AMERICAN NATIONAL STANDARD

Spindle Noses and Tool Shanks for Milling Machines

ANSI B5.18 - 1972

(REVISION OF B5.18-1960)

REAFFIRMED 1991

REAFFIRMED 1998

FOR CURRENT COMMITTEE PERSONNEL
PLEASE SEE ASME MANUAL AS-11

REAFFIRMED 2004

FOR CURRENT COMMITTEE PERSONNEL
PLEASE E-MAIL CS@asme.org

SOCIETY OF AUTOMOTIVE ENGINEERS
SOCIETY OF MANUFACTURING ENGINEERS
NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

PUBLISHED BY

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

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FOREWORD

The first edition of this standard, known as B5.18-1943, resulted from intensive efforts dating back to 1926 by a special group of milling machine manufacturers; it was reaffirmed in 1949, revised in 1953 and again in 1960. ASA B5.18-1960 incorporated several changes and corrections. It also included a new spindle nose size, designated as 50 A, suggested by the 'Society of Manufacturing Engineers' and several recommendations made by a special committee of fifteen milling machine manufacturers appointed by the National Tool Builder's Association. The revised standard reflected accurately the actual practice at this period of time.

This revision is based on the recommendations of the Technical Committee No. 33 of the American National Standards Committee B5 for 'Standardization of Machine Tools, Components, Elements, Performance, and Equipment'. It updates the 1960 standards; incorporates several recommendations made by members of industry as users and by machine tool builders; it follows the Decimal Inch practice according to ASA B87.1-1965. Several notes have been added, tolerances more clearly defined and conformity with pertinent American National Standards obtained.

The true position dimensions and symbols contained herein are based on American National Standard Y14.5-1966 "Dimensioning and Tolerancing for Engineering Drawings."

Upon the suggestion of the International Organization for Standardization (ISO) a No. 45 size number of spindle nose and tool shank has been added to meet a need for an intermediate size between the 40 and 50 size numbers.

The draft of the proposed revision was submitted to the Technical Committee No. 33 for final review and comments.

The final draft of the proposed revision was processed according to the established procedures of ANSI; it was voted on by letter ballot, approved by the American National Standards Institute on August 22, 1972 as ANSI B5.18-1972.

