

8 Hinges

8a Butt Hinges

3 Ordering String

4 Two-Knuckle Hinges

6 Three-Knuckle Hinges

8 Information & Specifications

Butt Hinges

9101 Series

FSB Butt Hinges

FSB offers a line of hinges unique in their construction, finish, and performance.

FSB hinges are stainless steel, available in two-knuckle and three-knuckle versions that utilize carbon steel and oil-impregnated sintered bronze bearings to minimize wear. FSB stainless steel hinges can be supplied to simulate many of our popular finishes.



All hinges are UL & cUL listed up to 3 hours.

FSB hinges are ANSI A156.1-2006 grade 1.

Specifying Hinges

9101 Series

Butt Hinge Series

9101

Hinge Type

0001

Insert your choice of the Two- or Three-Knuckle Hinge type.

Two-Knuckle

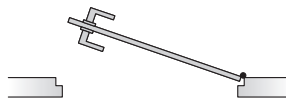
- 0000 (3 ½ × 3 ½" RH)
- 0001 (3 ½ × 3 ½" LH)
- 0002 (4 × 4" RH)
- 0003 (4 × 4" LH)
- 0004 (4 ½ × 4 ½" RH)
- 0005 (4 ½ × 4 ½" LH)
- 0006 (4 ½ × 4" RH)
- 0007 (4 ½ × 4" LH)

Three-Knuckle

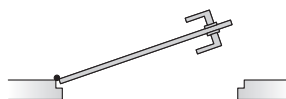
- 0050 (3 ½ × 3 ½")
- 0051 (4 × 4")
- 0052 (4 ½ × 4 ½")
- 0053 (4 ½ × 4")

Handing for Hinges

RH – Right Hand Hinge



LH – Left Hand Hinge



Material and Finish

6204

Insert your choice of finish using one of the four digit codes. Base material for hinges is stainless steel.

Finishes are approximate and finish codes are nearest equivalent.

- 0105 Aluminum Natural Color (689)
- 0704 Dark Bronze Color (710)

- 8120 Black (671)
- 8220 White (714)

- 6204 Satin (630)
- 6205 Polished (629)

- 4205 Polished Brass (606)
- 4404 Oxidized Brass (607)

- 7615 Aged Bronze (703)

Example for Specifying

9101 - 0001 - 6204

All details subject to modification

2016/02

Two-Knuckle Hinges

Series 9101



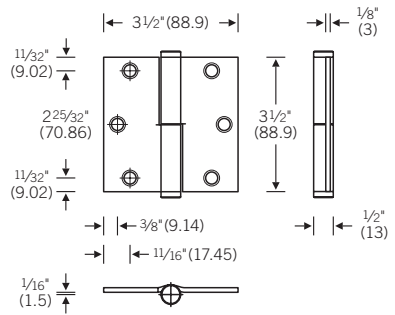
9101 0000 (RH)
9101 0001 (LH)



Two-Knuckle Hinge

3 1/2 x 3 1/2" (88.9 x 88.9 mm)
Minimum door thickness 1 3/8" (35 mm)

9101 0001 pictured below



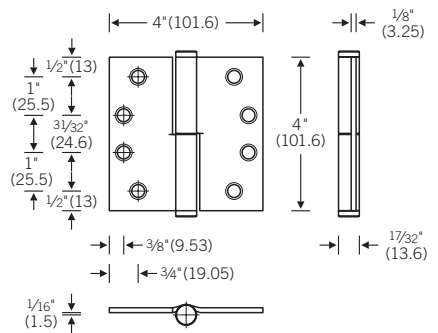
9101 0002 (RH)
9101 0003 (LH)



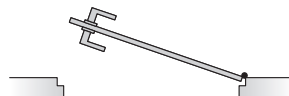
Two-Knuckle Hinge

4 x 4" (101.6 x 101.6 mm)
Minimum door thickness 1 3/4" (44 mm)

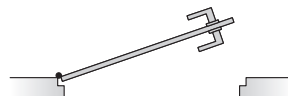
9101 0003 pictured below



RH – Right Hand Hinge



LH – Left Hand Hinge



Base material of all hinges is stainless steel. For all available finishes please refer to page 3.

All details subject to modification

Two-Knuckle Hinges

Series 9101



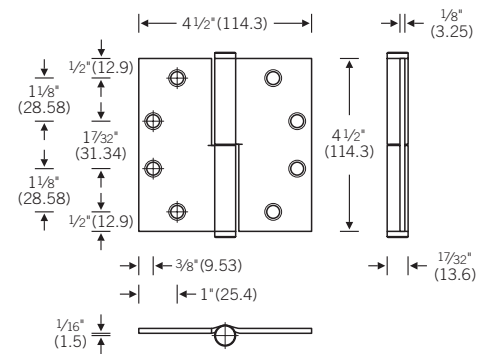
9101 0004 (RH)
9101 0005 (LH)



