



## **PHD Manufacturing, Inc.**

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### **SEISMIC PRODUCT INSTALLATION INSTRUCTIONS**

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**FIG. 010 SWAY BRACE PIPE ATTACHMENT**

**Pipe Braced:** 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4", 6"

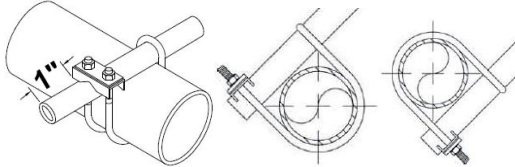
**Bracing:** 1" Or 1 1/4" SCH40 steel pipe

**Function:** Designed for bracing pipe against sway and seismic disturbance. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting, and joined together with a bracing pipe element forms a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**Approvals:** Underwriters Laboratories listed for US and Canada  
 Factory Mutual approved  
 Listed for use with NFPA and PHD sway brace components only

**Material:** Low Carbon Steel

**Installation:** Place over the pipe to be braced, adjust brace angle, and insert bracing pipe through opening leaving a minimum of 1" extending from attachment. Brace pipe can be installed on top or bottom of pipe to be braced but must be a minimum of 6" away from a pipe joint. Tighten nuts down evenly until hex heads break off.



UL Maximum Design Loads					
Pipe Size	Pipe Schedule	Brace Size	Brace Schedule	lbs.	
1	40	1 & 1 1/4	40	655	
1 1/4	10 & 40	1 & 1 1/4	40	655	
1 1/2	10 & 40	1 & 1 1/4	40	655	
2	10 & 40	1 & 1 1/4	40	655	
2 1/2	10 & 40	1 & 1 1/4	40	655	
3	10 & 40	1 & 1 1/4	40	655	
4	10 & 40	1 & 1 1/4	40	655	
6	10 & 40	1 1/4	40	1265	

FM Approved Loads							
Orientation	Pipe Size	Pipe Schedule	Allowable Horizontal Capacity Per Installation Angle (lbs.)				Brace Member
			Brace Angle From Vertical				
			30°-44°	45°-59°	60°-74°	75°-90°	
Lateral	1	LW, 10, 40	340	480	590	660	1" or 1 1/4" Schedule 40 Pipe
Lateral	1 1/4	LW, 10, 40	350	500	610	680	1" or 1 1/4" Schedule 40 Pipe
Lateral	1 1/2	LW, 10, 40	290	420	510	570	1" or 1 1/4" Schedule 40 Pipe
Lateral	2	LW, 10, 40	390	550	670	750	1" or 1 1/4" Schedule 40 Pipe
Lateral	2 1/2	LW, 10, 40	440	620	760	850	1" or 1 1/4" Schedule 40 Pipe
Lateral	3	LW, 10, 40	470	660	810	910	1" or 1 1/4" Schedule 40 Pipe
Lateral	4	LW, 10, 40	430	610	750	840	1" or 1 1/4" Schedule 40 Pipe
Lateral	6	LW, 10, 40	250	350	430	480	1 1/4" Schedule 40 Pipe

NOTE: LW above refers to FM Approved Lightwall pipe, commonly referred to as Schedule 7. These ratings may also be applied to EN10220 and GB/T 8163 pipe. Schedule 10 above may be applied to GB/T 3091, GB/T 3092, EN 10255 M and H, JIS G3452. Schedule 40 above may be applied to GB/T3091, EN10255H or JISG3454 brace pipe.

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### FIG. 025 SWAY BRACE MULTI-FASTENER ADAPTER

**Bolt Hole Size:** 1/2" Or 3/4"

**Pipe Braced:** 8" Max (Maximum load of 2015 lbs.)

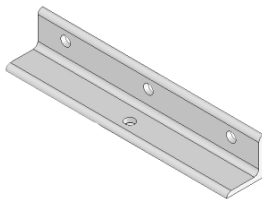
Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter

**Function:** Sway brace adapter designed to provide greater load capacities by providing multiple fastener attachments. The required type, number and size of fasteners used for the sway brace adapter shall be in accordance with NFPA 13. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**Approvals:** Underwriters Laboratories listed for US and Canada

**Material:** Low Carbon Steel

**Installation:** Attach Fig. 025 to mounting surface using appropriate fasteners. Please note that the two outermost bolt holes must be used and the middle bolt hole should be used only in conjunction with both outermost bolt holes to ensure concentric loading. Then attach a PHD structural attachment fitting to Fig. 025 and follow the instructions provided with said fitting. For use in both lateral and longitudinal brace assembly.