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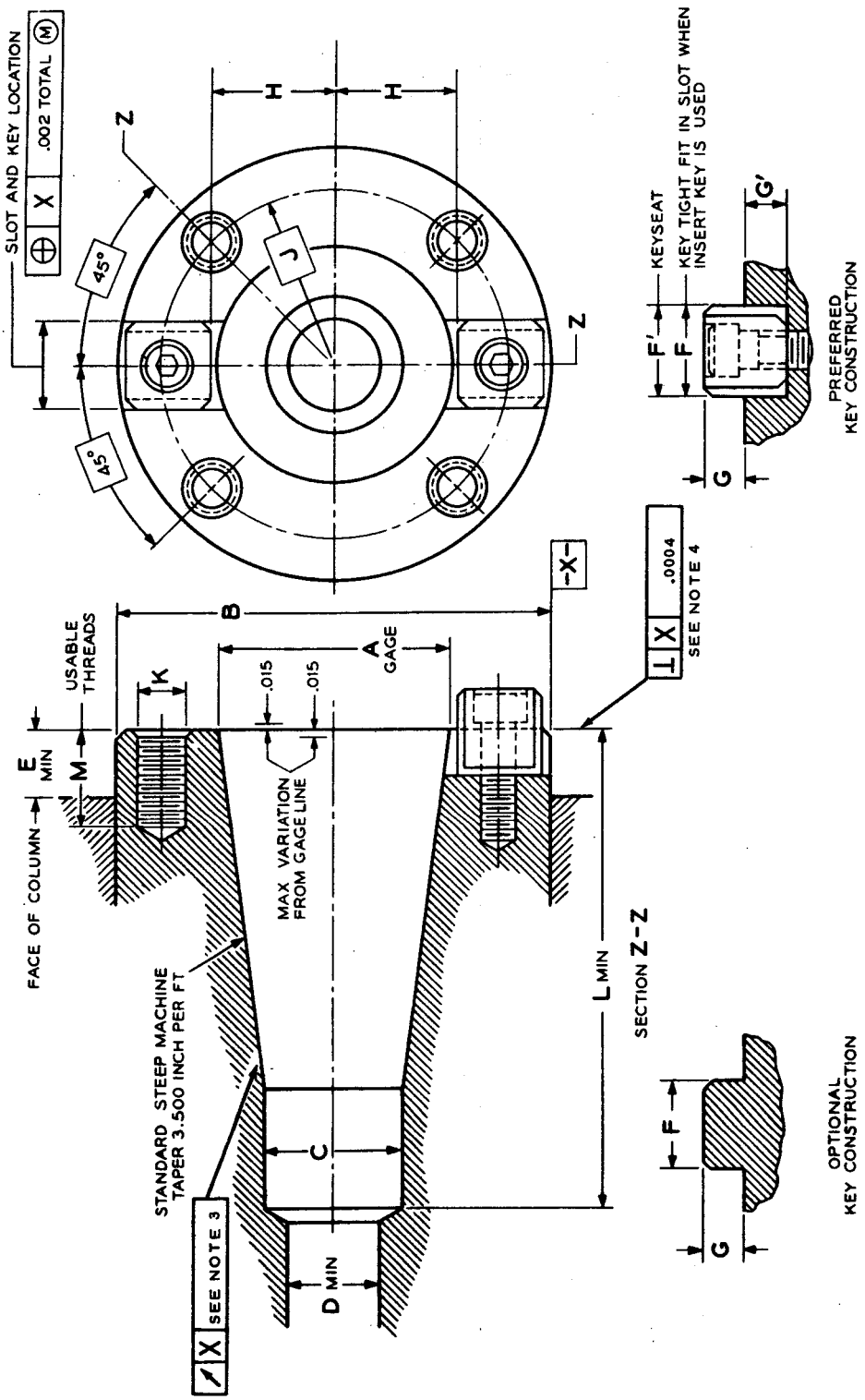


Table 1. Essential Dimensions Of Spindle Nose

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Table 1. Essential Dimensions Of Spindle Nose (cont.)

Size Number	Gage Diameter of Taper A	Diameter of Spindle B	Pilot Diameter C	Clearance Hole for Draw-in Bolt Min. D	Minimum Dimension Spindle End to Column E	Width of Driving Key F	Width of Keyseat F′	Maximum Height of Driving Key G	Minimum Depth of Keyseat G′	Distance from Center to Driving Keys H	Radius of Bolt Hole Circle J	Size of Threads for Bolt Holes UNC-2B K	Full Depth of Arbor Hole in Spindle Min. L	Depth of Usable Thread for Bolt Hole M
30	1.250	2.7493 2.7488	0.692 0.685	0.66	0.50	0.6255 0.6252	0.624 0.625	0.31	0.31	0.660 0.654	1.0625 (Note 1)	0.375–16	2.88	0.62
40	1.750	3.4993 3.4988	1.005 0.997	0.66	0.62	0.6255 0.6252	0.624 0.625	0.31	0.31	0.910 0.904	1.3125 (Note 1)	0.500–13	3.88	0.81
45	2.250	3.9993 3.9988	1.286 1.278	0.78	0.62	0.7505 0.7502	0.749 0.750	0.38	0.38	1.160 1.154	1.500 (Note 1)	0.500–13	4.75	0.81
50	2.750	5.0618 5.0613	1.568 1.559	1.06	0.75	1.0006 1.0002	0.999 1.000	0.50	0.50	1.410 1.404	2.000 (Note 2)	0.625–11	5.50	1.00
60	4.250	8.7180 8.7175	2.381 2.371	1.38	1.50	1.0006 1.0002	0.999 1.000	0.50	0.50	2.420 2.414	3.500 (Note 2)	0.750–10	8.62	1.25

All dimensions are given in inches.

