

AN AMERICAN NATIONAL STANDARD

**ASME B5.60b-2009**

**ADDENDA**

to

ASME B5.60-2002

**WORKHOLDING CHUCKS: JAW TYPE CHUCKS**

Incorporating ASME B5.60.1, ASME B5.60.3, ASME B5.60.4, and ASME B5.60.5

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

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# ASME B5.60b-2009

Following approval by the ASME B5 Committee and ASME, and after public review, ASME B5.60b-2009 was approved by the American National Standards Institute on February 2, 2009.

Addenda to the 2002 edition of ASME B5.60 are issued in the form of replacement pages. Revisions, additions, and deletions are incorporated directly into the affected pages. It is advisable, however, that this page, the Addenda title and copyright pages, and all replaced pages be retained for reference.

## SUMMARY OF CHANGES

This is the second Addenda to be published to ASME B5.60-2002. The first Addenda was published in 2005.

Replace or insert the pages listed. Changes given below are identified on the pages by a margin note, **(b)**, placed next to the affected area. Previous Addenda changes are indicated by **(a)**. The pages not listed are the reverse sides of the listed pages and contain no changes.

<i>Page</i>	<i>Location</i>	<i>Change</i>
iii	Contents	Updated to reflect Addenda
iv	Foreword	Updated to reflect Addenda
v	Committee Roster	Updated to reflect Addenda
vii	Preface	Updated to reflect Addenda
4.1–4.33	ASME B5.60.3	Added

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CONTENTS

(a)  
(b)

Foreword ..... iv

Standards Committee Roster ..... v

Correspondence With the B5 Committee ..... vi

Preface ..... vii

**ASME B5.60.1    General Description and Definitions of Terms ..... 1**

**ASME B5.60.2    Chuck-to-Spindle Interface (to be added) .....**

**ASME B5.60.3    Jaw Mountings ..... 4.1**

**ASME B5.60.4    Performance Testing ..... 5**

**ASME B5.60.5    Safety Code of Practice ..... 11**

**ASME B5.60.6    Chuck Assembly: Sizes and Designation (to be added) .....**

(a)  
(b)

## FOREWORD

During the review, revision, and update of the existing inch-based American National Standard B5.8 on Chucks and Chuck Jaws, Technical Committee 11 of the ASME B5 Committee on Machine Tools recognized the need for an industry standard on metric-dimensioned chucks.

This Standard was developed after reviewing currently available national and international standards, which were used as its foundation.

B5.60.1 and B5.60.4 were completed in November 1999 and submitted to ASME.

The standard titled, *Workholding Chucks: Jaw Type Chucks*, comprises six parts, with each covering a specific aspect of workholding chucks, as follows:

- ASME B5.60.1: General Description and Definitions of Terms
- ASME B5.60.2: Chuck-to-Spindle Interface
- ASME B5.60.3: Jaw Mountings
- ASME B5.60.4: Performance Testing
- ASME B5.60.5: Safety Code of Practice
- ASME B5.60.6: Chuck Assembly: Sizes and Designation

ASME B5.60.1 was approved by the American National Standards Institute on June 26, 2002.

ASME B5.60.3 was approved by the American National Standards Institute on February 2, 2009.

ASME B5.60.4 was approved by the American National Standards Institute on June 26, 2002.

ASME B5.60.5 was approved by the American National Standards Institute on February 24, 2005.

ASME B5.60.2 and ASME B5.60.6 will be added.

# ASME B5 STANDARDS COMMITTEE

## Machine Tools — Components, Elements, Performance, and Equipment

(a)  
(b)

(The following is the roster of the Committee at the time of approval of this Standard.)

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**C. J. Gomez**, *Secretary*

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*General.* ASME Codes and Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by proposing revisions and attending Committee meetings. Correspondence should be addressed to:

Secretary, B5 Standards Committee  
The American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016

*Proposed Revisions.* Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible: citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

*Attending Committee Meetings.* The B5 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B5 Standards Committee.



PREFACE

(a)  
(b)

ORGANIZATION OF THIS DOCUMENT

This Standard compiles the following standards.

<i>Standard</i>	<i>Title</i>
ASME B5.60.1	General Description and Definitions of Terms
ASME B5.60.2	Chuck-to-Spindle Interface (to be added)
ASME B5.60.3	Jaw Mountings
ASME B5.60.4	Performance Testing
ASME B5.60.5	Safety Code of Practice
ASME B5.60.6	Chuck Assembly: Sizes and Designation (to be added)

ADDENDA SERVICE

This edition of ASME B5.60 includes an automatic addenda subscription service up to the publication of the next edition. The addenda subscription service will include the additional B5.60 documents not already included in the initial publication, and approved revisions to the existing parts.

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# ASME B5.60.3

(b)

<b>1</b>	<b>Introduction</b>	4.2
<b>2</b>	<b>Scope</b>	4.2
<b>3</b>	<b>Definitions of Terms</b>	4.2
<b>4</b>	<b>Chuck Jaw Interface Types</b>	4.2

## Figures

1	Fastener Guidelines	4.3
2	Jaw Interface Flatness Guidelines	4.4

## Tables

1	Top Jaw Features	4.5
2	Tongue and Groove, Medium Duty Chucks, Wrench Operated	4.7
3	Tongue and Groove, Medium Duty Chucks, Three-Step Reversible Top Jaw, Wrench Operated	4.9
4	Tongue and Groove, Heavy Duty Chucks, Wrench Operated	4.10
5	Tongue and Groove, Heavy Duty Chucks, Three-Step Reversible Top Jaw, Wrench Operated	4.12
6	Tongue and Groove, Heavy Duty Chucks, Drawbar Operated	4.13
7	Metric Tongue and Groove Chucks, Master Jaw	4.15
8	Square Serrated, Heavy Duty Chucks, Wrench or Drawbar Operated	4.16
9	Square Serrated, Heavy Duty Chucks, Top Jaw Master Key	4.17
10	Square Serrated, Heavy Duty Chucks, Master Jaw Nut	4.18
11	Square Serrated, Heavy Duty Chucks, Three-Step Reversible Top Jaw	4.19
12	Acme Serrated, Heavy Duty Chucks, Power Wrench or Drawbar Operated	4.20
13	Acme Serrated, Master Key	4.21
14	Acme Serrated, Jaw Nut	4.22
15	Acme Serrated, Three-Step Reversible Top Jaw	4.23
16	90 deg Serrated Jaw Interface (Inch), Serration Data	4.24
17	90 deg Serrated Jaw Interface (Inch), Accumulated Pitch Variation	4.25
18	60 deg Serrated Jaw Interface (Metric), Serration Data	4.26
19	60 deg Serrated Jaw Interface (Metric), Accumulated Pitch Variation	4.27
20	60 deg Metric and 90 deg Inch Serrated, Jaws and Jaw Nut Interface	4.28
21	1.5 mm × 60 deg Serrated Top Jaw (Metric)	4.29
22	Pin Locator Chucks, Master Jaw	4.30
23	Ball Style Chucks, Master Jaw	4.31
24	Ball Style Chucks, Top Jaw	4.32
25	Ball Style Chucks, Jaw Nut	4.33

## JAW MOUNTINGS

### 1 INTRODUCTION

This American National Standard establishes technical requirements for workholding chucks used primarily in turning operations. It covers jaw type chucks whether manual or power operated.

### 2 SCOPE

This Part of the ASME B5.60 Standard covers the interface of two-piece chuck jaws.

### 3 DEFINITIONS OF TERMS

*fasteners:* accessory devices (usually threaded) that are used to secure the top jaw onto the master jaw (see Fig. 1).

*groove (slot):* a recessed geometric form that receives a tongue, key, or jaw nut for positioning the top jaw with the master jaw.

*hard top jaw:* a top jaw that is made to its final size of hardenable steel. It is not intended to be machined in use.

*jaw interface:* geometric forms with fastening elements that position and secure top jaws to master jaws (see Fig. 2).

*jaw nut:* the fastener used in the master jaw for securing and, in some designs, positioning the top jaw with the master jaw.

*jaw-nut slot:* a T-slot in the master jaw for receiving a jaw nut.

*master jaw (base jaw):* radial-moving part within the chuck body to which the top jaw is mounted.

*master jaw pins:* precision pins that position the top jaw with the master jaw.

*master key:* a serrated positioning key, secured in the top jaw.

*monoblock (solid style jaw):* a one-piece combination master and top jaw.

*serration:* a repetitive geometric form for radial positioning the top jaw with the master jaw.

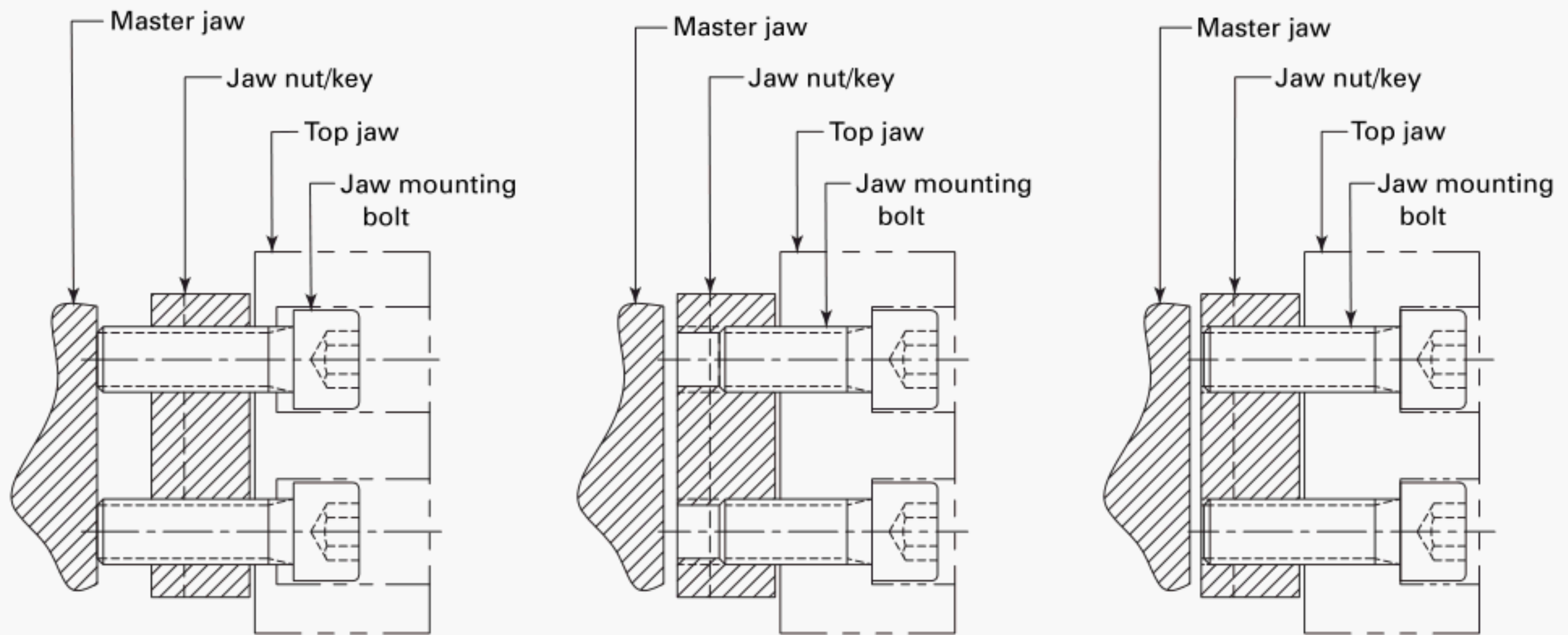
*soft top jaw (blank jaw):* a top jaw that is not heat-treated and is formed prior to usage.

*tongue:* the projected geometric form that aligns the top jaw with the master jaw.

*top jaw:* component that clamps the workpiece and is mounted on a master jaw.

### 4 CHUCK JAW INTERFACE TYPES

See Table 1 for top jaw features.



(a) Incorrect: Cap Screws Too Long

(b) Incorrect: Cap Screws Too Short

(c) Correct: Full Engagement

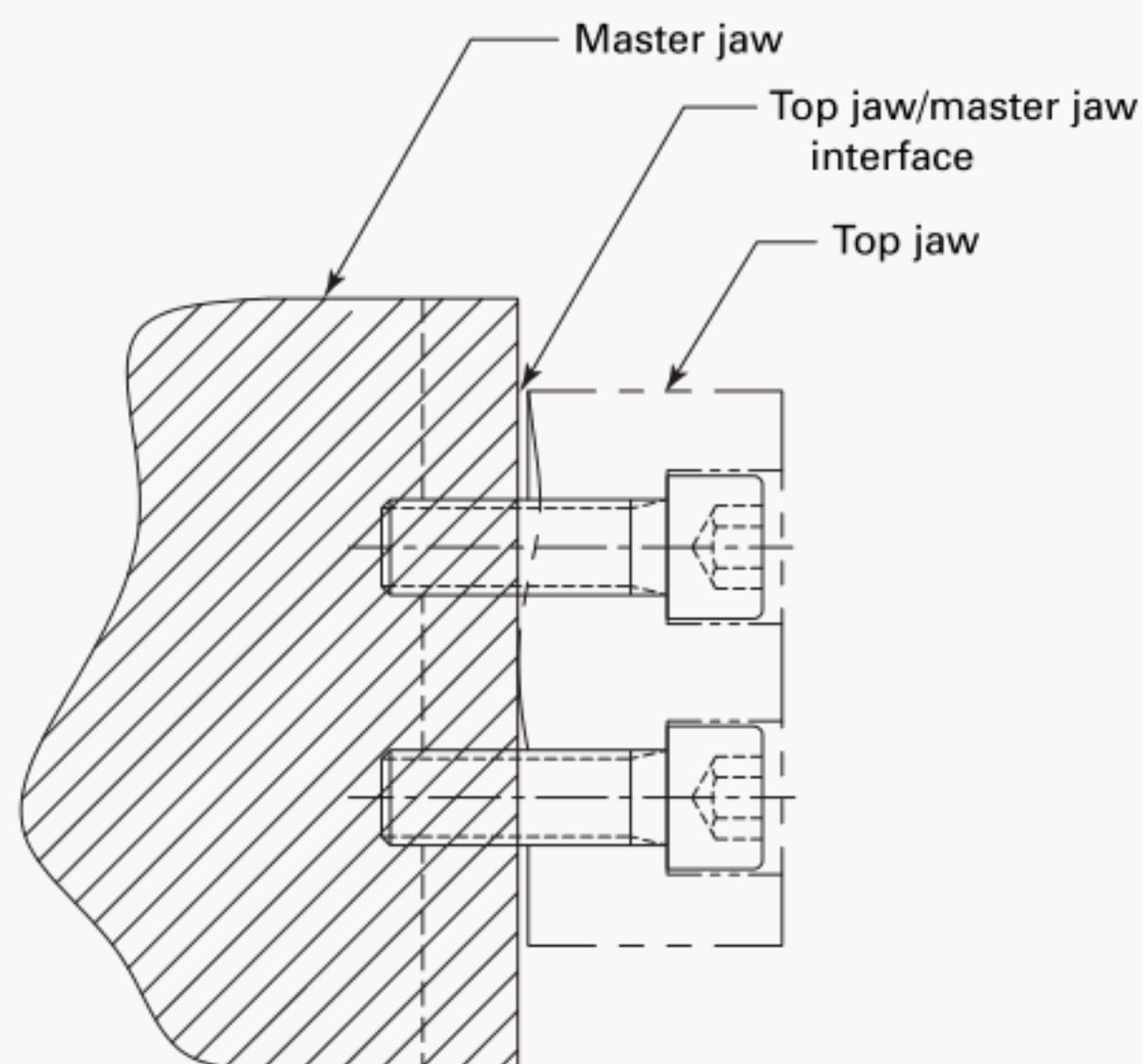
**GENERAL NOTE:** Discussion of factors relevant to jaw connection such as minimum fastener grades 8.8 English, 12.9 Metric. Recommended thread engagement 1.5 times diameter of thread (with illustration) and chuck manufacturer's recommended torque.

Now carefully mate the top jaw to the master jaw, making sure of a proper fit between all components. Insert jaw mounting bolts and tighten them evenly and firmly. Use only high quality fasteners.

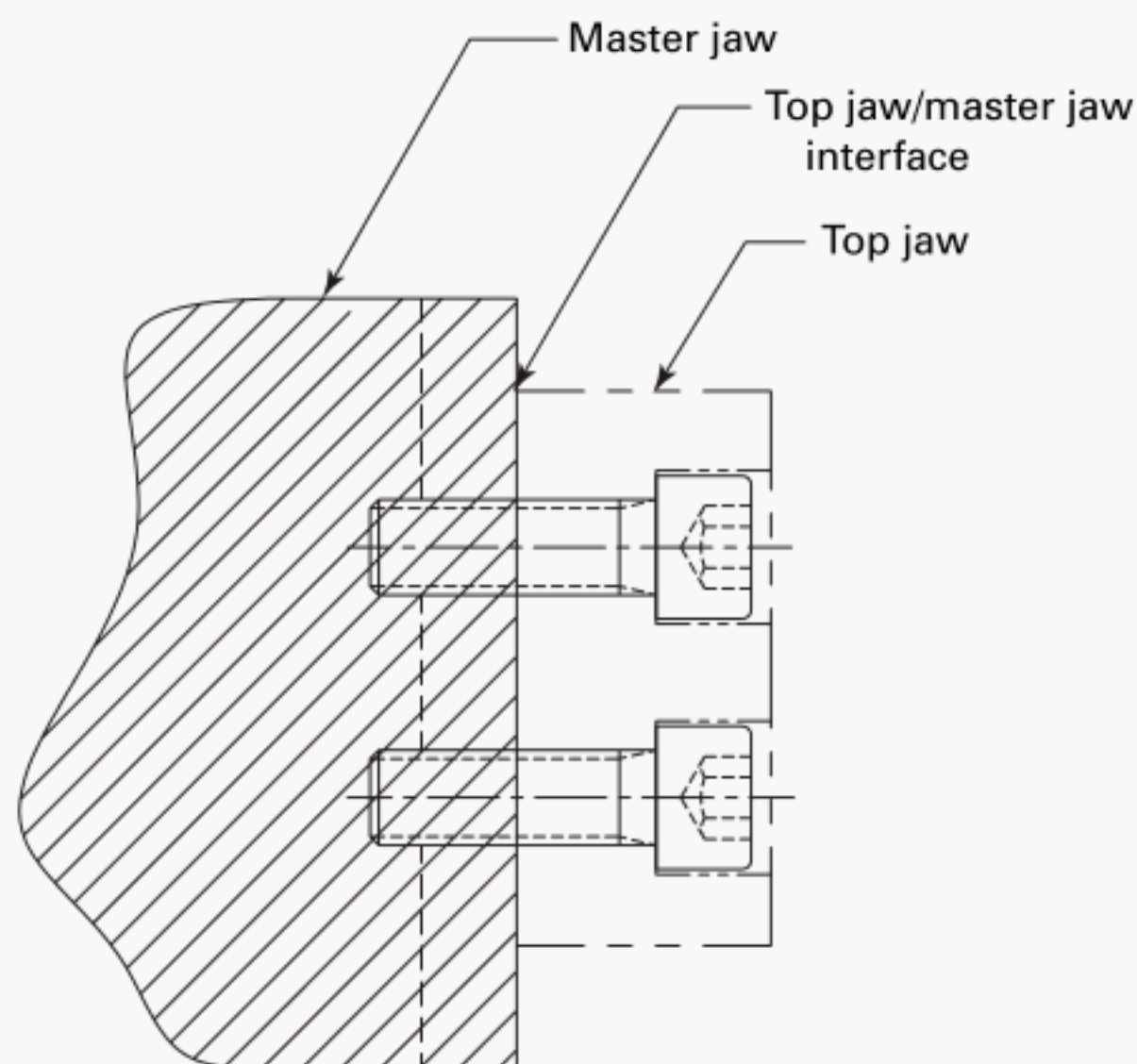
**CAUTION:** It is critical that the bolts be of recommended length for the top jaws being used — see illustration above. Bolts that are too long will extend through the jaw nut, bottom out, and give the appearance of being properly torqued while not actually securing the top jaw in place, and could cause breakage of the chuck master jaw. Bolts that are too short will have insufficient thread engagement in the jaw nut, and could result in the jaw nut fracturing. Ensure that the master jaw still moves without binding.

