



## **Roto Frank of America, Inc**

Casement & Awning Hardware

Information and Drawing Reference

July 1, 2009



# Information and Drawing Reference

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Note: All drawings are for reference only. Please contact Roto for your specific applications and profiles. Toll Free: 800 243-0893

# Roto Hardware Application Matrix

## INTRODUCTION:

The X-Drive and the HG05 Hinge were designed to meet all the feature and performance requirements of today's demanding Casement and Awning window markets. This system includes new sealed operator versions and three 2-bar hinges, that were designed to be installed together to achieve optimum performance levels.

## IMPORTANT NOTES:

The Hardware Application Matrix (Table 1.0) below should be used as a guide to select hardware for different window applications. This information is based on extensive load testing of all the various hardware combinations using protocol defined by the NAFS-05 Hardware Load Test. It is important to note that there are many factors that affect the maximum size window that can be safely manufactured as well as its level of performance. These include:

- Sash and frame rigidity
- Fastener holding strength
- Sash sag
- Weather-strip interference and drag
- Sash and frame strength
- Window tolerances
- Weather tightness

Due to the reasons highlighted above, Roto recommends evaluating the entire window system before producing the largest frame listed in Table 1.0 below. Structural & application testing must be thoroughly conducted by the window manufacturer, in accordance with their requirements prior to implementation of these recommendations.

The size and weight recommendations listed in Table 1.0 are based on standard mounting locations that are specified by Roto's Application Engineering Department. The ease of operation, service life, load capacity, and hence the maximum window size that can be produced, are strongly influenced by the mounting location of the hardware. The information provided in the table assumes that these mounting specifications have been adhered to although different mounting locations and hardware combinations are possible. Please contact one of Roto's experienced application engineers to review your specific window requirements.

**Table 1.0 Hardware Application Matrix for Casement Window Hardware Load Test**  
(AAMA/WDMA/CSA101/I.S.2/A440-05, section 5.3.6.6.2)

**Performance Class R:** The Maximum Frame Size and Sash Weight are listed in Table 1.0

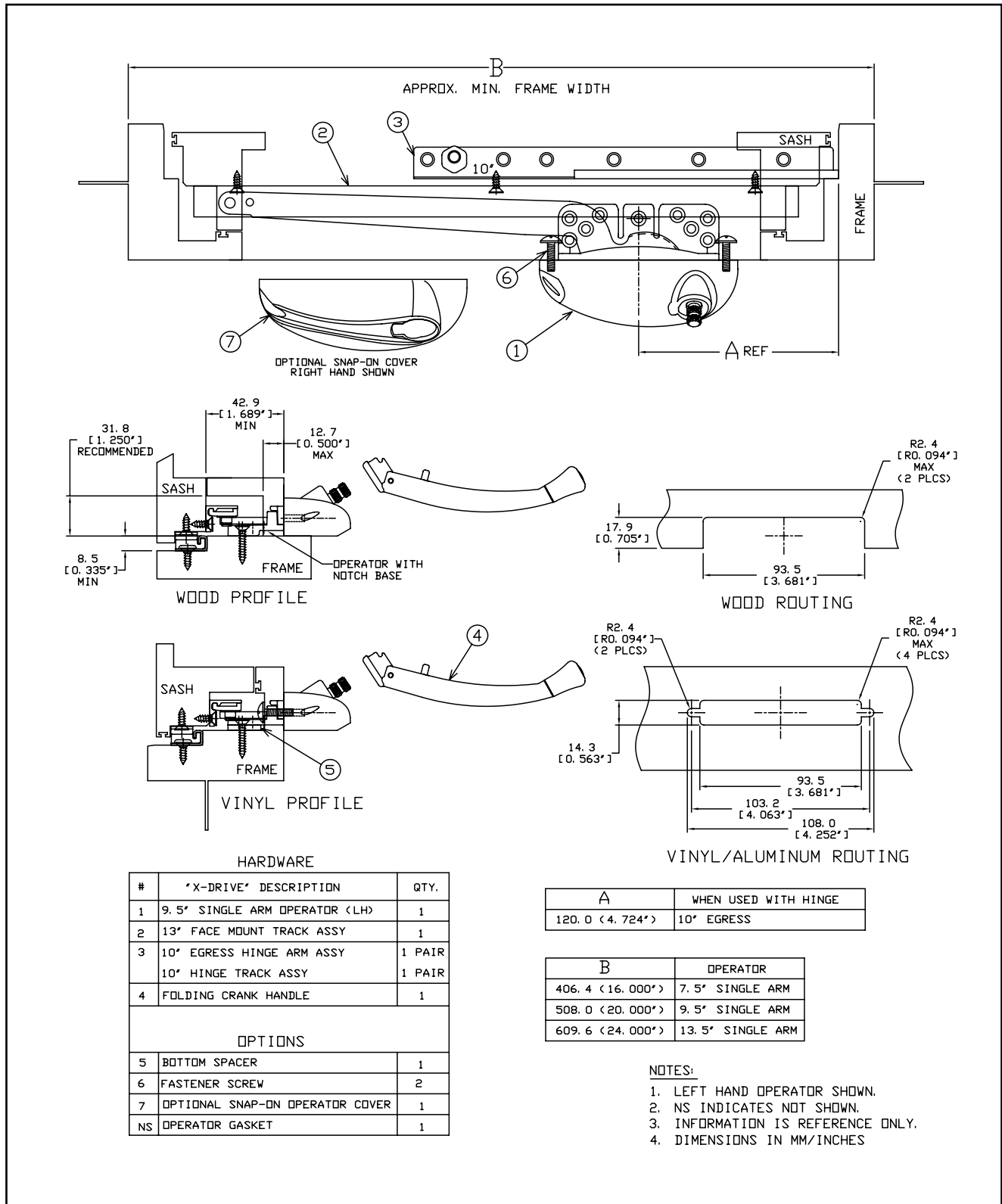
**Performance Classes LC, C, HC, AW:** The Frame Area (width x height) listed in the Table 1.0 must be **reduced by 20%**

X-Drive Operator	HG05 Hinge			Approximate Minimum Frame Width
	13" Washability	10" Washability	10" Egress	
<b>Dual Arm</b>	40"W x 84" H (108lb)	32"W x 66" H (70lb)	Not Recommended	24"
<b>Narrow Dual Arm</b>	32"W x 72" H (75lb)	30"W x 66" H (60lb)	Not Recommended	20"
<b>Split Arm</b> <small>(see note 4)</small>	32"W x 72" H (70lb)	24"W x 64" H (50lb)	Not Recommended	16"
<b>Inverted Split Arm</b> <small>(see note 4)</small>	32"W x 72" H (70lb)	24"W x 64" H (50lb)	Not Recommended	16"
<b>Single Arm 13.5"</b>	Not Recommended	Not Recommended	30"W x 66" H (75lb)	24"
<b>Single Arm 9.5"</b>	Not Recommended	Not Recommended	26"W x 66" H (65lb)	20"
<b>Single Arm 7.5"</b>	Not Recommended	Not Recommended	24"W x 60" H (50lb)	16"
<b>Single Arm 5.5"</b>	Not Recommended	Not Recommended	16"W x 60" H (45lb)	12"
<b>Awning</b> <small>(see notes #5-6)</small>	60"W x 36" H max. 18"W x 18"H min. (50lb)	60"W x 18" H max. 18"W x 14"H min. (40lb)	60"W x 18" H max. 18"W x 14"H min. (30lb)	18"

## Notes:

- 1) Maximum frame size and sash weight is shown for each operator and hinge combination. Sash weight is the maximum allowed in order to pass the NAFS Hardware Load Test.
- 2) To ensure ease of operation, the specific application mounting locations identified on the following pages must be followed. Contact the Roto Application Group for further assistance regarding your specific application.
- 3) Standard operator cavity height is 0.811" (20.6mm). A minimum cavity height of 0.630" (16.0mm) may be available through modification of the standard product. This may involve special brackets, tracks and/or spacer configurations. Contact Roto for specific details.
- 4) It is recommended that a 90° stop be used on any casement window which uses a split arm operator unless a limit device is already being used.
- 5) The Hardware Load Test is not applicable to Awning windows. The sash weight listed in Table 1.0 represents the maximum for best operation.
- 6) For Awning windows less than 18" high use of a restricted Awning Operator may be required. Contact to Application Group for further assistance regarding your specific application. Other restricted opening Awning variants are available for variants code requirements.
- 7) It is recommended that the sash width does not exceed 66% of the sash height for proper performance
- 8) To ensure optimum hardware function and longevity, Roto recommends that the operator handle torque to open or close a sash does not exceed 35 in-lb.

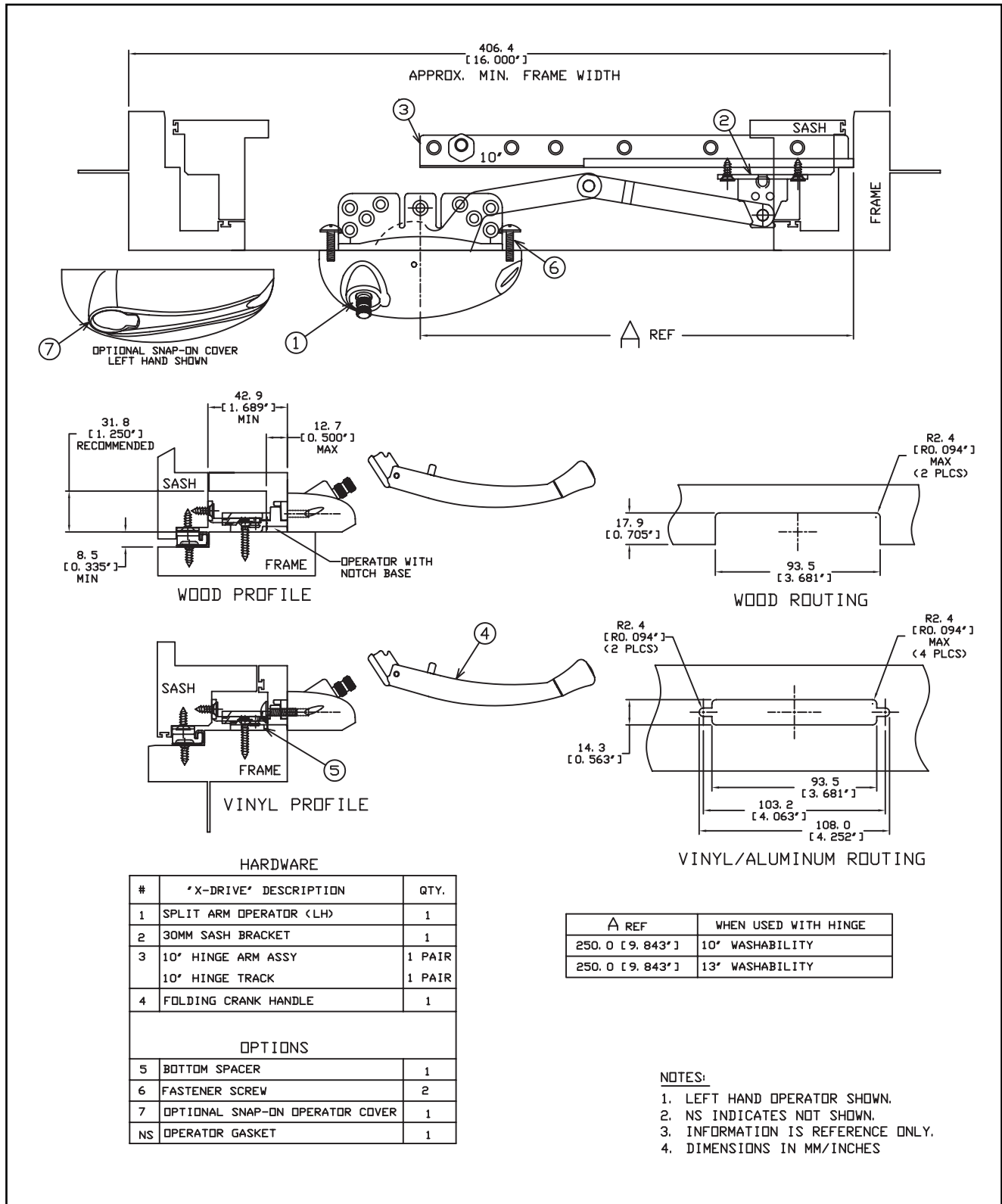
# Roto X-Drive Single Arm Operator



## Application of Roto X-Drive Single Arm Operator

For ordering information, please contact Roto's customer service department at (800) 243 0893