TOLERANCES:

Two digit decimal dimensions ± 0.010 unless otherwise specified.

A – See plug gages listed in ANSI B5.10-1963–Table-13.
Taper: Tolerance on rate of taper to be 0.001 inch per foot applied only in direction which decreases rate of taper.

F′ – Centrality of Keyway with axis of taper 0.002 total at maximum material condition. (0.002 Total Indicator Variation)

F – Centrality of solid key with axis of taper 0.002 total at maximum material condition. (0.002 Total Indicator Variation)

Size number 45 dimensions from ANSI B5.40-1968 Appendix–Table A3–Page 19.

NOTE 1 – Holes spaced as shown and located within 0.006 Dia of true position

NOTE 2 – Holes spaced as shown and located within 0.010 Dia of true position

NOTE 3 – Maximum turnout on test plug 0.0004 at 1" projection from gage line
0.0010 at 12" projection from gage line

NOTE 4 – Squareness of mounting face measured near mounting bolt hole circle

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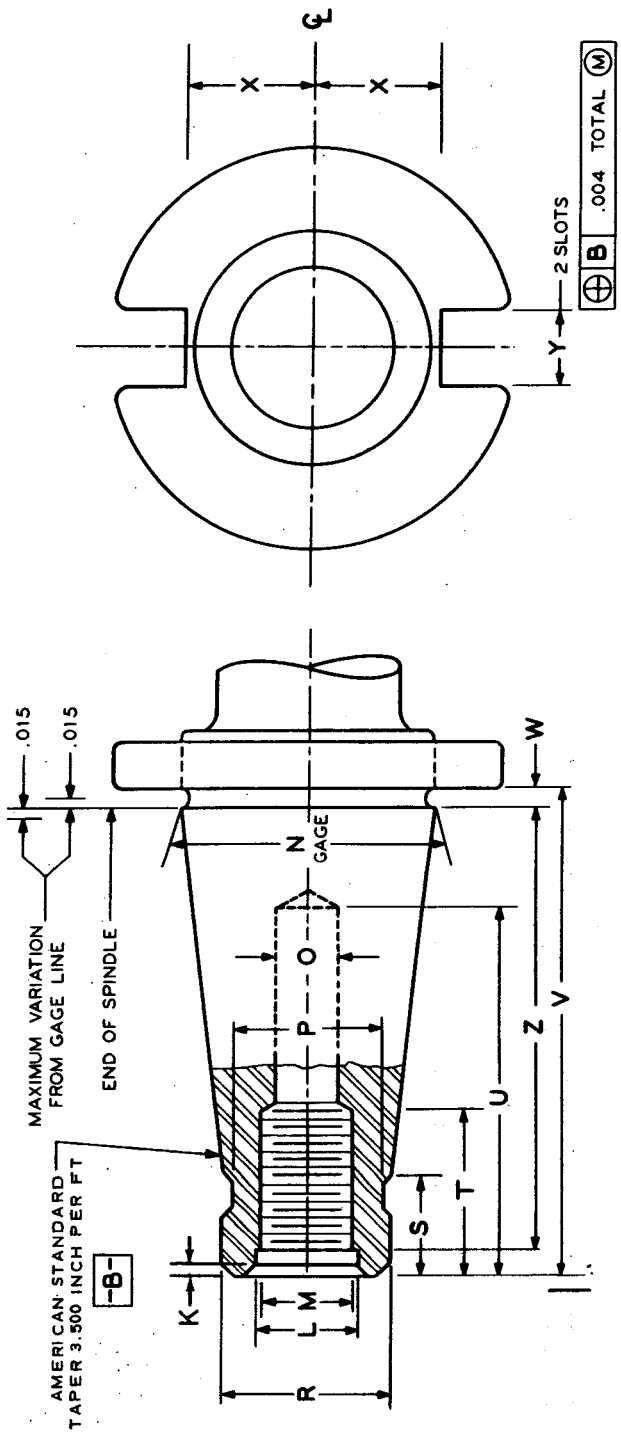


Table 2. Essential Dimensions For Tool Shanks

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Table 2. Essential Dimensions for Tool Shanks (cont.)

