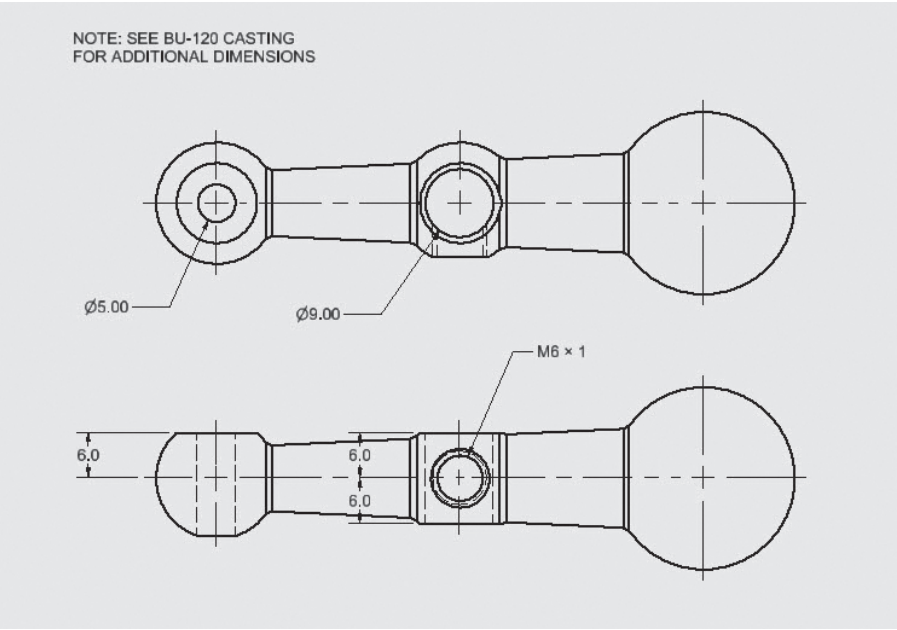


Figure 13-32

Pivot, Handle
PN: BU-127



Casting for Pivot, Handle

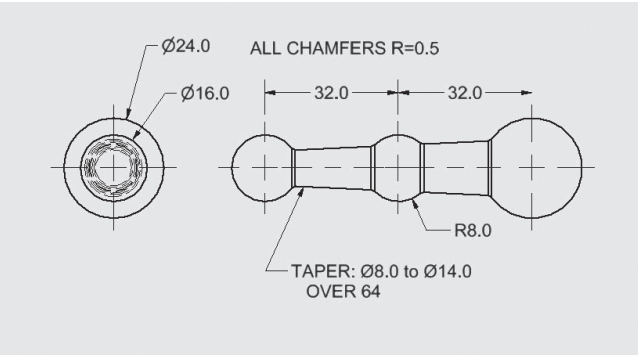


Figure 13-33

Post, Handle
PN: BU-128

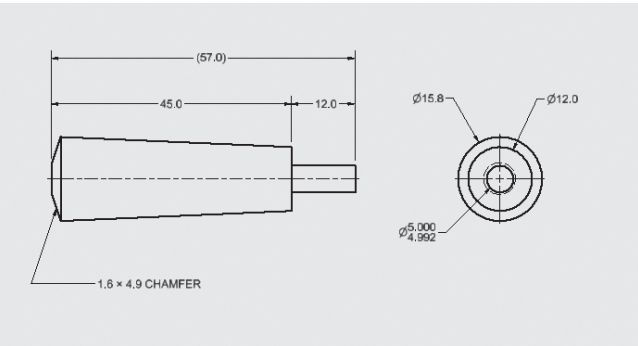
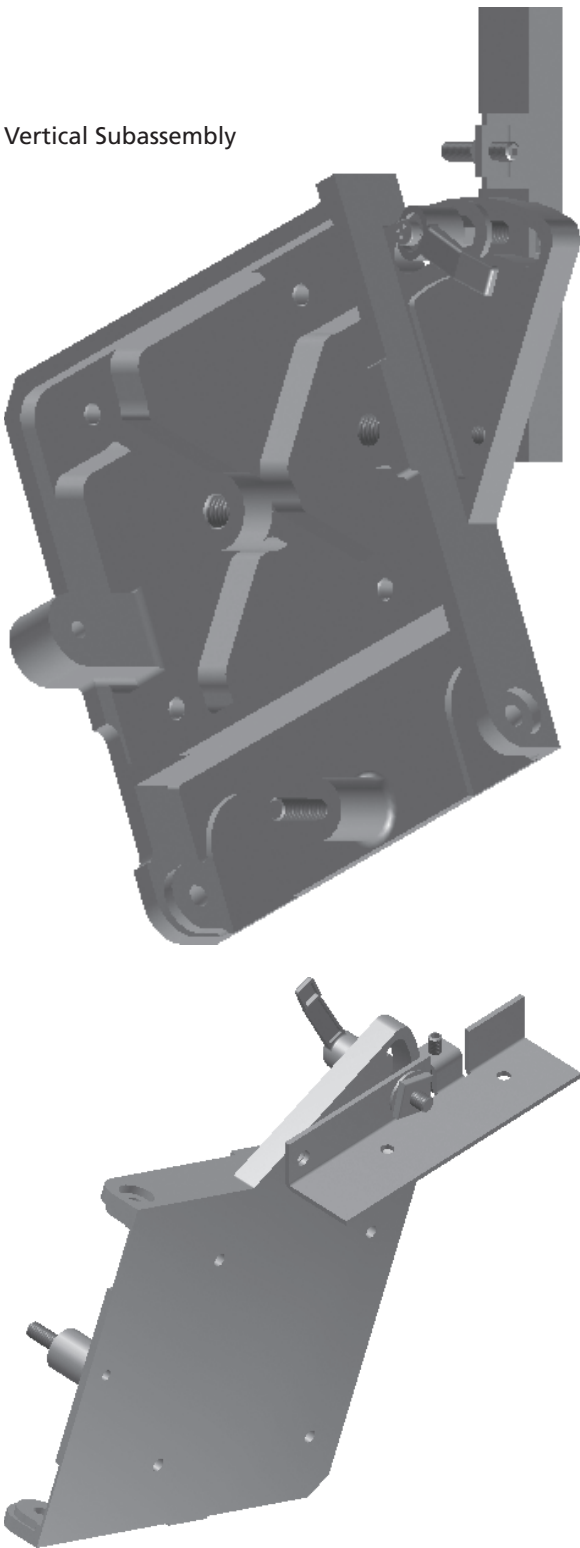