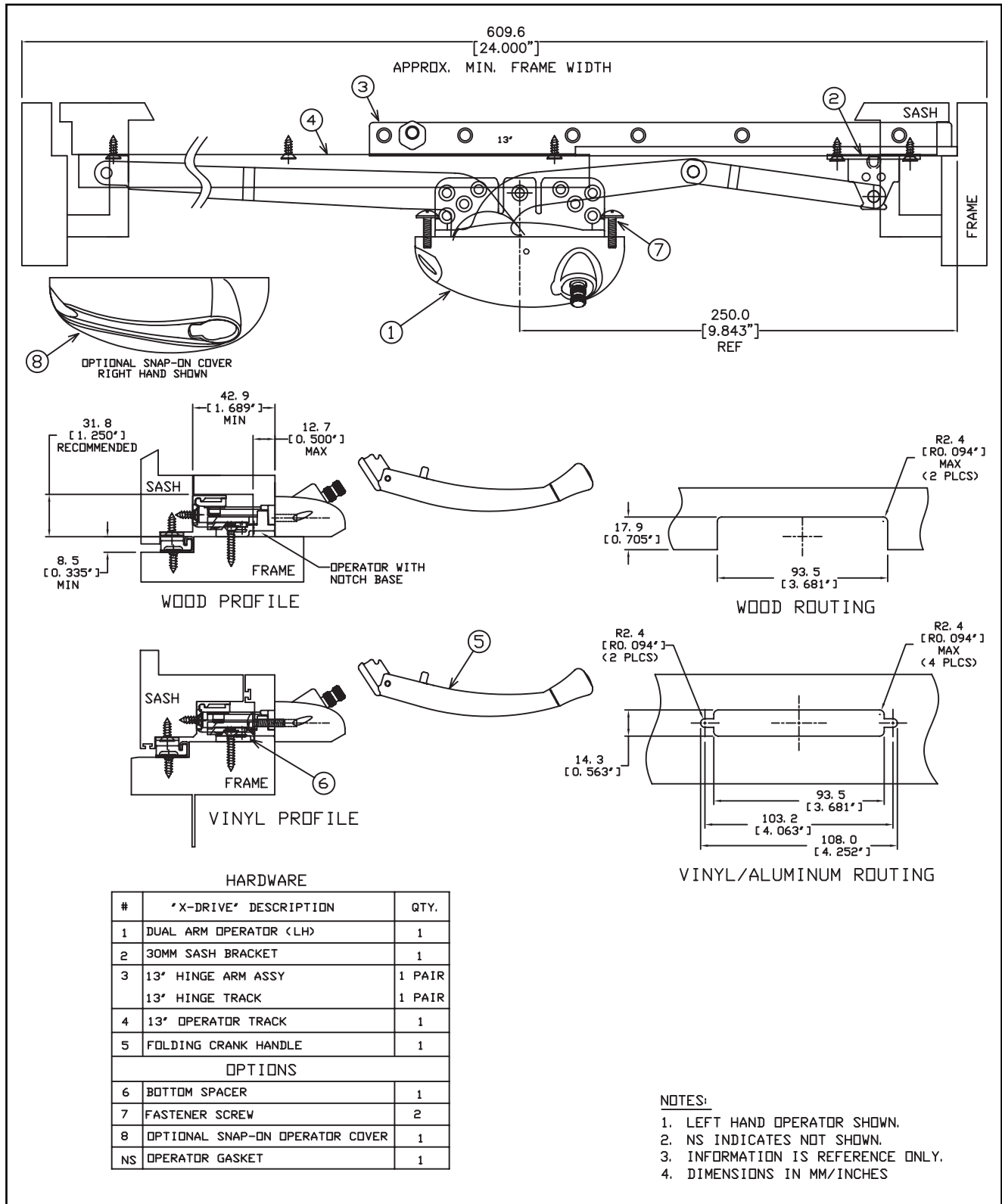
# Roto X-Drive Split Arm Operator



## Application of Roto X-Drive Split Arm Operator

For ordering information, please contact Roto's customer service department at (800) 243 0893

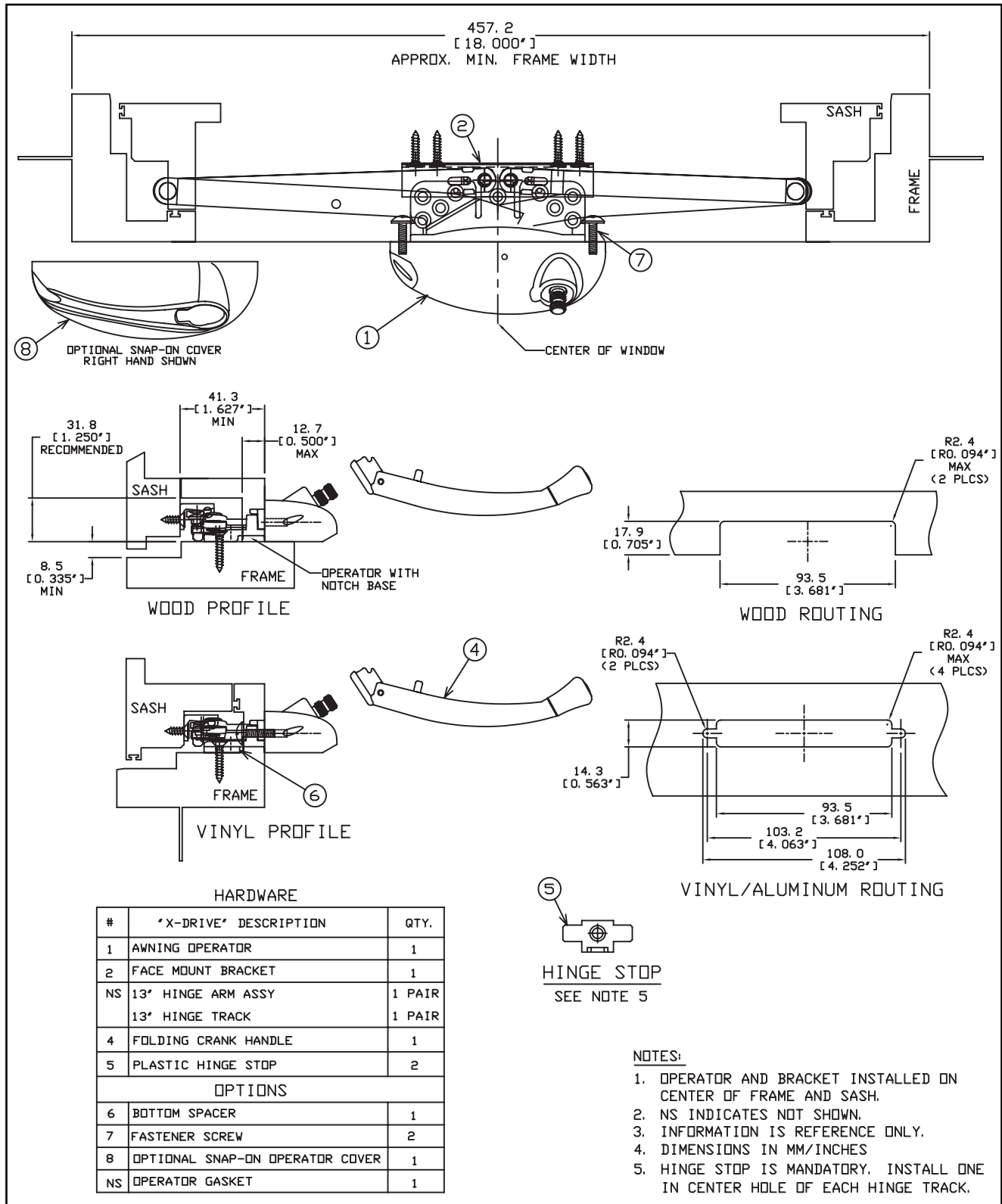
# Roto X-Drive Dual Arm Operator



## Application of Roto X-Drive Dual Arm Operator

For ordering information, please contact Roto's customer service department at (800) 243 0893

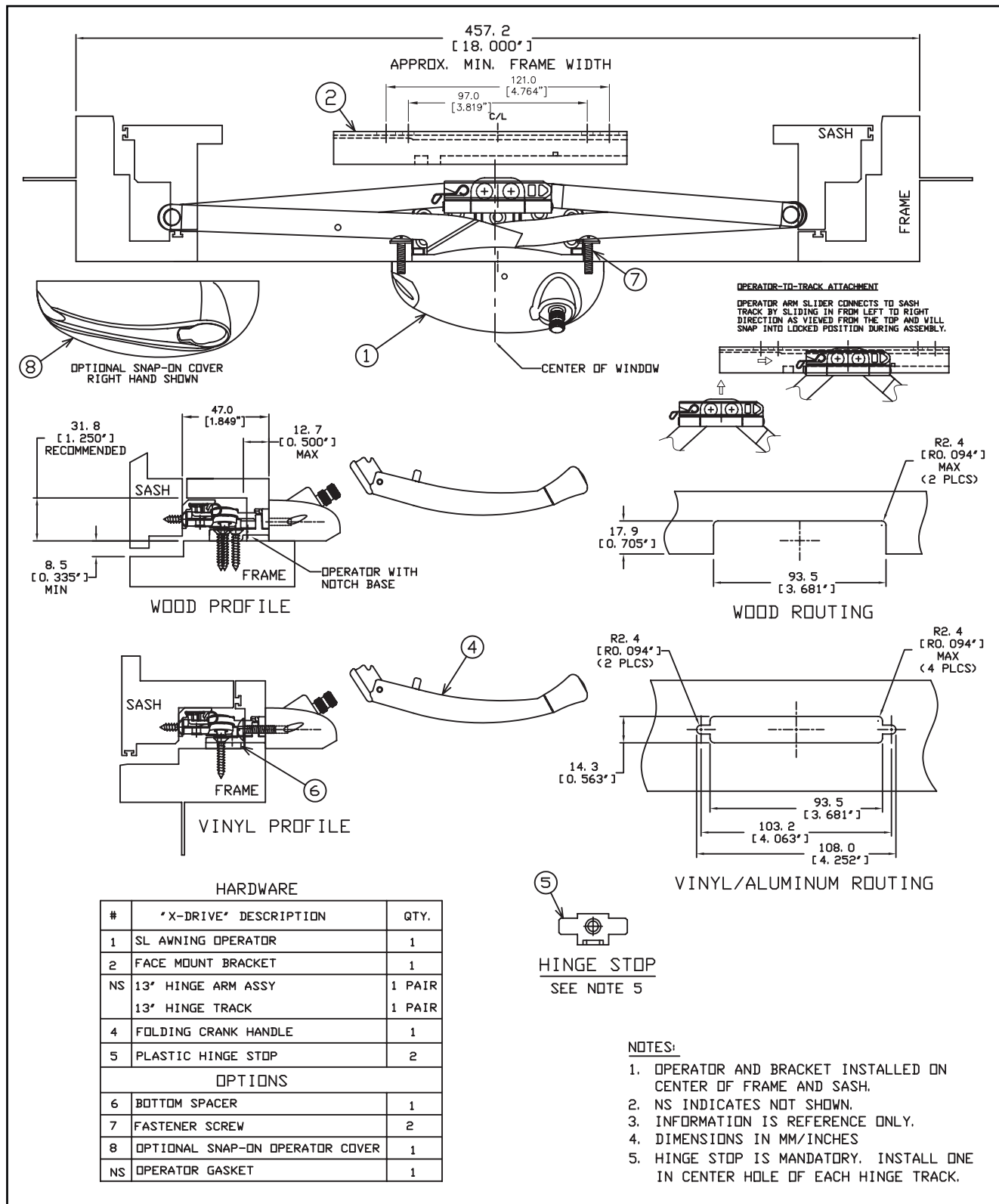
# Roto X-Drive Awning Operator



## Application of Roto X-Drive Awning Operator

For ordering information, please contact Roto's customer service department at (800) 243 0893