FIG. 1 FASTENER GUIDELINES





**(a) Incorrect: Master Jaw/Top Jaw Interface Not Flat/Parallel**



**(b) Correct: Master Jaw/Top Jaw Interface Is Flat/Parallel**

**GENERAL NOTE:** Prior to mounting the top jaws, it is critical to confirm that the master jaws, top jaws, and interface between the two are clean, free from nicks/damage, and form a uniform/flat fit. Now carefully mate the top jaw to the master jaw, making sure of a proper fit between all components. Insert jaw mounting bolts and tighten them evenly and firmly.

**CAUTION:** It is critical that the interface between the top jaw and master jaw is a flat/parallel fit — see illustration above. Improper jaw interface can result in damage to the chuck and/or binding of the master jaw. Binding will result in reduced chuck performance and unsafe operating condition.

**FIG. 2 JAW INTERFACE FLATNESS GUIDELINES**

TABLE 1 TOP JAW FEATURES




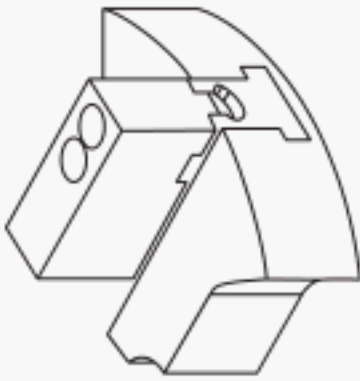
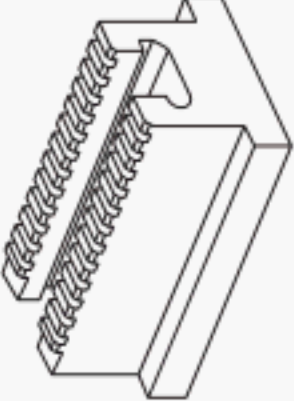
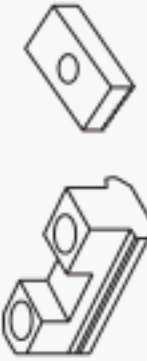
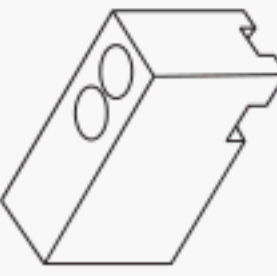
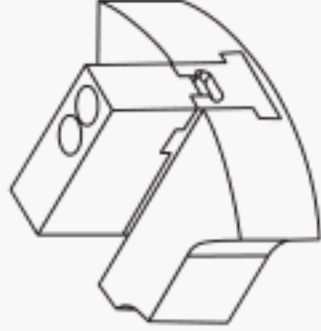
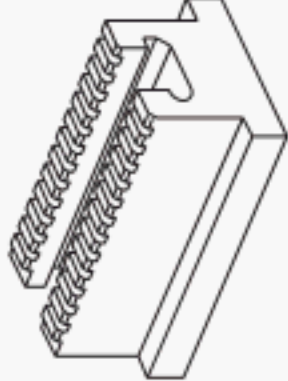
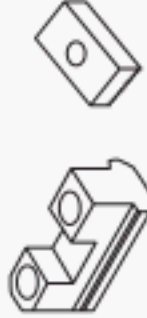
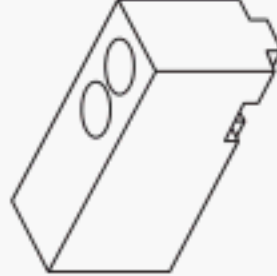

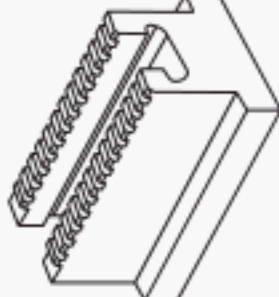



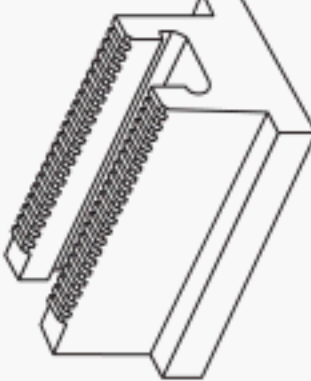


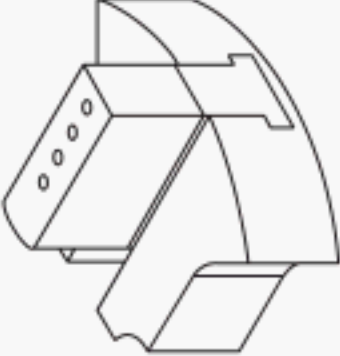
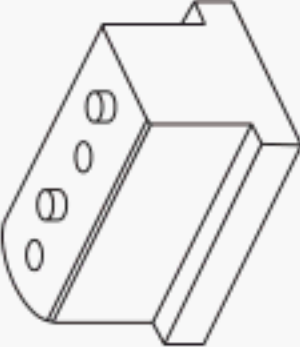
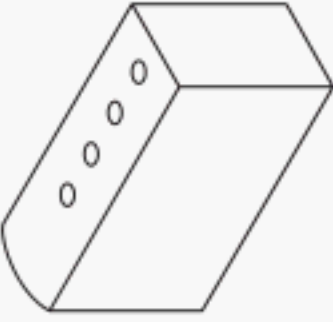
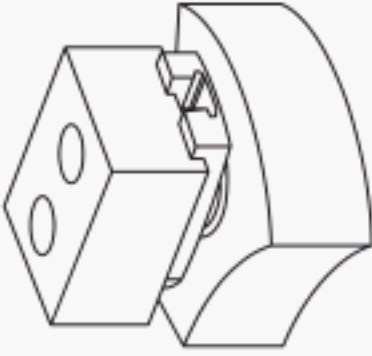


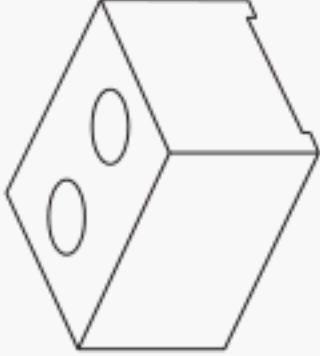
Type	Radial	Tangential	Assembly	Master Jaws	Nut/Key	Top Jaws	Corresponding Tables
Tongue and Groove Medium Duty Heavy Duty Metric/DIN Standard	Groove	Tongue			Not required		Tables 2 through 7
Square Serrated Key Type	Slot	Master key [Note (1)]					Tables 8 through 11
Acme Serrated Key Type	Tongue	Master key [Note (1)]					Tables 12 through 15
90 deg Serrated $\frac{1}{16}$ in. x 60 deg $\frac{3}{32}$ in. x 90 deg	Slot	Serration					Tables 16, 17, and 20
60 deg Serrated 1.5 mm x 60 deg 3.0 mm x 60 deg	Slot	Serration					Tables 18 through 21

TABLE 1 TOP JAW FEATURES (CONT'D)

Type	Radial	Tangential	Assembly	Master Jaws	Nut/Key	Top Jaws	Corresponding Tables
Pin Locator	Precision pinholes	Precision pinholes			Precision pins		Table 22
Ball Style Platform	Shoulder	Slot					Tables 23 through 25

NOTE:  
(1) Master key is separate from top jaw.



TABLE 2 ILLUSTRATION

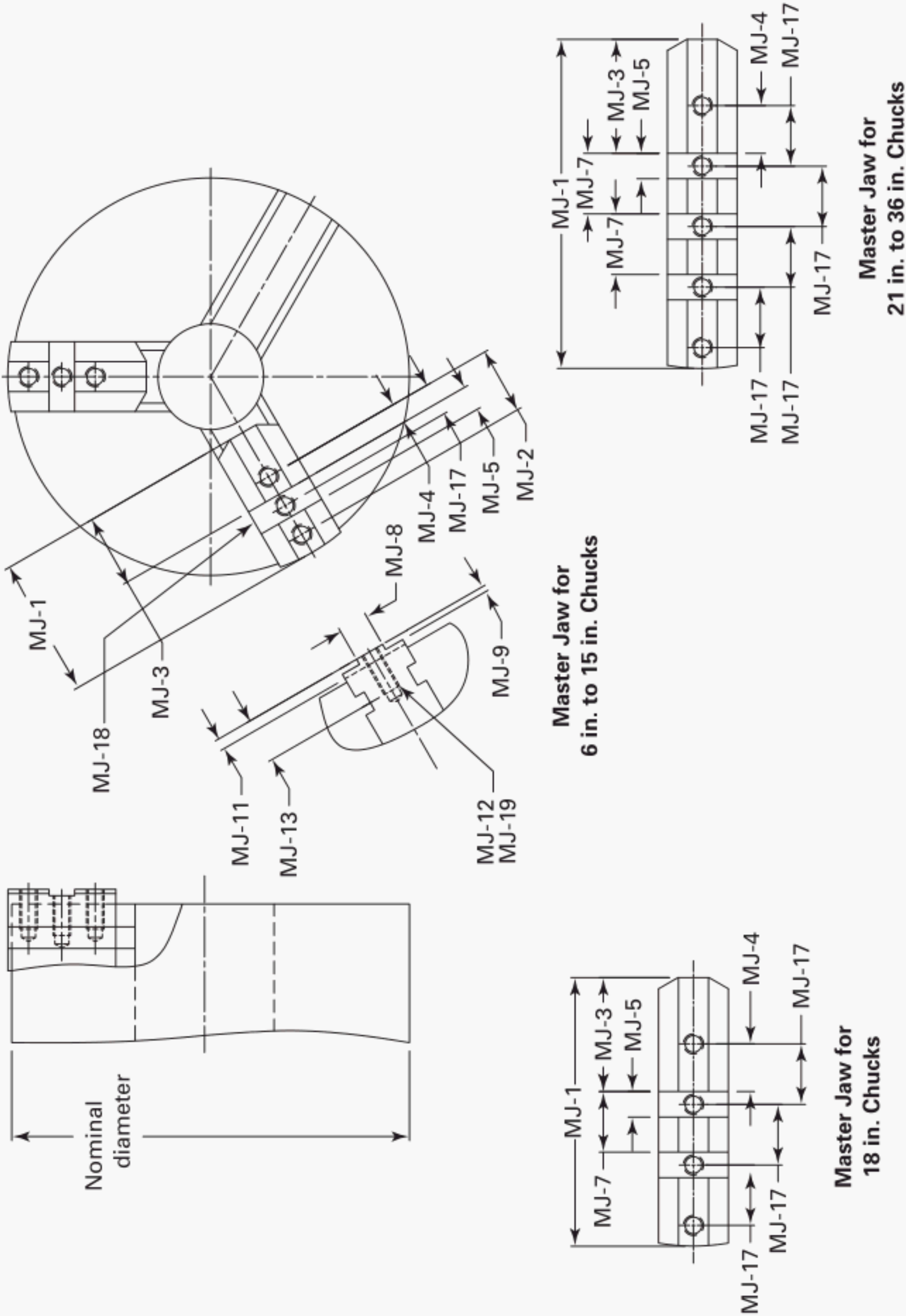


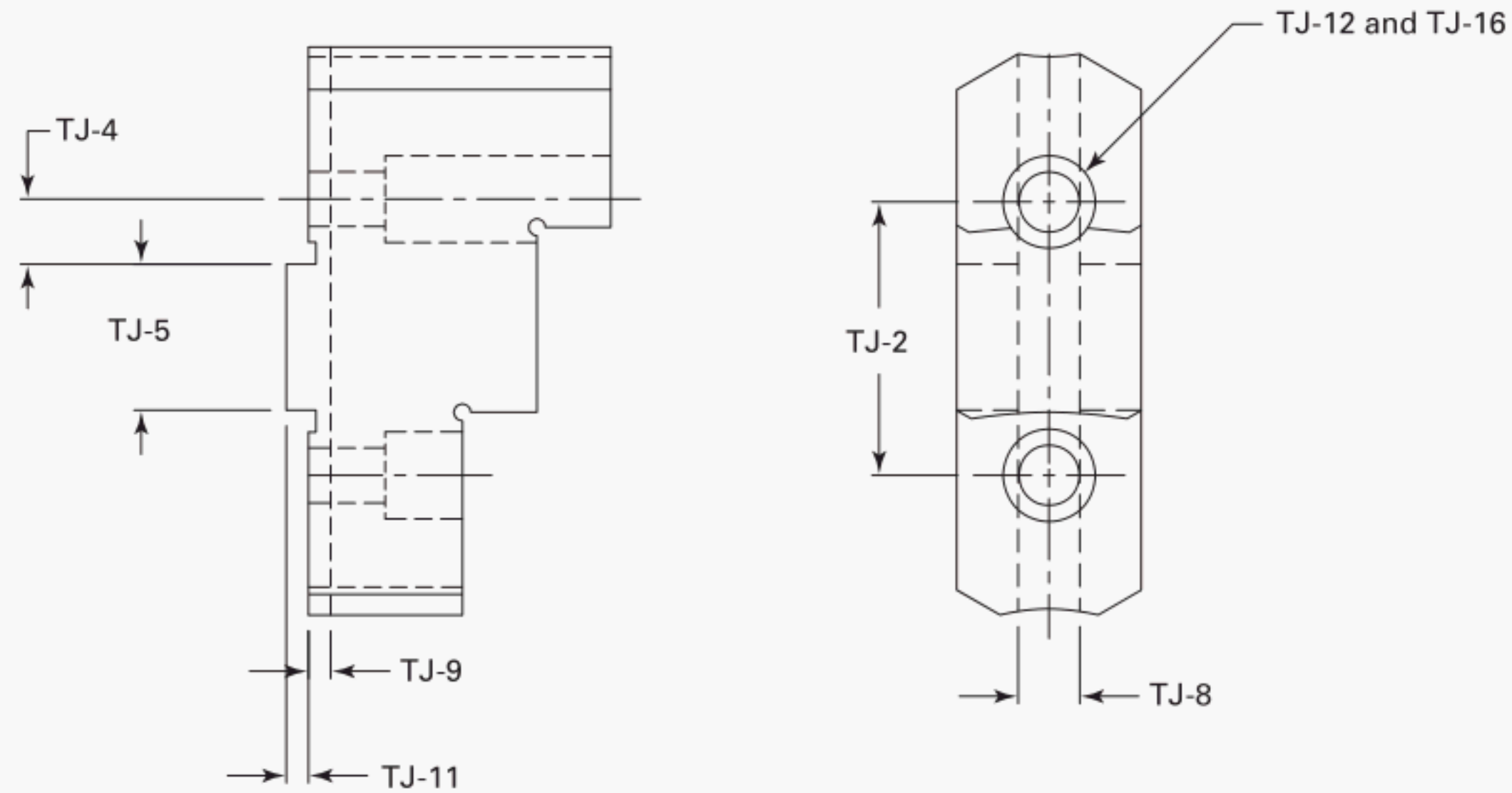
TABLE 2 TONGUE AND GROOVE, MEDIUM DUTY CHUCKS, WRENCH OPERATED

Nominal Size of Chuck	Length of Jaw, MJ-1	Center-to- Center Screw Holes, MJ-2	Cross Slot to Center Line of Bite, MJ-3	Screw Center to Cross Slot Edge, MJ-4		Cross Slot to Cross Slot, MJ-5	Width of Tongue, MJ-8		Height of Tongue, MJ-9		Depth of Cross Slot, MJ-11		Tapped Hole (UNC-3B), Thread, MJ-12	Full Depth of Thread, MJ-13	Center- to- Center of Holes, MJ-17 [Note (1)]	Number of Cross Slots, MJ-18	Number of Tapped Holes, MJ-19	
				[Note (1)]	[Note (1)]		Min.	Max.	Min.	Max.	Min.	Max.						
6	2.56	1.500	1.125	0.500	0.4995	0.500	...	0.310	0.312	0.12	0.14	0.16	0.18	3/8-16	0.76	...	1	2
8	3.06	1.750	1.375	0.625	0.4995	0.500	...	0.310	0.312	0.12	0.14	0.16	0.18	3/8-16	0.76	...	1	2
10	3.62	2.125	1.562	0.688	0.7495	0.750	...	0.498	0.500	0.12	0.14	0.16	0.18	1/2-13	0.88	...	1	2
12	4.26	2.500	1.875	0.875	0.7495	0.750	...	0.498	0.500	0.12	0.14	0.16	0.18	1/2-13	1.00	1.250	1	3
15	5.00	3.000	2.250	1.125	0.7495	0.750	...	0.498	0.500	0.12	0.14	0.28	0.30	5/8-11	1.12	1.500	1	3
18	6.50	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.12	0.14	0.28	0.30	3/4-10	1.50	1.500	2	4
21 to 36	8.00	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.12	0.14	0.28	0.30	3/4-10	1.50	1.500	3	5

GENERAL NOTE: All dimensions are in inches.