Two-Knuckle Hinge

4 1/2 × 4 1/2" (114.3 × 114.3 mm)
Minimum door thickness 1 3/4" (44 mm)

9101 0005 pictured below



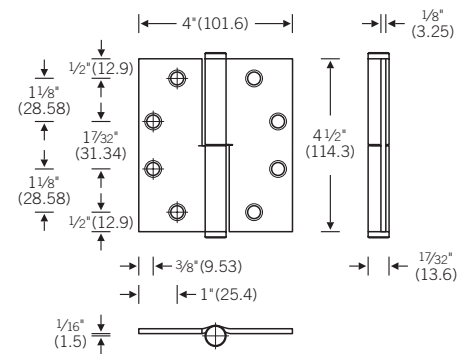
9101 0006 (RH)
9101 0007 (LH)



Two-Knuckle Hinge

4 1/2 × 4" (114.3 × 101.6 mm)
Minimum door thickness 1 3/4" (44 mm)

9101 0007 pictured below



All details subject to modification

RH – Right Hand Hinge

LH – Left Hand Hinge



Base material of all hinges is stainless steel. For all available finishes please refer to page 3.

Three-Knuckle Hinges

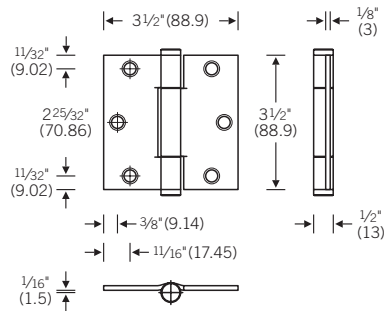
Series 9101



9101 0050

Three-Knuckle Hinge

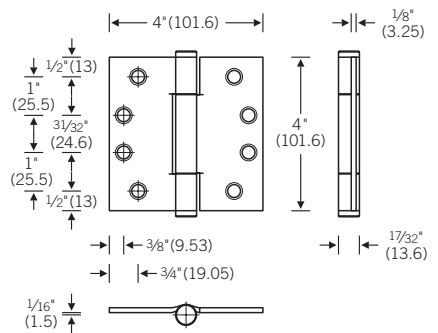
3 1/2" x 3 1/2" (88.9 x 88.9 mm)
 Minimum door thickness 1 3/8" (35 mm)



9101 0051

Three-Knuckle Hinge

4 x 4" (101.6 x 101.6 mm)
 Minimum door thickness 1 3/4" (44 mm)



All details subject to modification

Base material of all hinges is stainless steel. For all available finishes please refer to page 3.

Three-Knuckle Hinges

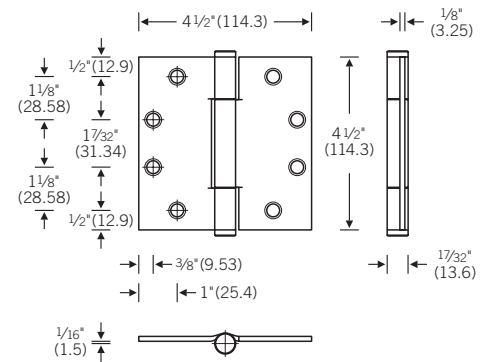
Series 9101



9101 0052

Three-Knuckle Hinge

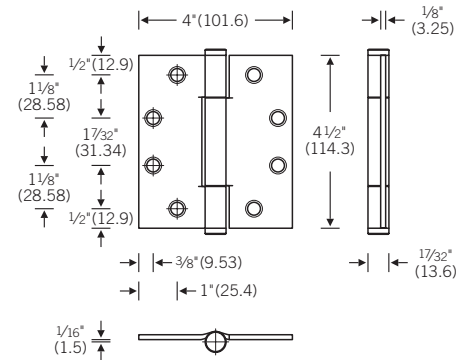
4 1/2" x 4 1/2" (114.3 x 114.3 mm)
Minimum door thickness 1 3/4" (44 mm)



9101 0053

Three-Knuckle Hinge

4 1/2" x 4" (114.3 x 101.6 mm)
Minimum door thickness 1 3/4" (44 mm)



All details subject to modification

Base material of all hinges is stainless steel. For all available finishes please refer to page 3.

Series 9101

Information and Specification



Site/Situation

Serious consideration should be given to the type of door and frame being installed as well as the nature of the building and the door's specific location. For example, very frequently used doors, in a hospital or school, tend to be put under more arduous stresses than in residential applications. The table to the right shows some estimates of traffic in certain building/locations.

All FSB two- and three-knuckle hinges are swaged and full mortise, for use with all door and frame materials. They are designed for use in high frequency situations, with other specific requirements guiding the appropriate hinge choice.