# Roto X-Drive Awning - SL Operator

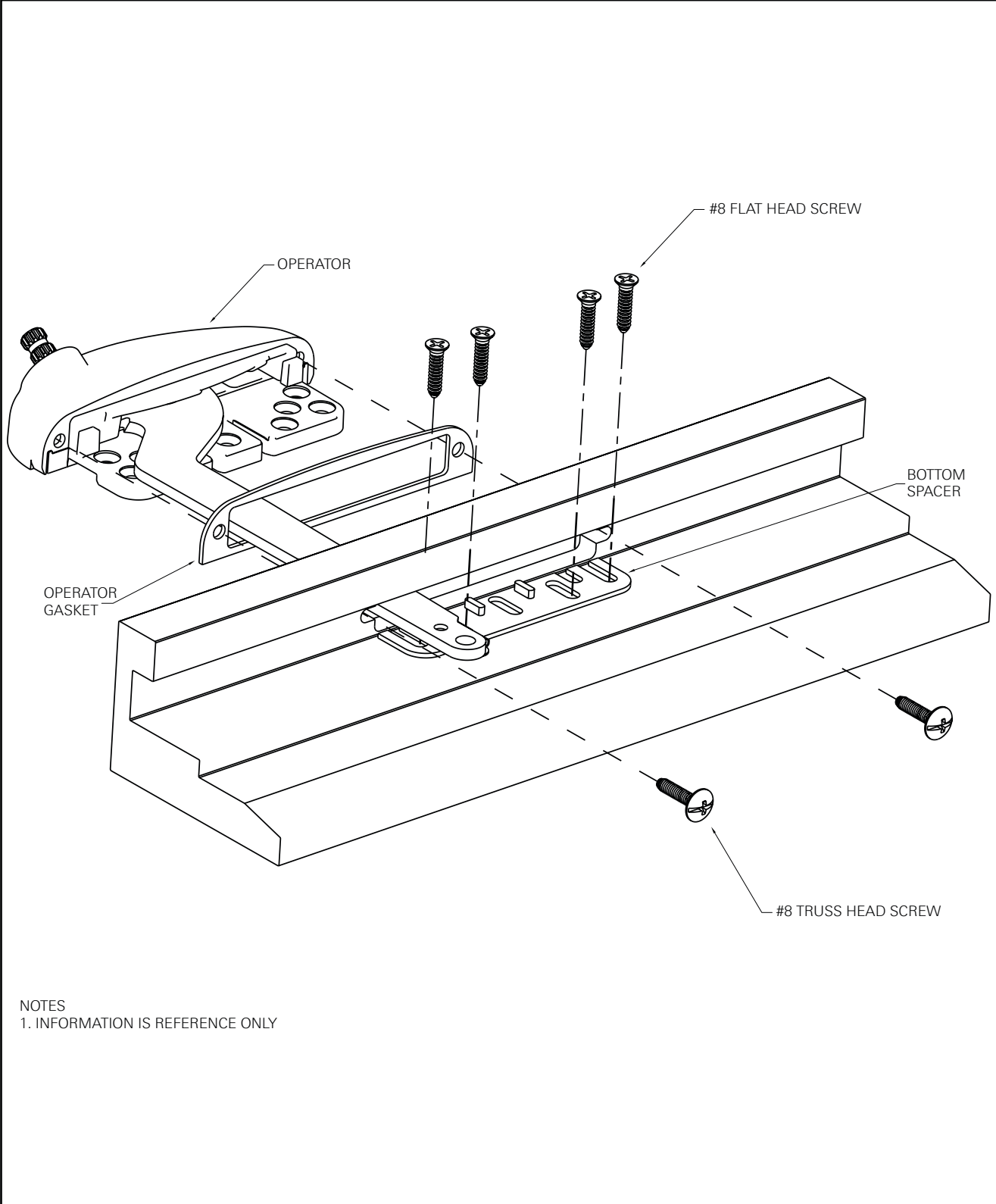


## Application of Roto X-Drive Awning - SL Operator

For ordering information, please contact Roto's customer service department at (800) 243 0893



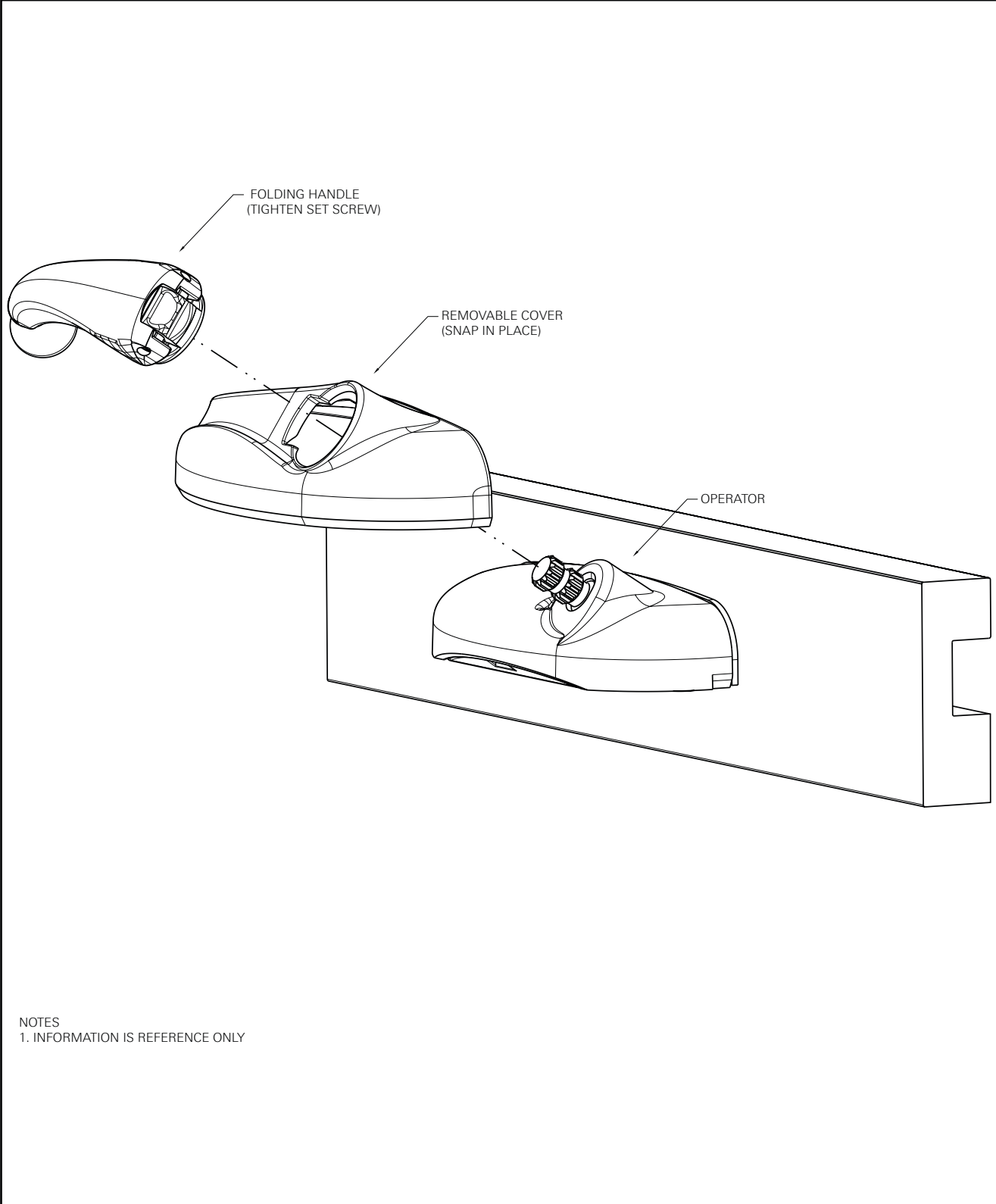
# X-Drive Operator Installation



Typical Installation of X-Drive Operators

For ordering information, please contact Roto's customer service department at (800) 243 0893

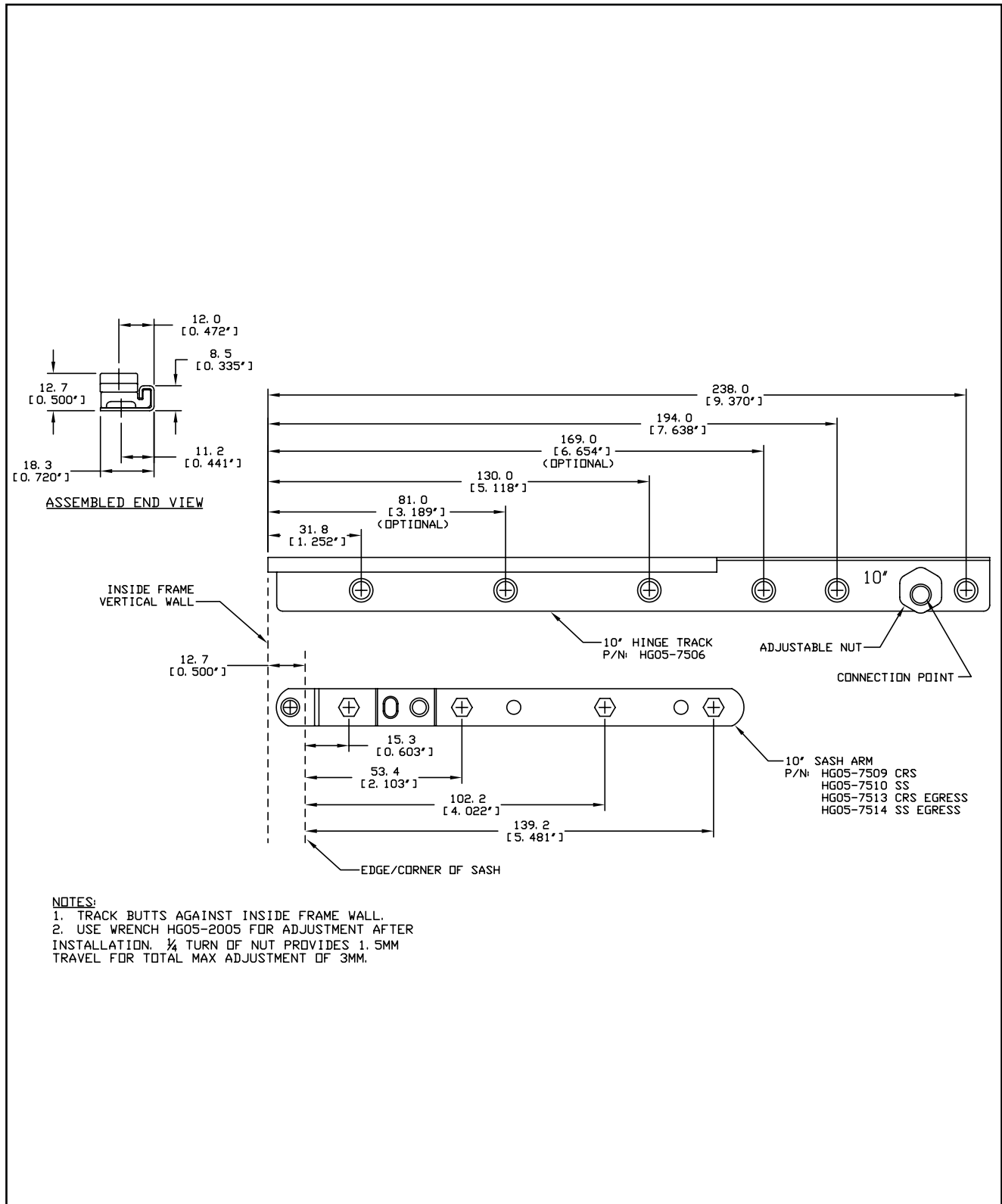
# X-Drive Operator Cover Installation



Typical Installation of X-Drive Operator Cover

For ordering information, please contact Roto's customer service department at (800) 243 0893