Figure 13-34



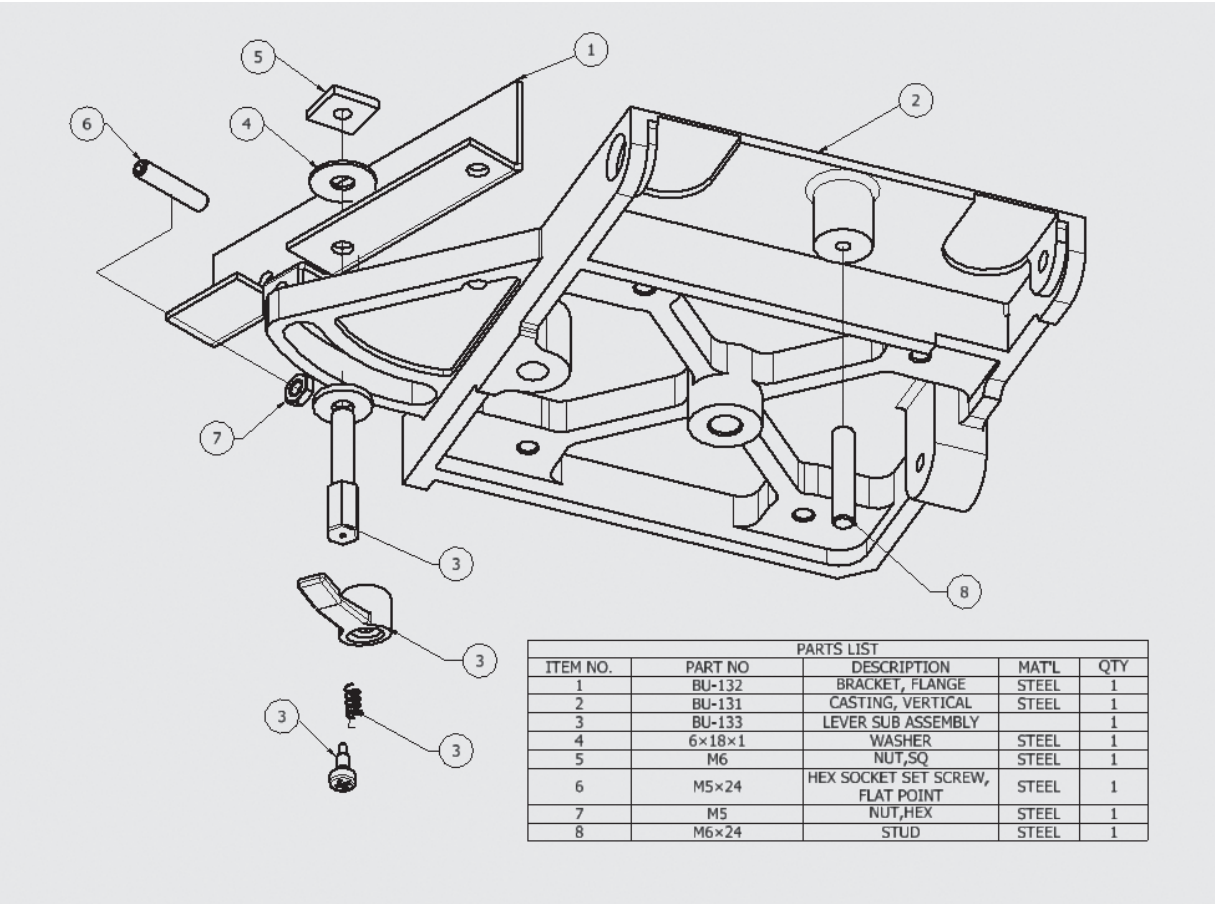


Figure 13-35

Bracket, Flange
PN: BU-132

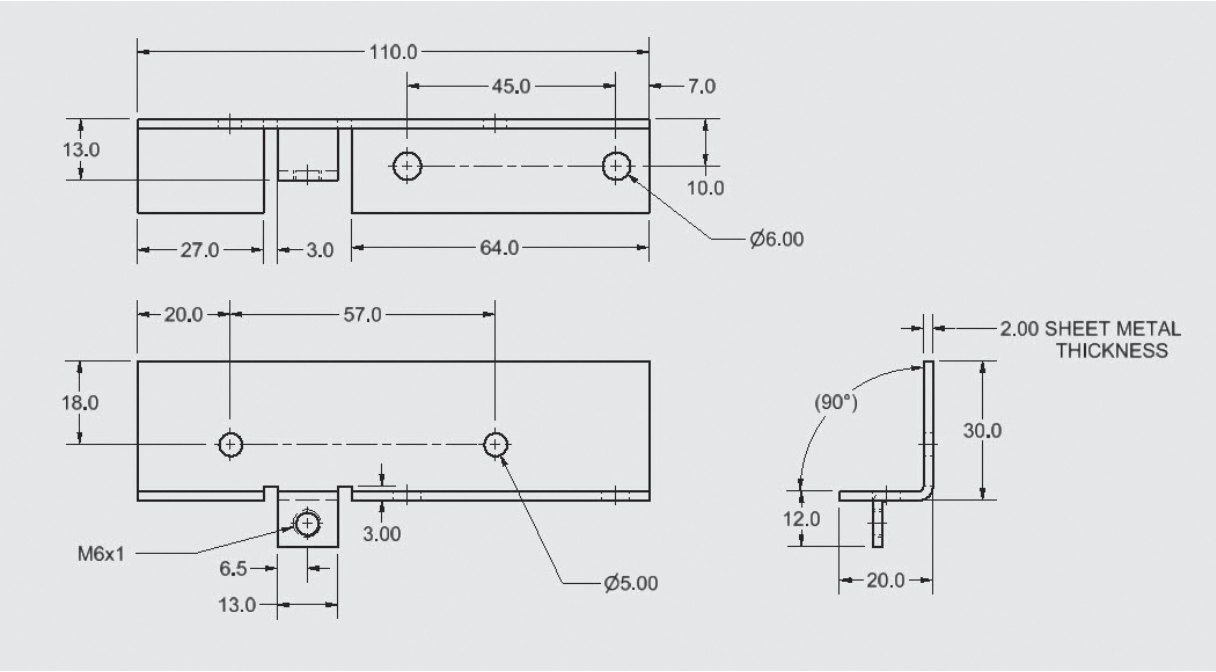


Figure 13-36

Figure 13-37a

Casting, Vertical
PN: BU-131

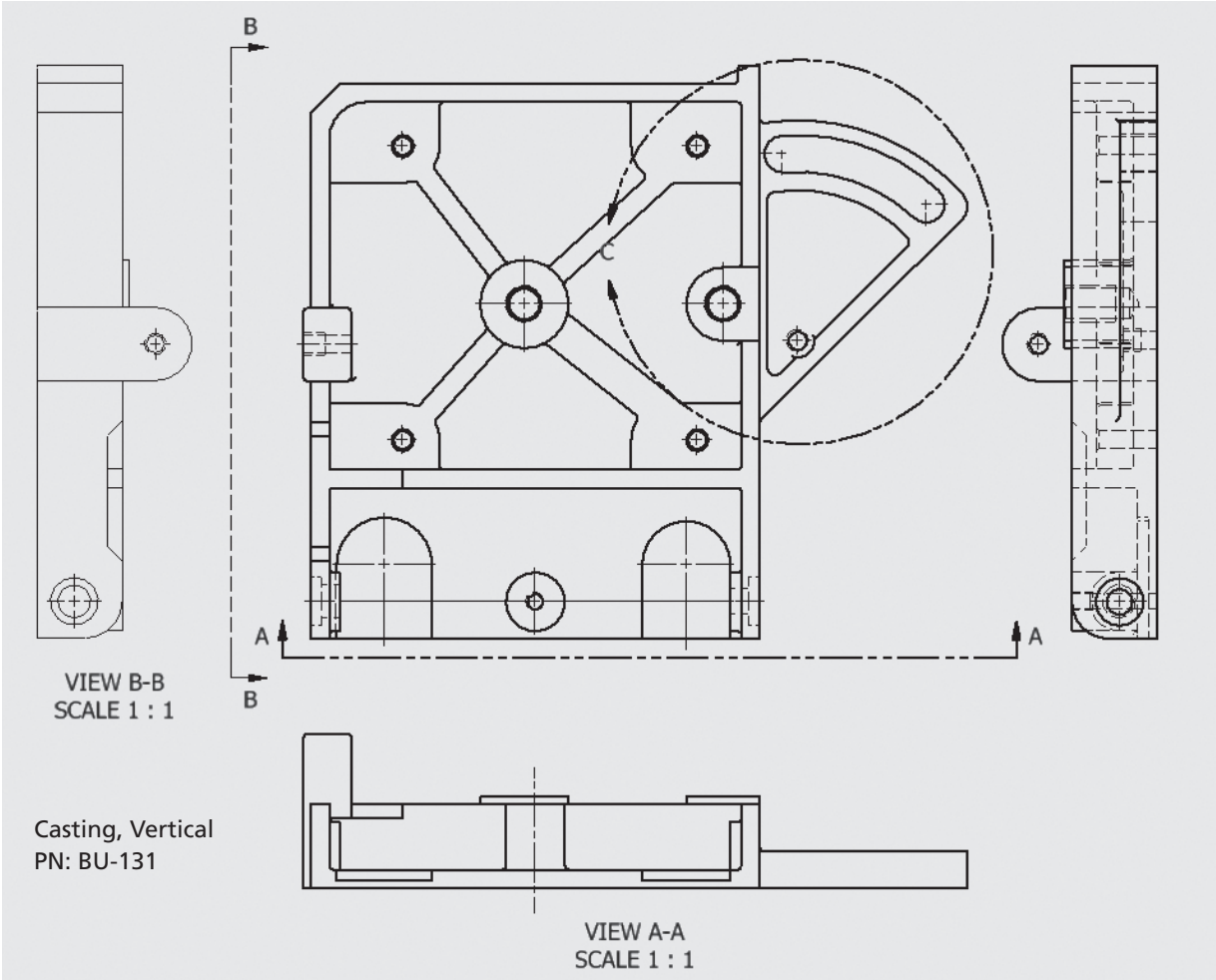
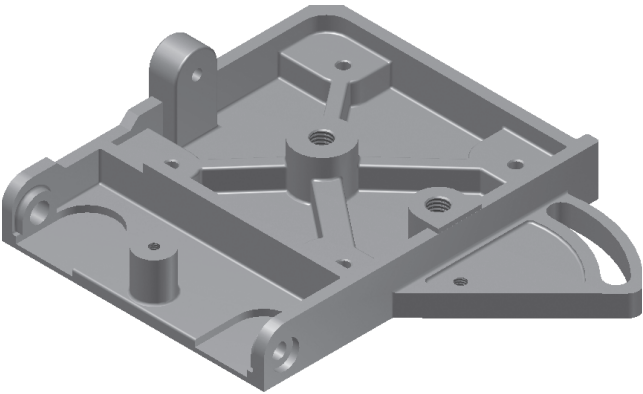


Figure 13-37b



Figure 13-37e

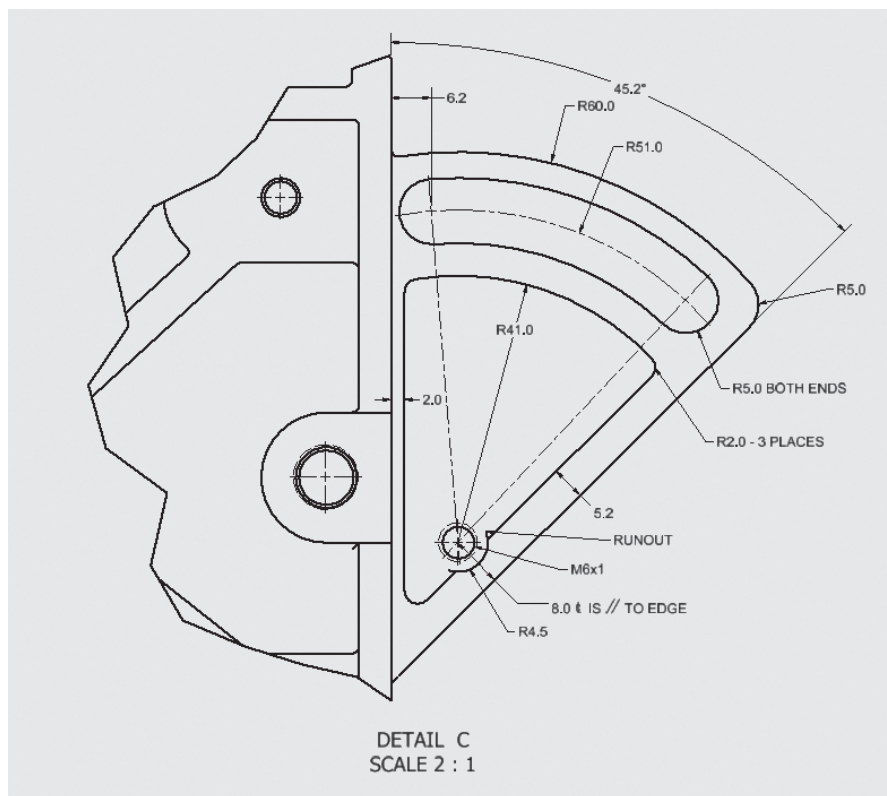
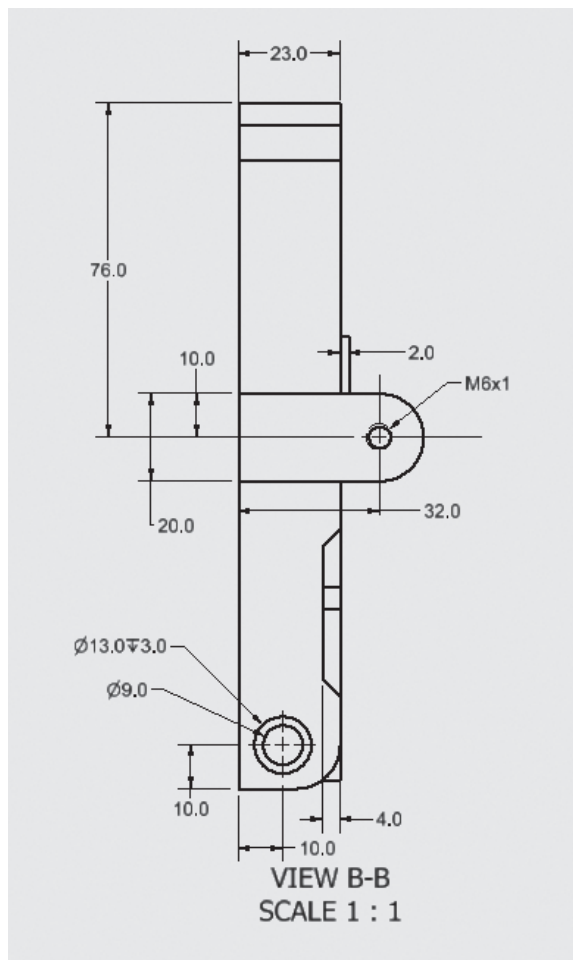


