

X: Suspended Equipment with four cable restraints
 LRFD ASD AC-156

Ss =	3.75	ap =	2.5	From the tables:	
z/h =	1.0	Rp =	2	Fa =	1.00
Site Class	D	lp =	1.5	S _{DS} =	2.500
Use Group	IV	Calculated Seismic Design Category			D
Product	V				

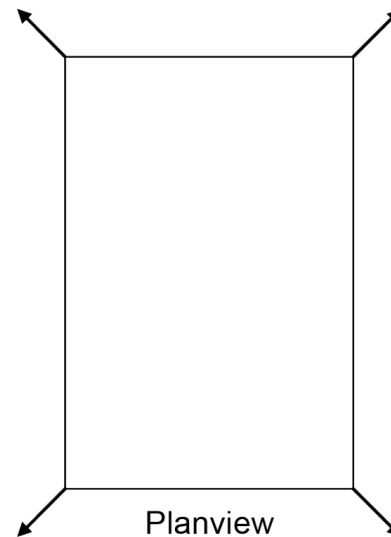
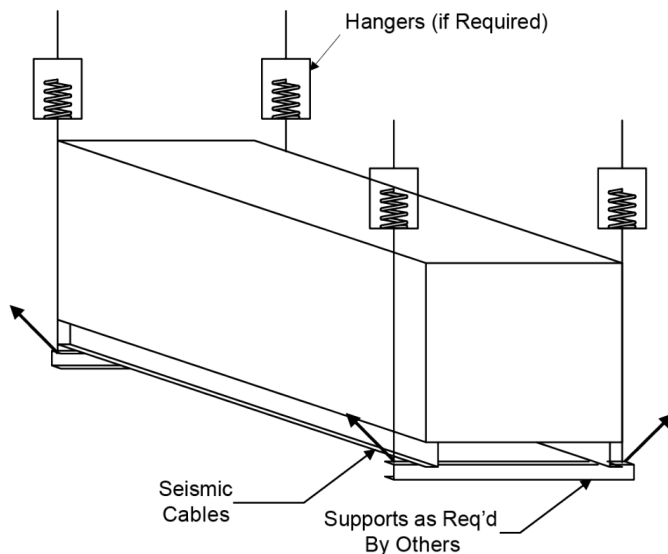
Fp/Wp		
Min. limit	Actual	Max. limit
1.125 g's	5.625 g's	6.00 g's

Tension in Cable, $T = Fp/Cos(\theta p)$
 Design Strength of Cable = Ft

θp	horz g's	vert g's	Load Combination 1	DL	E
55°	5.625	0.400	1.700	1.2	1
				0.9	

Reaction Calculation and Cable Selection

Tags	Mfr	Model	Weight	L	W	H	Fp	T	Cable	Ft	T/Ft (<1.0)
TFS-A	Titus	TFS-A	143 #	48	21	11	804 #	1402 #	SB-250	4400 #	0.32
TFS-B	Titus	TFS-B	205 #	43	37	16	1153 #	2010 #	SB-250	4400 #	0.46
TFS-C	Titus	TFS-C	210 #	43	37	16	1181 #	2059 #	SB-250	4400 #	0.47
TFS-D,E	Titus	TFS-D,E	290 #	48	39	20	1631 #	2844 #	SB-250	4400 #	0.65
TFS-G	Titus	TFS-G	275 #	39	52	18	1547 #	2697 #	SB-250	4400 #	0.61
4,5,6	Titus	4,5,6	90 #	16	12	8	506	883 #	SB-125	1100	0.80
7,8	Titus	7,8	94 #	16	12	10	529	922 #	SB-125	1100	0.84
9,10	Titus	9,10	110 #	16	14	13	619	1079 #	SB-125	1100	0.98
12,14	Titus	12,14	125 #	16	20	18	703	1226 #	SB-250	4400	0.28
16	Titus	16	156 #	16	24	18	878	1530 #	SB-250	4400	0.35
24x16	Titus	24x16	213 #	16	38	18	1198	2089 #	SB-250	4400	0.47



Attachment of SB-125 With 1/8" Cable
Into concrete & steel:

Tag:
4,5,6

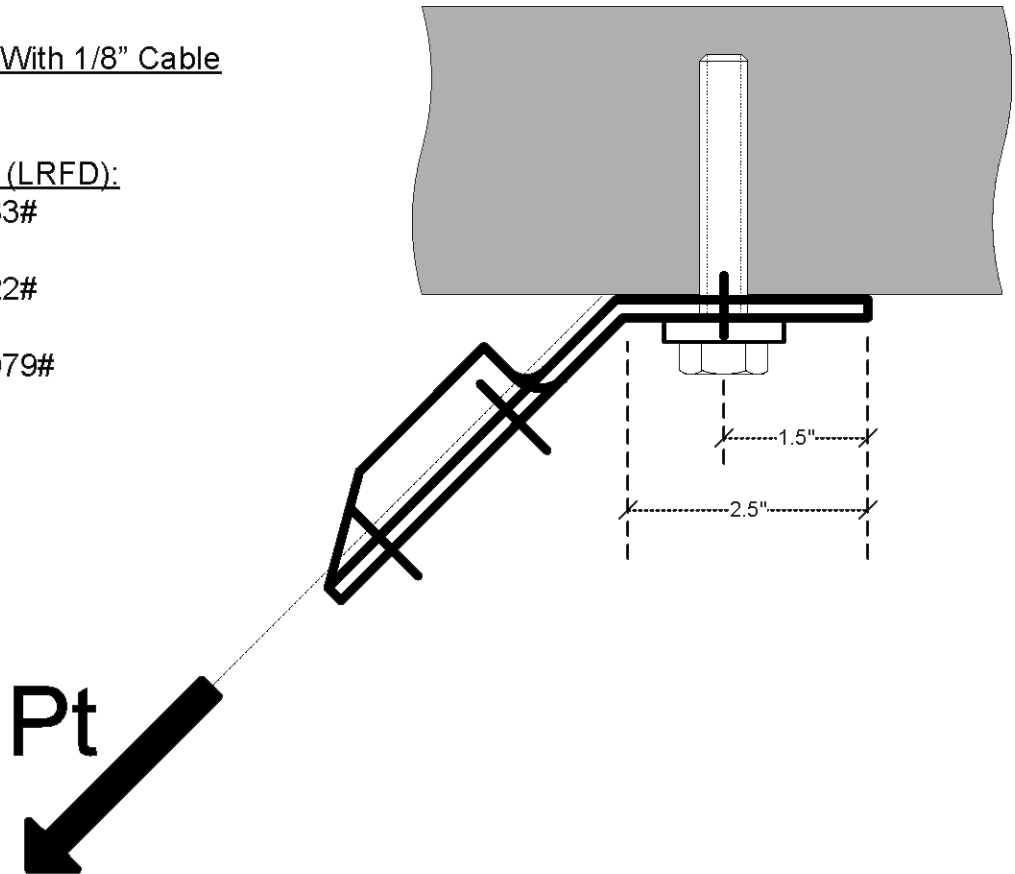
Pt (LRFD):
883#

7,8

922#

9,10

1079#

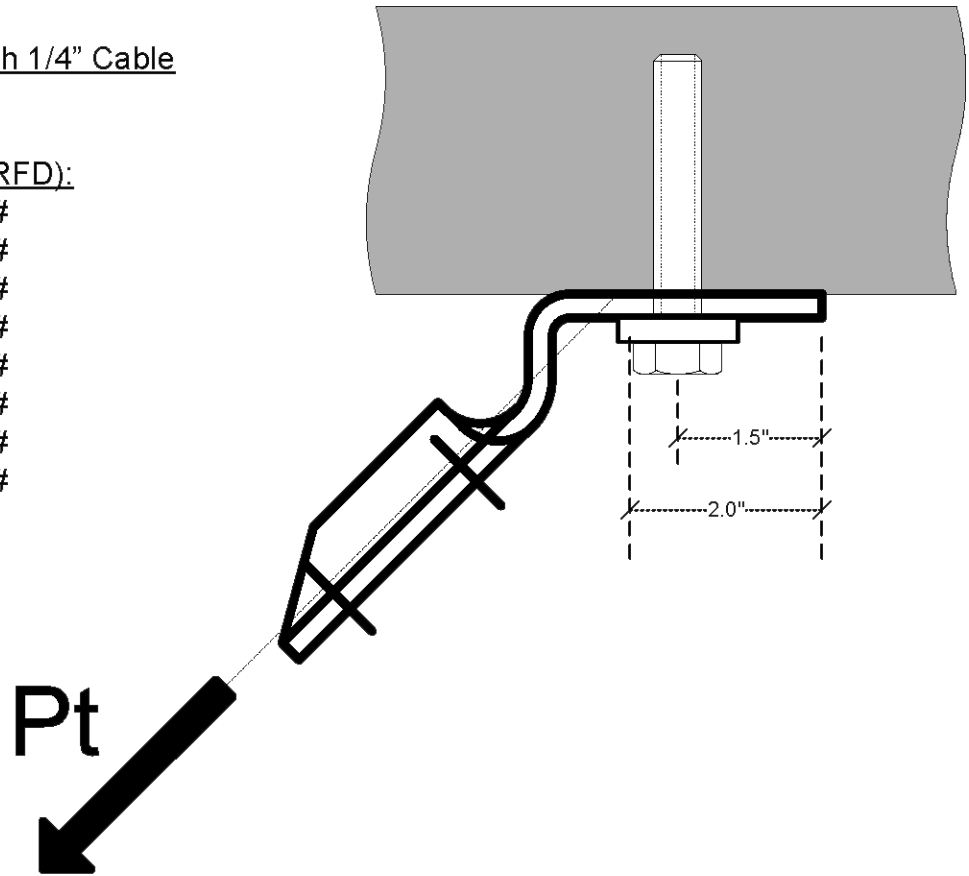


	SB-125-01; 9/16" Hole			
Anchor	Hilti TZ	Hilti TZ	HY-150	A-307
Diameter	1/2"	1/2"	1/2"	1/2"
Embedment	2"	3.25"	2.75"	Bolted to Steel
Slab Depth	4"	6"	4"	
Max Tension Loads (LRFD)				
Anchor Allowable	1220	2010	1740	4950
Max Actual Load	1079	1079	1079	1079
Interaction	0.88	0.54	0.62	0.22

