

Introduction to Cast Junction Boxes

I Purpose of Enclosure

Enclosures are used to protect personnel against accidental contact with enclosed electrical devices or connections and to protect the enclosed devices or connections against specified external conditions. They also serve as intermediate pulling and splicing points in a conduit system.

II Design of Enclosures

Enclosures are offered in different designs and construction to permit their use in various locations and areas. These are as follows:

Non-hazardous Locations:

- 1** Weatherproof boxes are so constructed as to be suitable for use outdoors under normal conditions. If it is necessary to prevent the entry of water under extreme conditions of weather, boxes listed as watertight or raintight are recommended.
- 2** Raintight boxes are so constructed as to exclude a beating rain. All boxes in this catalog which are designated as raintight have been so listed by Underwriters Laboratories, Inc.
- 3** Watertight boxes (NEMA Type 4) are constructed to meet the requirements listed under "NEMA DATA" on Page UA3.
- 4** Submersible Boxes are so constructed that they will exclude water when submerged under specified conditions of pressure and time.
- 5** Dust-Tight Boxes are so constructed to meet the requirements listed on Page UA3 under "NEMA DATA".

Hazardous Locations:

Consult Section V for our complete line of Hazardous Location Enclosures.

III Advantages of Cast Enclosures

Cast metal enclosures have the advantage over formed (fabricated) sheet metal enclosures for the following reasons:

- A** They are of one piece construction and do not have the disadvantages of spot welded seams usually found in formed sheet metal boxes.
- B** They have greater mechanical strength, have thicker walls and are suitable for drilling and tapping at the factory or in the field.
- C** They are corrosion resistant and can withstand more mechanical abuse.

IV Comparison of Enclosures in Various Cast Metals

CAST IRON BOXES will provide long life, are inherently corrosion resistant and have the lowest initial cost.

CAST ALUMINUM BOXES are lightweight, non-rusting, non-sparking, and non-magnetic. They are subject to corrosion under certain alkalis conditions such as encasement in concrete unless provided with a suitable coating.

CAST BRONZE BOXES (optional) will provide long life under adverse atmospheric conditions, are non-rusting, non-sparking and non-magnetic.

V Finishes on Cast Enclosures

CAST IRON - The hot-dip galvanized finish which is applied to all our cast iron boxes will conform to ASTM Designation A153-73, Class A and NEMA requirements for rust-resistance. Other protective finishes such as various types of paints or plastic coatings can be supplied.

CAST ALUMINUM - supplemental finishes are not normally required on cast aluminum enclosures. Special finishes such as epoxy coating, anodizing or plastic coating to meet specific environmental conditions can be applied.

CAST BRONZE is inherently corrosion resistant. Supplemental finishes are usually not required on cast bronze.

VI Hardware Used on Cast Enclosures

CAST IRON BOXES are furnished with Stainless Steel screws. Silicon bronze screws are available on most enclosures. CAST ALUMINUM BOXES are furnished with stainless steel screws. CAST BRONZE BOXES are furnished with either brass or silicon bronze screws.

VII Specification of Extras on Cast Enclosures

The type of holes to be provided for the entrance of conduit into the enclosure are defined under "Instructions for Ordering Boxes" on Page UA4.

VIII Specification of Extras on Cast Enclosures

The "Standard Construction" of each type of enclosure is shown on each listing. The extras which are available and must be specified are shown under "Additional Cost Items" on Pages UA6, UA7.

IX Delivery Schedules

Cast enclosures are normally produced to order. However, faster deliveries can be provided for some of the more commonly specified styles and sizes. Contact your Local Representative for delivery information and assistance to expedite shipments of the material required on your order.

Cast Iron & Cast Aluminum Boxes

NEMA Data

Our cast junction boxes are designed, constructed and tested to comply with NEMA standards. The following chart has been prepared to provide a quick reference for selecting enclosures to meet specific NEMA requirements.

A brief description of the more common types of enclosures used by the electrical industry relating to their environmental capabilities follows. Please refer to the appropriate sections of NEMA Standards Publication No. 250-1979. Enclosures for Electrical Equipment (1000 Volts Maximum) for complete information regarding applications, features and design tests.