Figure 13-37f



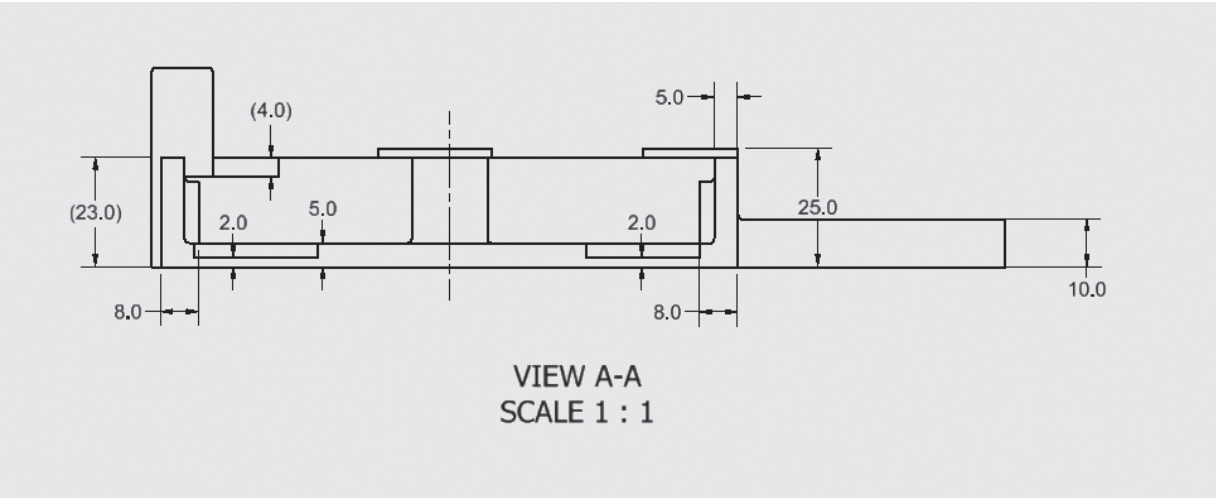
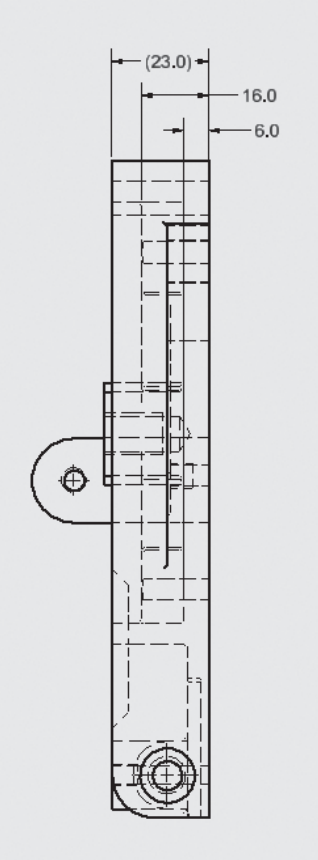