NOTE:

(1) Holes located within Ø 0.012 in. of true position.



**TABLE 3 TONGUE AND GROOVE, MEDIUM DUTY CHUCKS, THREE-STEP REVERSIBLE TOP JAW, WRENCH OPERATED**

Nominal Size of Chuck	Center to Center Screw Holes, TJ-2 [Note (1)]	Screw Center to Edge of Key TJ-4, [Note (1)]	Width of Tongue, TJ-5		Width of Tongue Slot, TJ-8		Depth of Tongue Slot, TJ-9		Height of Tongue, TJ-11		Drill Size for Screws, TJ-12	C'Bore for Screw Head, TJ-16
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
6	1.500	0.500	0.498	0.499	0.313	0.315	0.15	0.17	0.10	0.12	0.406	0.609
8	1.750	0.625	0.498	0.499	0.313	0.315	0.15	0.17	0.10	0.12	0.406	0.609
10	2.125	0.688	0.748	0.749	0.501	0.503	0.15	0.17	0.10	0.12	0.531	0.797
12	2.500	0.875	0.748	0.749	0.501	0.503	0.15	0.17	0.10	0.12	0.531	0.797
15	3.000	1.125	0.748	0.749	0.501	0.503	0.15	0.17	0.23	0.25	0.656	1.000
18 to 36	3.000	1.125	0.748	0.749	0.501	0.503	0.15	0.17	0.23	0.25	0.781	1.188

GENERAL NOTE: All dimensions are in inches.

NOTE:

(1) Holes located within  $\varnothing$  0.012 in. of true position.

TABLE 4 ILLUSTRATION

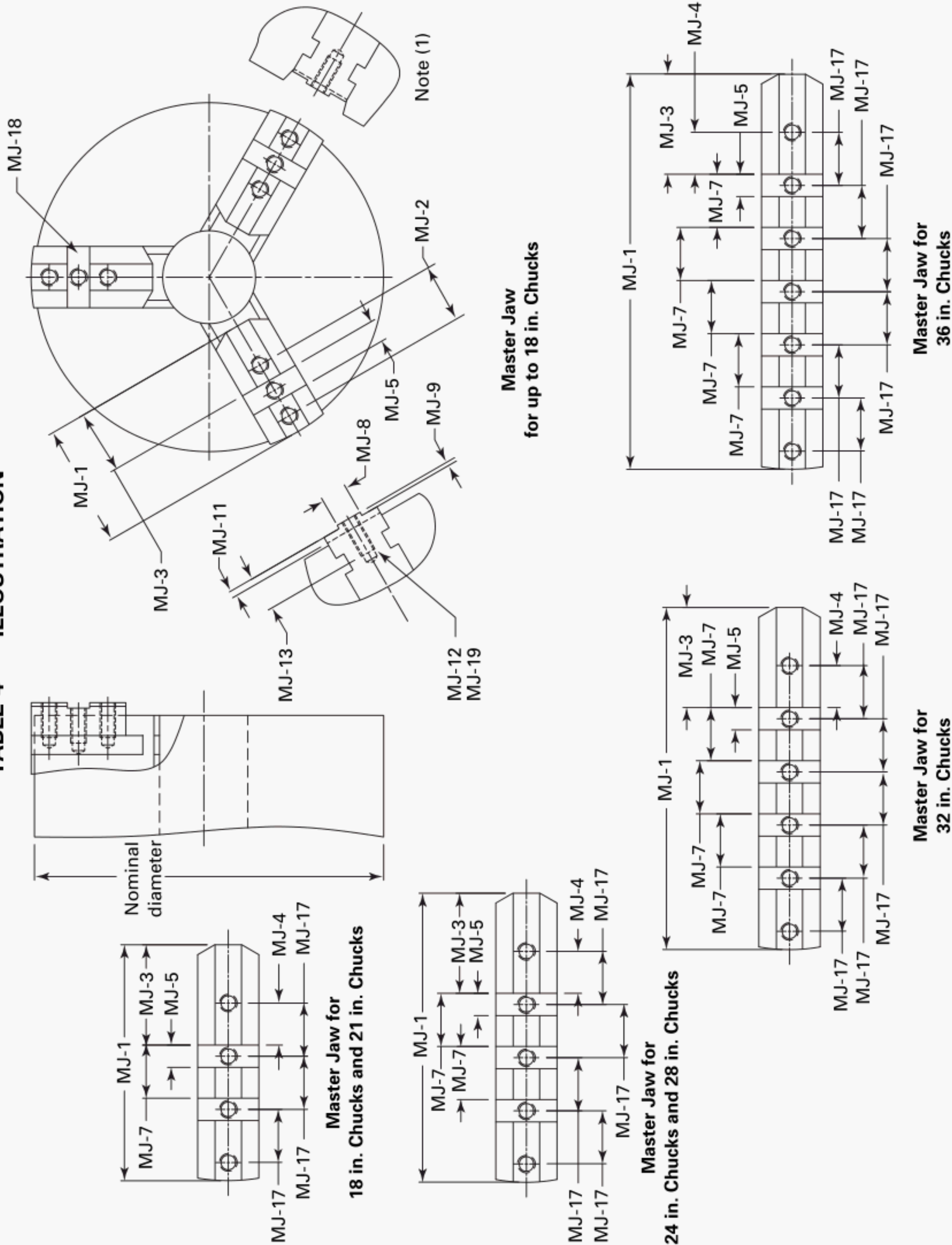




TABLE 4 TONGUE AND GROOVE, HEAVY DUTY CHUCKS, WRENCH OPERATED (CONT'D)

Nominal Size of Chuck	Length of Jaw, MJ-1	Center Bolt Holes, MJ-2	Bolt Center to Center				Cross Slot, MJ-4	Width of Cross Slot, MJ-5	Cross Slot to Cross Slot, MJ-7	Width of Tongue, MJ-8		Height of Tongue, MJ-9		Depth of Cross Slot, MJ-11		Tapped Holes, (UNC-3B) MJ-12	Full Depth of Thread, MJ-13	Center-to-Center of Holes, MJ-17		Number of Cross Tapped Slots, Holes, MJ-18	Number of Holes, MJ-19																																	
			Center Bolt Holes, MJ-2	Cross Slot to Centerline on Bite, MJ-3	Cross Slot to Edge, MJ-4	Cross Slot, MJ-5				Cross Slot to Cross Slot, MJ-7	Min.	Max.	Min.	Max.	Min.			Max.	Min.			Max.	Center of Holes, MJ-17	Center of Holes, MJ-18																														
Chuck	MJ-1 [Note (1)]	MJ-2	MJ-3	[Note (2)]	Min.	Max.	MJ-4	Min.	Max.	MJ-5	Min.	Max.	MJ-6	Min.	Max.	MJ-7	Min.	Max.	MJ-8	Min.	Max.	MJ-9	Min.	Max.	MJ-10	Min.	Max.	MJ-11	Min.	Max.	MJ-12	Min.	Max.	MJ-13	Min.	Max.	MJ-14	Min.	Max.	MJ-15	Min.	Max.	MJ-16	Min.	Max.	MJ-17	Min.	Max.	MJ-18	Min.	Max.	MJ-19	Min.	Max.
6	2.56	1.500	1.125	0.500	0.4995	0.500	...	0.310	0.312	0.10	0.12	0.15	0.17	7/16-14	0.76	...	1	2																																				
8	3.06	1.750	1.375	0.625	0.4995	0.500	...	0.310	0.312	0.10	0.12	0.15	0.17	1/2-13	0.85	...	1	2																																				
10	3.62	2.125	1.562	0.688	0.7495	0.750	...	0.498	0.500	0.10	0.12	0.15	0.17	5/8-11	1.06	...	1	2																																				
12	4.26	2.500	1.875	0.875	0.7495	0.750	...	0.498	0.500	0.10	0.12	0.15	0.17	5/8-11	1.20	1.250	1	3																																				
15	5.00	3.000	2.250	1.125	0.7495	0.750	...	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	1	3																																				
18	6.50	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	2	4																																				
21	6.50	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	2	4																																				
24	8.00	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	3	5																																				
28	8.00	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.10	0.12	0.28	0.30	7/8-9	1.50	1.500	3	5																																				
32	9.50	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.10	0.12	0.28	0.30	7/8-9	1.50	1.500	4	6																																				
36	11.00	3.000	2.250	1.125	0.7495	0.750	1.500	0.498	0.500	0.10	0.12	0.28	0.30	7/8-9	1.50	1.500	5	7																																				

GENERAL NOTE: All dimensions are in inches.

NOTES:

(1) Holes located within Ø 0.012 in. of true position.

(2) Optional: Face of body to project above top of master jaw on 12 in. to 36 in. chucks inclusive.

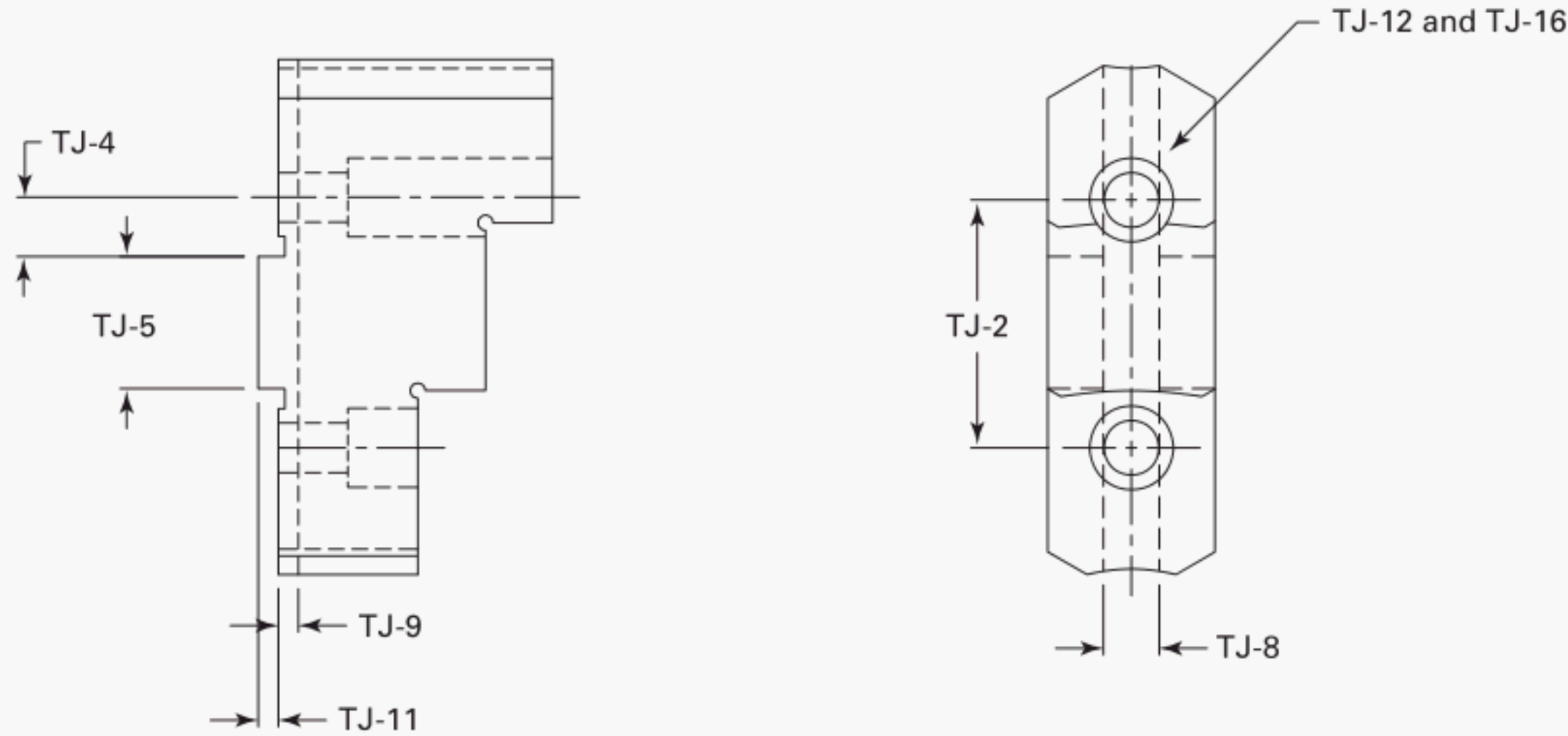


TABLE 5 TONGUE AND GROOVE, HEAVY DUTY CHUCKS, THREE-STEP REVERSIBLE TOP JAW, WRENCH OPERATED

Nominal Size of Chuck	Center- to- Center Screw Holes, TJ-2 [Note (1)]	Screw Center to Edge of Key, TJ-4 [Note (1)]	Width of Tongue, TJ-5		Width of Tongue Slot, TJ-8		Depth of Tongue Slot, TJ-9		Height of Tongue, TJ-11		Drill Size for Screws, TJ-12	C'Bore for Screw Head, TJ-16
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
6	1.500	0.500	0.498	0.499	0.313	0.315	0.15	0.17	0.10	0.12	0.469	0.703
8	1.750	0.625	0.498	0.499	0.313	0.315	0.15	0.17	0.10	0.12	0.531	0.797
10	2.125	0.688	0.748	0.749	0.501	0.503	0.15	0.17	0.10	0.12	0.656	1.000
12	2.200	0.875	0.748	0.749	0.501	0.503	0.15	0.17	0.10	0.12	0.656	1.000
15 to 24	3.000	1.125	0.748	0.749	0.501	0.503	0.15	0.17	0.23	0.25	0.781	1.188
28 to 36	3.000	1.125	0.748	0.749	0.501	0.503	0.15	0.17	0.23	0.25	0.906	1.375

GENERAL NOTE: All dimensions are in inches.  
NOTE:  
(1) Holes located within Ø 0.012 in. of true position.

TABLE 6 ILLUSTRATION

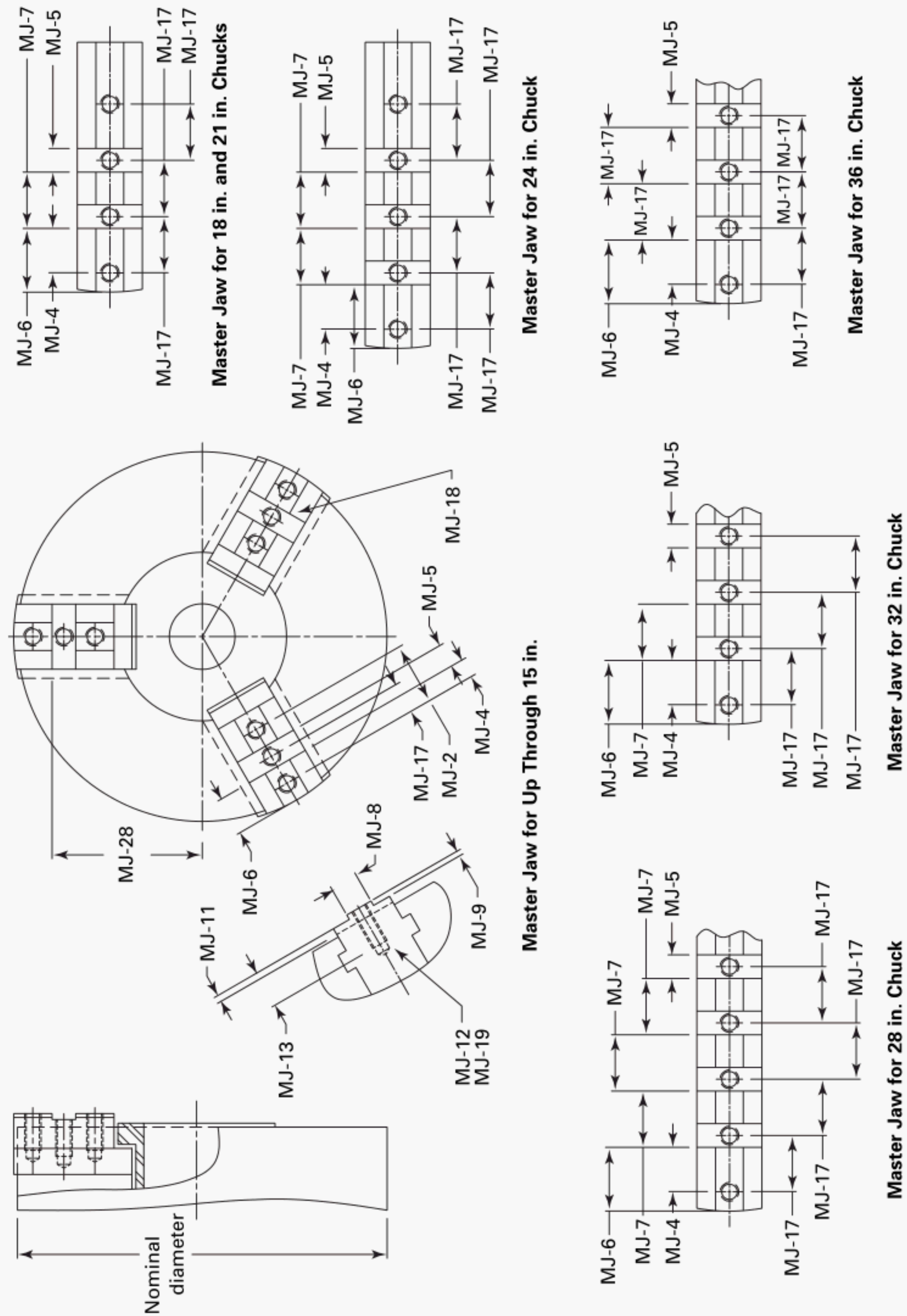
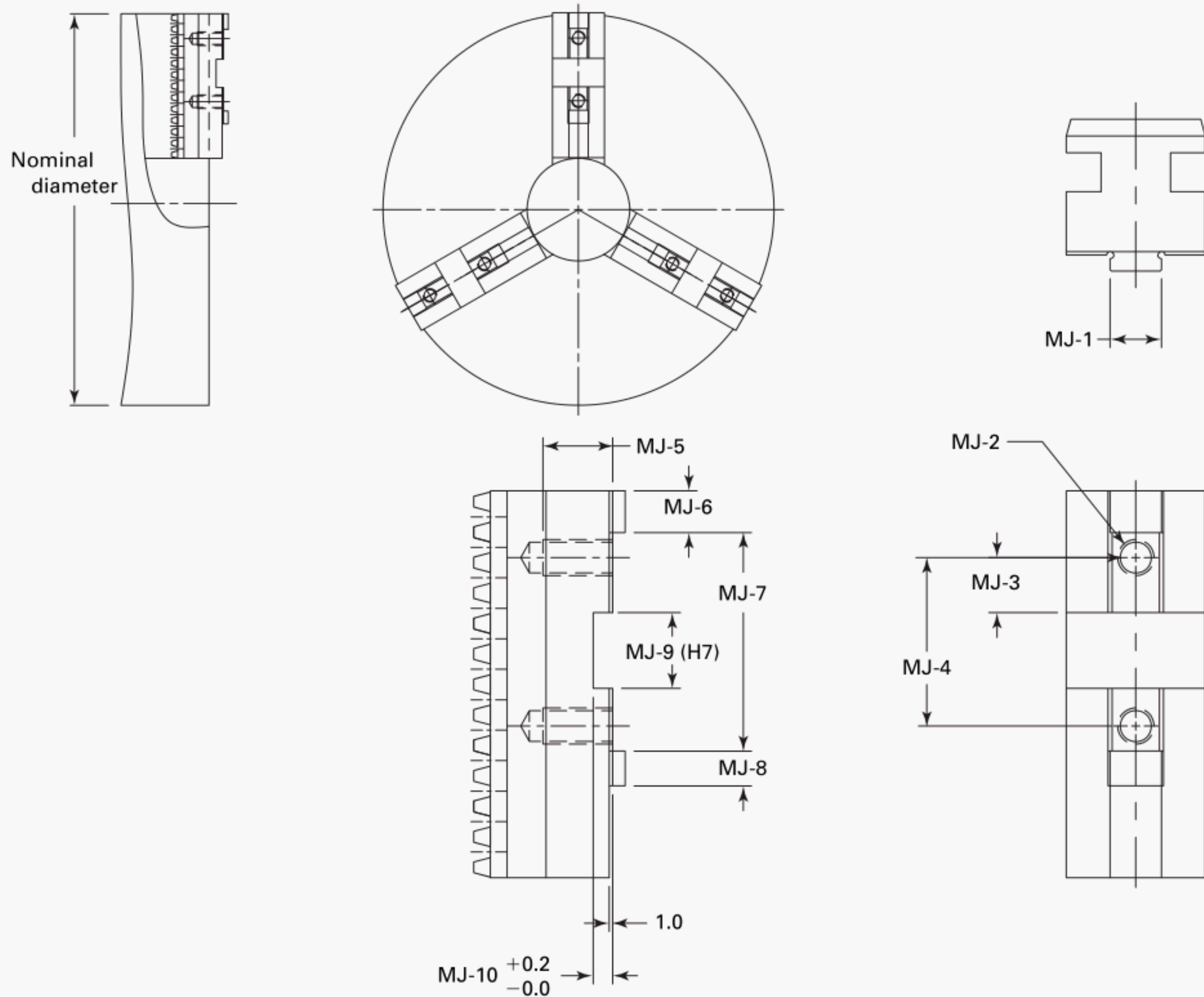