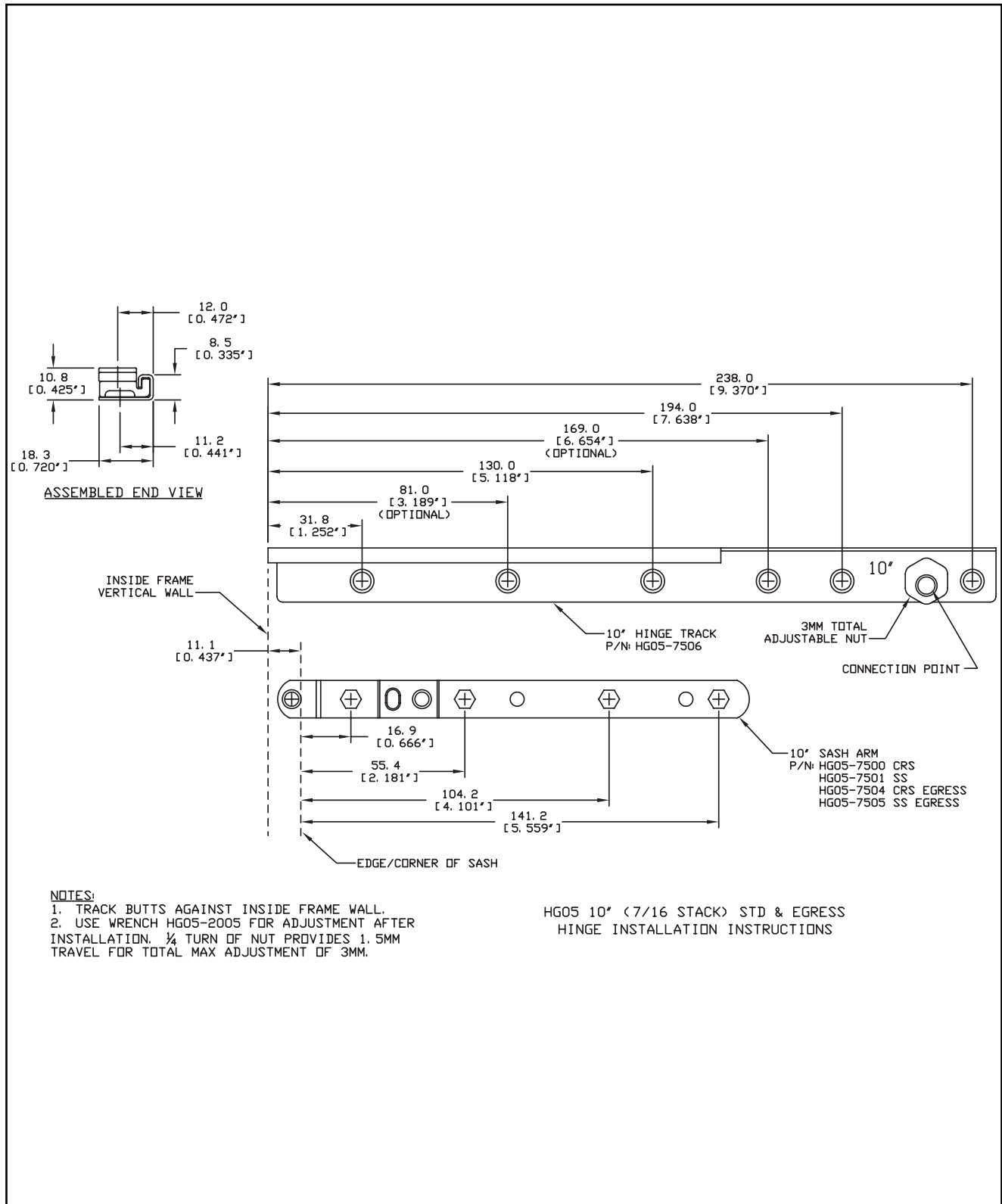
# Roto 2-Bar Hinges



## Application of HG05 10" (1/2" Stack) Washability & Egress Hinge

For ordering information, please contact Roto's customer service department at (800) 243 0893

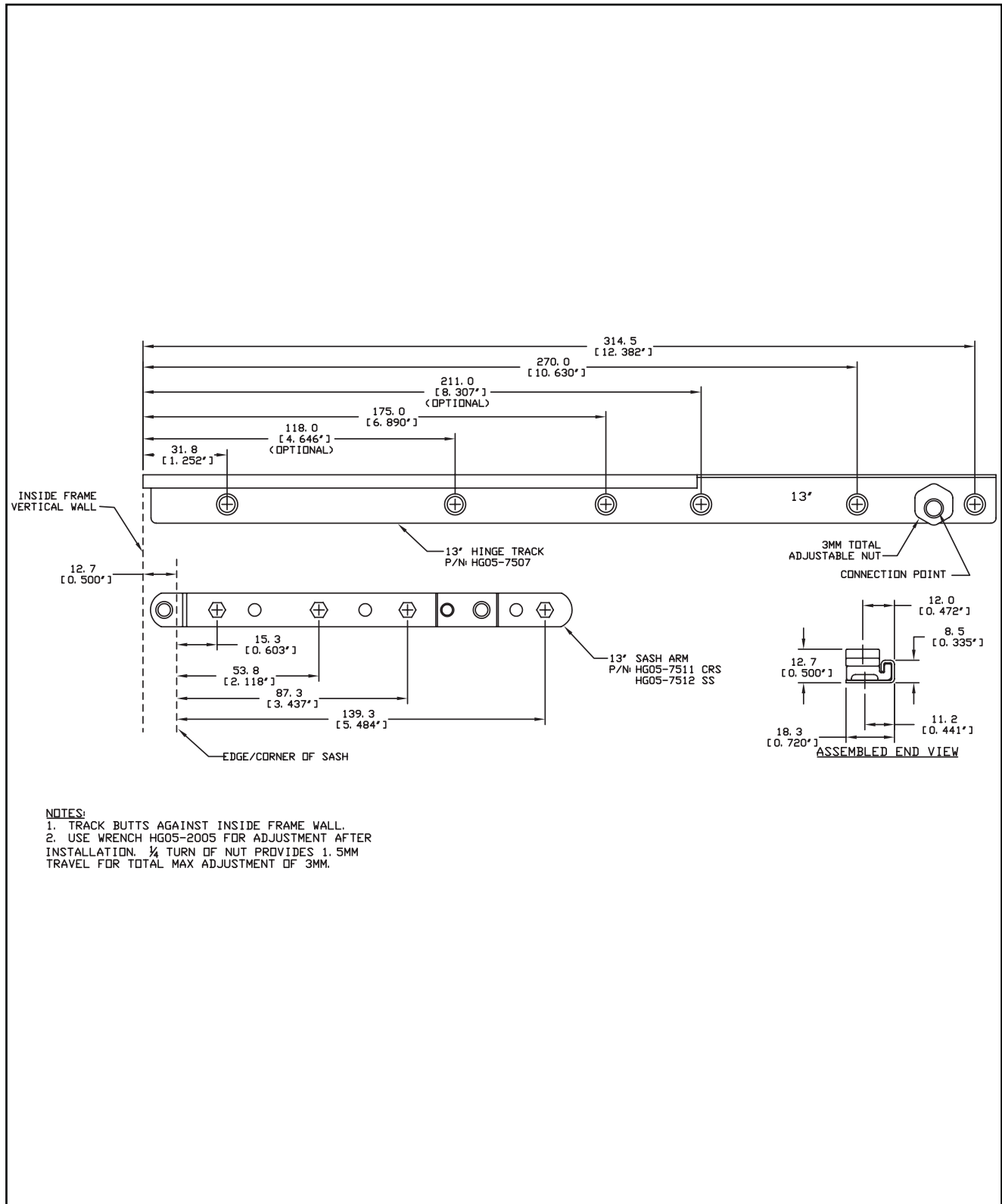
# Roto 2-Bar Hinges



## Application of HG05 10" (7/16" Stack) Washability & Egress Hinge

For ordering information, please contact Roto's customer service department at (800) 243 0893