Definitions Pertaining to Non-hazardous Locations

Type 1 enclosures are intended for use primarily to provide a degree of protection against contact with the enclosed equipment.

Type 2 enclosures are intended for indoor use primarily to provide a degree of protection against limited amounts of falling water.

Type 3 Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow and windblown dust; and that will be undamaged by the external formation of ice on the enclosure.

Type 3R enclosures are intended for outdoor use primarily to provide a degree of protection against falling rain, sleet, and external ice formation.

Type 3S enclosures are intended for outdoor use primarily to provide a degree of protection against windblown dust, rain, sleet, and provide for operation of external mechanisms when ice laden.

Type 4 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, and hose-directed water.

***Type 4X** enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose-directed water.

Type 5 enclosures are intended for indoor use primarily to provide a degree of protection against dust and falling dirt.

Type 6 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against the entry of water during occasional temporary submersion at a limited depth. (30 min. @ 6 ft.)

Type 6P enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against the entry of water during prolonged submersion at a limited depth. (24 hrs. @ 6ft.)

Type 12 enclosures are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping non-corrosive liquids.

Type 12K enclosures with knockouts are intended for indoor use primarily to provide a degree of protection against dust, falling dirt, and dripping non-corrosive liquids other than at knockouts.

Type 13 enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying of water, oil, and non-corrosive coolant.

Definitions Pertaining to Hazardous (Classified) Locations

Type 7 enclosures are for use indoors in locations classified as Class I, Groups A, B, C, or D, as defined in the *National Electrical Code*. See Section V.

Type 9 enclosures are for use in indoor locations classified in Class II, Groups E, F, or G, as defined in the *National Electrical Code*. See Section V.

Type of Enclosure	Type 1 Type 5	Type 2	Type 3 Type 3R Type 3S	Type 4	Type 4X	Type 6	Type 12 Type12K Type 13
YS & YS-A	✓	✓	✓	✓	*		✓
YL & YL-A	✓	✓	✓	✓	*		✓
YF	✓	✓	✓	✓		✓	✓
YF-A	✓	✓	✓	✓	*		✓
YW & YW-A	✓	✓	✓	✓	*		✓
YU	✓	✓	✓				✓
YR	✓	✓	✓	✓			✓
YT	✓	✓					
YC	✓	✓					
YW-T & YW-T-A	✓	✓	✓	✓	*		✓
YCW & YCW-A	✓	✓	✓	✓	*		✓
YPW & YPW-A	✓	✓	✓	✓	*		✓
YBW & YBW-A	✓	✓	✓	✓	*		✓

* Aluminum enclosures with stainless steel hardware may be ordered with optional spray applied epoxy powder coating to meet Type 4X corrosion protection. Use suffix -NX as listed in the price index. Contact your local representative for price and availability.

Instructions for Ordering Boxes

The following information should be given on all box orders:

Catalog Number and Inside Dimensions (L x W x D) should be specified.

Sketch showing size and location of conduit entrances should be furnished similar to Drilling Template, Fig. 2, page UA5. Tables on page UA5 give recommended spacing between conduits and minimum distance from corner and back of box. When spacings are not specified, they will be located at our discretion.

Type of Conduit Entrances (see Fig. 1, below) should be specified as follows:
1 Slip-Hole (SH) - conduit clearance hole.
2 Drilled and Tapped hole (DT).
3 Bossed, Drilled and Tapped hole to provide greater thread engagement (BDT).
4 Boss only (BWH) - for Drilling and Tapping in field. Specify conduit size.

Mounting Lugs (See Fig. 1 below) are provided on all surface mounted boxes over 100 cubic inches of internal volume to meet NEC Section 314.23(E). Boxes 100 cubic inches or less may be supported by 2 or more conduits threaded into the enclosure, or by optional mounting lugs. Boxes up to 12" x 6" have 2 mounting lugs. Larger boxes have 4 mounting lugs. All mounting lugs will be located on the long sides of the box, unless otherwise specified. Refer to page UA10 for dimensional data.