TABLE 6 TONGUE AND GROOVE, HEAVY DUTY CHUCKS, DRAWBAR OPERATED (CONT'D)

Nominal Size of Chuck	Center-to- Center Screw Holes,		Bolt Center to Cross Slot Edge,		Outside Edge to Cross Slot Edge,		Cross Slot to Cross Slot, MJ-7	Width of Tongue, MJ-8		Height of Tongue, MJ-9		Depth of Cross Slot, MJ-11		Tapped Holes (UNC-3B), MJ-12	Full Depth of Thread, MJ-13	Center to Center of Holes, MJ-17 [Note (1)]	Number of Cross Slots, MJ-18	Number of Tapped Holes, MJ-19
	MJ-2 [Note (1)]	[Note (1)]	MJ-4 [Note (1)]	Width of Cross Slot, MJ-5		MJ-6		MJ-7	Min.	Max.	Min.	Max.	Min.					
6	1.500		0.500	0.4995	0.500	0.938	...	0.310	0.312	0.10	0.12	0.15	0.17	7/16-14	0.76	...	1	2
8	1.750		0.625	0.4995	0.500	1.188	...	0.310	0.312	0.10	0.12	0.15	0.17	1/2-13	0.88	...	1	2
10	2.125		0.687	0.7495	0.750	1.312	...	0.498	0.500	0.10	0.12	0.15	0.17	5/8-11	1.06	...	1	2
12	2.500		0.875	0.7495	0.750	1.625	...	0.498	0.500	0.10	0.12	0.15	0.17	5/8-11	1.20	1.250	1	3
15	3.000		1.125	0.7495	0.750	2.000	...	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	1	3
18	3.000		1.125	0.7495	0.750	2.000	1.500	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	2	4
21	3.000		1.125	0.7495	0.750	2.000	1.500	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	2	4
24	3.000		1.125	0.7495	0.750	2.000	1.500	0.498	0.500	0.10	0.12	0.28	0.30	3/4-10	1.50	1.500	3	5
28	3.000		1.125	0.7495	0.750	2.000	1.500	0.498	0.500	0.10	0.12	0.28	0.30	7/8-9	1.50	1.500	4	6
32	3.000		1.125	0.7495	0.750	2.000	1.500	0.498	0.500	0.10	0.12	0.28	0.30	7/8-9	1.50	1.500	5	7
36	3.000		1.125	0.7495	0.750	2.000	1.500	0.498	0.500	0.10	0.12	0.28	0.30	7/8-9	1.50	1.500	6	8

GENERAL NOTE: All dimensions are in inches.  
NOTE:  
(1) Holes located within Ø 0.012 in. of true position.



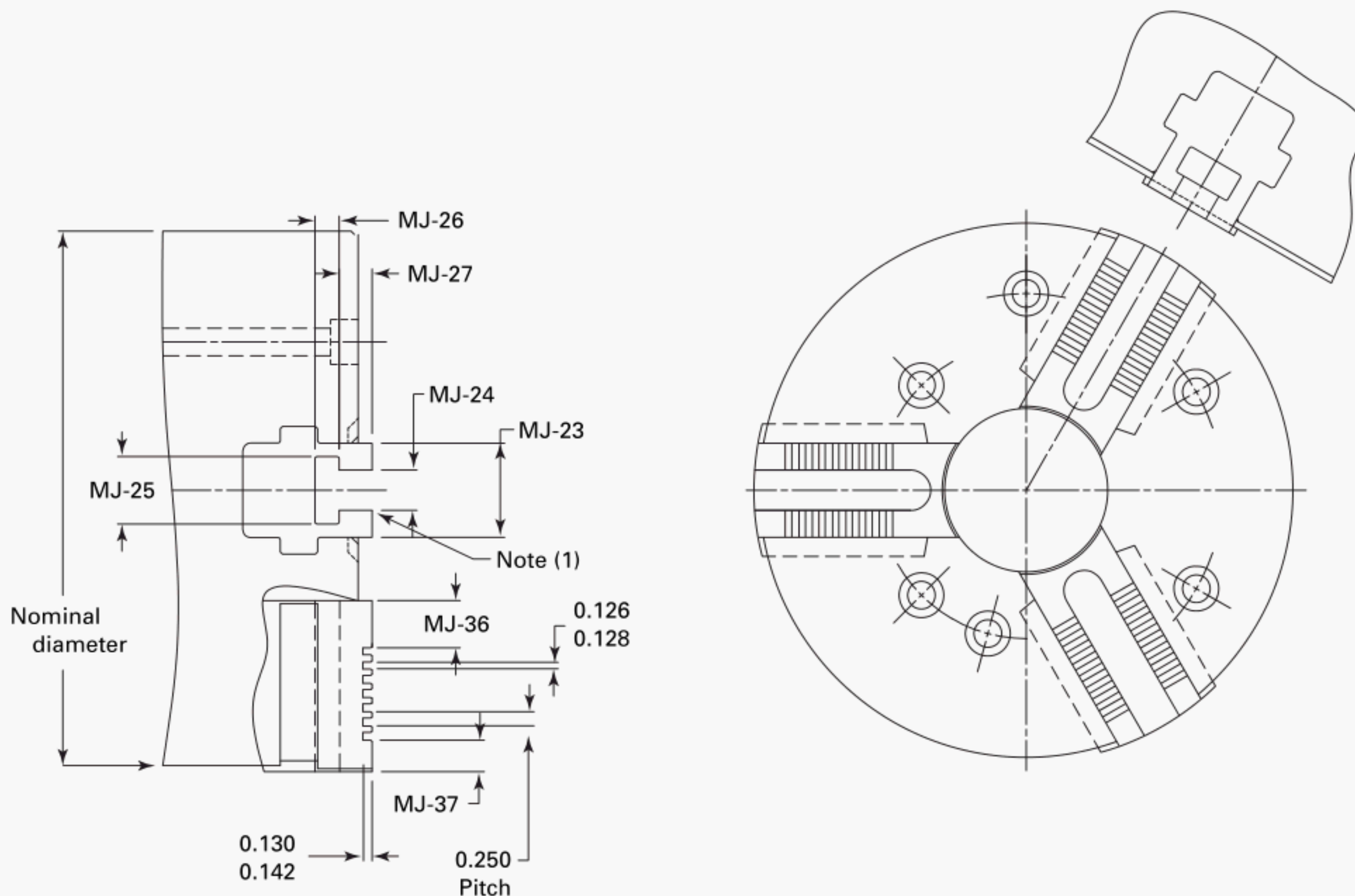
**TABLE 7 METRIC TONGUE AND GROOVE CHUCKS, MASTER JAW**

Nominal Size of Chuck	Width of Tongue, MJ-1 +0.01, -0.04	Class G6 Tapped Hole, (2) Holes, MJ-2	Edge of Cross Slot to Tapped Hole, MJ-3 [Note (1)]	Center- to- Center for Holes, MJ-4 [Note (1)]	Depth of Tapped Holes, MJ-5	Length of Tongue, MJ-6	Distance Between Tongues, MJ-7	Length of Tongue, MJ-8	Width of Cross Slot, MJ-9		Depth of Cross Slot, MJ-10
									Min.	Max.	
165	8	M8	7.00	32.00	12.0	7.0	42.0	7.0	18.000	18.018	5.0
210	10	M8	10.00	40.00	13.0	8.0	50.0	8.0	20.000	20.021	4.5
265	12	M12	10.00	40.00	14.0	9.0	54.0	9.0	20.000	20.021	5.5
315	12	M12	10.00	40.00	17.0	9.0	54.0	9.0	20.000	20.021	6.0
400	12	M12	14.00	54.00	17.0	9.0	68.0	9.0	26.000	26.021	6.0
500	18	M16	15.00	60.00	34.0	11.0	78.0	14.0	30.000	30.021	9.0
630	18	M16	15.00	60.00	34.0	11.0	78.0	14.0	30.000	30.021	9.0

GENERAL NOTE: All dimensions are in millimeters.

NOTE:

(1) Tapped holes located within  $\varnothing$  0.3 mm of true position.

**TABLE 8 SQUARE SERRATED, HEAVY DUTY CHUCKS, WRENCH OR DRAWBAR OPERATED**

Nominal Size of Chuck	Jaw Width, MJ-23	Width of Throat, MJ-24		Width of Head Space, MJ-25		Depth of Head Space, MJ-26	Depth of Throat, MJ-27		Start of Serrations, MJ-36, Min.	Outside Edge to First Tooth, MJ-37
		Min.	Max.	Min.	Max.		Min.	Max.		
8	1.76	0.753	0.755	1.10	1.16	0.44	0.44	0.46	0.62	0.38
10	1.76	0.753	0.755	1.10	1.16	0.44	0.44	0.46	0.62	0.50
12	1.76	0.753	0.755	1.10	1.16	0.44	0.44	0.46	0.62	0.75
15	2.12	1.003	1.005	1.34	1.40	0.50	0.62	0.64	0.88	0.75
18	2.12	1.003	1.005	1.34	1.40	0.50	0.62	0.64	0.88	0.75
21	2.94	1.003	1.005	1.34	1.40	0.50	0.62	0.64	1.12	1.00
24	2.94	1.003	1.005	1.34	1.40	0.50	0.62	0.64	1.12	1.00
28	2.94	1.190	1.192	1.62	1.68	0.76	0.88	0.90	1.18	1.00
32	2.94	1.190	1.192	1.62	1.68	0.76	0.88	0.90	1.18	1.00
36	2.94	1.190	1.192	1.62	1.68	0.76	0.88	0.90	1.18	1.00

**GENERAL NOTES:**

(a) All dimensions are in inches.

(b) See Tables 9, 10, and 11 for dimensions of master key, jaw nut, and three-step reversible top jaws.

(c) Serration pitch error not to accumulate more than 0.0002 in. per inch.

**NOTE:**

(1) Jaws optional above or below chuck face.

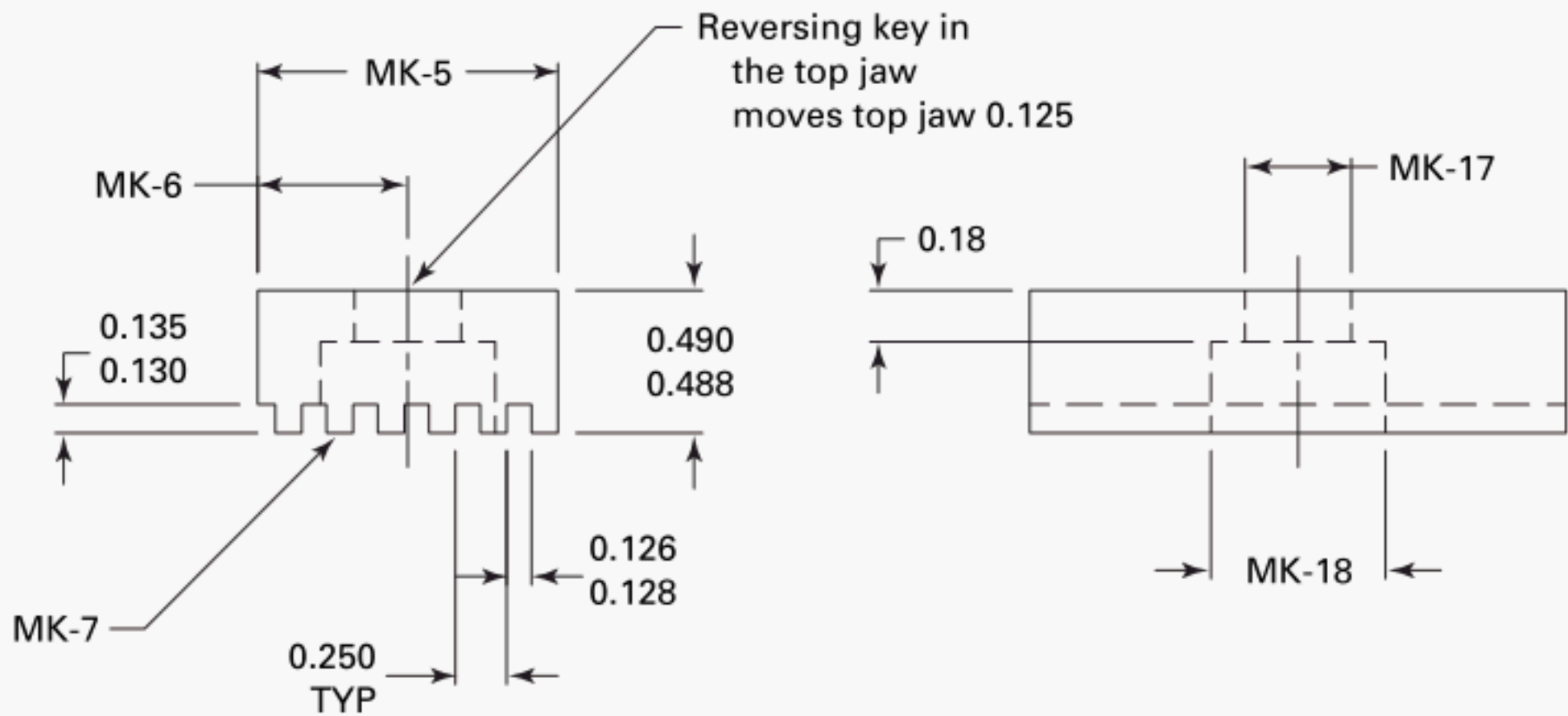


TABLE 9 SQUARE SERRATED, HEAVY DUTY CHUCKS, TOP JAW MASTER KEY

Nominal Size of Chuck	Width of Key, MK-5		Edge to Center of Screw, MK-6 [Note (1)]	Number of Teeth, MK-7	Drill Size for Screw, MK-17	C'Bore for Screw Head, MK-18
	Min.	Max.				
8	0.744	0.745	0.375	3	0.281	0.422
10	0.994	0.995	0.500	4	0.344	0.515
12	0.994	0.995	0.500	4	0.344	0.515
15 and 18	1.486	1.487	0.750	6	0.406	0.609
21 and 24	1.486	1.487	0.750	6	0.406	0.609
28 and 36	1.530	1.531	0.766	6	0.406	0.609

GENERAL NOTES:  
(a) All dimensions are in inches.  
(b) Serration pitch error not to accumulate more than 0.0002 in. per inch.  
NOTE:  
(1) Hole located within Ø 0.012 in. of true position.