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**FIG. 030 C-CLAMP STRUCTURAL ATTACHMENT**

- Pipe Braced:** 8” Pipe MAX  
**Bracing:** 1” thru 2” SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201)  
**Function:** Designed for bracing pipe against sway and seismic disturbances. Universal swivel design allows for attachment at any surface angle combined with concentric loading. Structure attachment fitting designed to use 1” thru 2” SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201) as sway bracing elements. No bracing member thicker than 3/8” can be used in conjunction with this product. Utilize the Fig. 030 with a PHD Manufacturing pipe attachment fitting and a bracing element to form a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer’s installation instructions.
- Approvals:** Underwriters Laboratories listed for US and Canada  
 Factory Mutual approved  
 Listed for use with NFPA fastener tables and PHD sway brace components only
- Material:** Ductile Iron and Low Carbon Steel  
**Installation:** Insert brace element into fitting against back of jaw. Tighten set screw finger tight, then tighten until hex head breaks off. Adjust attachment to proper brace angle and mount to structure.

UL Maximum Design Loads (Up to 8” Pipe) Lateral & Longitudinal Assemblies			
Brace Member	Member Thickness	Member Length	lbs.
1” Thru 2” Pipe	SCH 40	Refer to NFPA13	2015
Structural Steel	3/8” thick	Refer to NFPA13	2015
*1001 Series Strut	12 Ga.	See Chart Below	2015
*1201 Series Strut	12 Ga.	See Chart Below	2015

\* Direction of load perpendicular to building structure

FM Maximum Design Load For Bracing SCH 10, 40 & Flow Pipe			
Brace Member		Brace Angle From Vertical (Degrees)	lbs.
1” Thru 2” SCH 40 Pipe	(GB/T3091, EN10255H, or JISG3454)	30°-44°	1270
		45°-59°	2040
		60°-74°	2450
		75°-90°	2740
1/4” Thru 3/8” Thick Structural Steel		30°-44°	900
		45°-59°	1280
		60°-74°	1570
		75°-90°	1750
PHD 12 Gauge Strut Channel 1001 & 1201		30°-44°	1070
		45°-59°	1440
		60°-74°	1740
		75°-90°	1940

Strut Fig. #	Max. Horizontal Load (lbs.) 90° From Vertical				
	r	1/r =	100	200	300
1001	0.580		58” 4670	116” 1165	174” 518
1201	0.297		29” 3260	59” 785	89” 345

NOTE: Use NFPA13 table “Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly” reduction factors for maximum loads at varying angles.

Refer to [www.phd-mfg.com](http://www.phd-mfg.com) regarding further strut channel details

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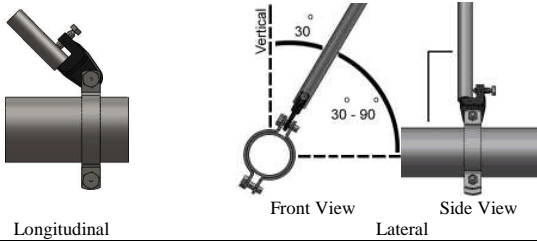
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**FIG. 031 CLAMPING PIPE ATTACHMENT**

- Pipe Braced:** 2", 2 1/2", 3", 3 1/2", 4", 5", 6", 8"  
**Bracing:** 1" thru 2" SCH 40 pipe, structural steel, and PHD 12 gauge strut channel (1001 & 1201)  
**Function:** Designed for bracing pipe against sway and seismic disturbance. Versatile design allows for attachment at any angle and the ability to be used in a lateral or longitudinal bracing configuration. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting and joined together with a bracing element forming a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.  
**Approvals:** Underwriters Laboratories listed for US and Canada  
 Factory Mutual approved  
 Listed for use with PHD sway brace components only  
**Material:** Ductile Iron and Low Carbon Steel, Grade 5 clamping bolts  
**Installation:** Place attachment around pipe to be braced, positioning brace attachment as needed, then tighten clamping bolts and nuts finger tight. Insert brace component into fitting against back of jaw. Tighten set screw finger tight, adjust brace angle as needed, then tighten set screw until hex head breaks off. Then evenly torque clamping bolts until hex portion of clamping nuts break off.