Figure 13-37g

Figure 13-37h

Right Side View



Lever Subassembly
PN: BU-133

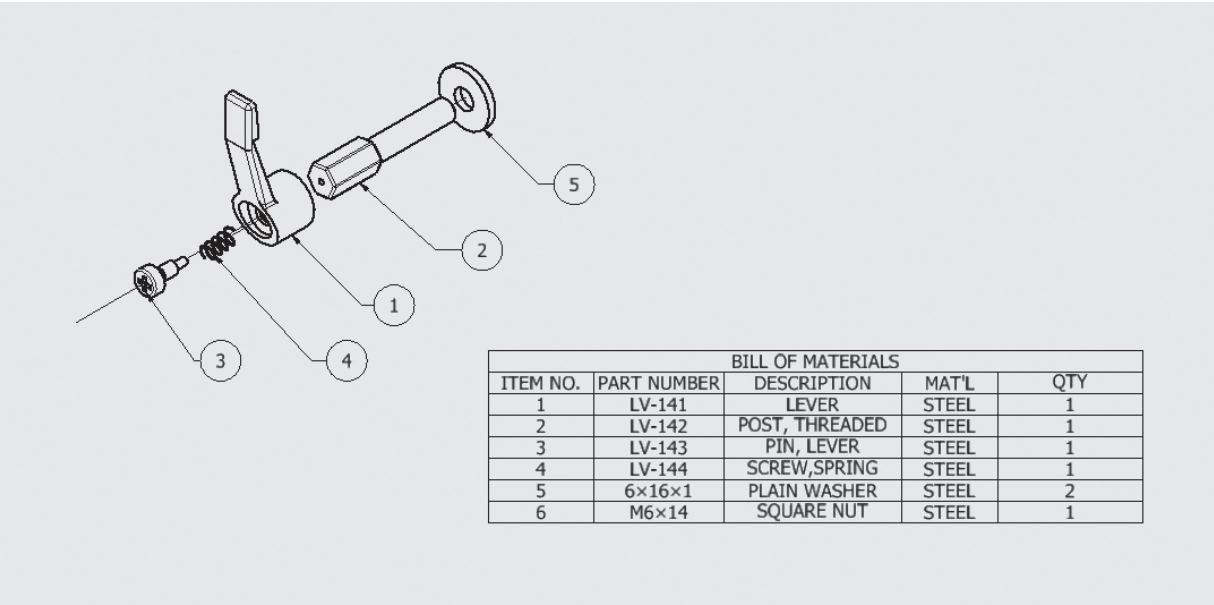


Figure 13-38a

Lever
PN: LV-141

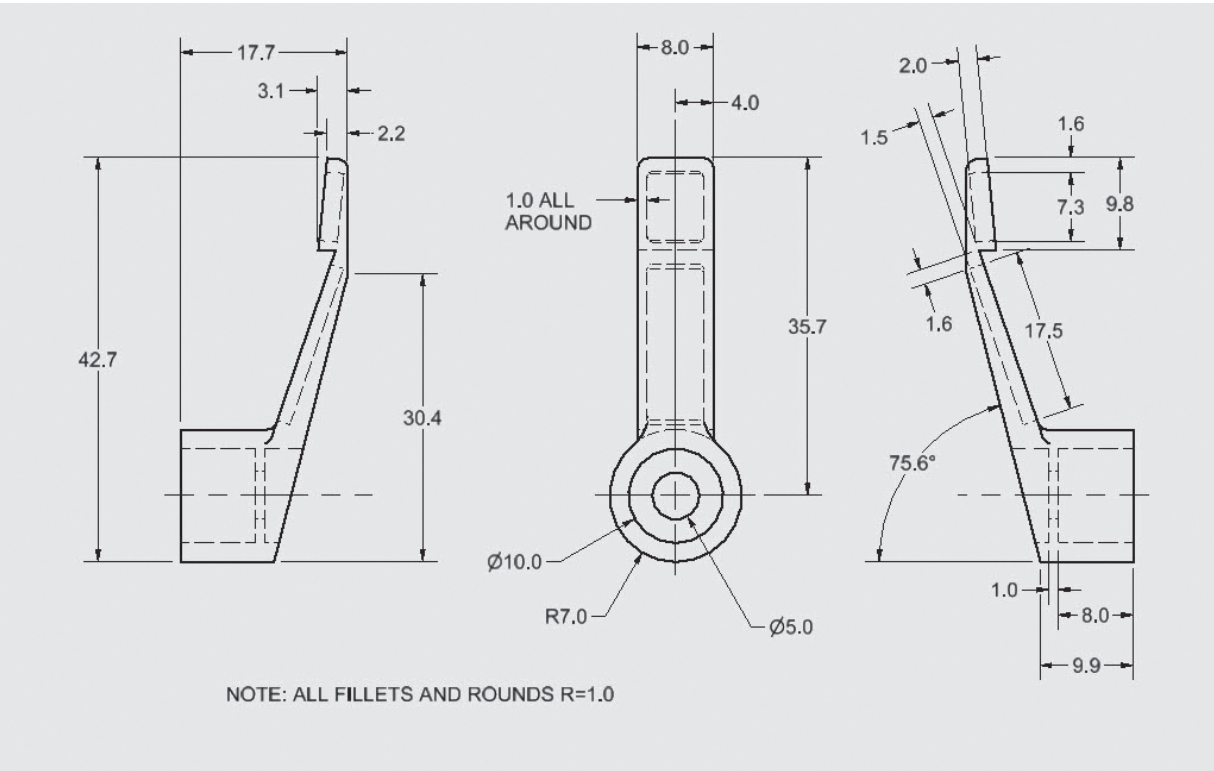


Figure 13-38b

Figure 13-38c

Post, Threaded
PN: LV-142

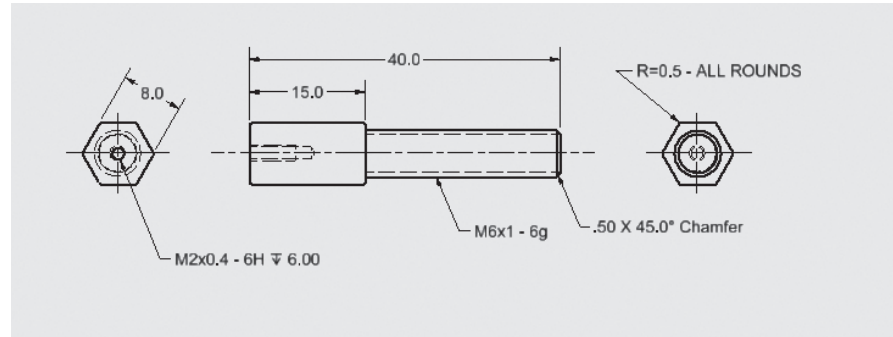


Figure 13-38d

Pin, Lever
PN: LV-143

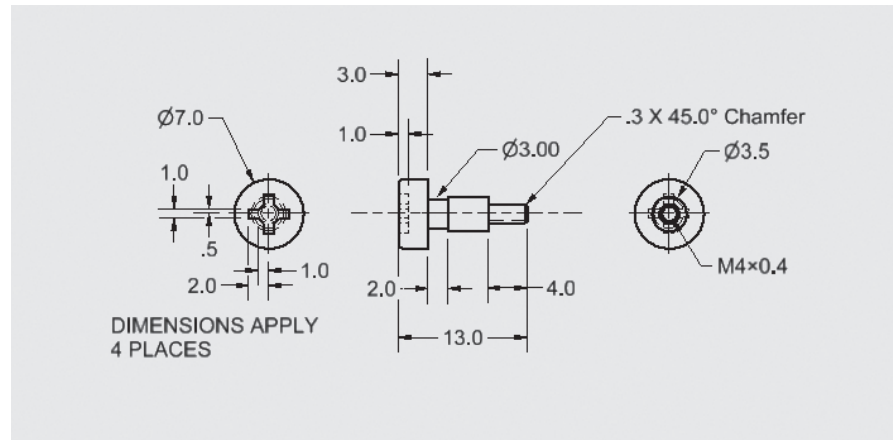


Figure 13-38e

Screw, Spring
PN: LV-144

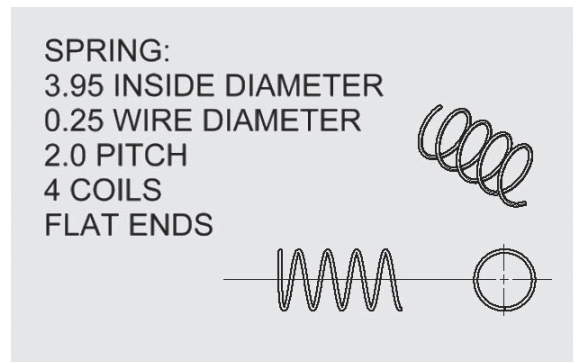


Figure 13-39a

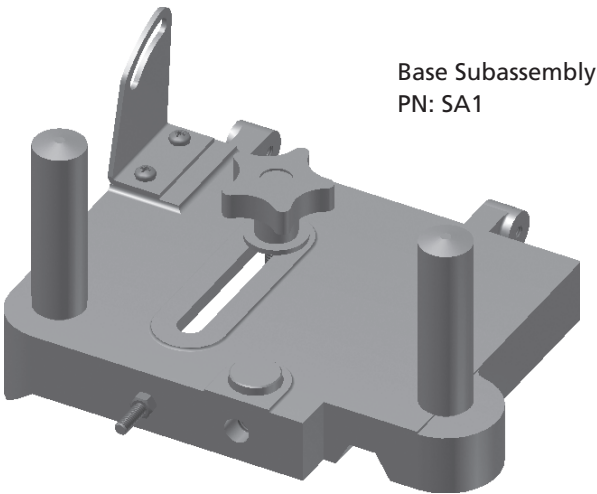


Figure 13-39b

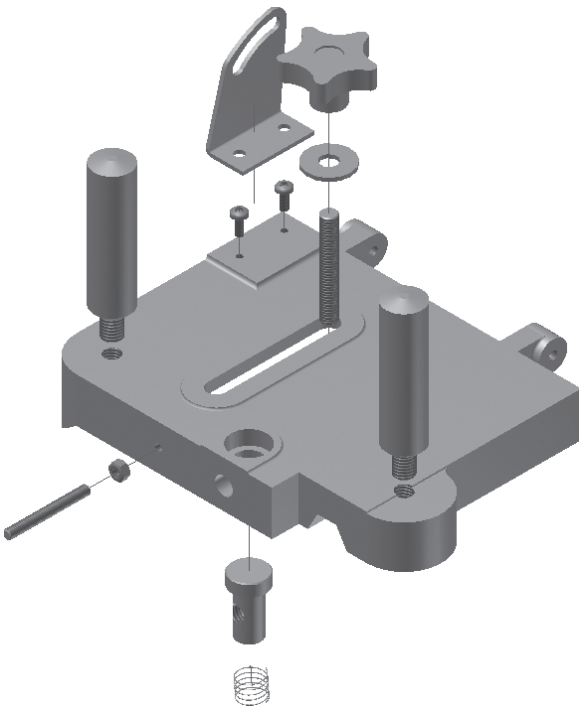


Figure 13-39c

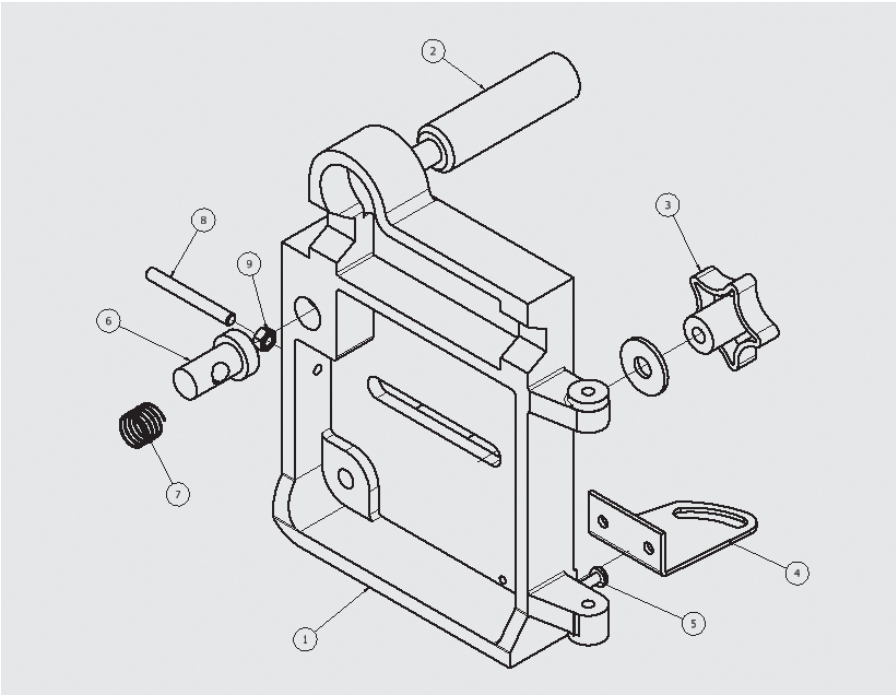


Figure 13-39d

PARTS LIST				
ITEM	PART NUMBER	DESCRIPTION	MATERIAL	QTY
1	BU-306-A	PLATE, BASE	CAST STEEL	1
2	P53-A2	POST, HANDLE, LARGE	STEEL	2
3	H5-21	LARGE KNOB SUB-ASSEMBLY		1
4	BU202	CLIP, BASE	STEEL	1
5	M4x0.7 x 10	Cross Recessed Pan Head Machine Screw	STEEL, MILD	2
6	P23-402	POST, RELEASE	STEEL	1
7	BU-003	SPRING	PIANO WIRE	1
8	M5x45	STUD	STEEL	1
9	M5	HEX NUT	Steel	1

Figure 13-40a

Plate, Base
BU-306-A

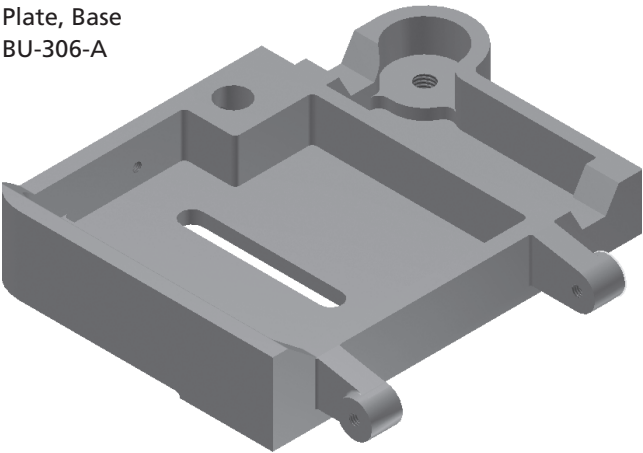


Figure 13-40b

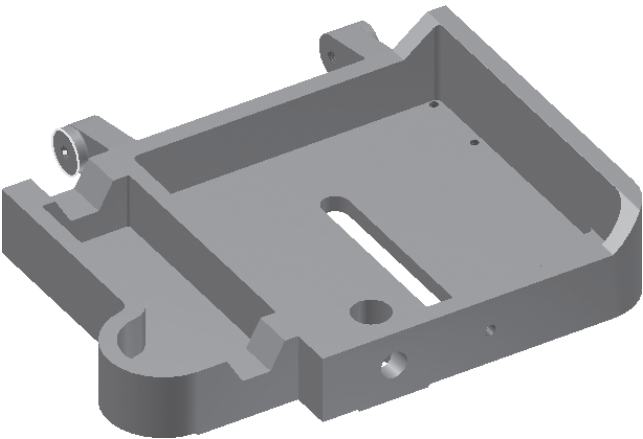
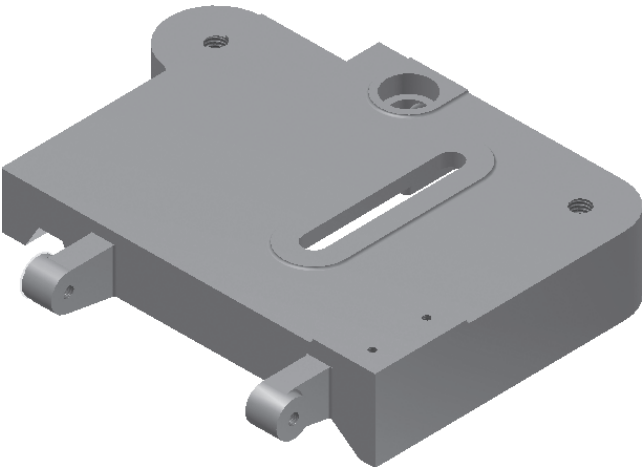


Figure 13-40c



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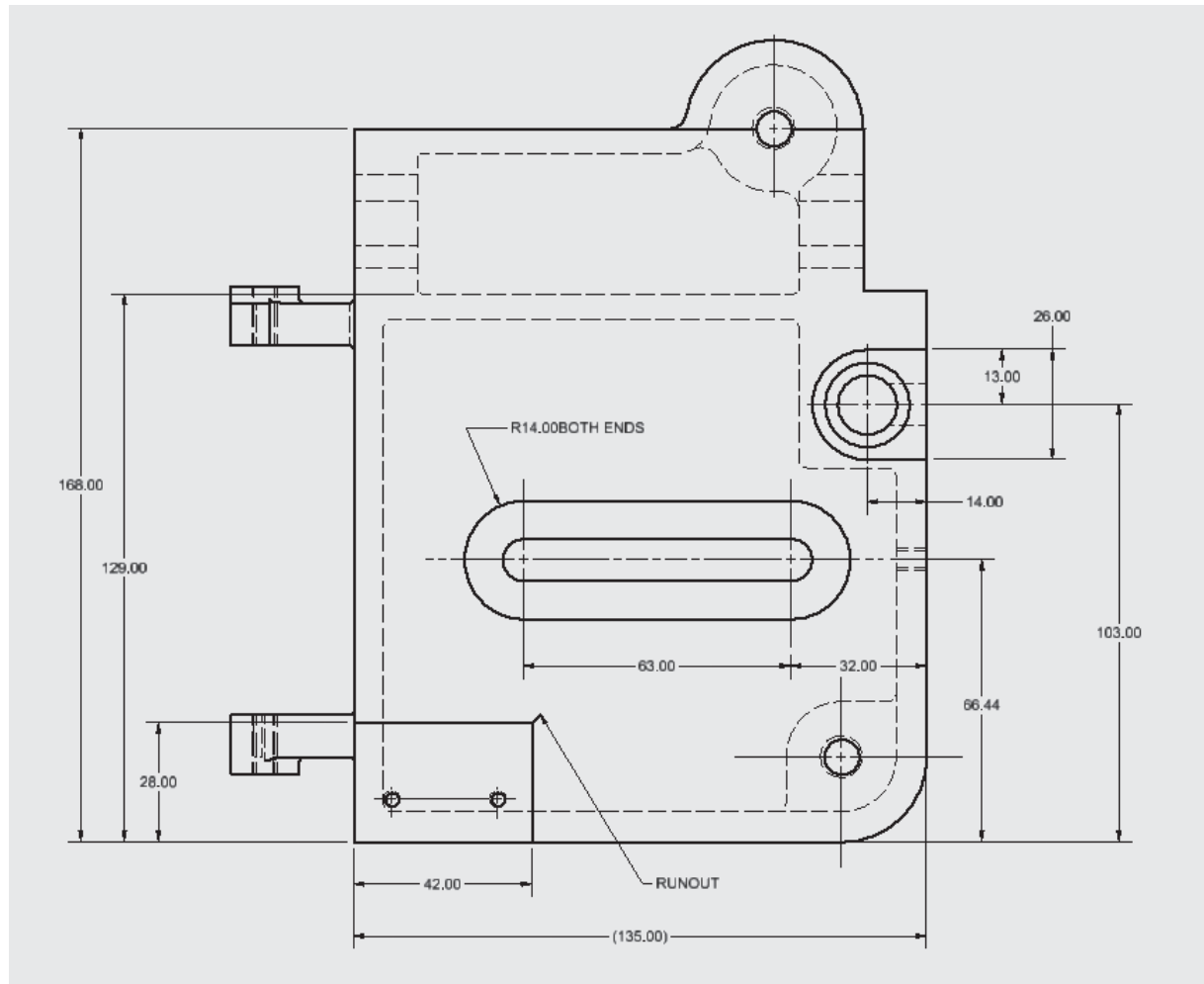