Size Number	Gage Diameter of Taper N	Tap Drill Size for Draw-in Thread O	Diameter of Neck P	Size of Thread for Draw-in Bolt UNC-2B M	Pilot Diameter R	Length of Pilot S	Minimum Length of Usable Thread T	Minimum Depth of Clearance Hole U	Distance from Rear of Flange to End of Arbor V	Clearance of Flange From Gage Diameter W	Tool Shank Center-line to Driving Slot X	Width of Driving Slot Y	Distance From Gage Line to Bottom of C'bore Z	Depth of 60° Center K	Diameter of C'bore L
30	1.250	0.422 0.432	0.66 0.65	0.500–13	0.675 0.670	0.81	1.00	2.00	2.75	0.045 0.075	0.640 0.625	0.635 0.645	2.50	0.05 0.07	0.525 0.530
40	1.750	0.531 0.541	0.94 0.93	0.625–11	0.987 0.980	1.00	1.12	2.25	3.75	0.045 0.075	0.890 0.875	0.635 0.645	3.50	0.05 0.07	0.650 0.655
45	2.250	0.656 0.666	1.19 1.18	0.750–10	1.268 1.260	1.00	1.50	2.75	4.38	0.105 0.135	1.140 1.125	0.760 0.770	4.06	0.05 0.07	0.775 0.780
50	2.750	0.875 0.885	1.50 1.49	1.000– 8	1.550 1.540	1.00	1.75	3.50	5.12	0.105 0.135	1.390 1.375	1.010 1.020	4.75	0.05 0.12	1.025 1.030
60	4.250	1.109 1.119	2.28 2.27	1.250– 7	2.360 2.350	1.75	2.25	4.25	8.25	0.105 0.135	2.400 2.385	1.010 1.020	7.81	0.05 0.12	1.307 1.312

All dimensions are given in inches.

TOLERANCES:

Two digit decimal dimensions ± 0.010 unless otherwise specified.

(M) – Permissible for Class 2B "NoGo" gage to enter five threads before interference.

(N) – See ring gages listed in ANSI B5.10–1963 Table 14 – Taper tolerance on rate of taper to be 0.001 inch per foot applied only in direction which increases rate of taper.

(Y) – Centrality of driveslot with axis of taper shank 0.004 at maximum material condition. (0.004 Total Indicator Variation)

NOTE:

Size Number 45 dimensions from ANSI B5.40 1968 Appendix Table A4 – Page 20.

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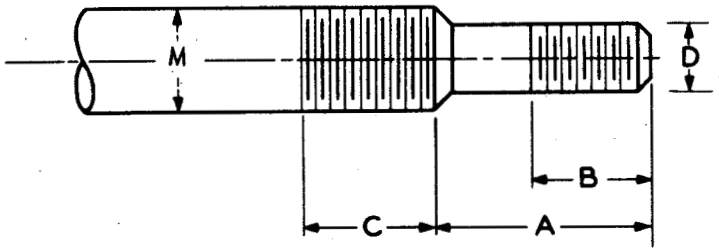