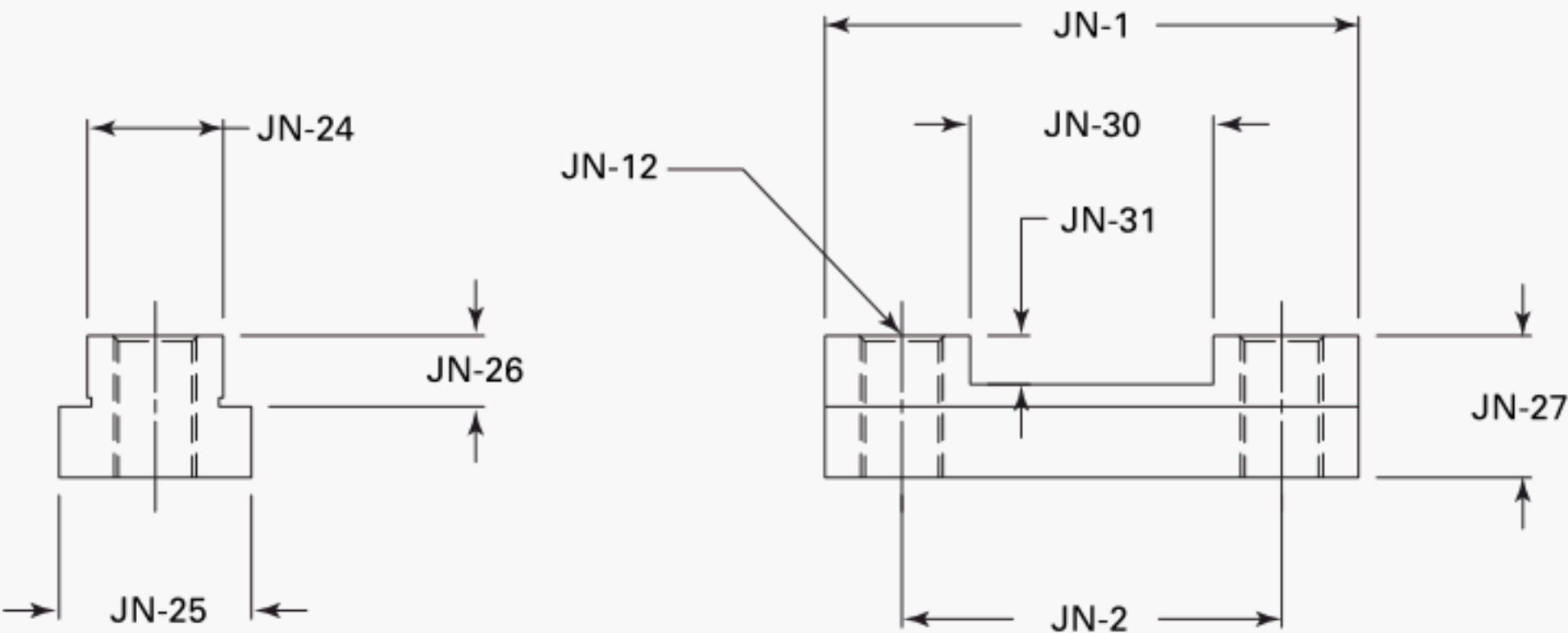


TABLE 10 SQUARE SERRATED, HEAVY DUTY CHUCKS, MASTER JAW NUT

Nominal Size of Chuck	Length of Nut, JN-1	Center-to- Center Tapped Holes, JN-2	Size of Tapped Holes (UNC-2B), JN-12	Width of Tongue, JN-24		Minimum Width of Nut Flange	Height of Tongue, JN-26		Thickness of Nut, JN-27	Length of Slot, JN-30	Depth of Slot, JN-31
				Min.	Max.		Min.	Max.			
8	2.32	1.438	1/2-13	0.749	0.750	1.000	0.62	0.64	1.00	0.88	0.38
10	2.62	1.750	1/2-13	0.749	0.750	1.000	0.62	0.64	1.00	1.12	0.38
12	2.62	1.750	1/2-13	0.749	0.750	1.000	0.62	0.64	1.00	1.12	0.37
15 and 18	3.76	2.500	3/4-10	0.999	1.000	1.250	0.80	0.82	1.26	1.62	0.46
21 and 24	4.26	3.000	3/4-10	0.999	1.000	1.250	1.06	1.08	1.26	1.62	0.46
28 and 36	4.50	3.000	7/8-9	1.186	1.187	1.562	1.06	1.08	1.76	1.62	0.46

GENERAL NOTES:  
(a) All dimensions are in inches.  
(b) Holes located within Ø 0.012 in. of true position.

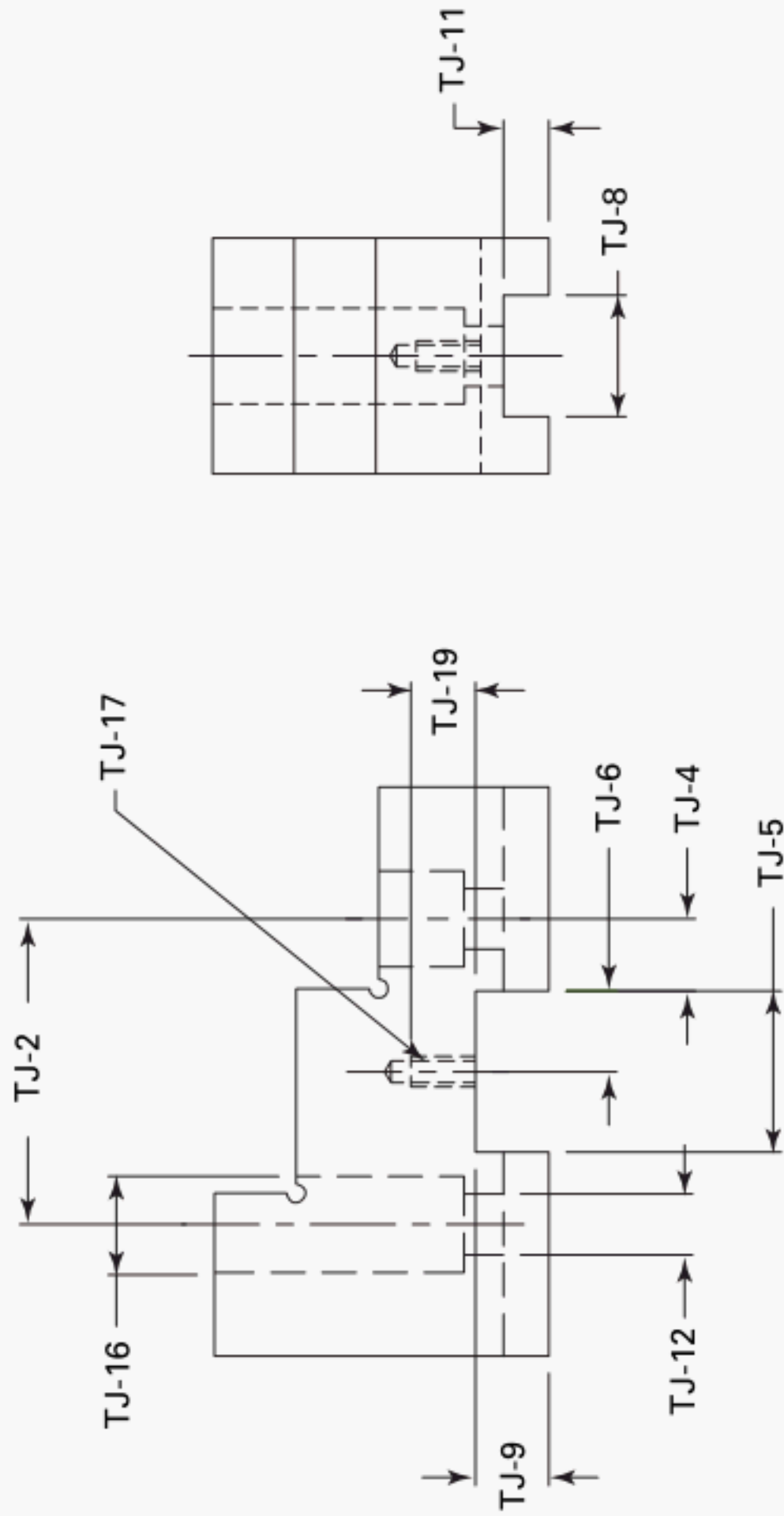
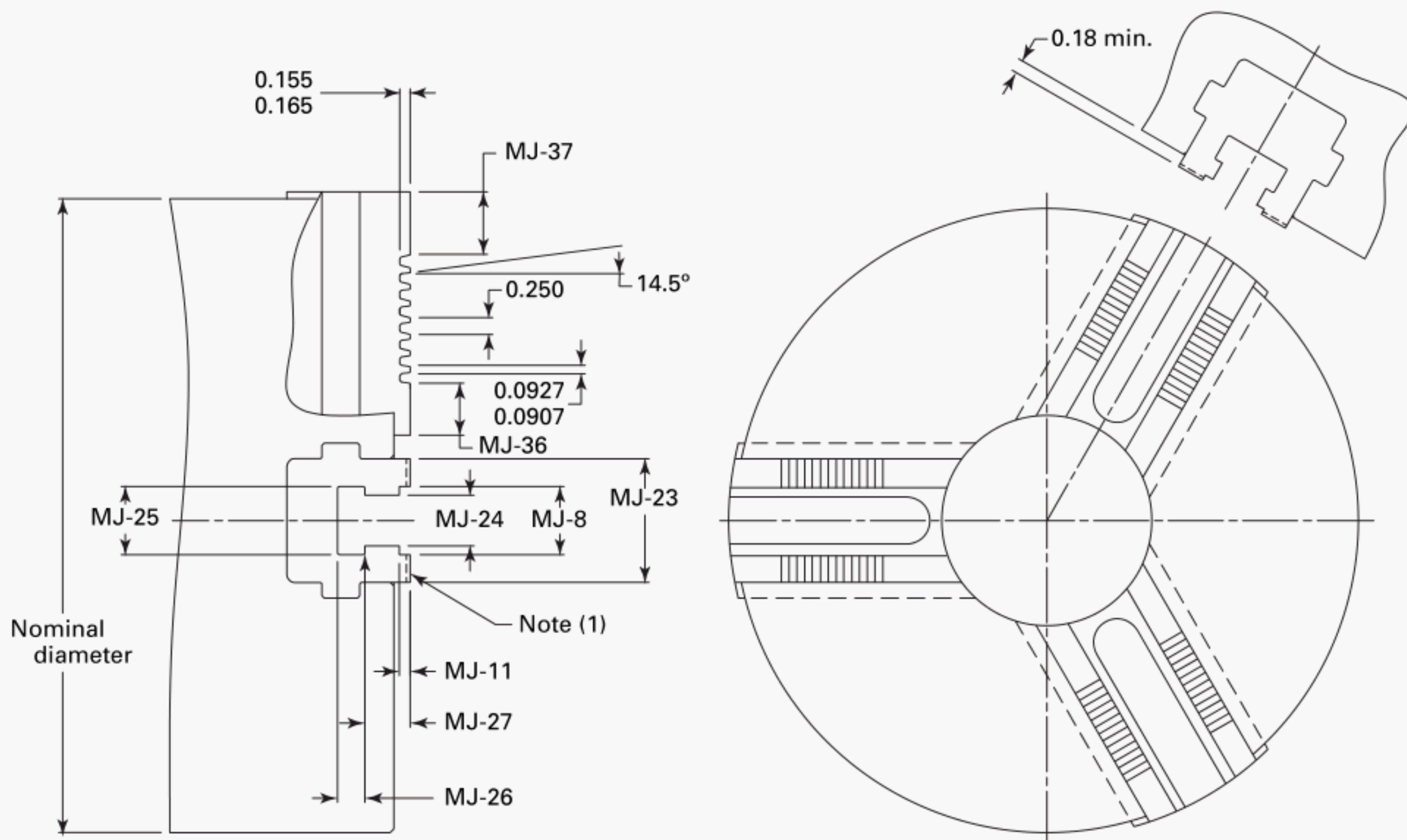


TABLE 11 SQUARE SERRATED, HEAVY DUTY CHUCKS, THREE-STEP REVERSIBLE TOP JAW

Nominal Size of Chuck	Center-to-Center Screw Holes, TJ-2	Screw Center to Edge of Key Slot, TJ-4	Width of Key Slot, TJ-5		Edge of Key Slot to Screw, TJ-6	Width of Tongue Slot, TJ-8		Depth of Key Slot, TJ-9		Depth of Tongue Slot, TJ-11		Drill Size for Screws, TJ-12	Size of C'Bore for Screw Heads, TJ-16	Size of Tapped Hole (UNC-3B), TJ-17	Full Depth of Thread, TJ-19
			Min.	Max.		Min.	Max.	Min.	Max.	Min.	Max.				
8	1.438	0.344	0.746	0.747	0.375	0.751	0.753	0.380	0.385	0.22	0.24	0.531	0.797	1/4-20	0.38
10	1.750	0.375	0.996	0.997	0.500	0.751	0.753	0.380	0.385	0.22	0.24	0.531	0.797	5/16-18	0.44
12	1.750	0.375	0.996	0.997	0.500	0.751	0.753	0.380	0.385	0.22	0.24	0.531	0.797	5/16-18	0.44
15 and 18	2.500	0.500	1.488	1.489	0.750	1.001	1.003	0.380	0.385	0.22	0.24	0.781	1.188	3/8-16	0.62
21 and 24	3.000	0.750	1.488	1.489	0.750	1.001	1.003	0.380	0.385	0.22	0.24	0.781	1.188	3/8-16	0.62
28 and 36	3.000	0.750	1.532	1.533	0.766	1.188	1.190	0.380	0.385	0.22	0.24	0.906	1.375	3/8-16	0.62

GENERAL NOTES:

- (a) All dimensions are in inches.
- (b) See Table 8 for Heavy Duty Wrench Operated or Drawbar Operated Chucks with Square Serrated Master Jaws.
- (c) Holes located within Ø 0.012 in. of true position.

**TABLE 12 ACME SERRATED, HEAVY DUTY CHUCKS, POWER WRENCH OR DRAWBAR OPERATED**

Nominal Size of Chuck	Width of Tongue Slot, MJ-8		Jaw Width, MJ-23, Min.	Depth of Tongue Slot, MJ-11	Width of Throat, MJ-24		Width of Head Space, MJ-25		Depth of Head Space, MJ-26	Depth of Throat, MJ-27	Start Serrations MJ-36, Min.	Outside Edge to First Tooth, MJ-37
	Min.	Max.			Min.	Max.	Min.	Max.				
10	0.750	0.752	1.76	0.25	0.687	0.697	0.97	1.03	0.44	0.56	0.62	0.50
12	0.875	0.877	1.76	0.25	0.812	0.822	1.09	1.16	0.50	0.63	0.62	0.75
15	1.000	1.002	2.12	0.31	0.937	0.947	1.28	1.34	0.63	0.75	0.88	0.75
18	1.000	1.002	2.12	0.31	0.937	0.947	1.28	1.34	0.63	0.75	0.88	0.75
21	1.250	1.252	2.94	0.31	1.187	1.197	1.59	1.66	0.75	0.88	1.12	1.00
24	1.250	1.252	2.94	0.31	1.187	1.197	1.59	1.66	0.75	0.88	1.12	1.00
28	1.250	1.252	2.94	0.31	1.187	1.197	1.59	1.66	0.75	0.88	1.18	1.00
32	1.250	1.252	2.94	0.31	1.187	1.197	1.59	1.66	0.75	0.88	1.18	1.00
36	1.250	1.252	2.94	0.31	1.187	1.197	1.59	1.66	0.75	0.88	1.18	1.00

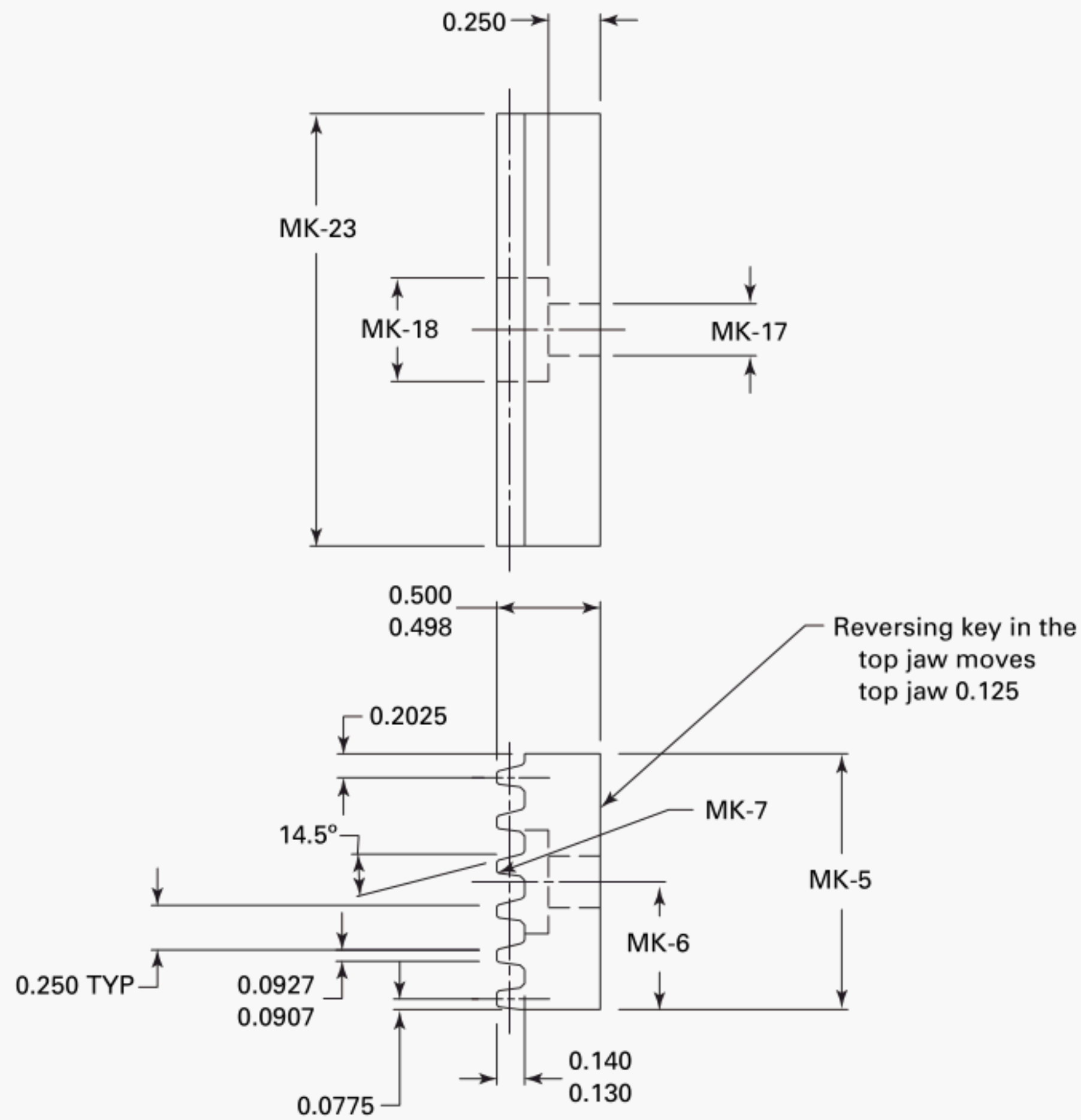
**GENERAL NOTES:**

- (a) All dimensions are in inches.  
 (b) Tolerances of  $\pm 0.015$  are permissible unless otherwise specified.  
 (c) Serration pitch error not to accumulate more than 0.0002 in. per inch.