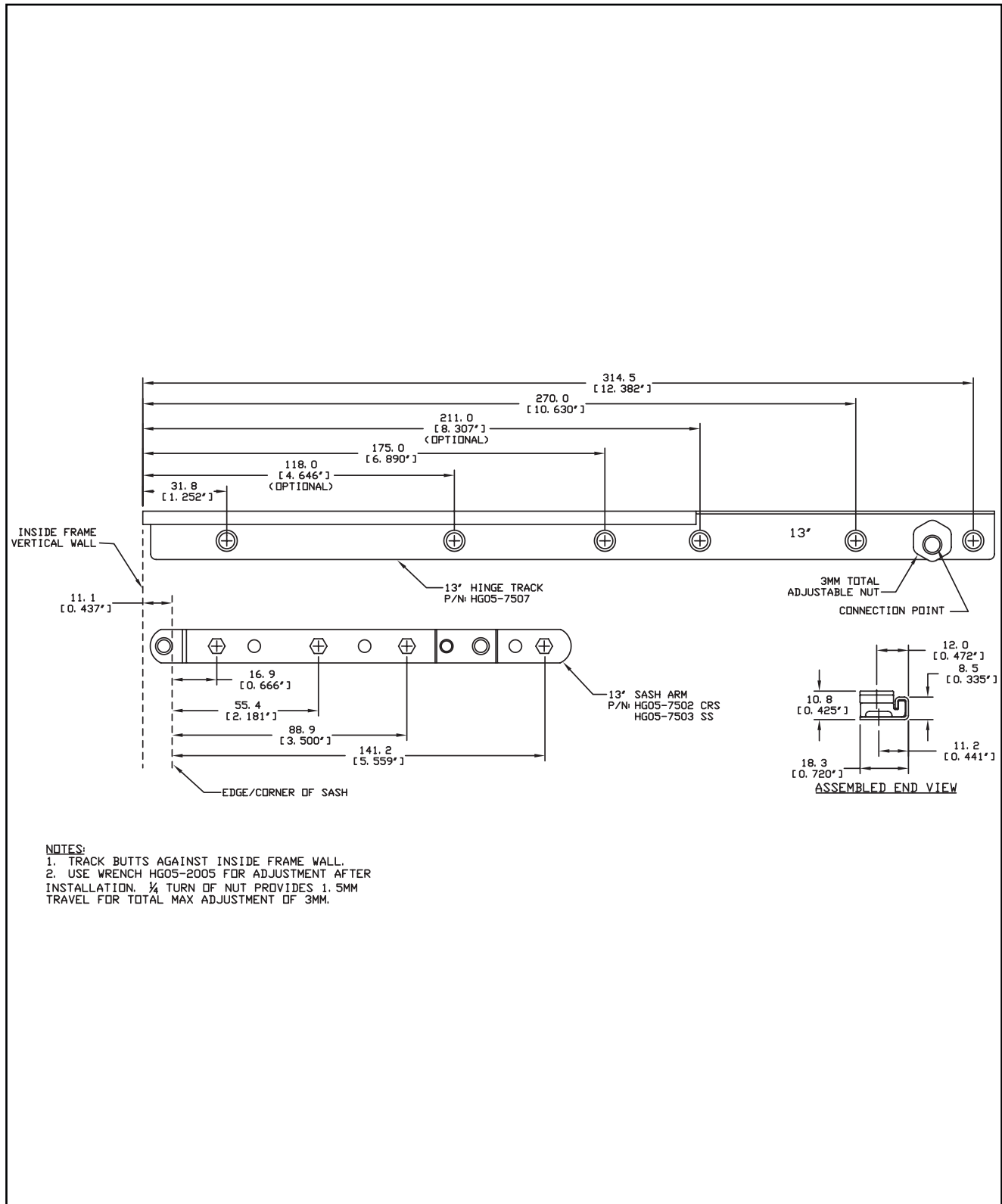
# Roto 2-Bar Hinges



## Application of HG05 13" (1/2" Stack) Washability

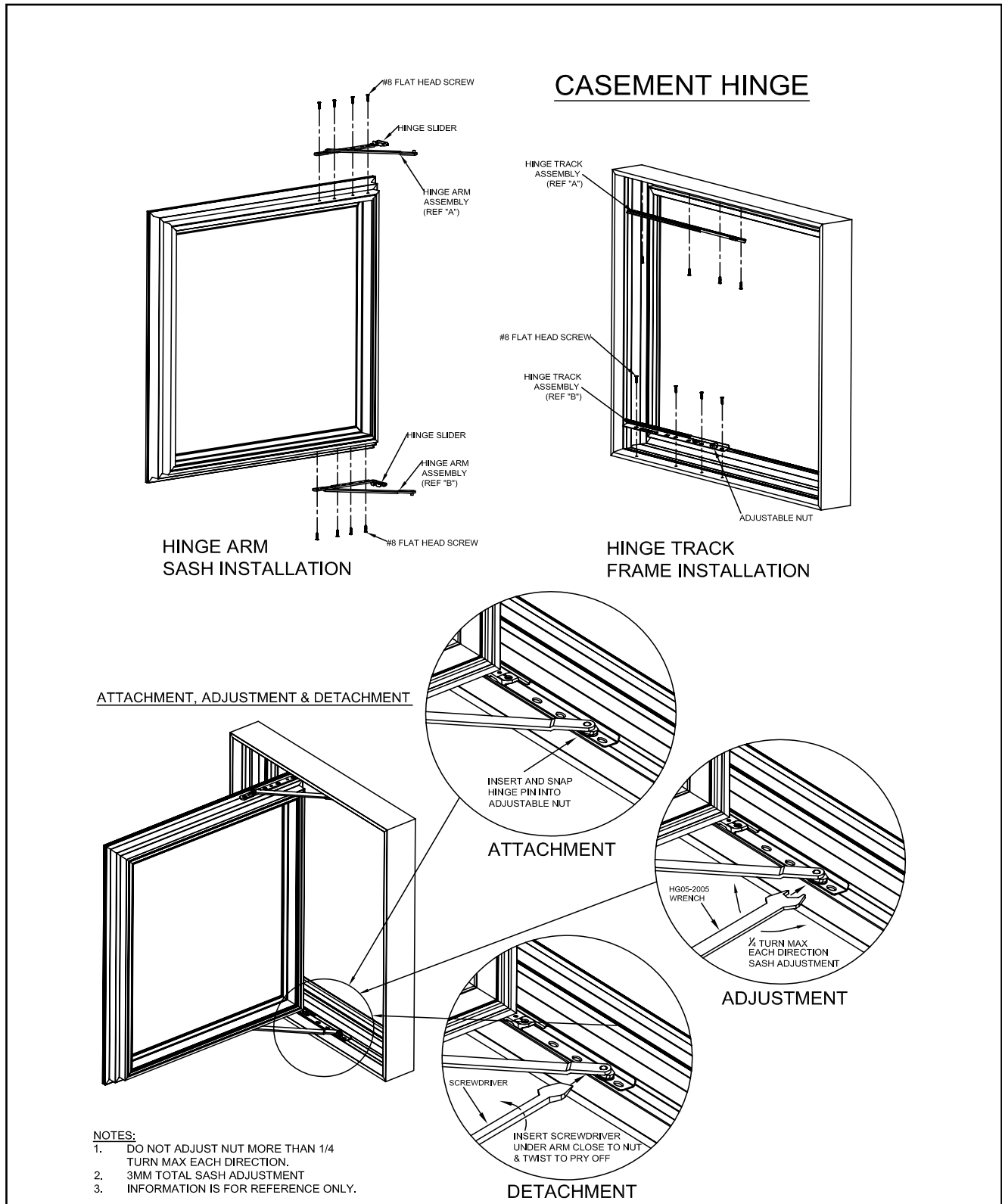
For ordering information, please contact Roto's customer service department at (800) 243 0893

# Roto 2-Bar Hinges



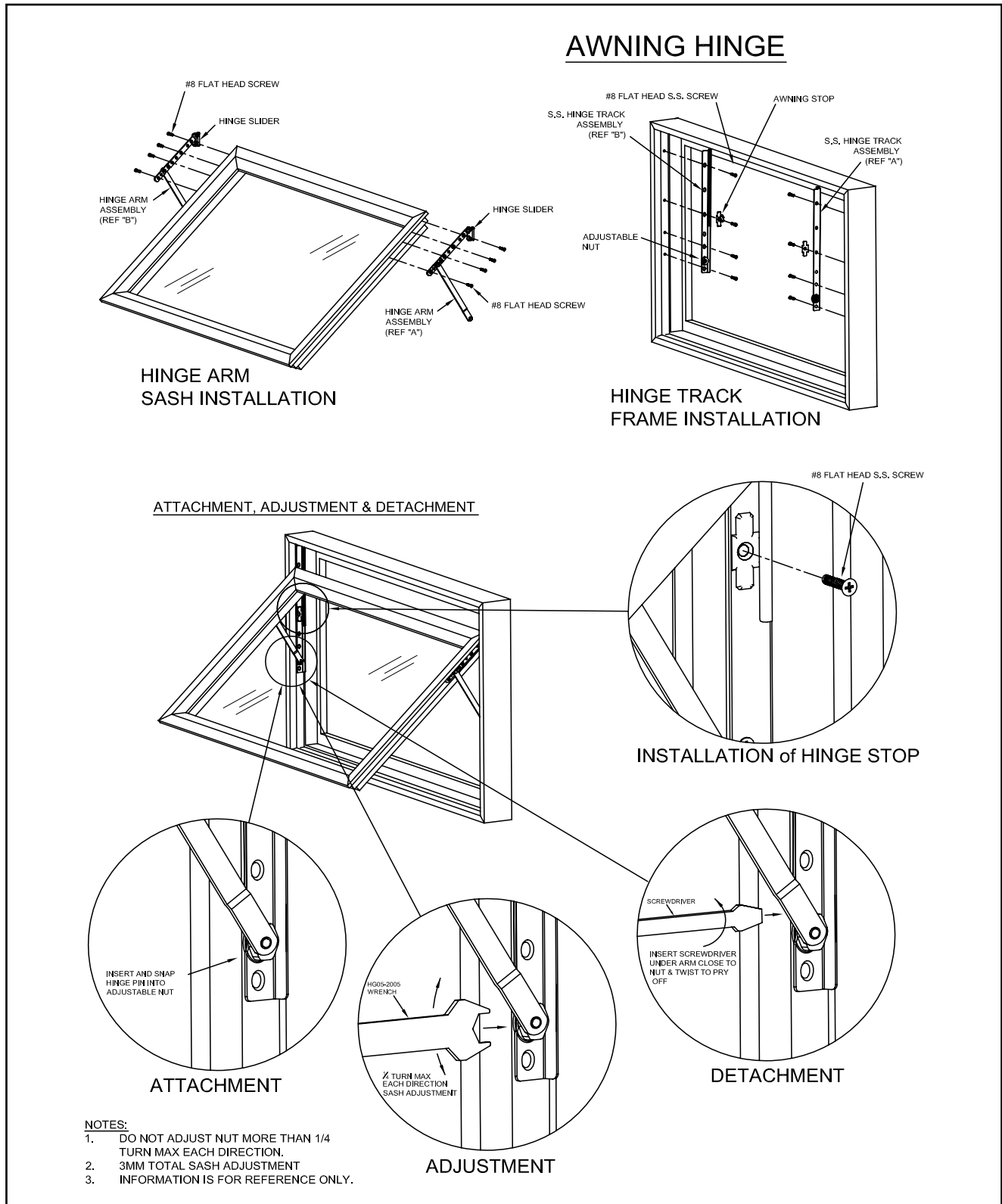
## Application of HG05 13" (7/16" Stack) Washability

For ordering information, please contact Roto's customer service department at (800) 243 0893



## Typical Installation of Roto HG05 Hinges - Casement

For ordering information, please contact Roto's customer service department at (800) 243 0893

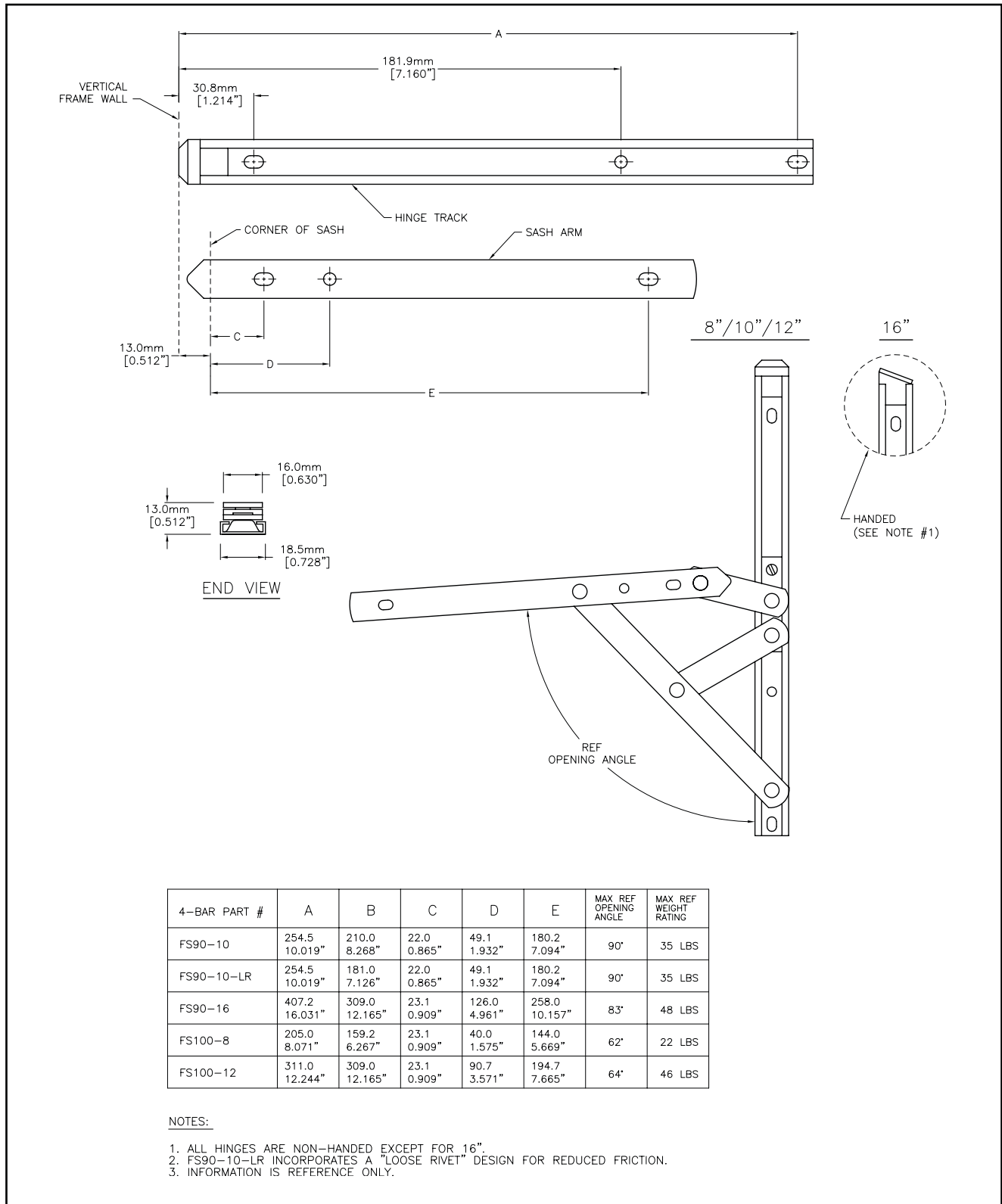


## Typical Installation of Roto HG05 Hinges - Awning

For ordering information, please contact Roto's customer service department at (800) 243 0893



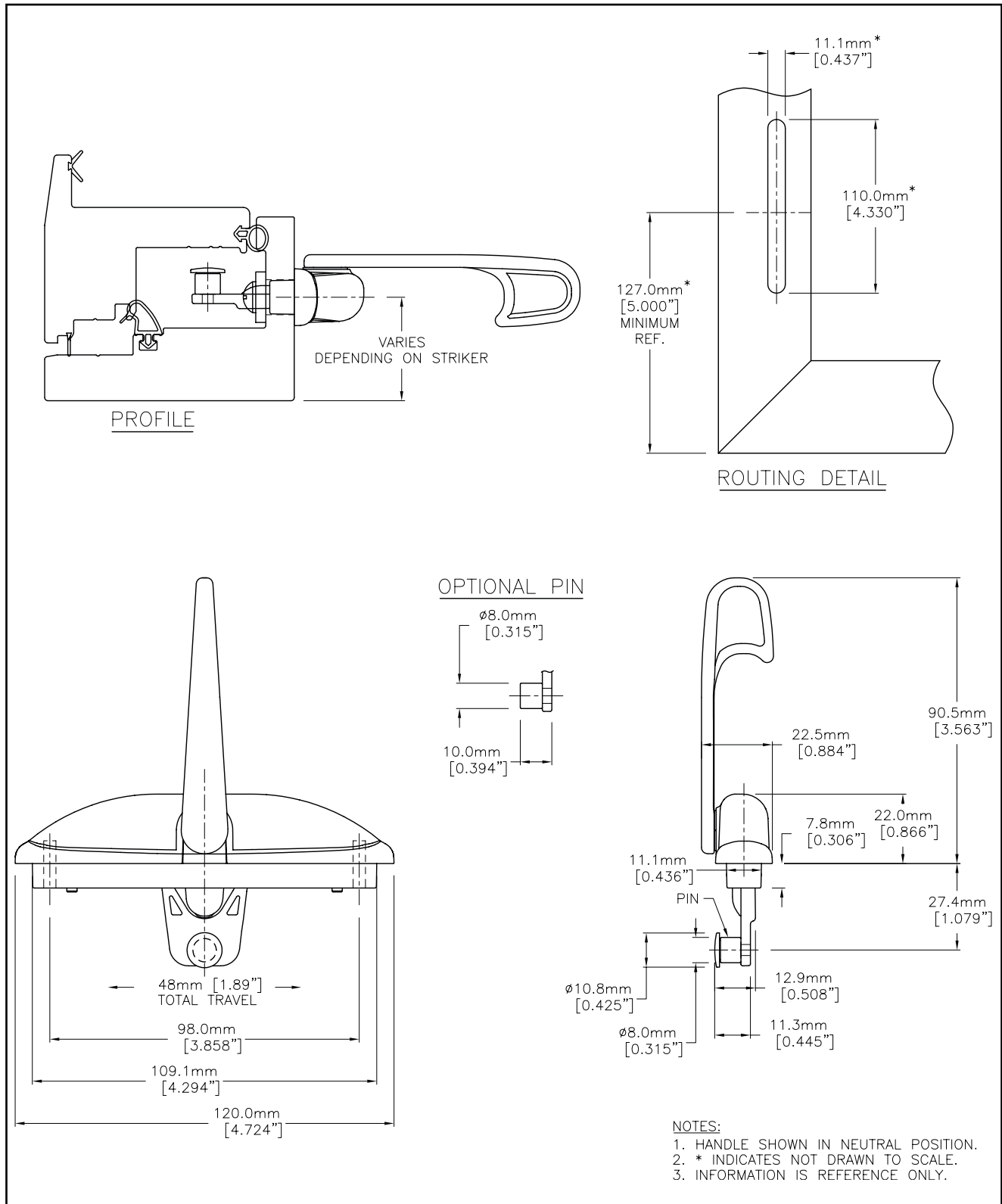
# Roto 4-Bar Hinge



## Application of 4-Bar Hinge

For ordering information, please contact Roto's customer service department at (800) 243 0893