Frequency of Door Operation

Type of Building and Door	Annual Cycles	FSB Hinges to Use
High frequency		Special Order
Large dept. store entrance	1,500,000	
Large office bldg. entrance	1,200,000	
High frequency		FSB Standard Two- and Three- Knuckle Hinges
School entrance	400,000	
School toilet door	225,000	
Store or bank entrance	150,000	
Office building toilet door	118,000	
Average frequency		
School corridor door	30,000	
Office building corridor door	22,000	
Store toilet door	18,000	
Dwelling entrance	15,000	
Low frequency		
Dwelling toilet door	9,000	
Dwelling corridor door	3,600	
Dwelling closet door	2,200	

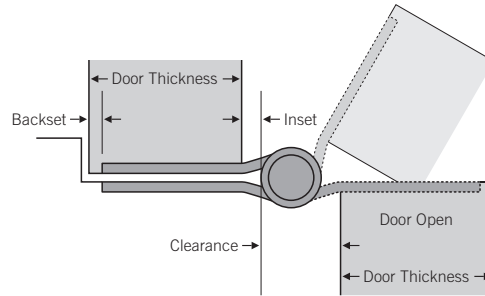
Hinge Size

The size of hinge to be used is determined not only by the weight but also the door size, thickness and any clearances required.

It should be noted that if extra "clearance" is required to allow the door to, for example, swing out and lay flat around any decorative casing then this should be considered in guiding hinge choice.

Guidance on the suitability of individual hinges can be found on the following and product specific pages.

The drawing to the right shows the plan detail of a standard hinge installation.



UL/cUL up to 3 hours
UL File - R27193

ANSI A156.1-2006 Grade 1

All details subject to modification

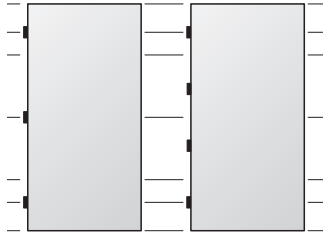
Series 9101

Information and Specification



Number of Hinges

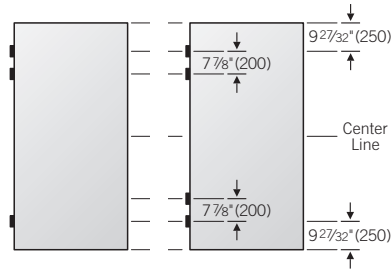
Typically, three hinges are fitted to each door. Hinge positions are determined by the weight of door, its situation and its construction/resistance to warping. The usual positioning is symmetrical, see examples.



Number of Hinges to be used on Standard Doors

Door height	No. hinges
Up to 7'	3 hinges
7' to 10'	4 hinges

Doors over 10' please contact FSB.



For extra heavy doors or doors with a low height to width ratio (see below) the positions should be modified to help account for the increased side loading* placed on the hinges.

*As the door has an eccentric centre of gravity a side loading force is placed on the hinges. This is the force trying to pull the hinges off the door frame.

Hinges for use with Doors of excess width

Wider doors increase the pressure and bending stresses exerted on the hinge. This must be allowed for by reduction in the mass of the door leaf supported by the hinges. The factors by which the door mass has to be adjusted for excessive widths of door are calculated by dividing the door height by its width.

For a factor of two or greater, no allowance has to be made. When the factor is less than two, the door mass has to be increased by the value required to bring the factor to two expressed as a percentage. These percentages are shown in the Side Loading Calculations to the right.

Side Loading Calculation

Door Size		Factor	Normal Increase of Mass of Door Leaf
Door Height	Door Width		
6' 8"	3' 6"	1.90	10 %
6' 8"	4' 0"	1.67	33 %
7' 0"	3' 6"	2.00	0 %
7' 0"	4' 0"	1.75	25 %
7' 6"	4' 0"	1.88	12 %
8' 0"	4' 0"	2.00	0 %

Approximate door construction average weights

The table to the right shows the approximate door weights per area when using various materials.

Example:

A 7'6" x 3'3" "Solid Core" door leaf at 1 3/4" thick will have an approximate weight of 110lb

Door Thickness	1 3/8" (35 mm)		1 3/4" (44 mm)		2" (51 mm)		2 1/8" (54 mm)	
	lbs/ft ²	kg/m ²	lbs/ft ²	kg/m ²	lbs/ft ²	kg/m ²	lbs/ft ²	kg/m ²
Hollow Metal	4	19.5	5	24.4	6 1/2	31.7	7	33.6
Kalamein	—	—	5	24.4	—	—	—	—
Hollow Core	2	9.8	2 1/2	12.2	—	—	—	—
Solid Core	3 1/2	17.0	4 1/2	22.0	5 1/4	25.6	5 1/2	27.1
Mineral Core	3 1/2	17.0	4	19.5	—	—	—	—
Pine (White)	3	14.6	3 1/2	17.0	4	19.5	4 1/4	20.6
Oak	5	24.4	7	34.2	8	39.0	8 1/2	41.3
Ash	4	19.5	5	24.4	6	29.3	6 1/2	31.0
Birch	4 1/4	20.8	5 1/2	26.9	6 1/4	30.5	6 1/2	32.3
Mahagony	3 1/2	17.0	4 1/2	22.0	5 1/4	25.6	5 1/2	27.1

All details subject to modification