**NOTE:**

- (1) Jaws optional above or below chuck face.



**TABLE 13 ACME SERRATED, MASTER KEY**

Nominal Size of Chuck	Width of Key, MK-5		Edge to Center of Screw, MK-6		Number of Teeth, MK-7	Drill Size for Screw, MK-17	C'Bore for Screw Head, MK-18	Length of Key, MK-23
	Min.	Max.	Min.	Max.				
10	1.029	1.030	0.507	0.523	4	0.344	0.469	1.625
12	1.029	1.030	0.507	0.523	4	0.344	0.469	1.875
15 and 18	1.529	1.530	0.757	0.773	6	0.406	0.594	2.375
21 to 36	1.529	1.530	0.757	0.773	6	0.469	0.594	2.875

**GENERAL NOTES:**

- (a) All dimensions are in inches.  
 (b) Tolerances of  $\pm 0.015$  are permissible unless otherwise specified.  
 (c) Serration pitch error not to accumulate more than 0.0002 in. per inch.

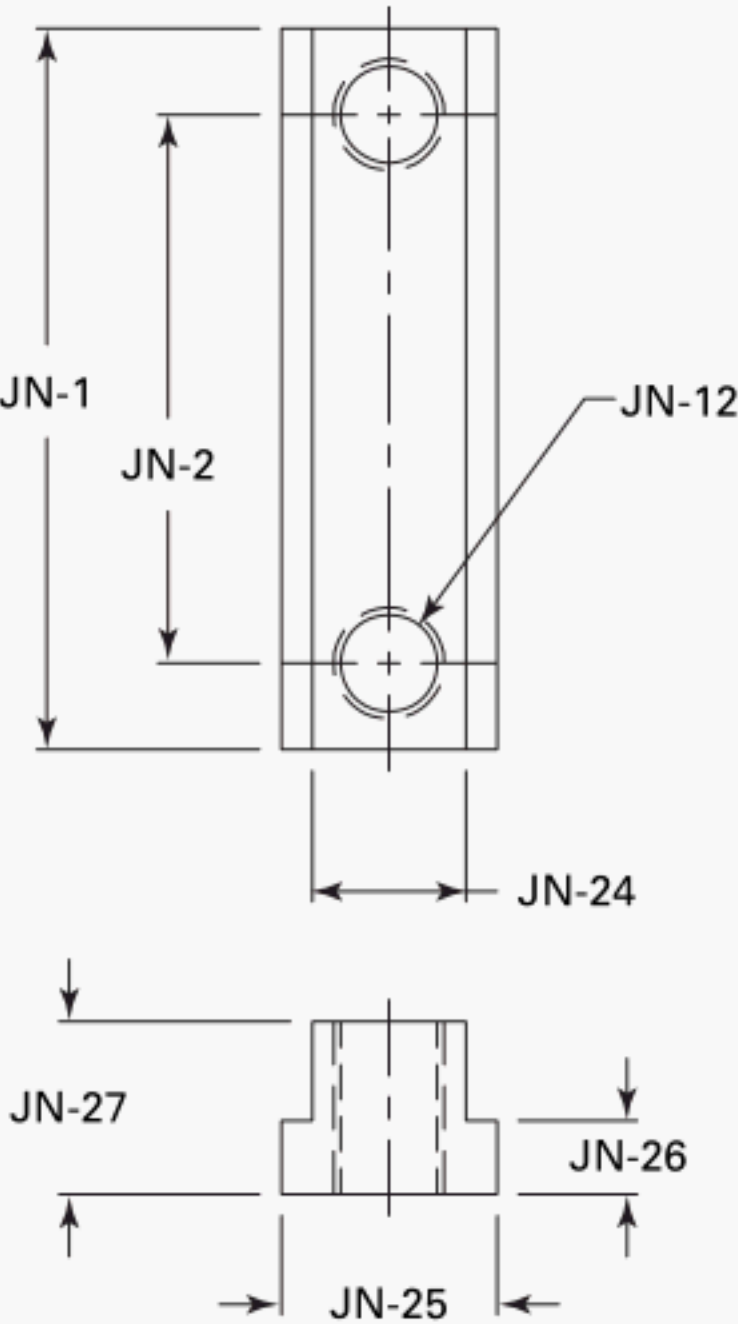
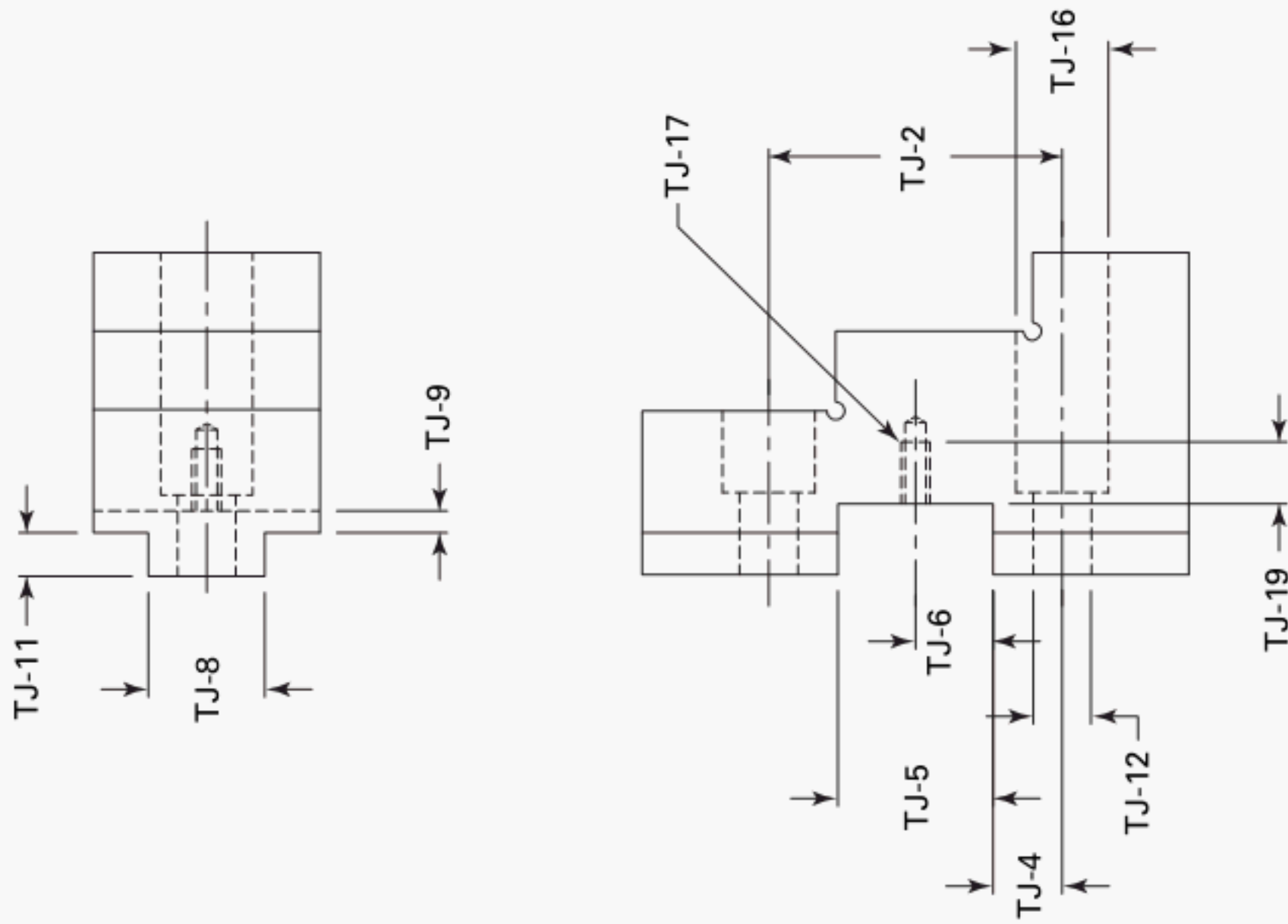


TABLE 14 ACME SERRATED, JAW NUT

Nominal Size of Chuck	Length of Nut, JN-1	Center-to- Center Tapped Holes, JN-2	Tapped Holes (UNC-3B), JN-12	Width of Tongue, JN-24		Width of Jaw Nut Flange, JN-25	Thickness of Flange, JN-26	Thickness of Nut, JN-27
				Min.	Max.			
10	2.62	1.750	1/2-13	0.675	0.680	0.94	0.94	0.62
12	3.00	2.000	5/8-11	0.800	0.805	1.06	1.06	0.75
15 and 18	3.75	2.500	3/4-10	0.925	0.930	1.25	1.25	0.94
21 and 36	4.50	3.000	7/8-9	1.175	1.180	1.56	1.56	1.18

GENERAL NOTES:  
(a) All dimensions are in inches.  
(b) Holes located within Ø 0.012 in. of true position.





**TABLE 15 ACME SERRATED, THREE-STEP REVERSIBLE TOP JAW**

Nominal Size of Chuck	Center-to- Center Bolt Holes, TJ-2	Bolt Center to Edge of Key Slot, TJ-4	Width of Key Slot, TJ-5		Edge of Key Slot to Screw, TJ-6		Width of Tongue, TJ-8		Depth of Key Slot, TJ-9		Height of Tongue, TJ-11	Drill Size for Bolts, TJ-12	C'Bore for Bolt Head, TJ-16	Tapped Holes (UNC-2B), TJ-17	Full Depth of Thread, TJ-19
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.					
10	1.750	0.375	1.030	1.031	0.507	0.523	0.747	0.749	0.375	0.377	0.19	0.531	0.781	$\frac{5}{16}$ -18	0.44
12	2.000	0.500	1.030	1.031	0.507	0.523	0.872	0.874	0.375	0.377	0.19	0.656	0.906	$\frac{5}{16}$ -18	0.44
15 and 18	2.500	0.500	1.530	1.531	0.757	0.773	0.996	0.998	0.375	0.377	0.25	0.781	$1\frac{1}{32}$	$\frac{3}{8}$ -16	0.56
21 to 36	3.000	0.750	1.530	1.531	0.757	0.773	1.246	1.248	0.375	0.377	0.25	0.906	$1\frac{5}{32}$	$\frac{3}{8}$ -16	0.56

**GENERAL NOTES:**

- (a) All dimensions are in inches.  
 (b) Tapped holes located within  $\varnothing$  0.012 of true position.

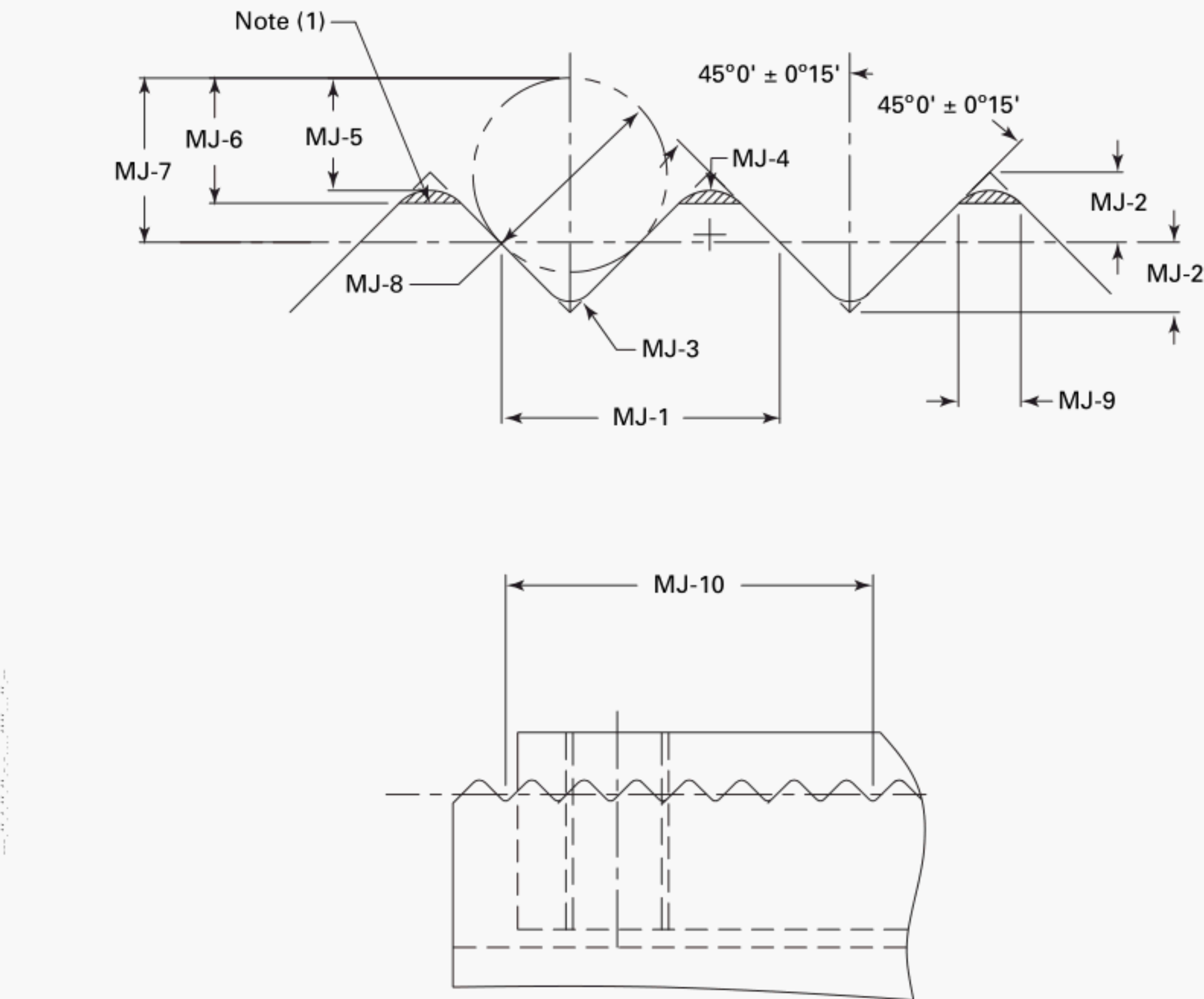


TABLE 16 90 deg SERRATED JAW INTERFACE (INCH), SERRATION DATA

Designation	Pitch of Serration, MJ-1	Theoretical Sharp Corner to Pitch Line, MJ-2	Root Radius, MJ-3	Minimum Crest Radius, MJ-4	Checking Pin to Crest, Min., MJ-5	Checking Pin to Flat, Max., MJ-6	Checking Pin to Pitch Line Max., MJ-7	Checking Pin Diameter, MJ-8	Length of Flat, MJ-9
$\frac{1}{16} \times 90^{\circ}$	0.0625	0.0156	0.005 to 0.007	0.010	0.025	0.028	0.037	0.0433	0.014
$\frac{3}{32} \times 90^{\circ}$	0.0938	0.0234	0.006 to 0.010	0.016	0.038	0.043	0.055	0.0650	0.022

GENERAL NOTES:

(a) All dimensions are in inches.

(b) The checking pin diameters given are recommended values. If pins of nonstandard diameter are used, the manufacturer shall be responsible for recalculating the dimensions such that the form and geometry conform with the ISO standard form.

(c) See Table 17 for accumulated pitch variation.

NOTE:

(1) Any profile contained within the hatched area is acceptable.

**TABLE 17 90 deg SERRATED JAW INTERFACE (INCH),  
ACCUMULATED PITCH VARIATION**

Serration Designation				Permissible Accumulated Pitch Variation
$\frac{1}{16} \times 90 \text{ deg}$		$\frac{3}{32} \times 90 \text{ deg}$		
Measuring Length, MJ-10	Number of Teeth	Measuring Length, MJ-10	Number of Teeth	
1.000	16	1.0312	11	±0.0003
2.000	32	1.9688	21	±0.0005
3.000	48	3.0000	32	±0.0006
4.000	64	4.0312	43	±0.0008
5.000	80	4.9688	53	±0.0009
6.000	96	6.0000	64	±0.0011

GENERAL NOTE: All dimensions are in inches.