Figure 13-40f

Figure 13-40g

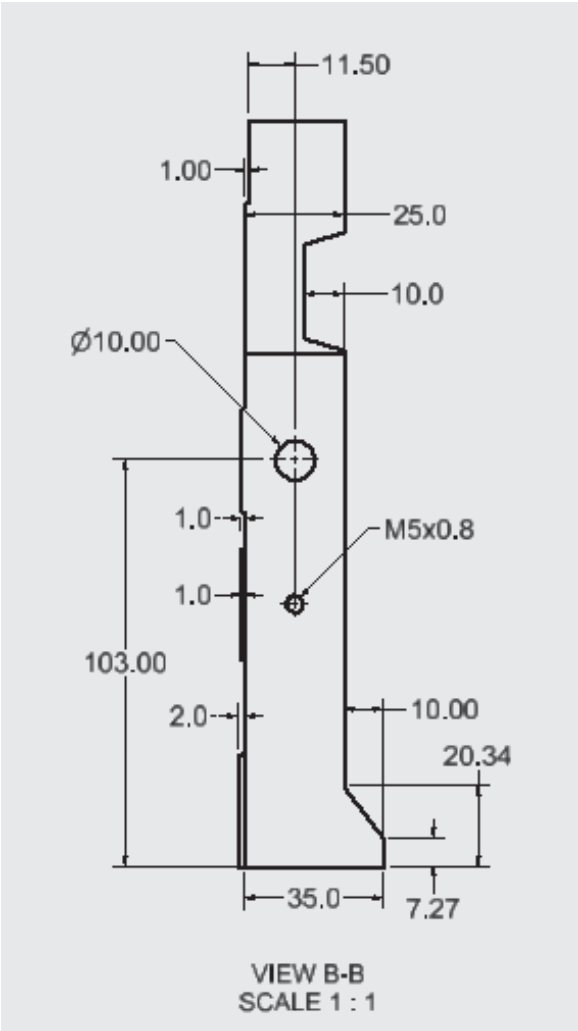


Figure 13-40h

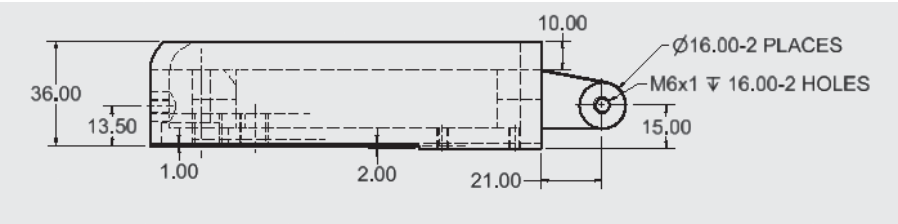
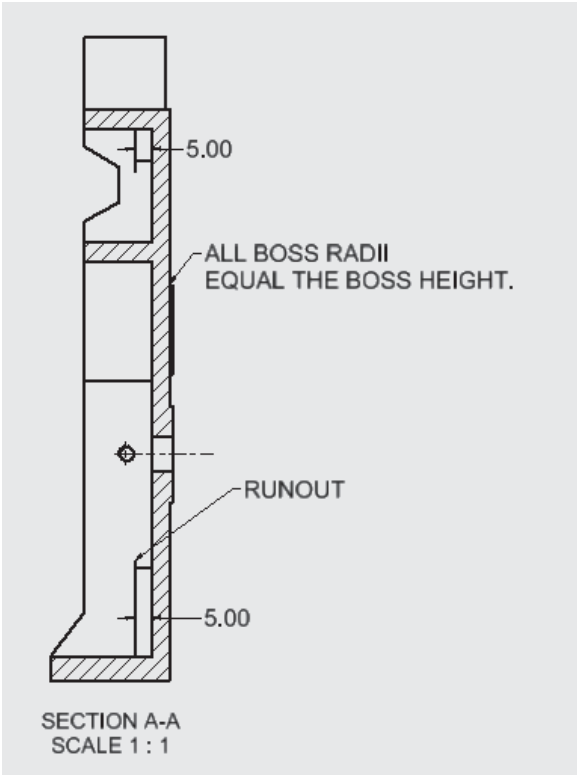


Figure 13-40i



Post Handle, Large
PS3-A2

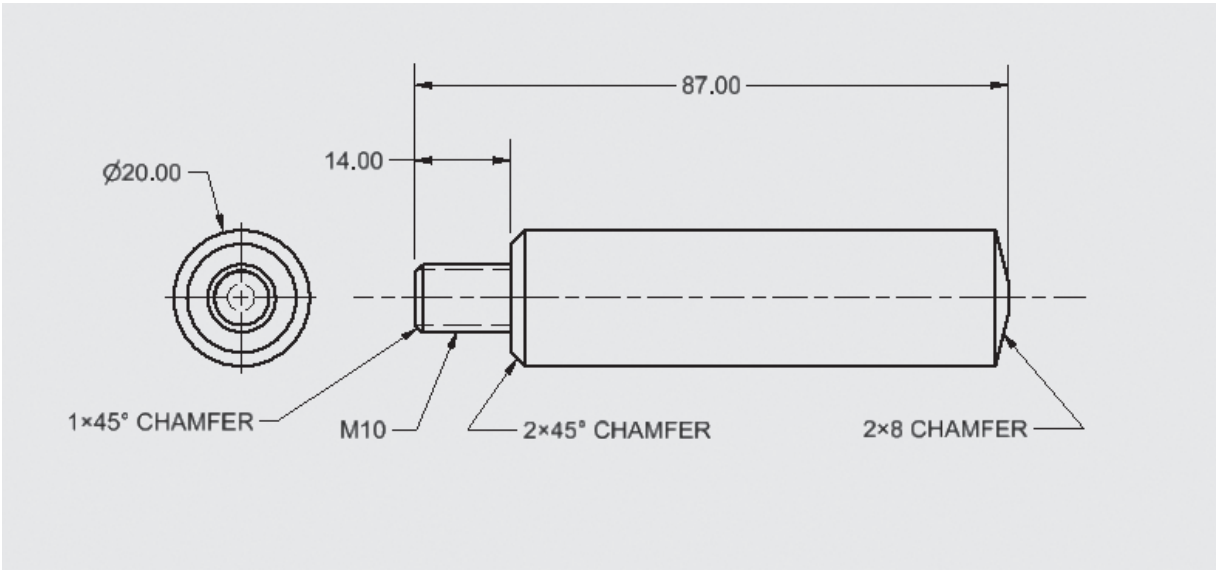


Figure 13-41

Large Knob Subassembly
PN: HS-21

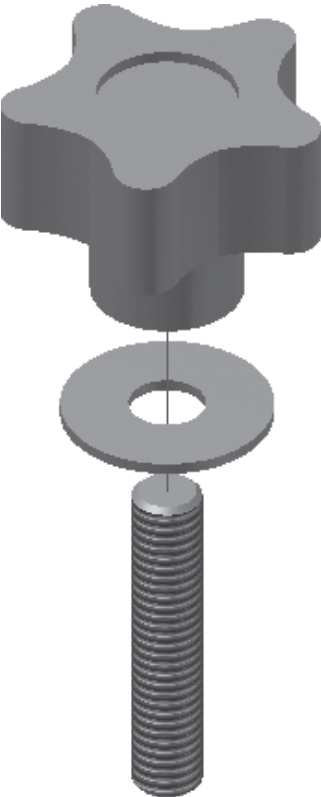


Figure 13-42a

Large Knob Subassembly
PN: HS-21

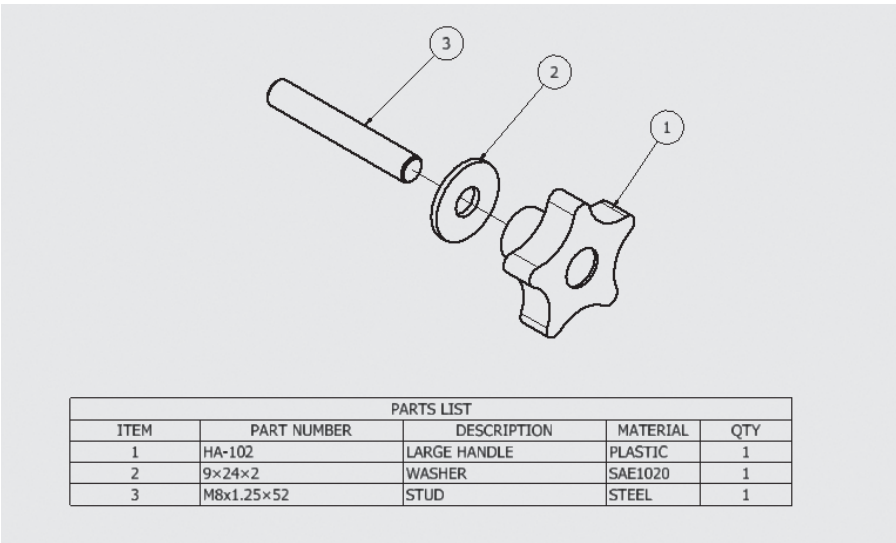
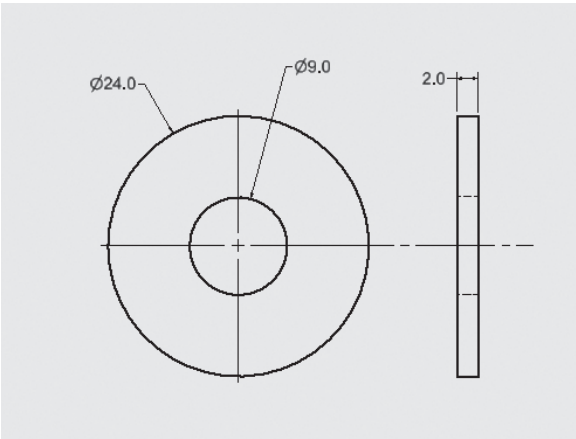