Mounting Buttons (see Fig. 1 below) for mounting equipment off the back of the box can be furnished located on standard centers and blind D & T for ¼" - 20 screws. If special mounting button arrangement is required furnish a sketch showing layout including the size of the mounting screws. Please use the drilling template provided on page UA11.

Covers other than standard, must be specified if required.

Gaskets other than standard must be specified if required.

Drilled & Tapped Holes are threaded holes provided in the enclosure wall into which the conduit is screwed. To meet UL requirements, they must conform to the following:

1* Enclosures for use in Non-hazardous Locations must have a wall thickness of not less than ¼" at the tapped holes for the conduit and there shall be not less than 3½ threads in the metal.

* Compare the wall thickness shown in the catalog page for these enclosures with the chart below to determine the number of threads which the box wall will provide for the various conduit sizes. If more threads are required, please specify a Bossed, Drilled and Tapped hole, type BDT.

Wall Thickness Required – Inches			
Conduit Size	Number of Threads per inch	5 Threads	3½ Threads
3/8"	18	9/32	7/32 †
½" to ¾"	14	3/8	¼
1" to 2"	11½	7/16	5/16
2½" to 6"	8	5/8	7/16

† ¼" minimum wall thickness must be provided

Conduit Entrances:

Slip Holes: These are clearance holes for conduit. No threads are provided. Conduits are usually fastened in slip holes by means of locknuts and bushings. *STANDARD LOCKNUT SPACINGS MUST BE ALLOWED BETWEEN THE CONDUITS.* See Table on Page UA5.

Bossed, Drilled & Tapped Holes are holes threaded thru the box wall and a boss (or pad) which has been added at the location of the conduit entrance to provide added wall thickness for 5 threads of engagement.

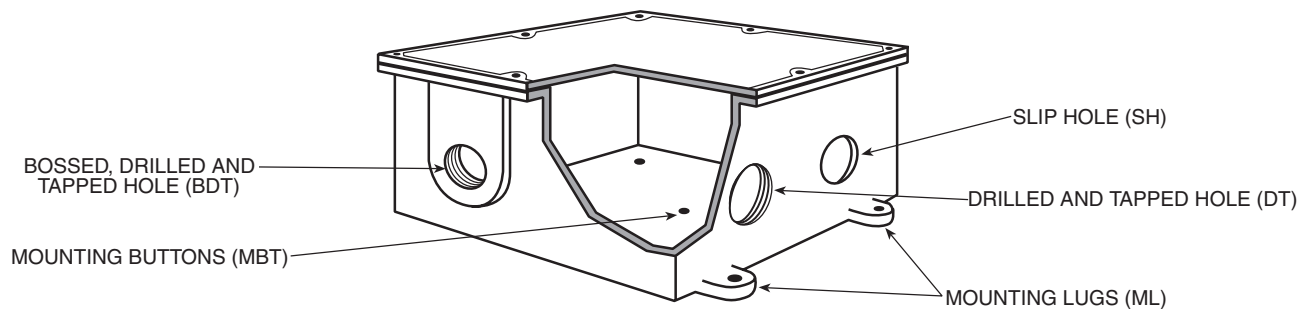


Fig. 1

Instructions For Ordering Boxes

Drilling Template

- View looking into box - sides laid down.
- Dimensions are always understood to be Inside Measurements unless otherwise specified.
- See page UA11 for a blank Drilling Template, for copier reproduction or computer scanning.