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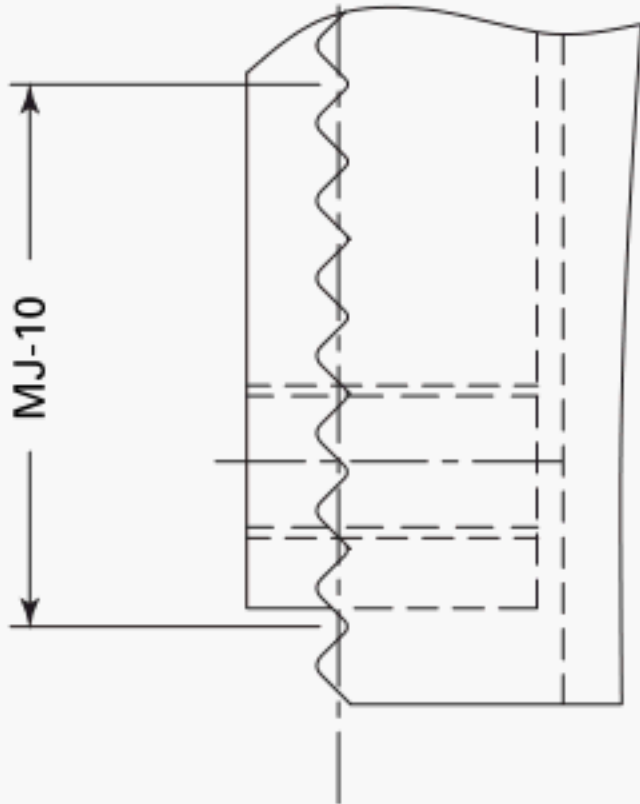
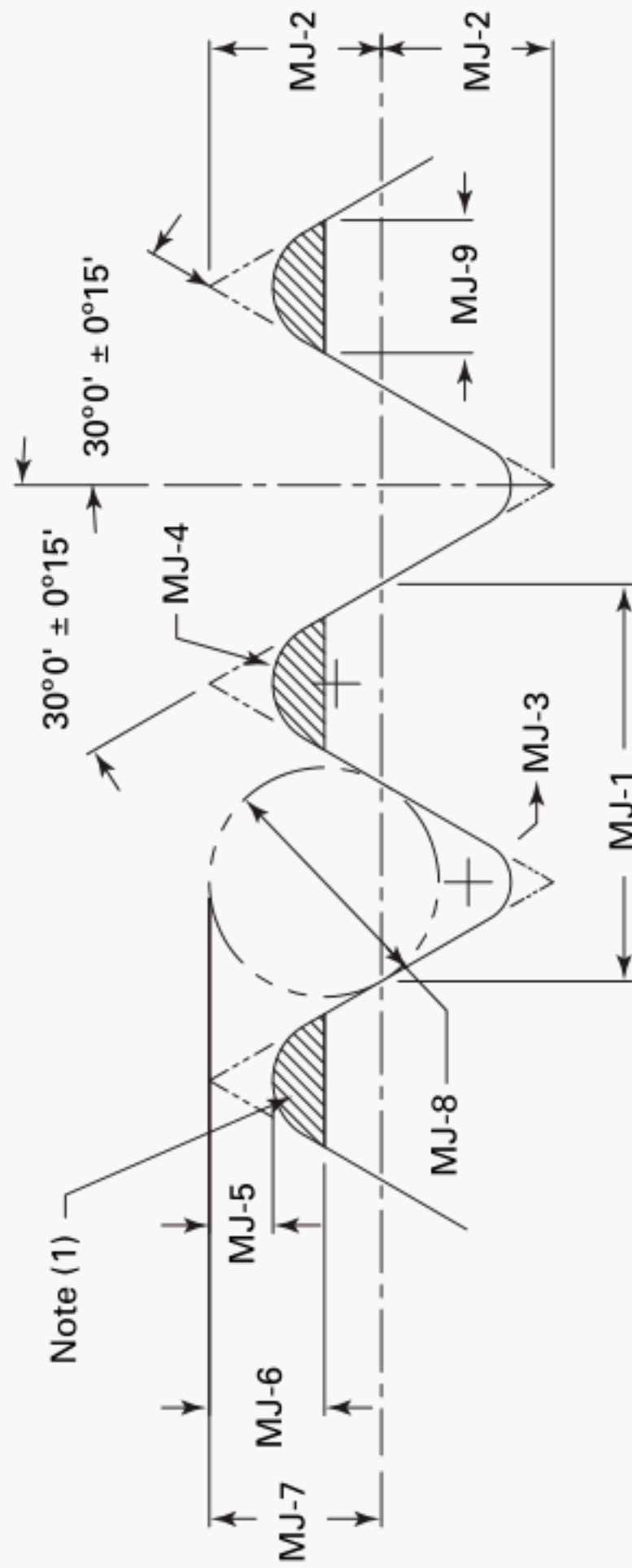


TABLE 18 60 deg SERRATED JAW INTERFACE (METRIC), SERRATION DATA

Designation	Pitch of Serration, MJ-1	Theoretical Sharp Corner to Pitch Line, MJ-2	Root Radius, MJ-3	Crest Radius, MJ-4	Checking Pin to Crest, MJ-5	Checking Pin to Flat, MJ-6	Checking Pin to Pitch Line, MJ-7	Checking Pin Diameter, MJ-8	Length of Flat (ref), MJ-9
1.5 x 60 deg	1.5	0.650	0.12 to 0.18	0.25 to 0.30	0.293 to 0.343	0.393 to 0.473	0.693	0.895	0.40 to 0.50
3 x 60 deg	3	1.299	0.15 to 0.25	0.40 to 0.50	0.277 to 0.377	0.506 to 0.656	1.176	1.650	0.73 to 0.90

GENERAL NOTES:

- (a) All dimensions are in millimeters.
- (b) The checking pin diameters (MJ-8) given are recommended values. If pins of nonstandard diameter are used, the manufacturer shall be responsible for recalculating the dimensions such that the form and geometry conform with the ISO standard form.
- (c) See Table 19 for accumulated pitch variation.

NOTE:

- (1) Any profile contained within the hatched area is acceptable.

**TABLE 19 60 deg SERRATED JAW  
INTERFACE (METRIC), ACCUMULATED PITCH  
VARIATION**

Serration Designation				
1.5 × 60 deg		3.0 × 60 deg		Permissible Accumulated Pitch Variation
Measuring Length, MJ-10	Number of Teeth	Measuring Length, MJ-10	Number of Teeth	
30	20	30	10	±0.008
60	40	60	20	±0.013
90	60	90	30	±0.018
120	80	120	40	±0.023
150	100	150	50	±0.028

GENERAL NOTE: All dimensions are in millimeters.



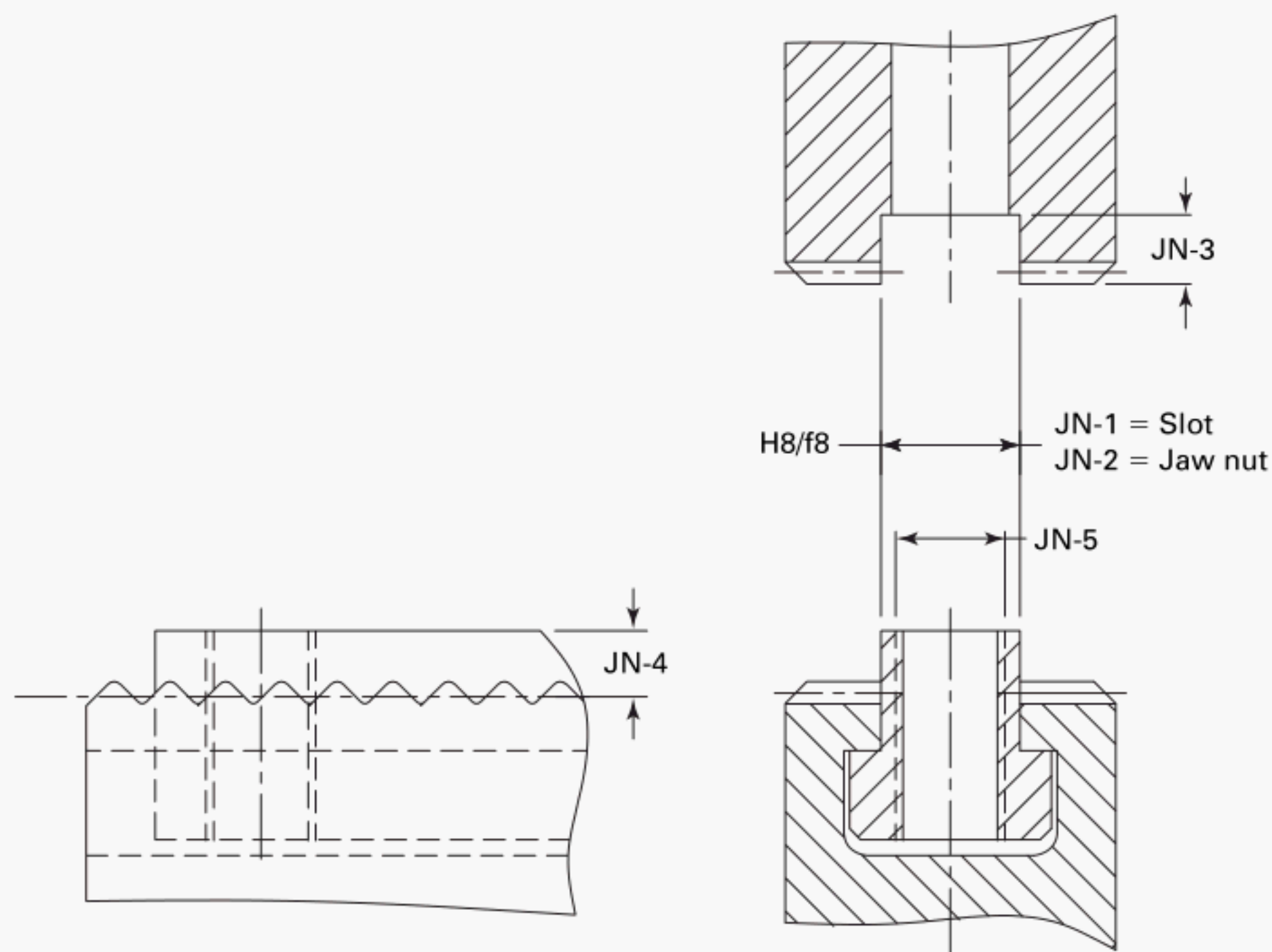
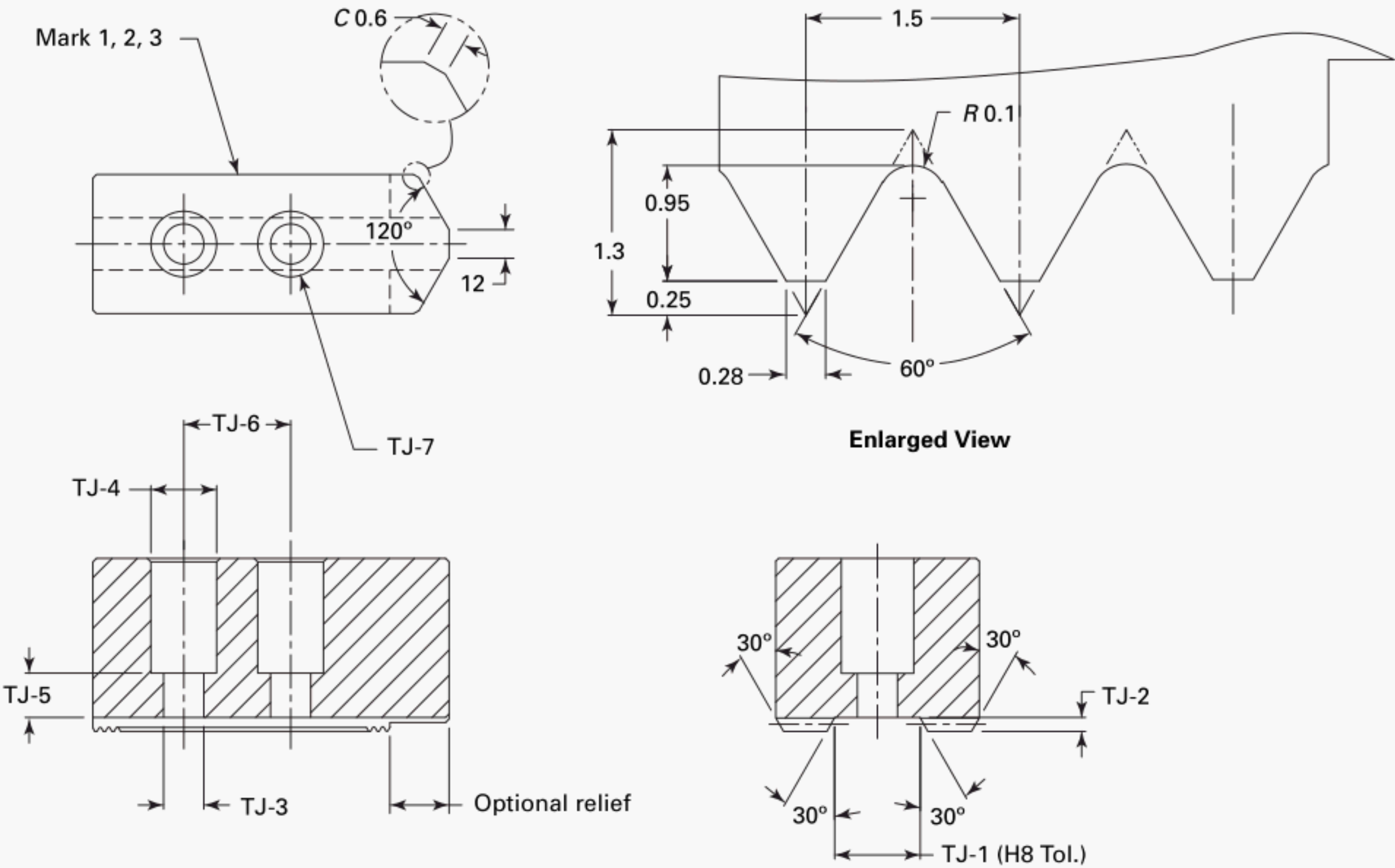


TABLE 20 60 deg METRIC AND 90 deg INCH SERRATED, JAWS AND JAW NUT INTERFACE

Nominal Size of Chuck	Slot Size Master Jaw and Top Jaw (H8 Tol.), JN-1		Jaw Nut Size (f8 Tol.), JN-2		Slot Depth in Top Jaw, JN-3	Jaw Nut Above Master Jaw, JN-4	Internal Thread, JN-5	Designation of Serration
	Min.	Max.	Min.	Max.				
100	10.000	10.022	9.965	9.987	4.5	2.5	M6	$\frac{1}{16}$ in. $\times$ 90 deg or 1.5 mm $\times$ 60 deg
125	12.000	12.027	11.957	11.984	4.5	2.5	M8	$\frac{1}{16}$ in. $\times$ 90 deg or 1.5 mm $\times$ 60 deg
160	14.000	14.027	13.957	13.984	4.5	2.5	M10	$\frac{1}{16}$ in. $\times$ 90 deg or 1.5 mm $\times$ 60 deg
200	17.000	17.027	16.957	16.984	4.5	2.5	M12	$\frac{1}{16}$ in. $\times$ 90 deg or 1.5 mm $\times$ 60 deg
250	21.000	21.033	20.947	20.980	4.5	2.5	M16	$\frac{1}{16}$ in. $\times$ 90 deg or 1.5 mm $\times$ 60 deg
315	21.000	21.033	20.947	20.980	4.5	2.5	M16	$\frac{1}{16}$ in. $\times$ 90 deg or 1.5 mm $\times$ 60 deg
400	25.500	25.533	25.447	25.480	5.5	3.5	M20	$\frac{3}{32}$ in. $\times$ 90 deg or 3.0 mm $\times$ 60 deg
500	25.500	25.533	25.447	25.480	5.5	3.5	M20	$\frac{3}{32}$ in. $\times$ 90 deg or 3.0 mm $\times$ 60 deg
630	25.500	25.533	25.447	25.480	5.5	3.5	M20	$\frac{3}{32}$ in. $\times$ 90 deg or 3.0 mm $\times$ 60 deg

## GENERAL NOTES:

- (a) Unless otherwise specified, all dimensions are in millimeters.  
 (b) Tolerance Grade of Thread (JN-5) (see ISO 965-3).



**TABLE 21 1.5 mm × 60 deg SERRATED TOP JAW (METRIC)**

Nominal Size of Chuck	Slot Width (H8 Tol.), TJ-1		Slot Depth, TJ-2	Screw Clearance Drill Diameter, TJ-3	Screw C'bore Diameter, TJ-4	Screw C'bore Depth, TJ-5, Min.	Screw Center-to- Center Distance, TJ-6	Screw Size, TJ-7
	Min.	Max.						
100	10.000	10.022	4.5	6.80	11.25	5.0	14.00	M6
125	12.000	12.027	4.5	8.80	14.25	6.0	18.00	M8
160	14.000	14.027	4.5	10.80	17.25	6.0	20.00	M10
200	17.000	17.027	4.5	12.80	19.25	8.0	25.00	M12
250	21.000	21.033	4.5	16.75	25.50	10.0	30.00	M16
315	21.000	21.033	4.5	16.75	25.50	10.0	30.00	M16

**GENERAL NOTES:**

- (a) All dimensions are in millimeters.
- (b) Serration pitch error not to accumulate more than 0.005 mm per 25 mm.
- (c) Tapped holes located within Ø 0.2 mm of true position.