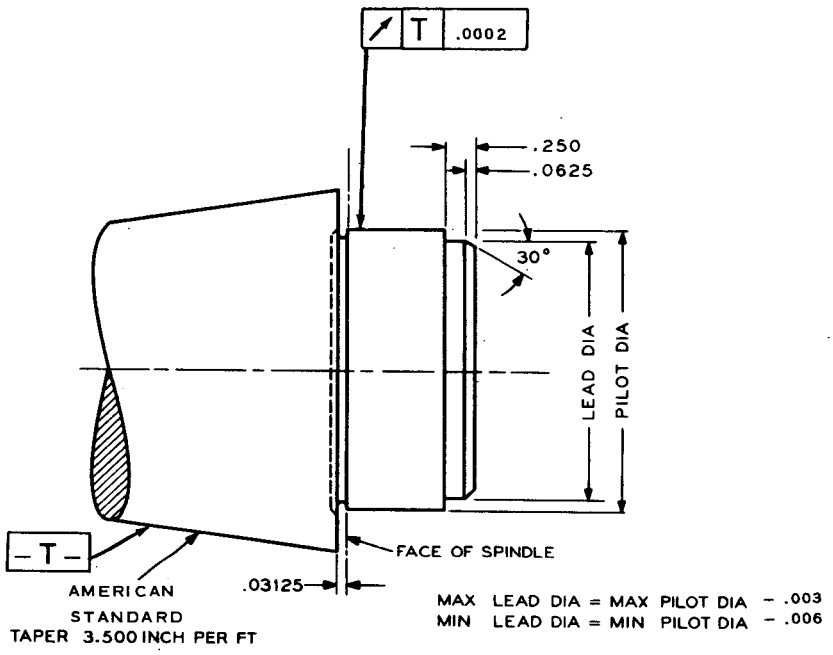
Table 3. Dimensions of Draw-in Bolt Ends

Size Number	Length of Small End A	Length of Usable Thread at Small End B	Length of Usable Thread on Large Diameter C	Size of Thread for Large End UNC-2A M	Size of Thread for Small End UNC-2A D
30	1.06	0.75	0.75	0.500 – 13	0.375 – 16
40	1.25	1.00	1.12	0.625 – 11	0.500 – 13
45	1.50	1.12	1.25	0.750 – 10	0.625 – 11
50	1.50	1.25	1.38	1.000 – 8	0.625 – 11
60	1.75	1.37	2.00	1.250 – 7	1.000 – 8

All dimensions are given in inches.

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All dimensions are given in inches.

FIG. 1 PILOT LEAD ON CENTERING PLUGS FOR FLATBACK CUTTERS

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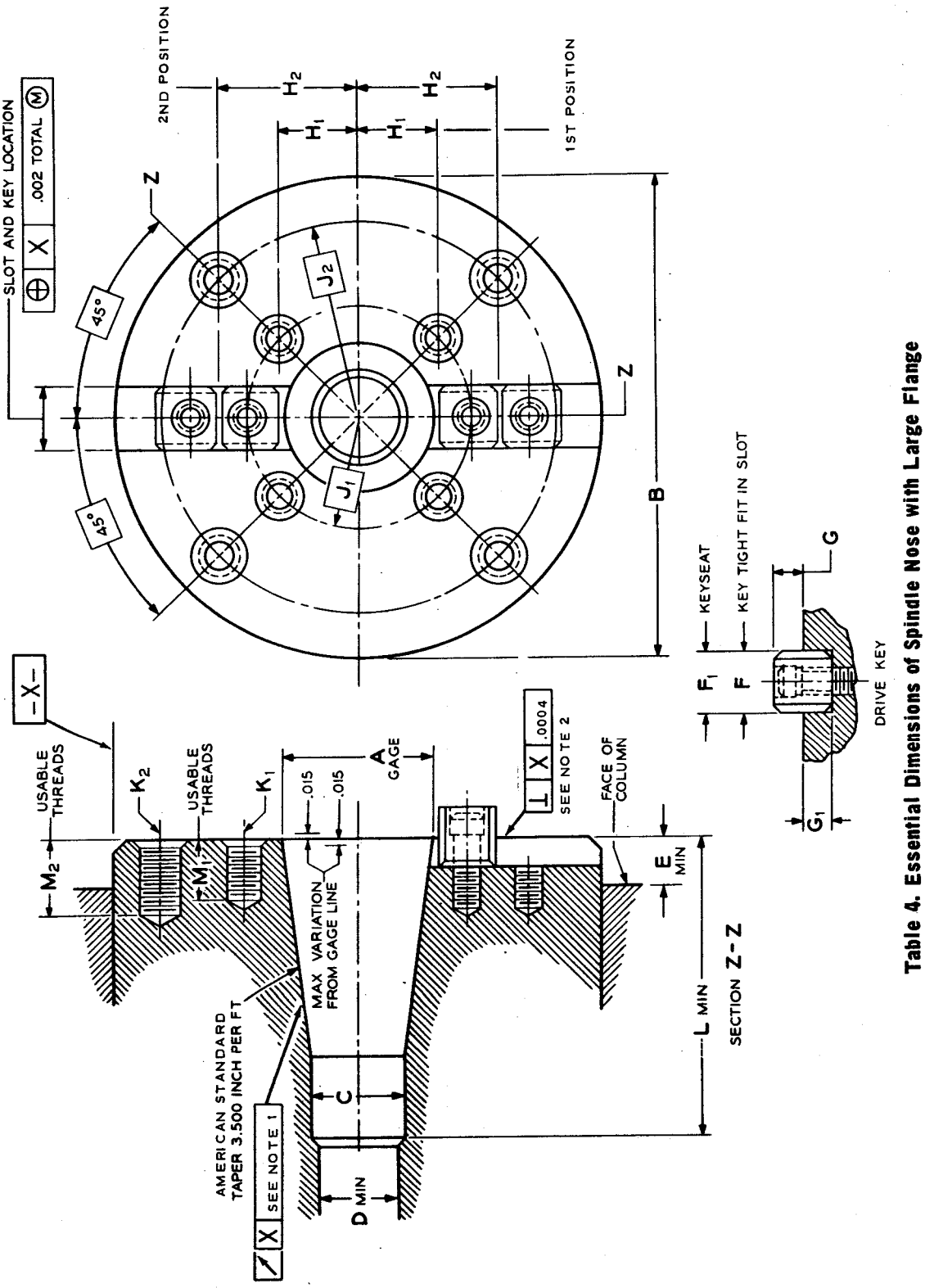