UL Maximum Design Loads			
Pipe Sizes 2" thru 8" SCH 10 & 40 (3 1/2 SCH 40 only)			
Lateral & Longitudinal Assemblies			
Brace Member	Member Thickness	Member Length	Max. Design Load
1" Thru 2" Pipe	SCH 40	Refer to NFPA13	2015
Structural Steel	1/4" to 3/8" thick	Refer to NFPA13	2015
1001 Series Strut	12 Ga.	See Chart Below	2015
1201 Series Strut	12 Ga.	See Chart Below	2015

FM Maximum Design Loads							
Orientation	Pipe Size	Pipe Schedule	Allowable Horizontal Capacity Per Installation Angle (lbs.)				Brace Member
			Brace Angle From Vertical				
			30°-44°	45°-59°	60°-74°	75°-90°	
Lateral	2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	LW, 10, 40	1270	1800	2200	2460	1" to 2" Schedule 40 Pipe
Longitudinal	2	LW, 10, 40	1370	1930	2370	2810	1" to 2" Schedule 40 Pipe
Longitudinal	2 1/2	LW, 10, 40	1500	2120	2600	2900	1" to 2" Schedule 40 Pipe
Longitudinal	3, 3 1/2, 4	LW, 10, 40	1370	1930	2370	2810	1" to 2" Schedule 40 Pipe
Longitudinal	5, 6	LW, 10, 40	1410	2000	2450	2730	1" to 2" Schedule 40 Pipe
Longitudinal	8	LW, 10, 40	1320	1870	2290	2550	1" to 2" Schedule 40 Pipe
Lateral or Longitudinal	2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	LW, 10, 40	900	1280	1570	1750	1/4" to 3/8" Thick Structural Steel
Lateral or Longitudinal	2, 2 1/2, 3, 3 1/2, 4, 5, 6, 8	LW, 10, 40	1070	1440	1740	1940	1001 & 1201 Strut

NOTE: LW above refers to FM Approved Lightwall pipe, commonly referred to as Schedule 7. These ratings may also be applied to EN10220 and GB/T 8163 pipe. Schedule 10 above may be applied to GB/T 3091, GB/T 3092, EN 10255 M and H, JIS G3452. Schedule 40 above may be applied to GB/T3091, EN10255H or JISG3454 brace pipe.

Strut Fig. #	Max. Horizontal Load (lbs.) 90° From Vertical							
	r	1/r =	100	200	300			
1001	0.580		58"	4670	116"	1165	174"	518
1201	0.297		29"	3260	59"	785	89"	345

NOTE: Use NFPA13 table "Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly" reduction factors for maximum loads at varying angles. Refer to [www.phd-mfg.com](http://www.phd-mfg.com) regarding further strut channel details



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## FIG. 035 SWAY BRACE BAR JOIST ADAPTER

**Pipe Braced:** 8" Pipe MAX

**Function:** Sway brace adapter used to attach a PHD Manufacturing sway brace assembly to a steel bar joist or structural member of 3/8" maximum thickness. To provide a point of connection when drilling or welding is not allowed or not practical. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**Approvals:** Underwriters Laboratories listed for US and Canada

Factory Mutual approved

Listed for use with NFPA fastener tables and PHD sway brace components only

**Material:** Ductile Iron

**Installation:** Steel bar joist manufacturer's warranty requires attachment within 6" of chord panel point. Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight, then evenly tighten until hex heads break off. Attach PHD structural attachment to Fig. 035 with the supplied attachment bolt, ensuring that the attachment bolt head bottoms out securely. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.

UL Maximum Design Load	
Pipe Size	lbs.
8" MAX	2015

FM Maximum Design Load						
Beam Flange Thickness	Brace Angle From Vertical (Degrees)	X-Z	Y-Z	Beam Flange Thickness	Brace Angle From Vertical (Degrees)	A-B
		lbs.	lbs.			lbs.
3/8" Max	30°-44°	1040	970	3/8" Max	30°-44°	1150
	45°-59°	1490	1370		45°-59°	1660
	60°-74°	1800	2060		60°-74°	1990
	75°-90°	2010	2300		75°-90°	2220

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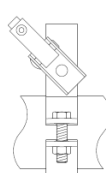
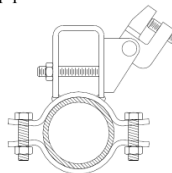
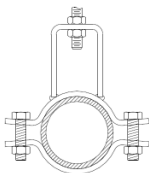
**FIG. 040 SWAY BRACE SUPPORTING PIPE ATTACHMENT**