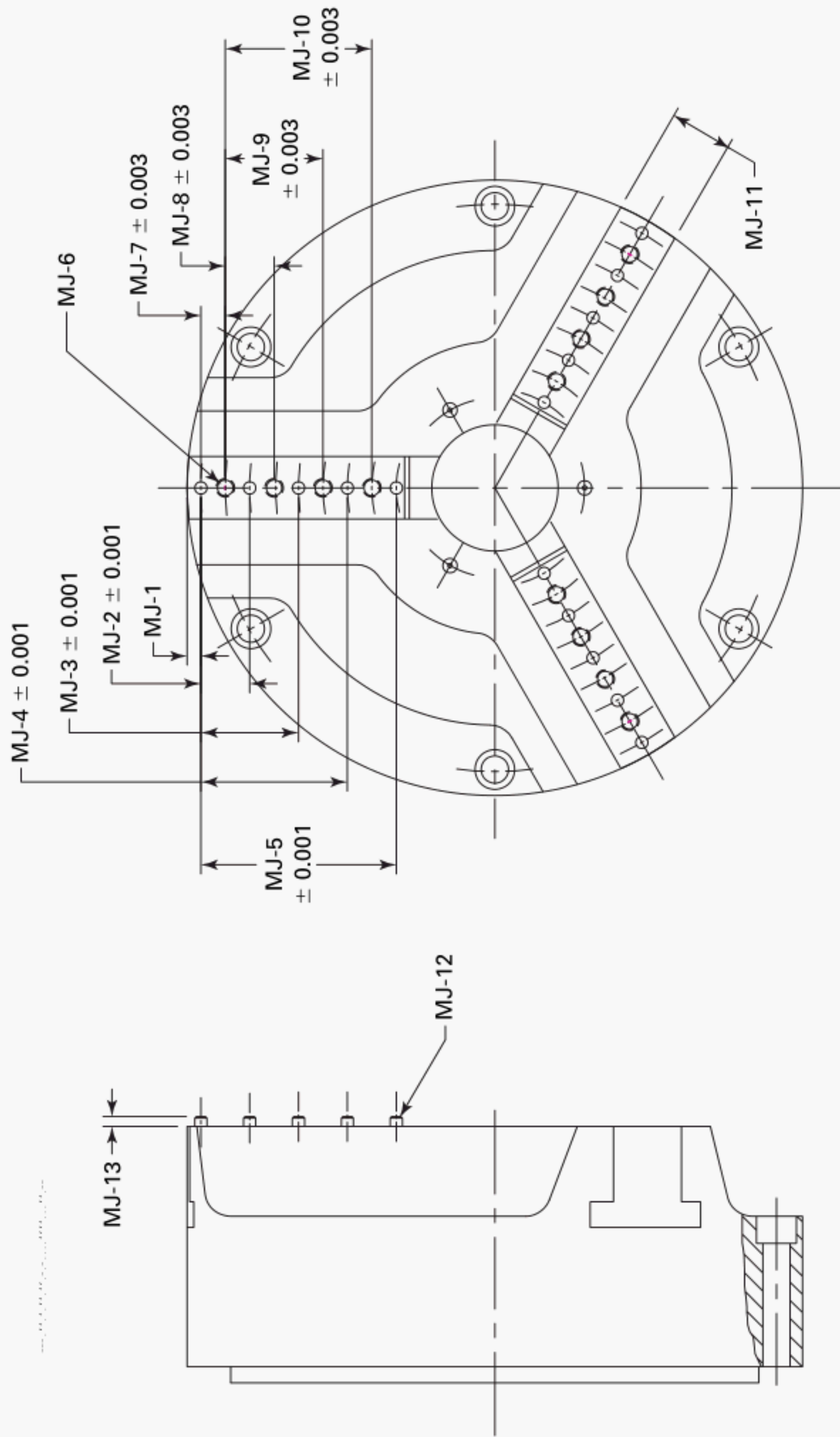
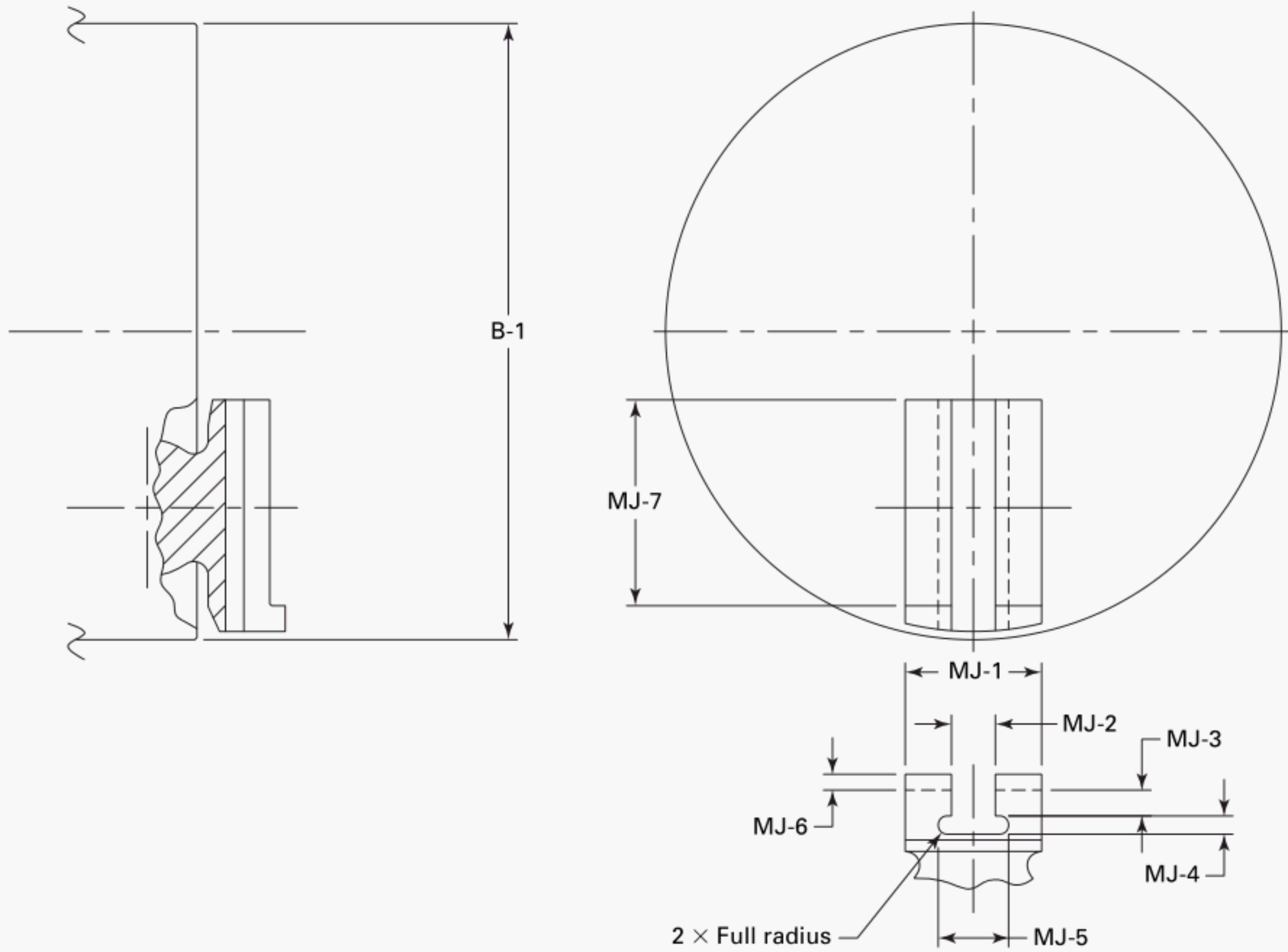


TABLE 22 PIN LOCATOR CHUCKS, MASTER JAW

Nominal Chuck Diameter	Edge to First Locating Pin, MJ-1	First to Second Locating Pin, MJ-2	First to Third Locating Pin, MJ-3	First to Fourth Locating Pin, MJ-4	First to Fifth Locating Pin, MJ-5	Thread for Mounting Screws, in. (UNF-2B), MJ-6	First Locating Pin to					First Screw to Fourth Screw, MJ-10	First Screw to Master Jaw Width, MJ-11	Locating Pin Diameter, MJ-12	Locating Pin Height, MJ-13
3	0.14	0.610	...	...	...	1/4"-28	0.30	...	...	...	...	...	0.63	0.1250	0.10
4	0.14	0.500	1.000	...	...	10-32	0.25	0.50	...	...	...	...	0.63	0.1250	0.10
6	0.14	0.500	1.000	1.500	2.000	10-32	0.25	0.50	1.00	1.50	...	...	0.63	0.1250	0.10
7	0.25	2.000	...	...	...	3/8"-24	0.45	1.10	...	...	...	...	1.26	0.2500	0.25
8	0.30	1.100	2.200	...	...	3/8"-24	0.55	1.10	...	...	...	...	1.26	0.2500	0.25
10	0.30	1.100	2.200	3.300	...	3/8"-24	0.55	1.10	2.20	...	...	...	1.26	0.2500	0.25
12	0.47	3.440	...	...	...	5/8"-24	0.72	2.00	...	...	...	...	1.53	0.4375	0.31

GENERAL NOTE: Dimensions are in inches unless otherwise specified.





**TABLE 23 BALL STYLE CHUCKS, MASTER JAW**

Nominal Size of Chuck, B-1	Jaw Width, MJ-1		Jaw Nut Slot Width, MJ-2		Top of Jaw Platform to Top of Slot, MJ-3		Jaw Slot Height, MJ-4		Jaw Slot Width, MJ-5		Master Jaw Support Height, MJ-6		Mounting Face Length, MJ-7
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
6	1.497	1.499	0.498	0.503	0.250	0.260	0.198	0.206	0.801	0.811	0.245	0.255	2.19
8	1.747	1.749	0.560	0.565	0.312	0.322	0.230	0.240	0.895	0.905	0.190	0.205	2.63
10	2.247	2.249	0.748	0.754	0.411	0.421	0.292	0.302	1.115	1.125	0.222	0.237	3.00
12	2.247	2.249	0.748	0.754	0.411	0.421	0.292	0.302	1.115	1.125	0.222	0.237	3.25
15	2.622	2.624	0.873	0.878	0.442	0.452	0.292	0.302	1.302	1.312	0.222	0.237	4.16
18	2.622	2.624	0.873	0.878	0.442	0.452	0.292	0.302	1.302	1.312	0.222	0.237	4.16

GENERAL NOTE: All dimensions are in inches.

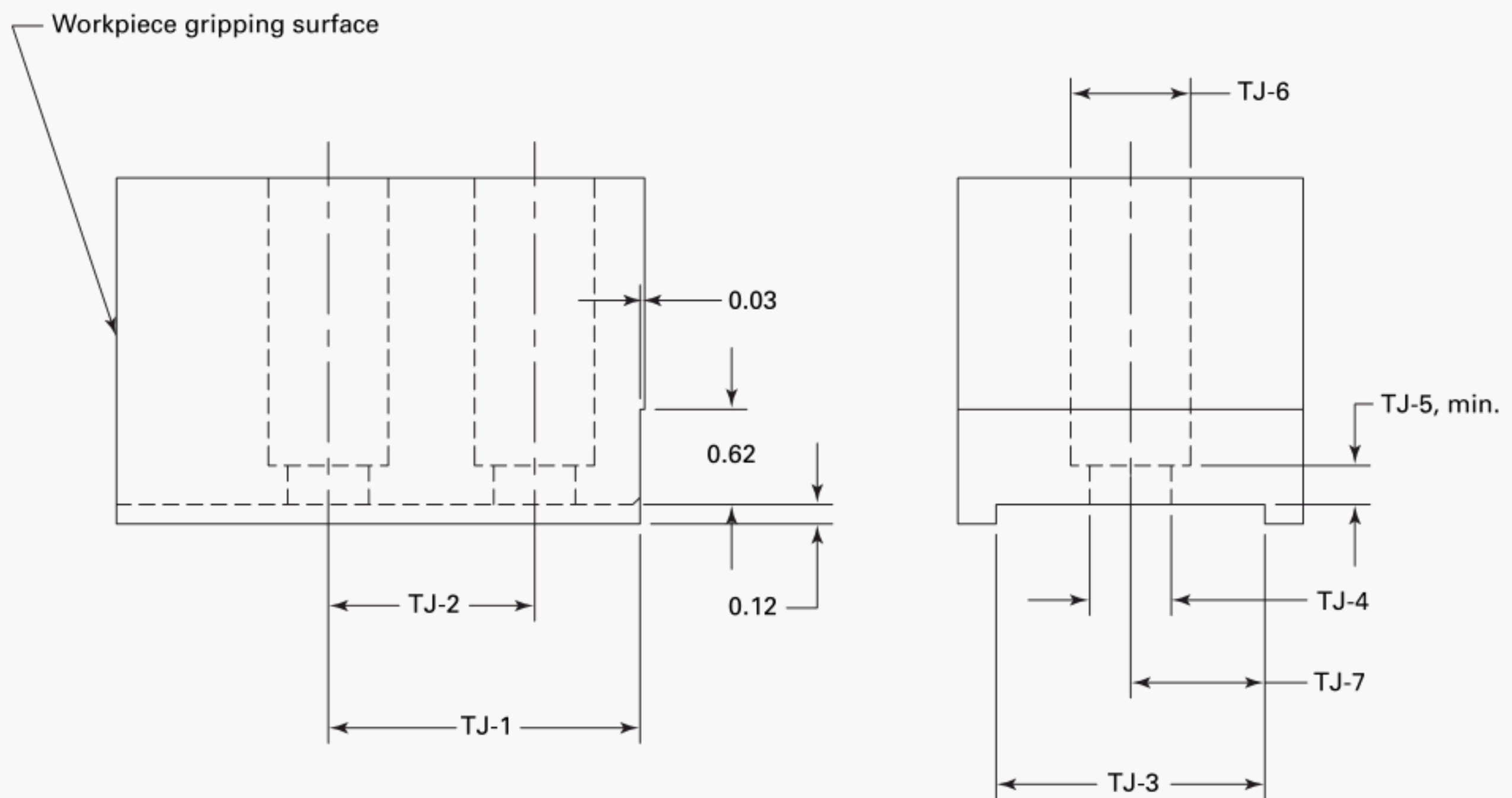
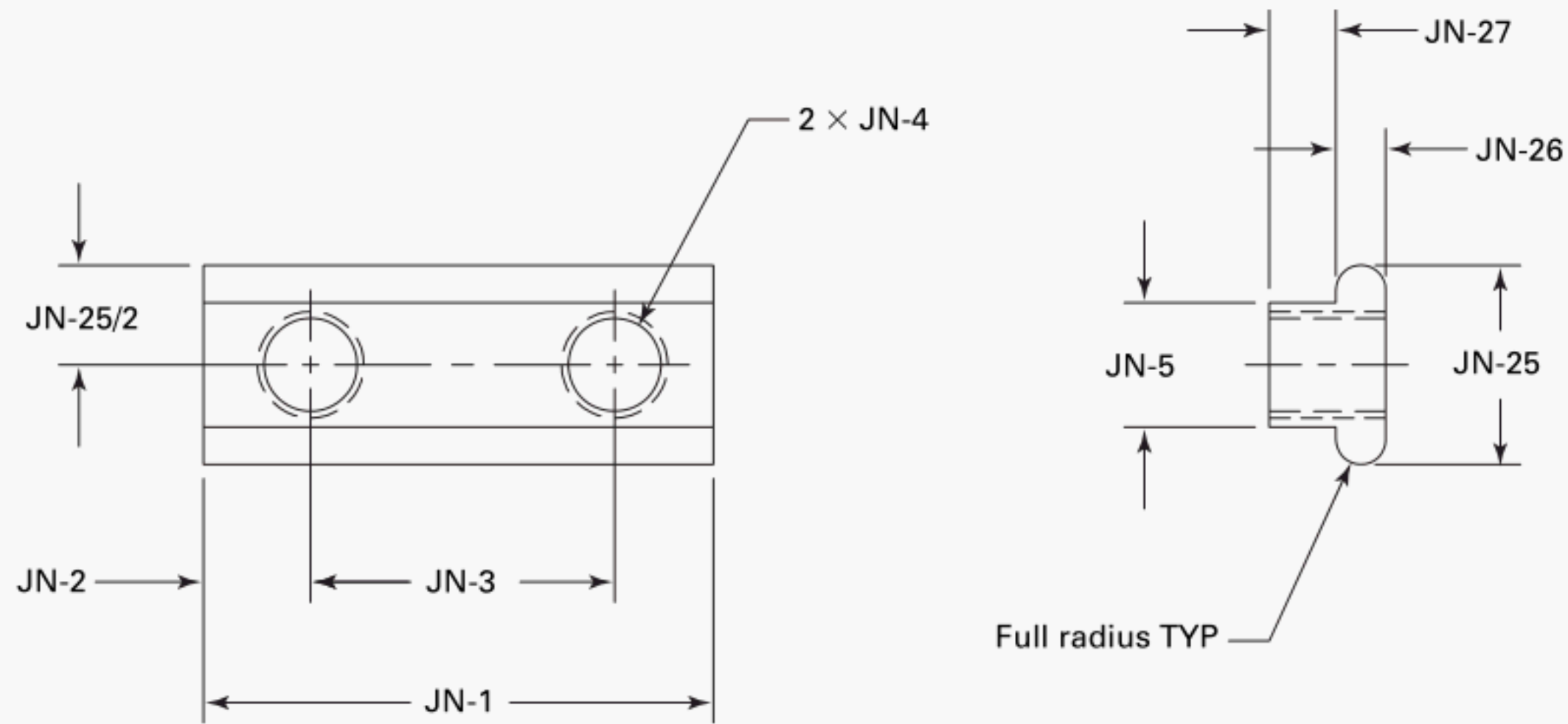


TABLE 24 BALL STYLE CHUCKS, TOP JAW

Nominal Size of Chuck	Back Edge to Inner Screw, TJ-1 [Note (1)]	Center-to- Center Screw Holes, TJ-2 [Note (1)]	Mounting Width, TJ-3		Screw Clearance Hole Diameter, TJ-4	Screw C'Bore Depth, TJ-5, Min.	Screw C'Bore Diameter, TJ-6	Setup Dimension, TJ-7
			Min.	Max.				
6	1.734	1.156	1.500	1.502	0.469	0.203	0.688	0.750
8	2.031	1.344	1.750	1.752	0.531	0.250	0.781	0.875
10	2.500	1.750	2.250	2.252	0.656	0.312	1.000	1.125
12	2.500	1.750	2.250	2.252	0.656	0.312	1.000	1.125
15	3.062	2.125	2.625	2.627	0.812	0.312	1.188	1.312
18	3.062	2.125	2.625	2.627	0.812	0.312	1.188	1.312

GENERAL NOTE: All dimensions are in inches.  
NOTE:  
(1) Holes located within Ø 0.012 in. of true position.



**TABLE 25 BALL STYLE CHUCKS, JAW NUT**

Nominal Size of Chuck	Overall Length, JN-1	Location of First Screw Hole, JN-2 [Note (1)]	Center-to- Center Screw Holes, JN-3 [Note (1)]	Tapped Hole Size (UNC-2B), JN-4	Width of Tongue, JN-5		Width of Tee, JN-25		Height of Tee, JN-26		Height of Tongue, JN-27	
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
6	2.16	0.53	1.156	$\frac{7}{16}$ -14	0.483	0.493	0.781	0.791	0.183	0.193	0.228	0.238
8	2.38	0.56	1.344	$\frac{1}{2}$ -13	0.545	0.555	0.875	0.885	0.215	0.225	0.290	0.300
10	3.03	0.78	1.750	$\frac{5}{8}$ -11	0.733	0.743	1.095	1.105	0.277	0.287	0.384	0.394
12	3.03	0.78	1.750	$\frac{5}{8}$ -11	0.733	0.743	1.095	1.105	0.277	0.287	0.384	0.394
15	3.56	0.84	2.125	$\frac{3}{4}$ -10	0.858	0.868	1.277	1.292	0.277	0.287	0.415	0.425
18	3.56	0.84	2.125	$\frac{3}{4}$ -10	0.858	0.868	1.277	1.292	0.277	0.287	0.415	0.425

GENERAL NOTE: All dimensions are in inches.

NOTE:

(1) Holes located within  $\varnothing$  0.012 in. of true position.

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