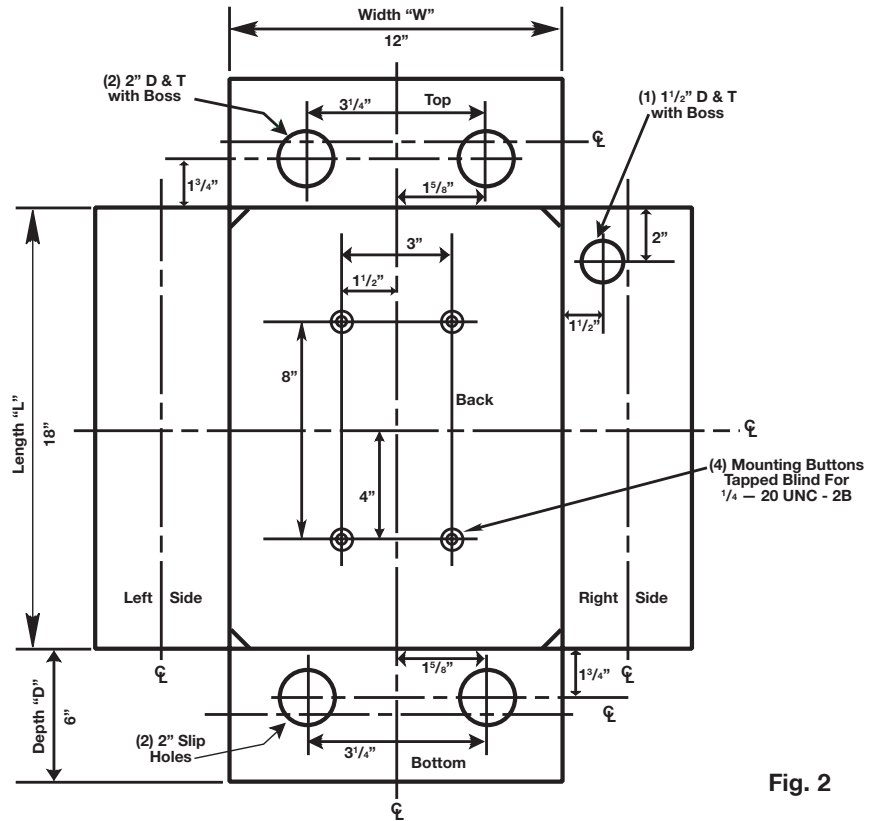


Fig. 2

Recommended Spacing and Location of Conduits

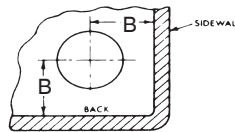
(Allows for bushing and locknut clearance)

All boxes of the Type YS, YL, YC, YW, and YT have a post in each corner and allowance must be made for them, when conduit entrances are to be located close to a corner. Dimension "A" in the table below is the minimum distance allowable from the sidewall of these boxes to the centerline of the conduit entrance, which provides the proper clearance between a locknut and the post. The "B" dimension will provide the proper clearance between a locknut or bushing and the sidewall of all other types of boxes and between a locknut or bushing and the backs of all boxes, including Types YS, YL, YC, YW, and YT.

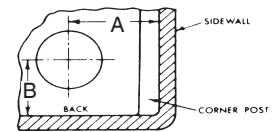
Size of Conduit	Minimum Space Between Centers of Conduits * (inches)											
	6	5	4	3 1/2	3	2 1/2	2	1 1/2	1 1/4	1	3/4	1/2
1/2	5	4 3/8	3 3/8	3 3/8	3	2 3/8	2 3/8	2	1 7/8	1 3/4	1 1/8	1 1/2
3/4	5 1/8	4 1/2	3 3/4	3 1/2	3 1/8	2 3/4	2 1/2	2 1/8	2	1 5/8	1 3/4	
1	5 1/4	4 3/8	4	3 3/8	3 1/4	3	2 3/8	2 3/8	2 1/4	2		
1 1/4	5 1/2	4 7/8	4 1/8	3 3/8	3 1/2	3 3/8	3	2 1/2	2 3/8			
1 1/2	5 3/8	5	4 1/4	4	3 3/8	3 1/4	3	2 3/8				
2	6	5 3/8	4 3/8	4 1/4	3 3/8	3 3/8	3 1/4					
2 1/2	6 1/4	5 5/8	4 3/8	4 3/8	4 1/4	3 3/8						
3	6 3/8	6	5 3/8	5	4 3/8							
3 1/2	7	6 1/4	5 3/8	5 1/4								
4	7 1/4	6 3/8	5 3/8									
5	8	7 1/4										
6	8 3/8											

* If Conduit Fittings are used additional spacing between conduits will be required. Determine spacings based on fittings being used.