- Pipe Braced:** 2", 2 1/2", 3", 3 1/2", 4", 5", 6", 8"
- Bracing:** Refer to PHD Structural attachment fitting literature regarding appropriate brace members, sizes, and further loading limitations.
- Function:** Designed for bracing pipe against sway and seismic disturbance. Versatile design allows for attachment at any angle and the ability to be used in a lateral or longitudinal bracing configuration. The pipe attachment component of a sway brace system used in conjunction with two PHD Manufacturing structural attachment fittings and joined together with a bracing element form a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.
- Approvals:** Underwriters Laboratories listed for US and Canada as a hanger, a sway brace, or as both functions at the same time. Factory Mutual approved as a sway brace only. Listed for use with PHD sway brace components only.
- Material:** Low Carbon Steel, Grade 5 clamping bolts
- Installation:** Attach PHD Manufacturing structural attachment fitting, Fig. 030 (sold separately), to Fig. 040 using supplied fastener. Place the assembly around the pipe to be braced, positioning welded clevis on top of the pipe, then tighten clamping bolts and nuts finger tight. Follow PHD Manufacturing structural attachment fitting's instructions for attaching to brace element. Adjust the brace element to the desired angle then tighten the supplied fastener to lock the PHD Manufacturing structural attachment fitting, Fig. 030, securely in position with the Fig. 040. Then evenly torque clamping bolts until hex portion of clamping nuts break off.

UL Maximum Design Load			
Pipe Sizes 2" Thru 8" SCH 10 & 40 (3 1/2 SCH 40 only)			
Lateral & Longitudinal Assemblies			
Pipe Size	Rod Size	Hanger	Sway Brace
		Used with threaded rod	Used with Fig. 030
		lbs.	lbs.
2	3/8	730	1000
2 1/2	1/2	850	1000
3	1/2	1000	1000
3 1/2	1/2	1000	1000
4	5/8	1000	1000
5	5/8	1600	1600
6	3/4	1600	1600
8	3/4	2015	2015

FM Maximum Design Loads						
Orientation	Pipe Size	Pipe Schedule	Allowable Horizontal Capacity Per Installation Angle (lbs.)			
			Brace Angle From Vertical			
			30°-44°	45°-59°	60°-74°	75°-90°
Lateral	2	LW, 10, 40	1070	1520	1860	2080
Lateral	2 1/2, 3, 3 1/2, 4, 5	LW, 10, 40	960	1360	1670	1860
Lateral	6	LW, 10, 40	1000	1420	1740	1940
Lateral	8	LW, 10, 40	1350	1900	2330	2600
Longitudinal	2	LW, 10, 40	1260	1440	1740	1940
Longitudinal	2 1/2, 3, 3 1/2	LW, 10, 40	1000	1420	1740	1940
Longitudinal	4, 5	LW, 10, 40	1110	1490	1800	1920
Longitudinal	6	LW, 10, 40	1280	1810	2210	2470
Longitudinal	8	LW, 10, 40	1160	1650	2020	2250

NOTE: LW above refers to FM Approved Lightwall pipe, commonly referred to as Schedule 7. These ratings may also be applied to EN10220 and GB/T 8163 pipe. Schedule 10 above may be applied to GB/T 3091, GB/T 3092, EN 10255 M and H, JIS G3452. Schedule 40 above may be applied to GB/T3091, EN10255H or JISG3454 brace pipe.



(Lateral Brace) (Longitudinal Brace)

Fig. 040 as a hanger Fig. 040 as a sway brace (Shown with Fig. 030)

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## FIG. 045 SWAY BRACE STRUCTURAL ADAPTER

**Pipe Braced:** 8" Pipe MAX

**Function:** Sway brace adapter used to attach a PHD Manufacturing sway brace assembly to a steel structural member of 3/8" minimum and 1 1/4" maximum thickness. To provide a point of connection when drilling or welding is not allowed or not practical. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**Approvals:** Underwriters Laboratories listed for US and Canada

Factory Mutual approved

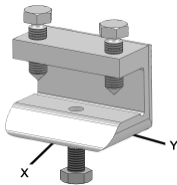
Listed for use with NFPA fastener tables and PHD sway brace components only

**Material:** Ductile Iron

**Installation:** Place on structural member with the flange contacting the back of the jaw. Tighten set screws finger tight, then evenly tighten until hex heads break off. Attach PHD structural attachment to Fig. 045 with the supplied attachment bolt, ensuring that the attachment bolt head bottoms out securely. Please note that the maximum load will be limited by the PHD Manufacturing structural attachment utilized with this adapter.