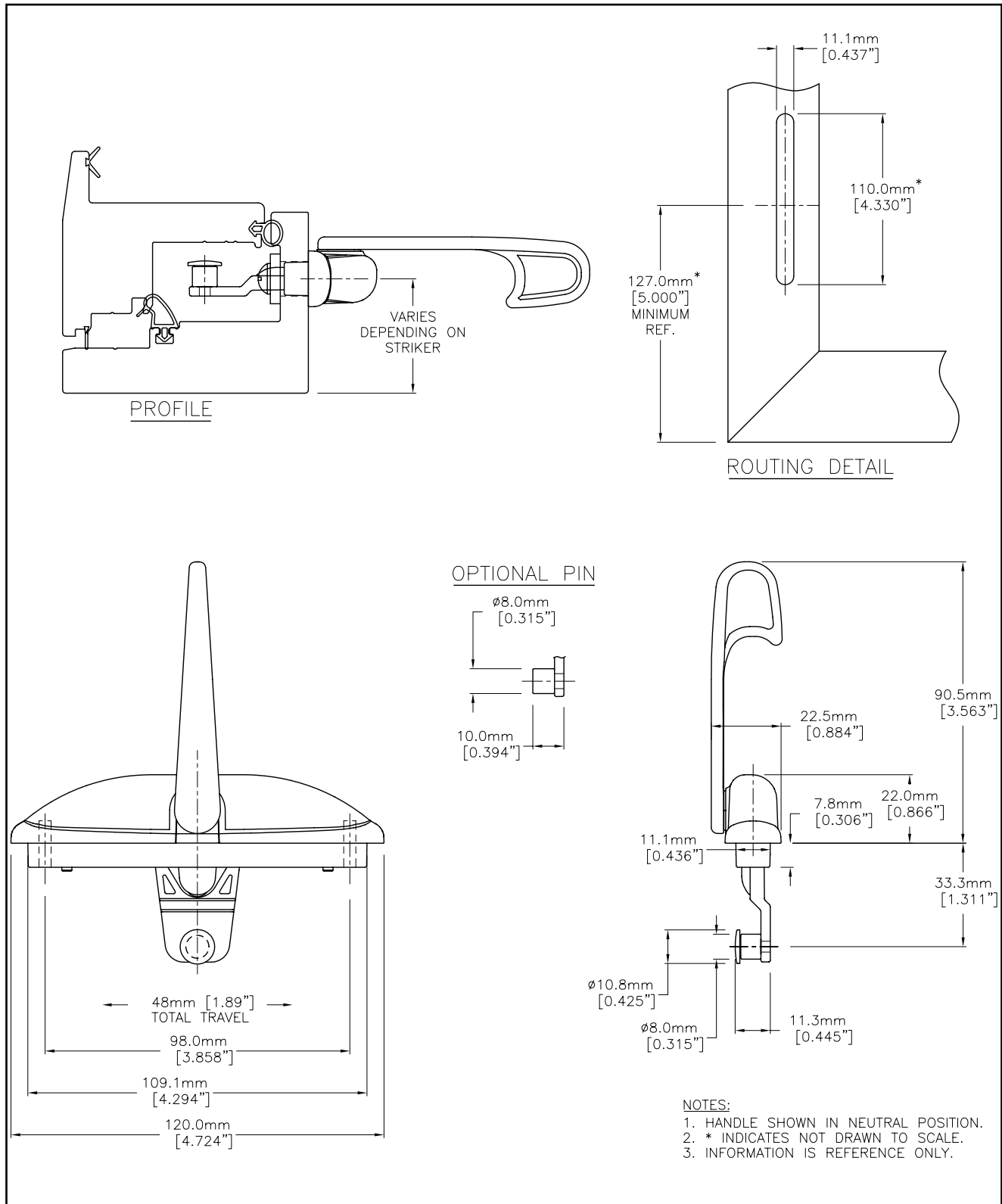
# Roto LH08 Handles - Single Point



## Application of LH08 Single Point Handle (27mm)

For ordering information, please contact Roto's customer service department at (800) 243 0893

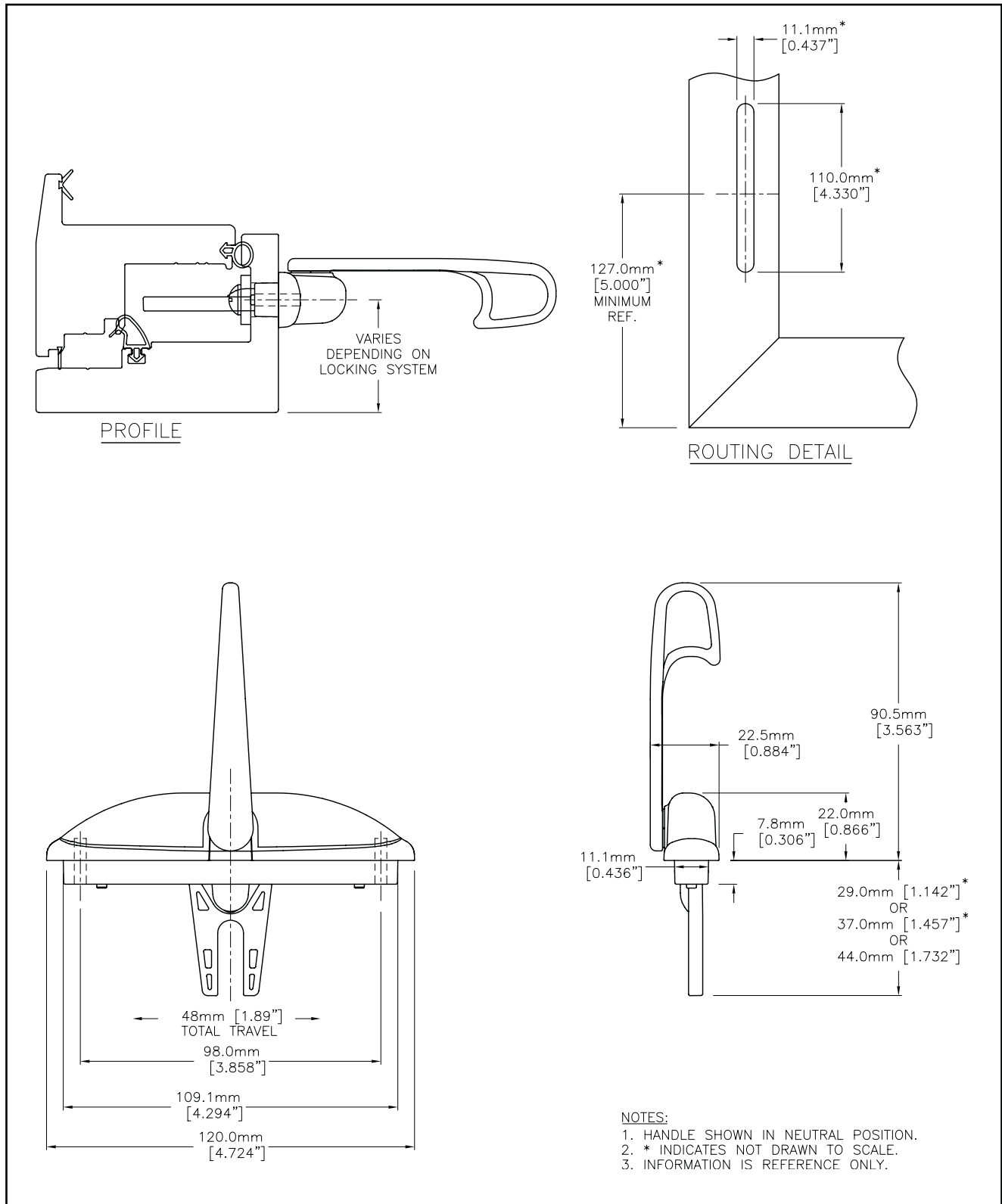
# Roto LH08 Handles - Single Point



## Application of LH08 Single Point Handle (33mm + Bend)

For ordering information, please contact Roto's customer service department at (800) 243 0893

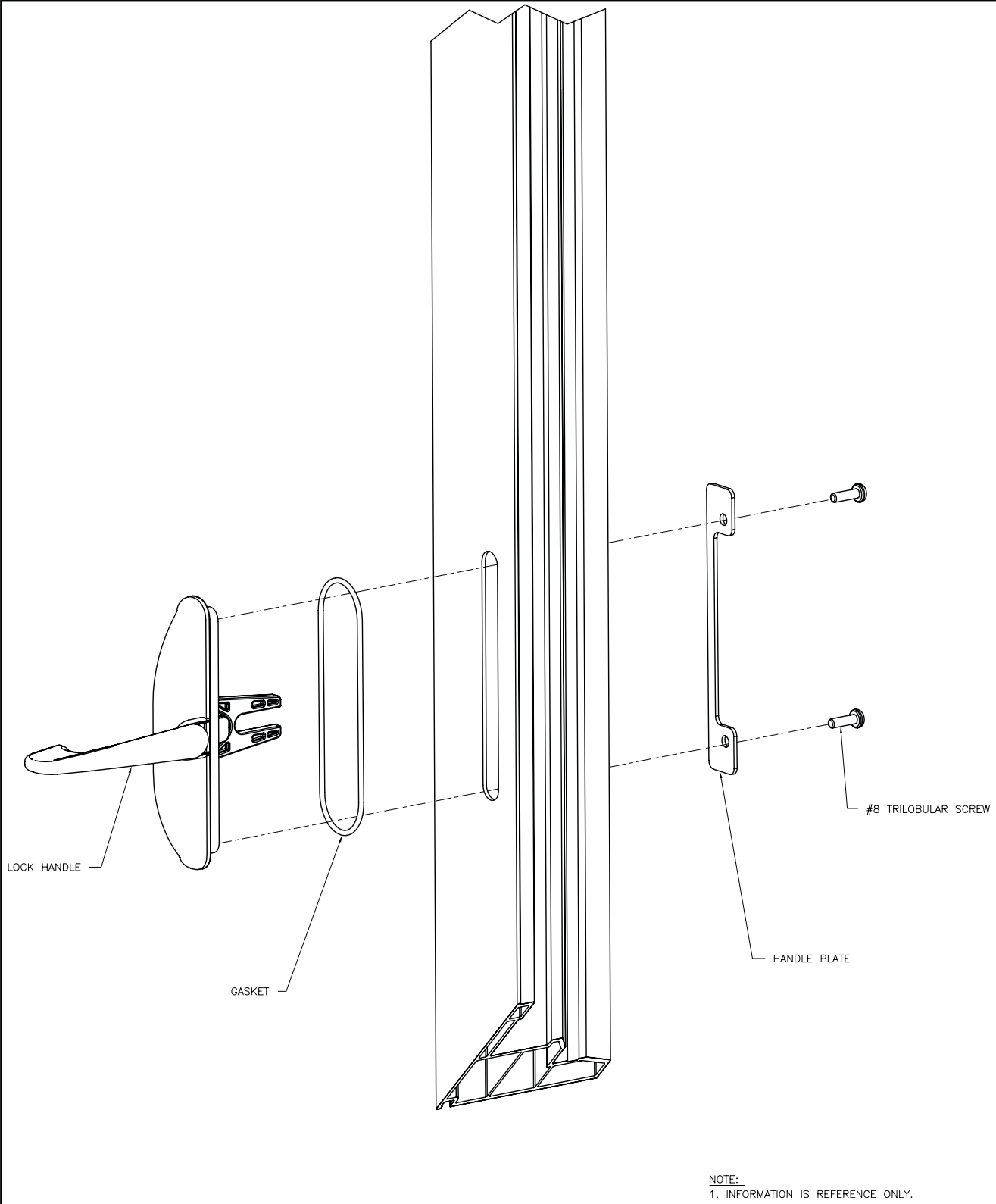
# Roto LH08 Handles - Multi-Point



## Application of LH08 Multi-point Handle

For ordering information, please contact Roto's customer service department at (800) 243 0893