Figure 13-42b

Figure 13-42c

Washer
9 × 24 × 2



Large Handle
PN: HA-102

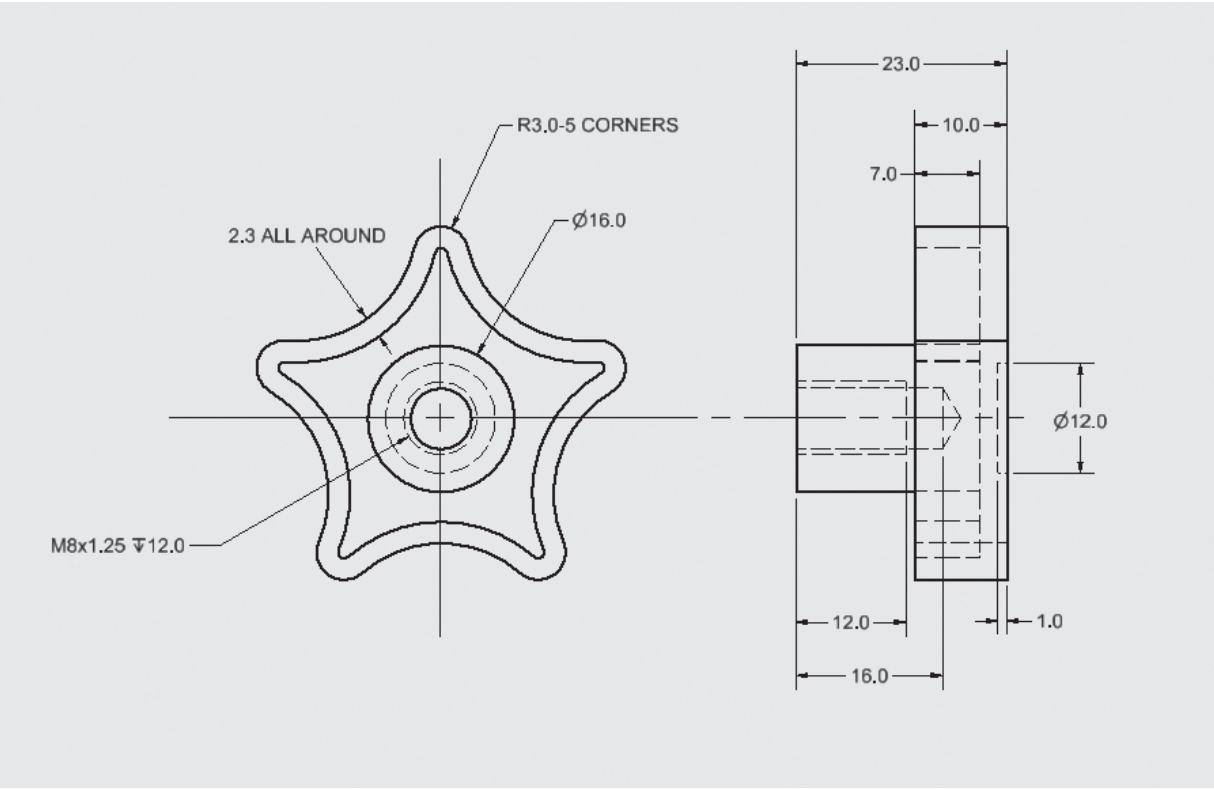
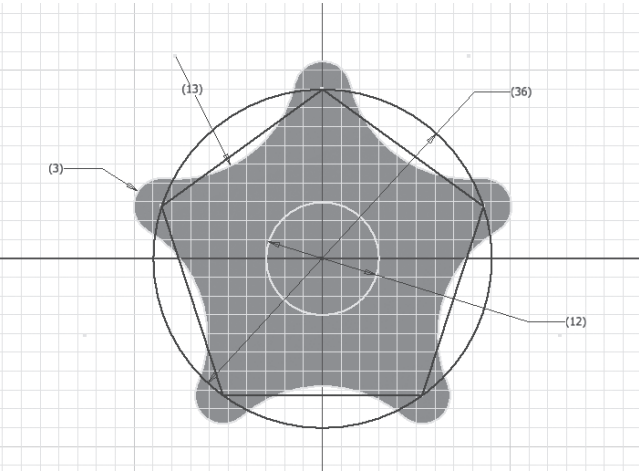


Figure 13-42d

Figure 13-42e

Layout for Large Handle



Clip, Base
BU-202

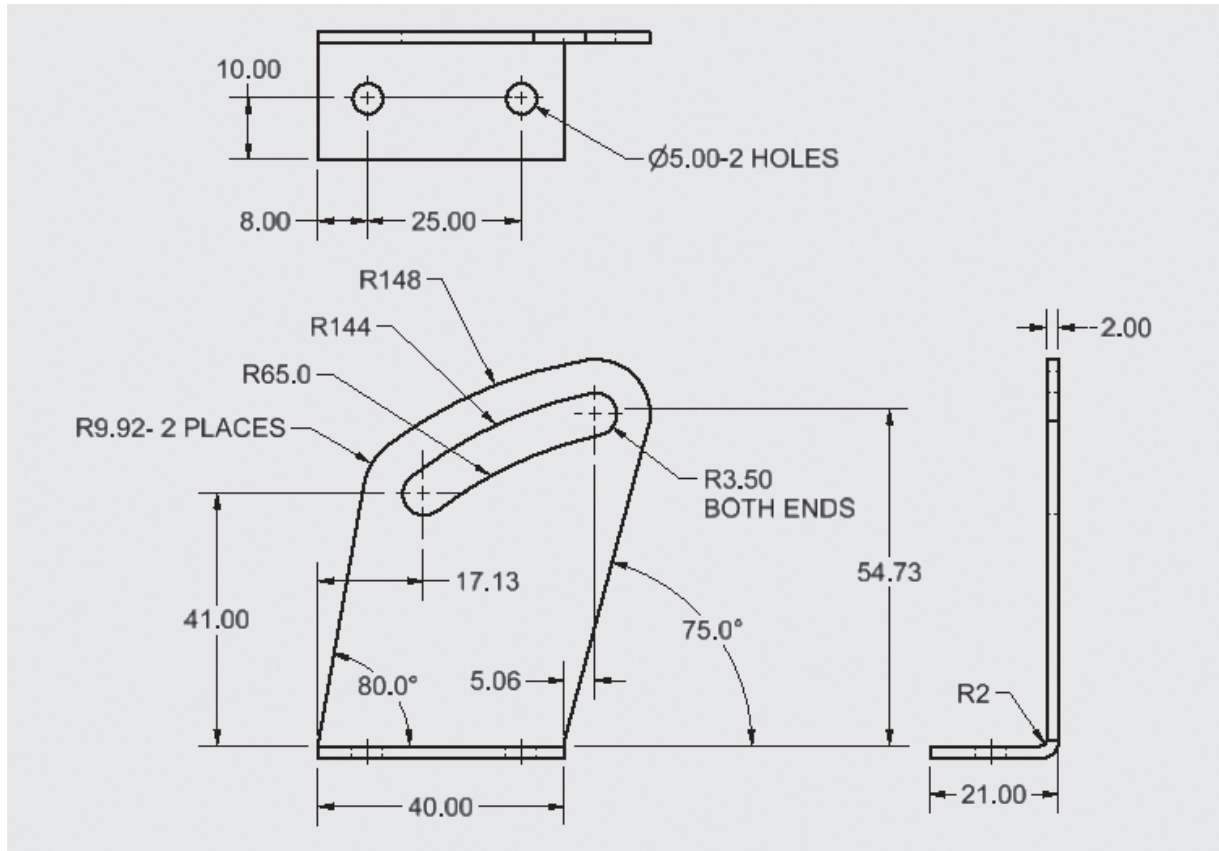
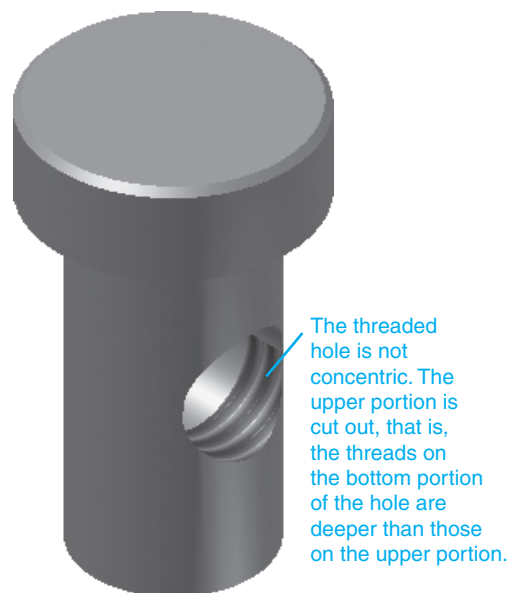