Conduit Size	Minimum Spacing of Conduit From Sides and Back											
	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"
Dimension - A	1 1/4"	1 3/8"	1 5/8"	1 7/8"	2"	2 3/8"	2 5/8"	3"	3 1/4"	3 3/8"	4 1/4"	4 7/8"
Dimension - B	1"	1"	1 1/8"	1 3/8"	1 1/2"	1 3/4"	2"	2 1/2"	2 3/8"	3"	3 3/4"	4 3/8"



Types YF, YU, YR



Types YS, YL, YW, YC, YT

Cast Iron Boxes & Cast Aluminum Boxes

Additional Cost Items

The table below shows the additional cost items available on the different types of enclosures shown in this catalog. These cost items are shown in the tables on the adjacent page and when not furnished as standard equipment the cost must be added to the base price of the box.

Special Equipment Consult Factory for Prices and Availability

Box Assemblies:

Our manufacturing and engineering facilities are available to help solve your special problems involving combinations of boxes and other equipment such as barriers, receptacles, cable seals, indicating lights, transformers, fuses, relays, terminal blocks, etc. Boxes incorporating variations of standard construction, special sizes and boxes of cast bronze can also be furnished.

Complete data regarding quantities and specifications will be required for quotation of special boxes. Please refer your requirements to our local representative.

Special Covers of plain or checkered aluminum, plain brass plate and plain or checkered bronze can be furnished as well as steel checkered plate covers for pedestrian or vehicular traffic.

Special Gaskets to meet specific environmental or temperature requirements can be furnished. Some of the materials frequently specified are: Hypalon, Vellumoid, Nitrile and Silicon Rubber.

Special Hardware such as tamper proof screws, silicon bronze screws or hex head screws are available.

Special Coatings such as various types of epoxy paints or plastic coatings can be applied. Information regarding type of coating, thickness and color required must be specified.

Lettering on Covers can be furnished. These are usually raised cast-on letters or engraved letters and can be applied to the cover of any type box.

Submersibility Tests can be made on our Types YF within the limitations shown on Pages UA14 listing these enclosures.

Certifications can be furnished if specific requirements are provided at time of order.

ITEM Catalog Designation	TYPE OF ENCLOSURE														
	YS	YL	YF	YW	YU	YR	YT	Y58E	YC	YNY	YW-T	1950	YCW	YPW	YBW
Slip Holes (SH)	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	NA	NA	NA	NA
D & T Holes (DT)	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	✓	NA	NA	NA
Bosses Only (BWH)	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	✓	NA	NA	NA
D & T/Boss (BDT)	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	✓	✓	S	S	S
Mtg. Lugs (ML)	S	S	S	S	✓	✓	✓	NA	✓	NA	S	S	NA	NA	NA
Mtg. Buttons (MBT)	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	NA	NA	NA	NA	NA
Mtg. Plates (YM)	✓	✓	✓	✓	✓	✓	✓	NA	✓	NA	NA	NA	NA	NA	NA
Hinges (HNG)	NA	NA	NA	S	✓	NA	NA	NA	S	NA	S	NA	NA	NA	NA
Drain & Breather (DB)	✓	✓	✓	✓	✓	NA	NA	NA	NA	NA	✓	✓	✓	✓	✓
Hasp (HSP)	NA	NA	NA	✓	✓	NA	NA	NA	NA	NA	✓	NA	NA	NA	NA

✓ - Available as required - at additional charge.

S - Furnished as standard equipment - at no additional charge (mounting lugs are standard only on surface mounted boxes over 100 cubic inches internal volume)

NA - Not permitted on this type of enclosure by NEMA and Underwriters Laboratories, Inc. standards and specifications, or basic construction of box will not allow or require this item.

Hinges can be added to most box types for an additional fee. Please contact your local representative for special pricing.

Unflanged Junction or Pull Boxes

Cast Iron Box For Surface Mounting – NEMA 4

Type YS

Raintight – Watertight – Dust Tight

Use:

These boxes are general purpose enclosures listed by Underwriters Laboratories, Inc. as Type 4. They are suitable for use indoors or outdoors, or where they would be subjected to rain, dripping or splashing of water, and hose directed water.

Standard Construction:

- Cast iron box and cover
- Hot dip galvanized finish
- Neoprene gasket
- Stainless steel cover screws
- Cast mounting lugs (see notes)

Options

- Available in aluminum. Add suffix **-A** to catalog number.