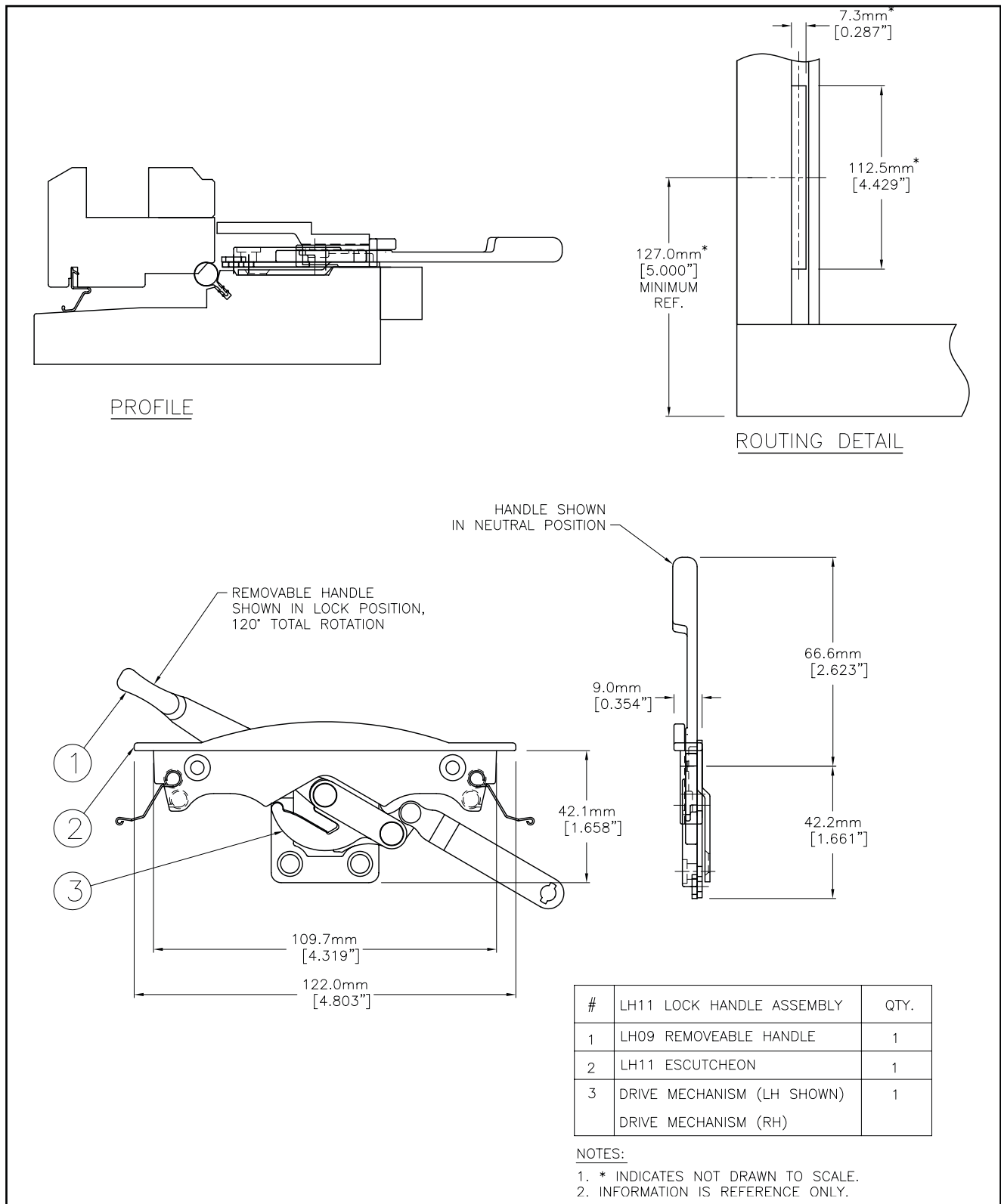
# Roto LH Handle Installation - Vinyl



Typical Installation of LH Vinyl Handle

For ordering information, please contact Roto's customer service department at (800) 243 0893

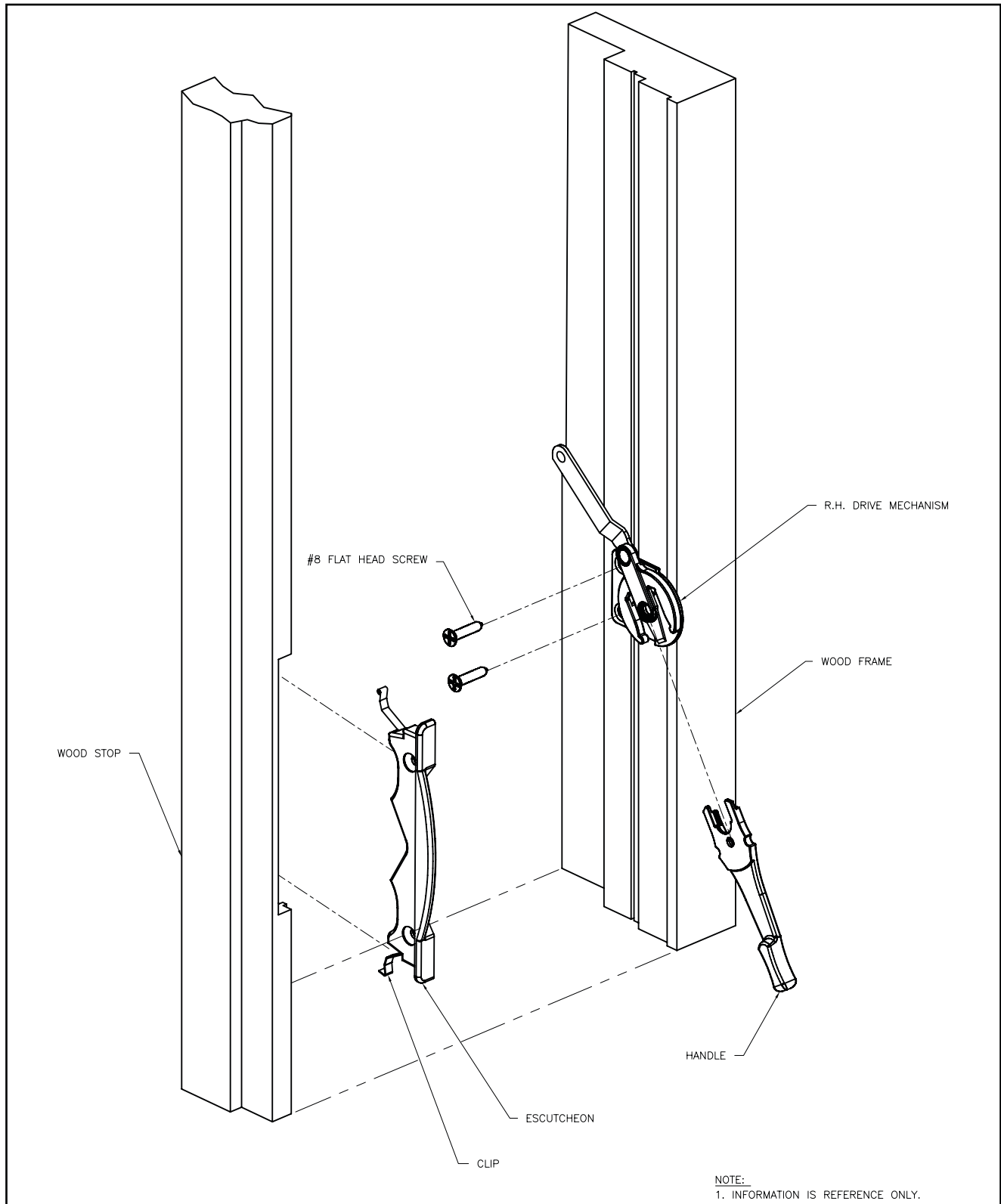
# Roto LH11 Wood Lock Handle and Escutcheon



## Application of LH11 Handle

For ordering information, please contact Roto's customer service department at (800) 243 0893

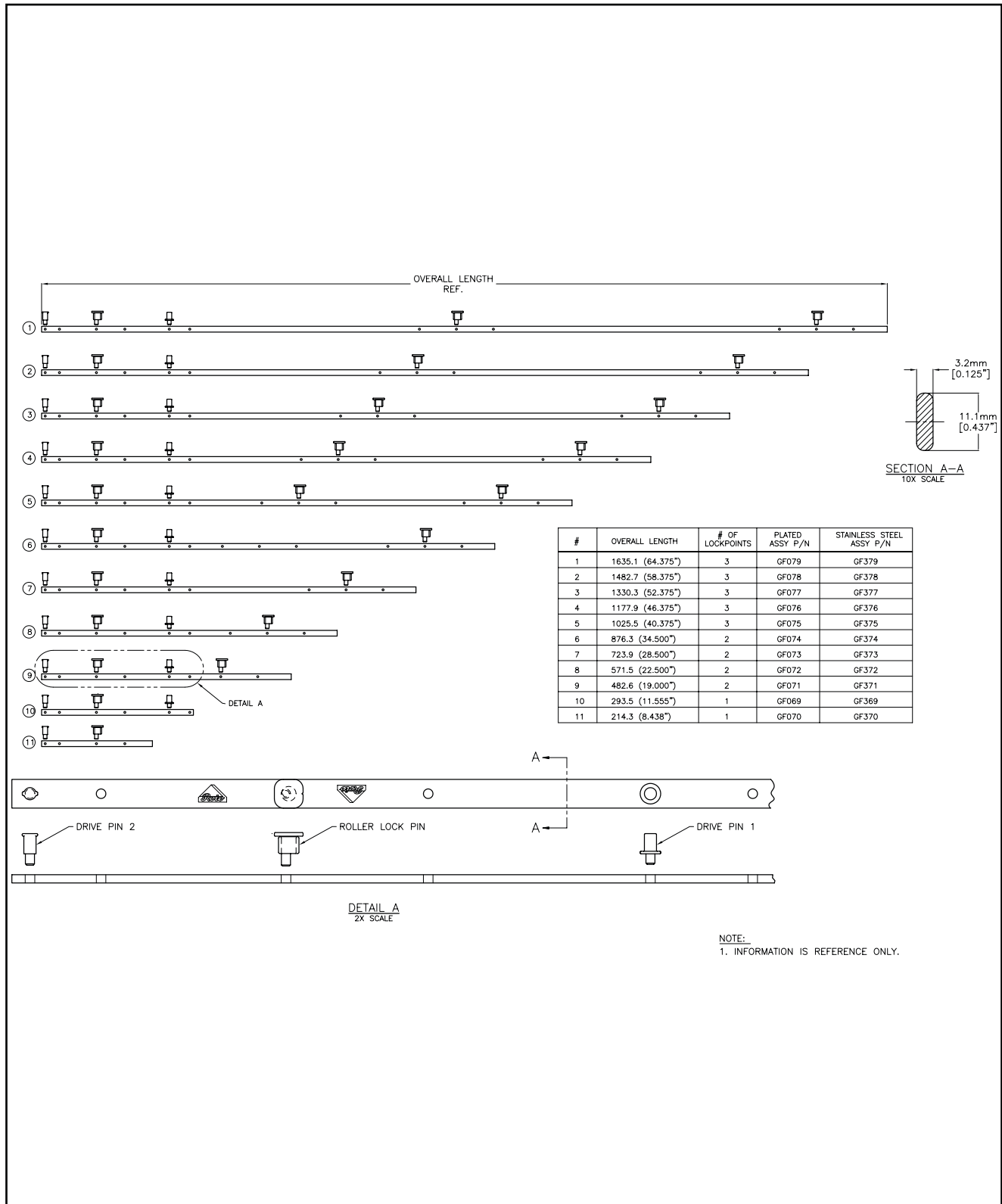
# Roto LH Handle Installation - Wood



## Typical Installation of LH Wood Handle

For ordering information, please contact Roto's customer service department at (800) 243 0893