Table 4. Essential Dimensions of Spindle Nose with Large Flange

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Table 4. Essential Dimensions of Spindle Nose with Large Flange (cont.)

Size Number	Gage Diam. of Taper	Dia. of Spindle Flange	Pilot Diam.	Clearance Hole for Draw-in Bolt Min.	Min. Dim. Spindle End to Column	Width of Driving Key	Height of Driving Key Max.	Depth of Keyseat Min.	Distance from Center to Driving Keys First Position	Distance from Center to Driving Keys Second Position	Radius of Bolt Hole Circles (See Note)		Size of Threads for Bolt Holes UNC-2B		Full Depth of Arbor Hole in Spindle Min.	Depth of Usable Thread for Bolt Holes		Width of Keyseat
											Inner	Outer						
	A	B	C	D	E	F	G	G_1	H_1	H_2	J_1	J_2	K_1	K_2	L	M_1	M_2	F_1
50A	2.750	8.7180 8.7175	1.568 1.559	1.06	0.75	1.0006 1.0002	0.50	0.50	1.410 1.404	2.420 2.410	2.000	3.500	0.625-11	0.750-10	5.50	1.00	1.25	0.999 1.000

All dimensions given in inches.

Note: Holes located as shown and within 0.010 dia. of true position.

TOLERANCES:

Two digit decimal dimensions ± 0.010 unless otherwise specified.

A – See plug gages listed in ANSI B5.10-1963 Table-13 Taper. Tolerance on rate of taper to be 0.001 inch per foot applied only in direction which decreases rate of taper.

F – Centrality of Solid Key with axis of taper 0.002 total at maximum material condition. (0.002 Total Indicator Variation)

F_1 – Centrality of Keyseat with axis of taper 0.002 total at maximum material condition. (0.002 Total Indicator Variation)

NOTE 1 – Maximum Runout on Test Plug 0.0004 at 1" Projection From Gage Line
0.0010 at 12" Projection From Gage Line

NOTE 2 – Squareness of Mounting Face Measured Near Mounting Bolt Hole Circle



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