Third Party Certification:



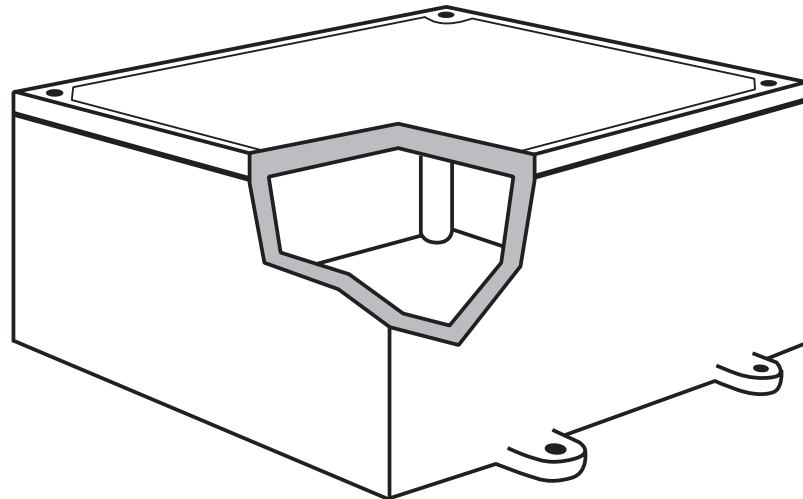
UL Listed: Type 4 Raintight
E-18095 and E-24824

Applicable Third Party Standards:

UL Standard: 514A, 50
NEMA 250-1997 Type 4

Notes:

- Mounting Lugs are standard on boxes over 100 cubic inches internal volume, and optional on boxes 100 cubic inches or less. See Pages UA4 and UA7 for additional information and ordering instructions.
- Type YS boxes have a post in each corner and allowances must be made for them when conduit entrances are to be located close to a corner. See "Recommended Location and Spacing of Conduits" on Page UA5.
- The listing of all Type YS boxes larger than 18" x 18" are now included with the Type YL boxes shown on Pages UA13 and UA15.
- See Page UA3 for additional NEMA data.
- See Pages UA4-UA9 for ordering instructions and additional cost items.
- See Page UA10 for mounting lug dimensions, if applicable.
- See Page UA11 for blank Drilling Template, to lay out conduit entries and optional features.



Iron Catalog Number	Approximate Wall Thickness *	Inside Dimensions (Inches)				
		L	x	W	x	D
YS-040404 †	3/16	4	x	4	x	4
YS-060404 †	3/16	6	x	4	x	4
YS-060604	3/16	6	x	6	x	4
YS-060606	1/4	6	x	6	x	6
YS-080404	7/32	8	x	4	x	4
YS-080604	7/32	8	x	6	x	4
YS-080606	1/4	8	x	6	x	6
YS-080804	7/32	8	x	8	x	4
YS-080806	1/4	8	x	8	x	6
YS-080808	5/16	8	x	8	x	8
YS-100604	7/32	10	x	6	x	4
YS-100606	9/32	10	x	6	x	6
YS-100806	9/32	10	x	8	x	6
YS-101004	7/32	10	x	10	x	4

Iron Catalog Number	Approximate Wall Thickness *	Inside Dimensions (Inches)				
		L	x	W	x	D
YS-101006	1/4	10	x	10	x	6
YS-120804	7/32	12	x	8	x	4
YS-120806	9/32	12	x	8	x	6
YS-120808	5/16	12	x	8	x	8
YS-121206	9/32	12	x	12	x	6
YS-121208	5/16	12	x	12	x	8
YS-121212	3/8	12	x	12	x	12
YS-161208	5/16	16	x	12	x	8
YS-180806	9/32	18	x	8	x	6
YS-181206	9/32	18	x	12	x	6
YS-181210	3/8	18	x	12	x	10
YS-181806	5/16	18	x	18	x	6
YS-181808	11/32	18	x	18	x	8
YS-181812	7/16	18	x	18	x	12

* Measured 2" up from back of box.

† Mounting Lugs are optional.