# Roto LB05 Lockbar

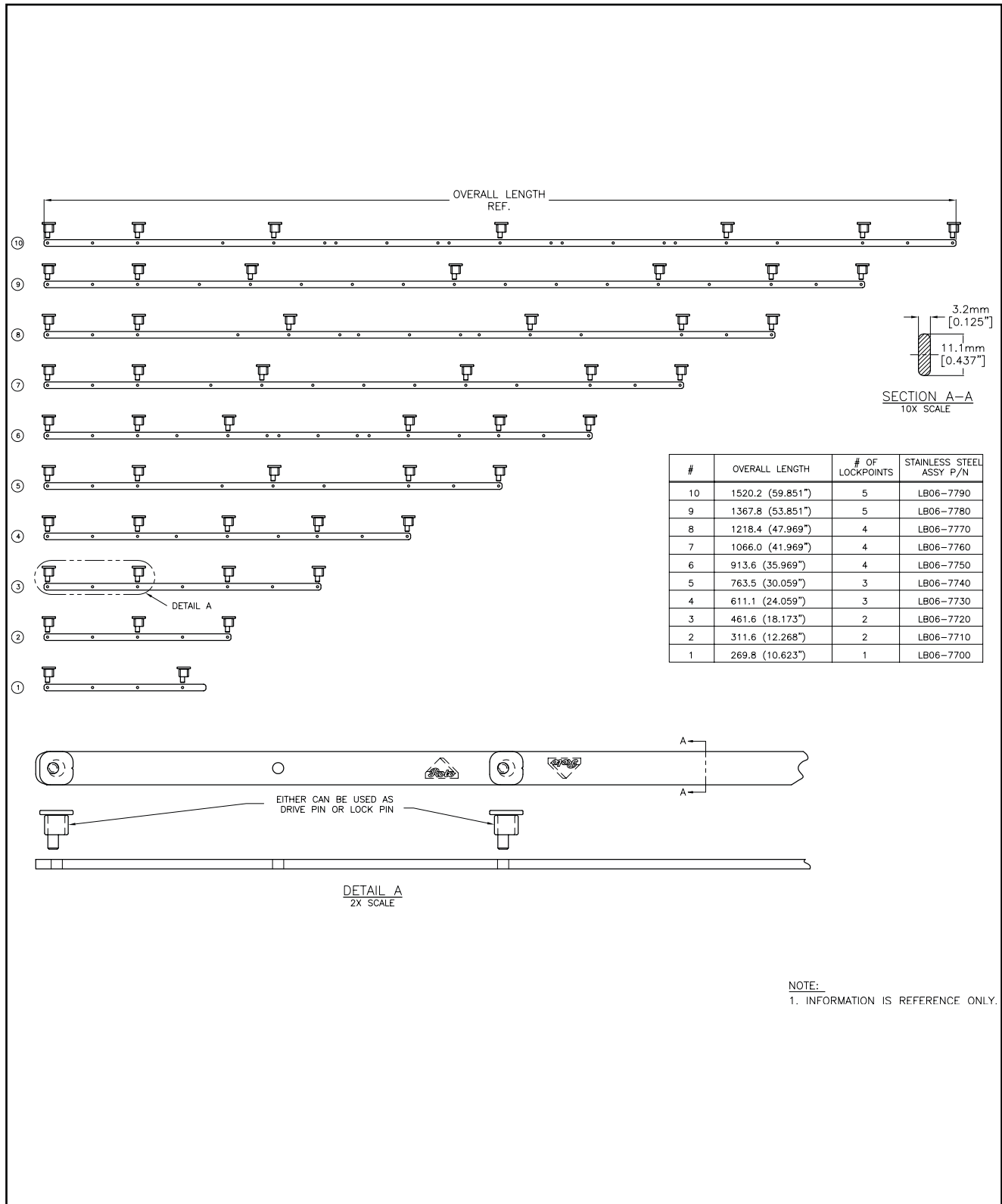


## LB05 Lockbar Configuration

For ordering information, please contact Roto's customer service department at (800) 243 0893



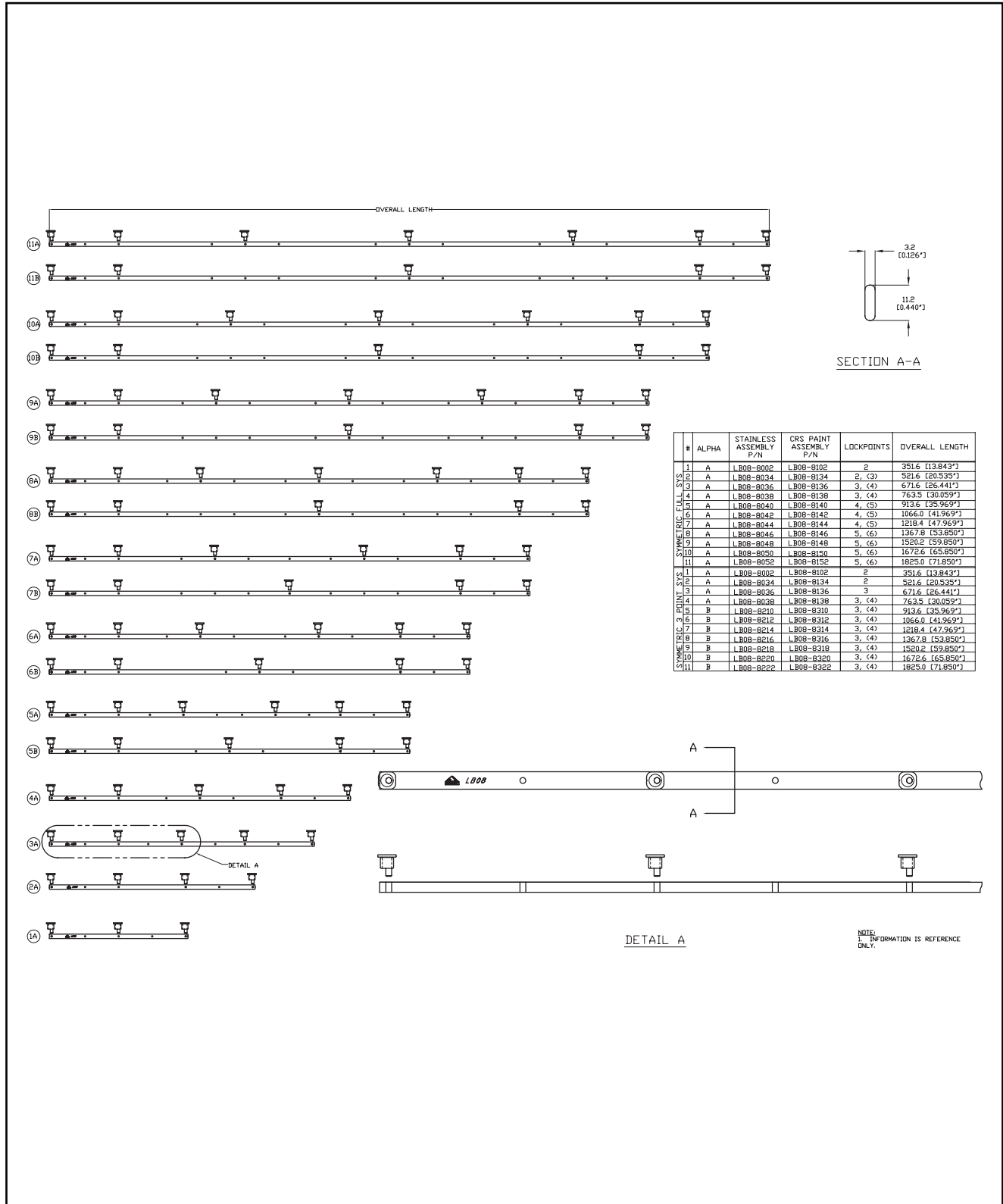
# Roto LB06 Lockbar



## LB06 Lockbar Configuration

For ordering information, please contact Roto's customer service department at (800) 243 0893

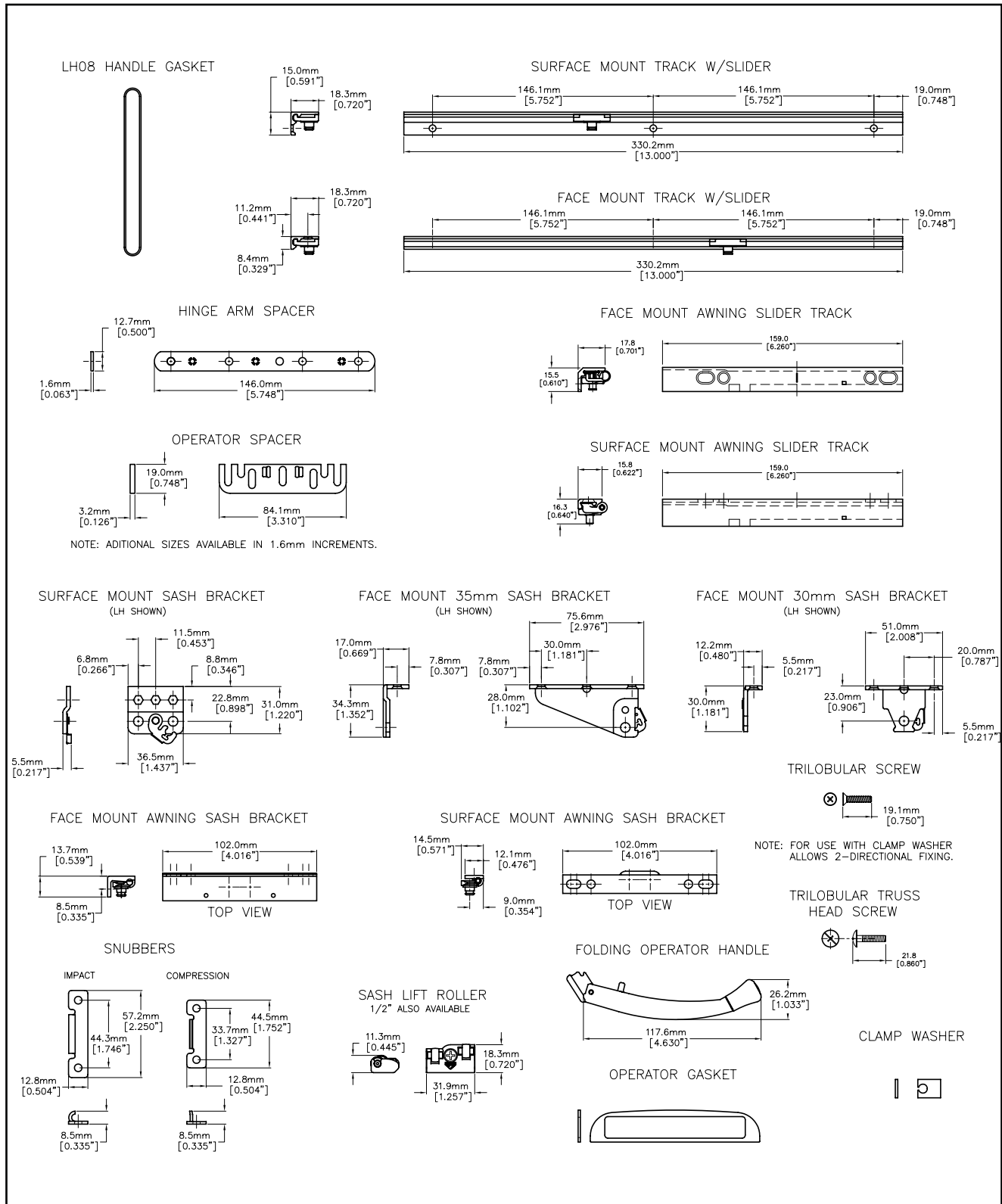
# Roto LB08 Lockbar



## LB08 Lockbar Configuration

For ordering information, please contact Roto's customer service department at (800) 243 0893

# Roto Accessories



## Application of Roto Accessories

For ordering information, please contact Roto's customer service department at (800) 243 0893