UL Maximum Design Load	
Pipe Size	lbs.
8" MAX	2015

FM Maximum Design Load			
Beam Flange Thickness	Brace Angle From Vertical (Degrees)	X	Y
		lbs.	lbs.
3/8" Min. 1 1/4" Max.	30°-44°	1150	900
	45°-59°	1800	1050
	60°-74°	2230	1260
	75°-90°	2460	1410



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### FIG. 050 THREADLESS PIPE ATTACHMENT

**Pipe Braced:** 2 1/2", 3", 4"

**Bracing Pipe:** 1" Or 1 1/4"

**Function:** Designed for bracing pipe against sway and seismic disturbance. Universal swivel design allows for attachment at any angle and the ability to be used in a lateral or longitudinal bracing configuration. The pipe attachment component of a sway brace system used in conjunction with a PHD Manufacturing structural attachment fitting and joined together with a bracing pipe element forming a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**Approvals:** Underwriters Laboratories listed for US and Canada

**Material:** Carbon Steel

**Installation:** Place attachment around pipe to be braced, position as needed, then tighten clamping bolts and nuts finger tight. Insert brace pipe into fitting against pivot bolt and tighten each set bolt finger tight. Then tighten clamping bolts and nuts until ears firmly touch. Then tighten each brace fitting set bolt evenly until hex heads break off.

PIPE SIZES	PIPE SCH	BRACE SIZE	BRACE SCH	MAX LOAD
2 1/2	10 & 40	1 & 1 1/4	40	655
3	10 & 40	1 & 1 1/4	40	655
4	10 & 40	1 & 1 1/4	40	655

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### FIG. 054 FOUR-WAY ADAPTER FITTING

**Bracing Pipe:** 1" X 1", 1 1/4" X 1 1/4", 1" X 1 1/4"

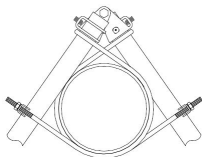
**Function:** Designed for bracing pipe against sway and seismic disturbances. Sway brace assembly component for use on risers and other vertical piping configurations, when each brace pipe is used in conjunction with two PHD Manufacturing Fig. 010 pipe attachments, two PHD Manufacturing structural attachment fittings, and joining together two bracing pipe elements forming a complete sway brace assembly. Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**Approvals:** Underwriters Laboratories listed for US and Canada

**Material:** Carbon Steel

**Installation:** Insert bracing pipe into fitting against the pivot bolt and tighten each fitting set screw finger tight. Then tighten each set screw evenly until both hex heads break off. Fitting can pivot for adjustment to proper brace angle, then tighten pivot bolt. Bracing connection must be positioned as close as possible to the braced pipe and cannot be more than 3" away MAXIMUM.

PIPE SIZES	PIPE SCH	BRACE SIZES	BRACE SCH	MAX LOAD
4" MAX	10 & 40	1 & 1 1/4	40	655



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### FIG. 055 SURGE RESTRAINT

**PIPE SIZES:**

3/4" through 2"

**FUNCTION:**

Designed to restrict the upward movement of activated fire sprinkler systems. Grips ring hanger, NOT THE NUT, and allows for fine tuning adjustments. Listed for use with PHD Manufacturing, Inc. Figure 141 ring hangers only.

**ORIENTATIONS:**

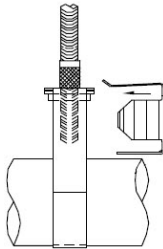


Illustration 1

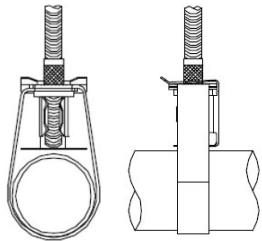


Illustration 2

**APPROVALS:**

Underwriters Laboratories listed for US and Canada

**MATERIAL:**

Spring Steel

**FINISH:**

Black E-Coat

**INSTALLATION:**

Installs easily before or after pipe installation and without tools. Simply clip Fig. 055 onto Fig. 141 ring hanger as shown above in Illustration 1. Run the hanger rod down to the bottom plate surface to ensure proper restraint as seen in Illustration 2.



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