Figure 13-43

Figure 13-44a

Post, Release
PN: P23-402



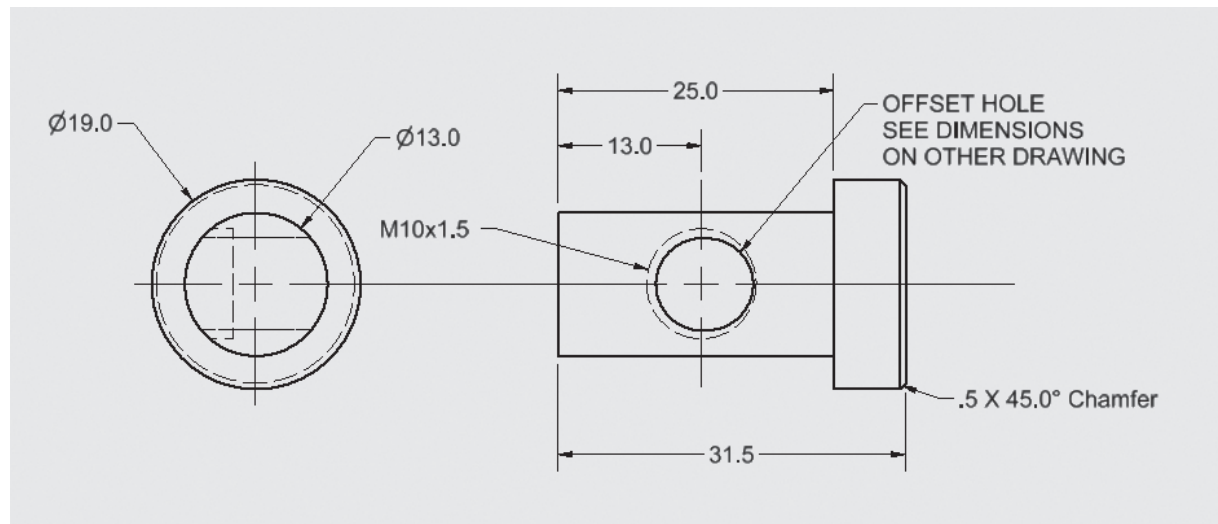


Figure 13-44b

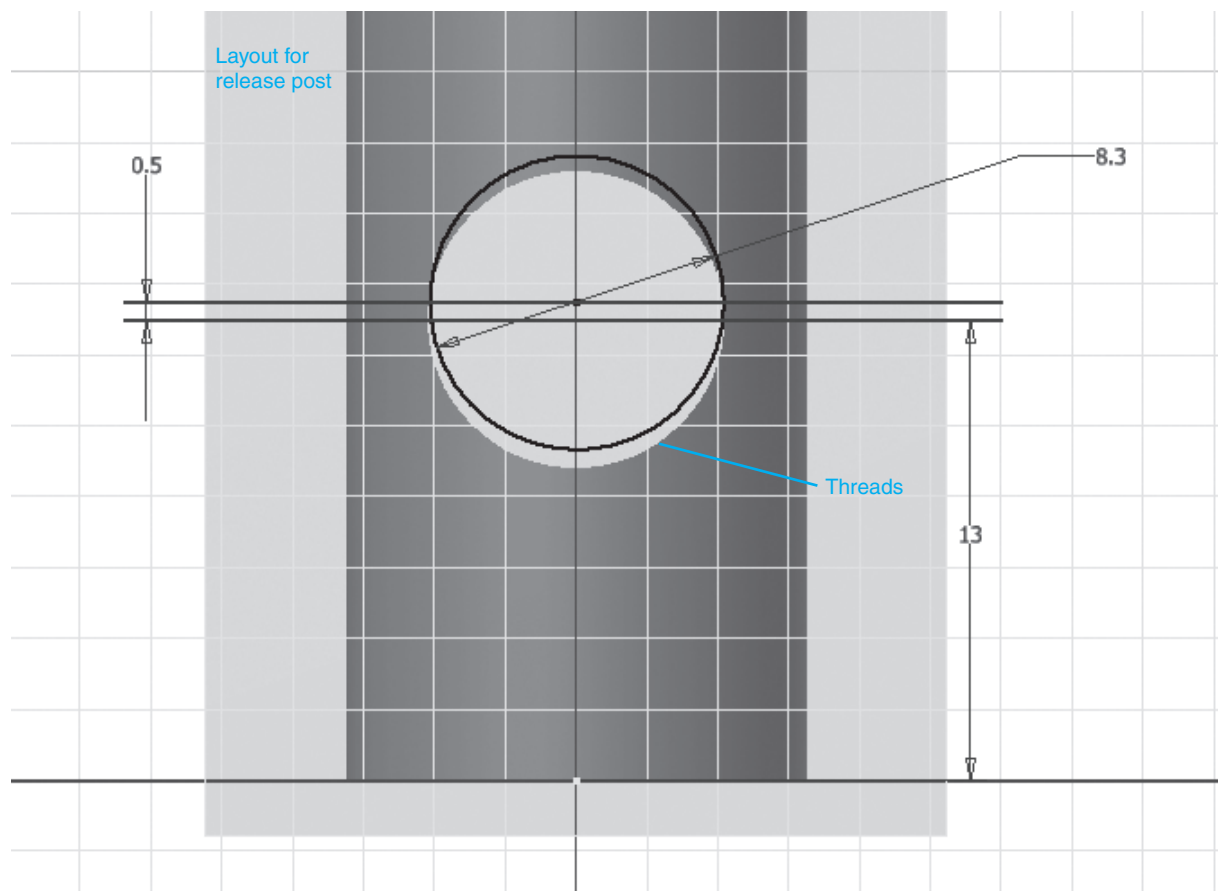
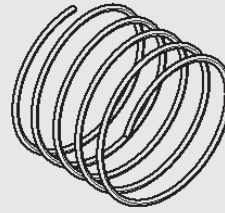


Figure 13-44c

Figure 13-45

Spring
PN: BU-003

SPRING:
6.7 INSIDE DIAMETER
0.50 WIRE DIAMETER
2.5 PITCH
12.0 HEIGHT
FLAT ENDS



Stud
PN: MS × 45

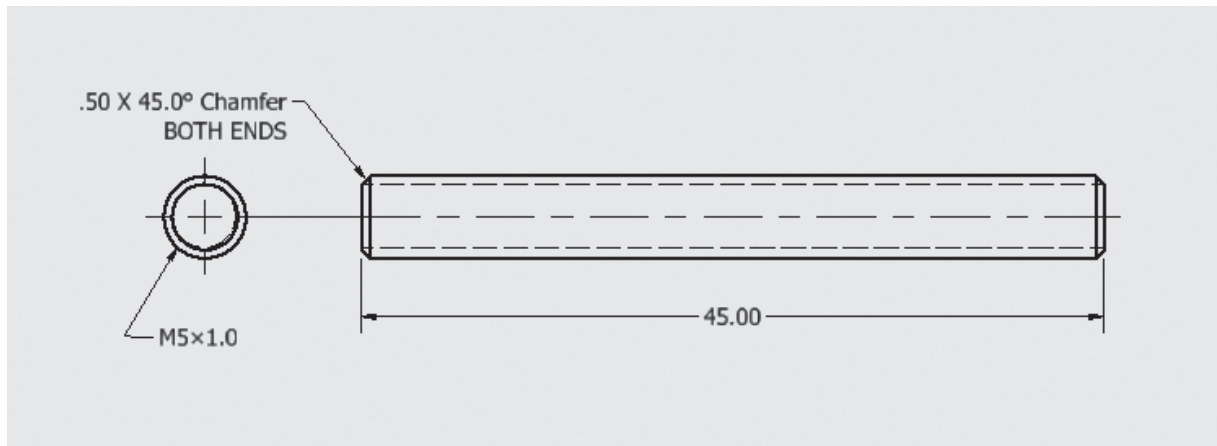


Figure 13-46

Guide Subassembly
PN: SA-4

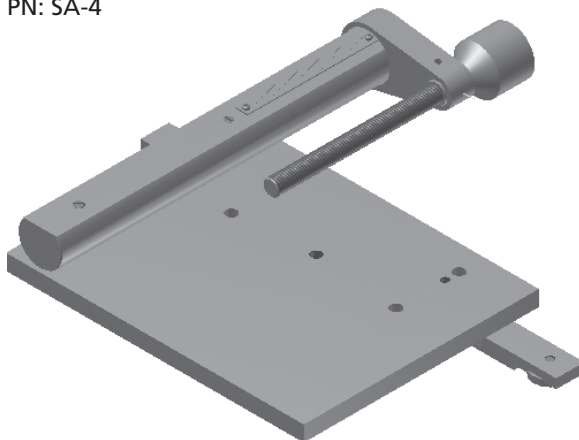


Figure 13-47a

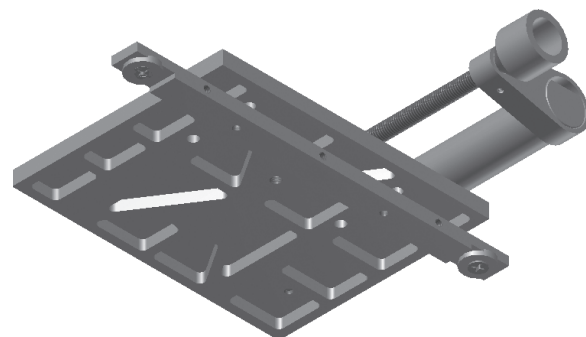


Figure 13-47b

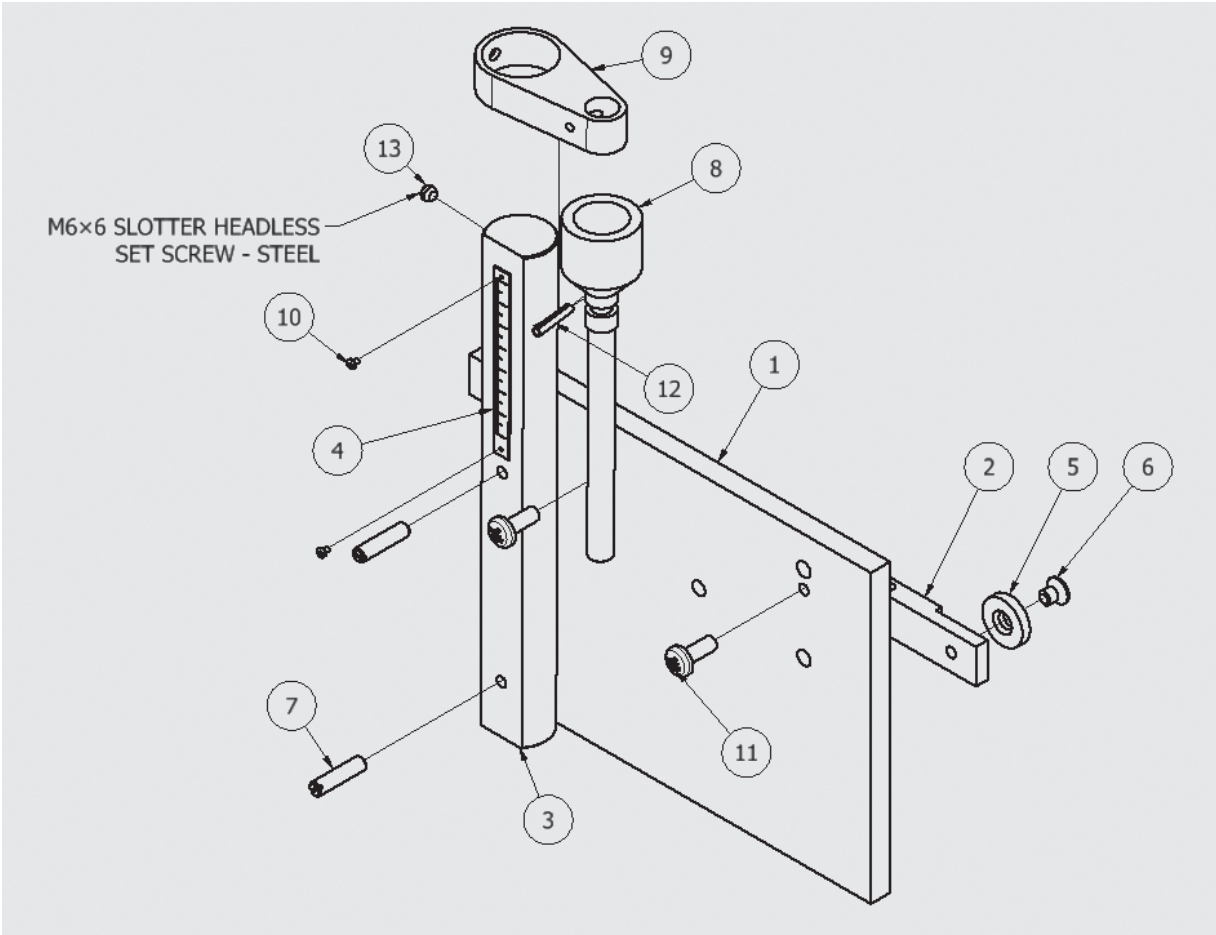
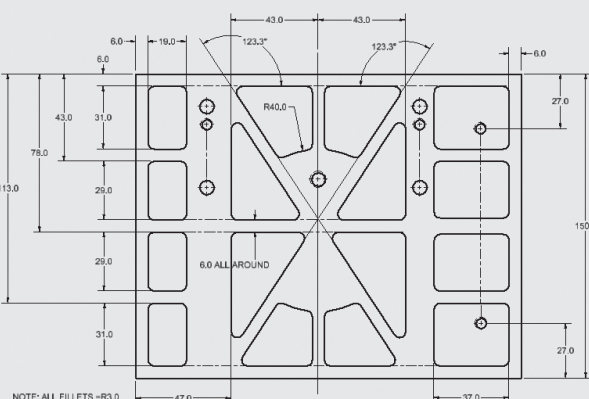


Figure 13-47c

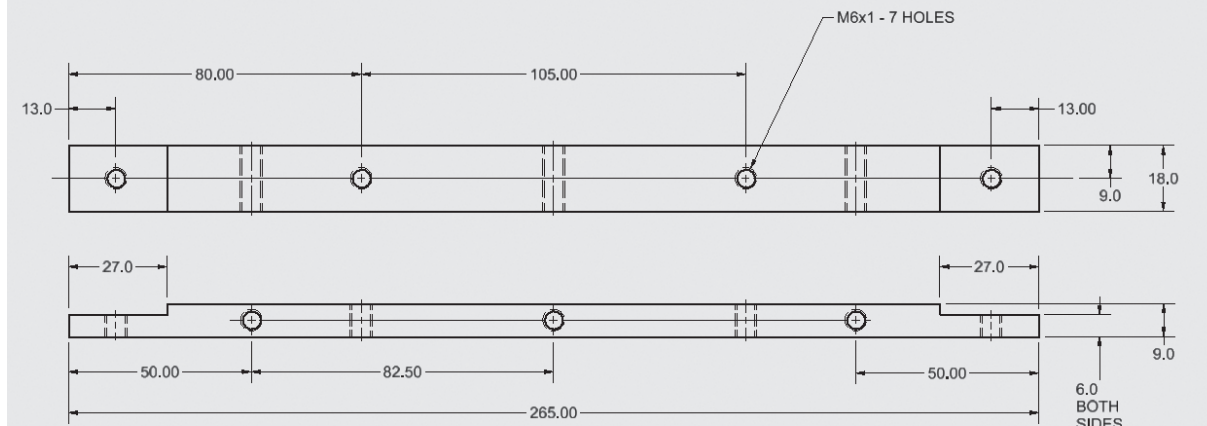
Figure 13-47d

PARTS LIST				
ITEM	PART NUMBER	DESCRIPTION	MATERIAL	QTY
1	G101-A1	PLATE, GUIDE	STEEL	1
2	G101-A2	BAR, GUIDE	STEEL	1
3	G101-A3	POST, GUIDE	STEEL	1
4	RR-6-40	RULER	STEEL	1
5	RG-1005	ROLLER, GUIDE	STEEL	2
6	M6x1 x 8	Cross Recessed Flat Countersunk Head Machine Screw	MILD STEEL	2
7	M6 x 25	Slotted Headless Set Screw - Flat Point	Steel	2
8	G103-2	SCREW, GUIDE	Steel	1
9	G101-4A	PLATE, GUIDE	STEEL	1
10	M2x0.4 x 3	Cross Recessed Pan Head Machine Screw	MILD STEEL	2
11	M6x1 x 16	Cross Recessed Pan Head Machine Screw	MILD STEEL	2
12	G101-63	PIN, HOLDER	STEEL	1

Chapter 13



Bar, Guide
PN: G101-A2



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Post Guide
PN: G101-A3

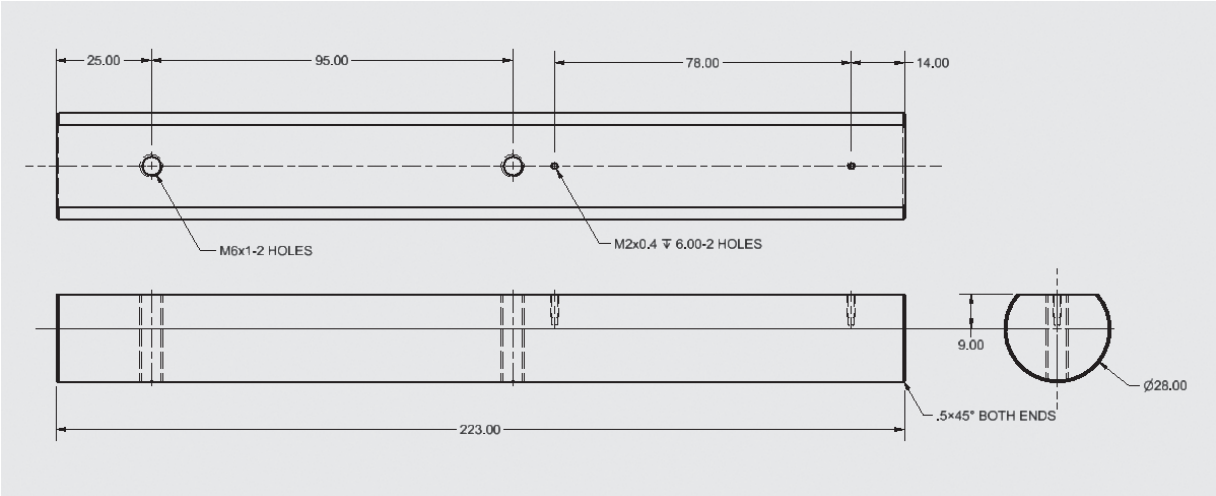


Figure 13-50

Figure 13-51

Ruler
PN: RR-6-40

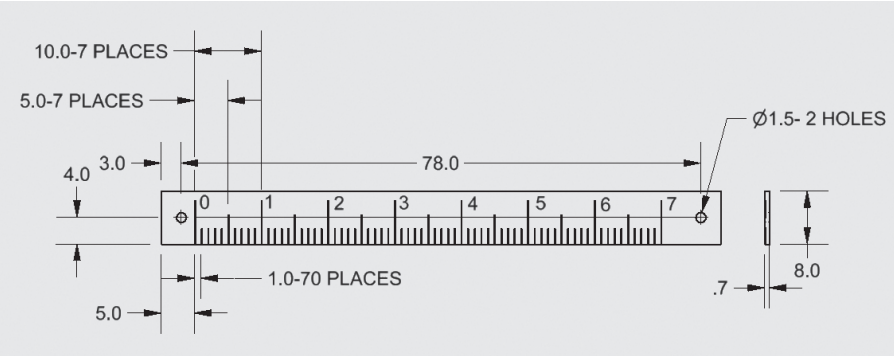
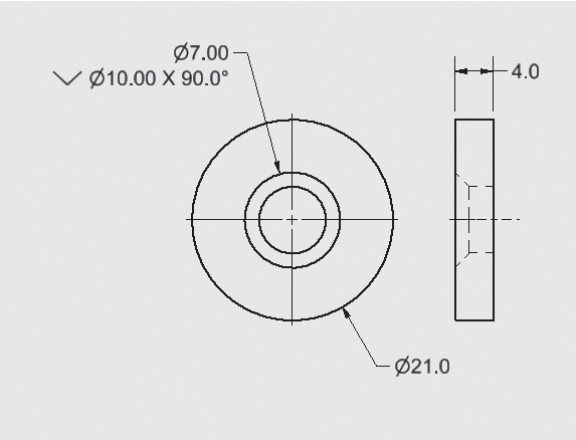
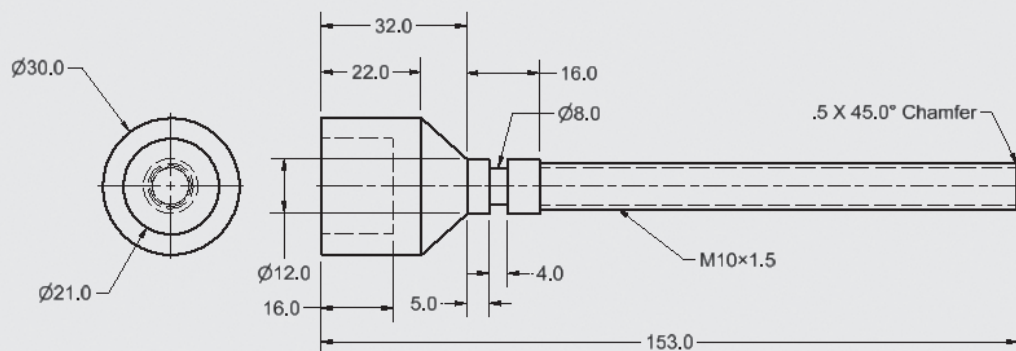


Figure 13-52

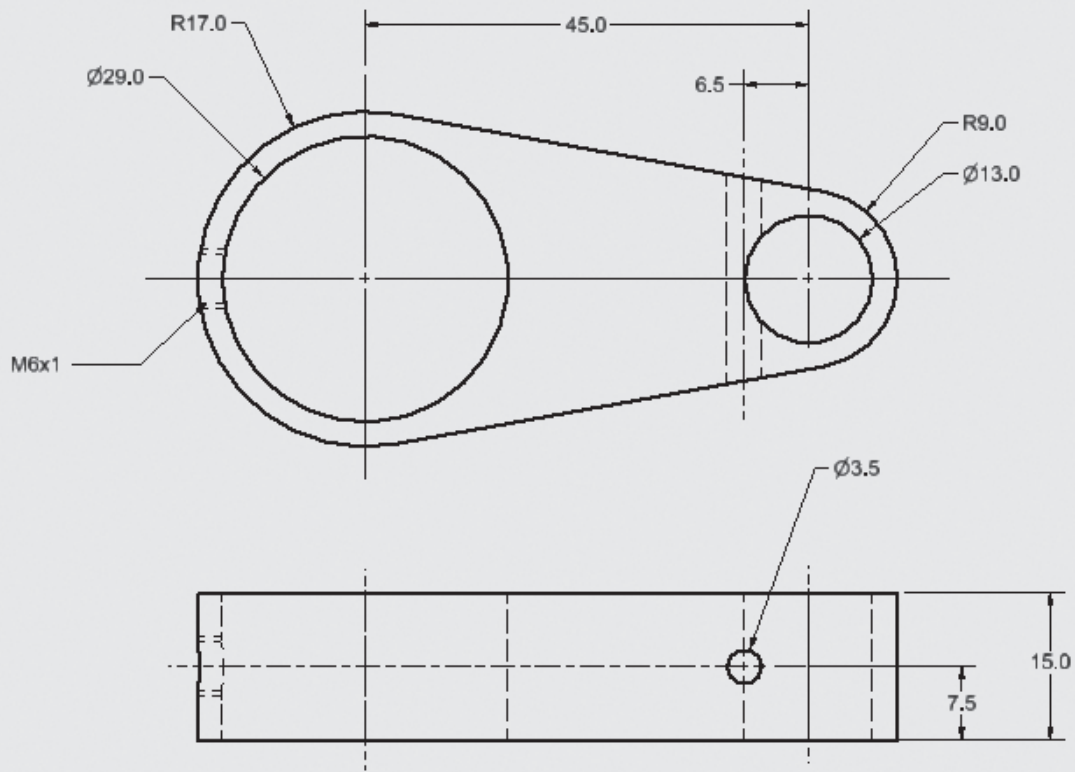
Ruler, Guide
PN: RG-1005



Chapter 13



Plate, Guide
PN: G101-4A



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Figure 13-55

Pin, Holder
PN: G101-63