This installation is acceptable with those anchors with an interaction < 1.0

Attachment of SB-250 With 1/4" Cable
Into concrete & steel:

<u>Tag:</u>	<u>Pt (LRFD):</u>
TFS-A	1402#
TFS-B	2010#
TFS-C	2059#
TFS-D,E	2844#
TFS-G	2697#
12,14	1220#
16	1530#
24x16	2089#



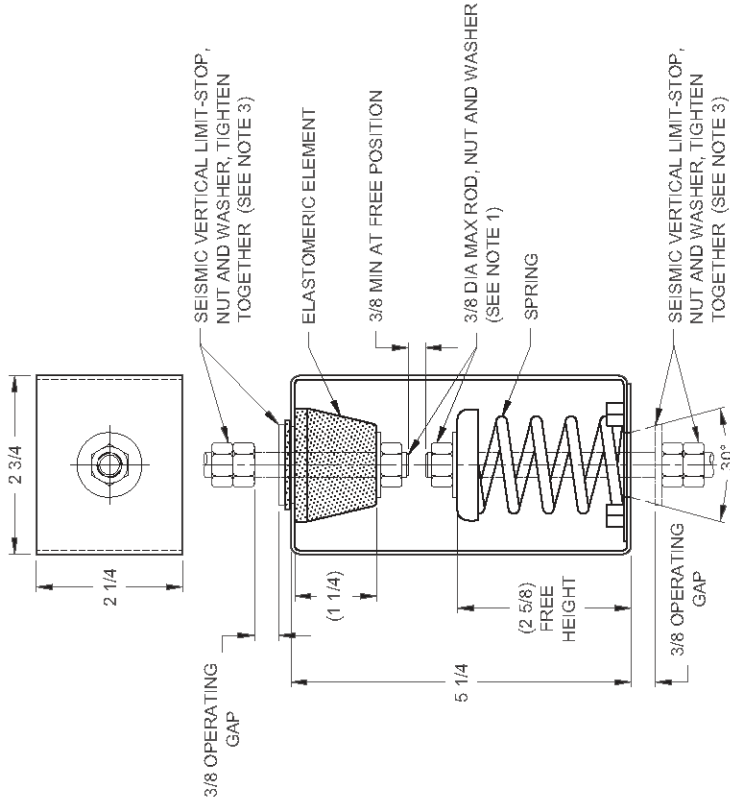
	SB-250-01; 11/16" Hole			
Anchor	Hilti TZ	Hilti TZ	HY-150	A-307
Diameter	5/8"	5/8"	5/8"	5/8"
Embedment	3.125"	4"	3.125"	Bolted to Steel
Slab Depth	5"	6"	4.625"	
Max Tension Loads (LRFD)				
Anchor Allowable	3250	4130	3535	9949
Max Actual Load	2844	2844	2844	2844
Interaction	0.88	0.69	0.80	0.29

This installation is acceptable with those anchors with an interaction < 1.0



MODEL HRSA-1B ELASTOMERIC & SPRING ANGULARITY HANGERS 1" NOMINAL DEFLECTION

Affected Model	Unit Size	Hanger
TFS	A	HRSA-1B-50
ESV	12, 14, 16	HRSA-1B-50
ESV	4, 5, 6, 7, 8, 9, 10	HRSA-1B-35
TFS (F)	(B & C)	HRSA-1B-70
ESV	24 x 16	HRSA-1B-70
TFS	G	HRSA-1B-85



TYPE HRSA-1B ELASTOMERIC & SPRING ANGULARITY HANGERS					
HANGER	RATED LOAD (LBS)	DEFLECTION (IN)	FOR 1" NOMINAL DEFLECTION		ELEMENT LOAD & COLOR CODE
			SPRING RATE (LB/IN)	SPRING COLOR CODE	
HRSA-1B-20	20	1.48	16	DK BLUE	RE-A-35 BLUE
HRSA-1B-35	35	1.57	30	BLACK	RE-A-35 BLUE
HRSA-1B-50	50	1.38	45	RED	RE-A-75 RED
HRSA-1B-70	70	1.25	80	DK GREEN	RE-A-75 RED
HRSA-1B-85	85	1.09	105	GRAY	RE-A-120 GREEN

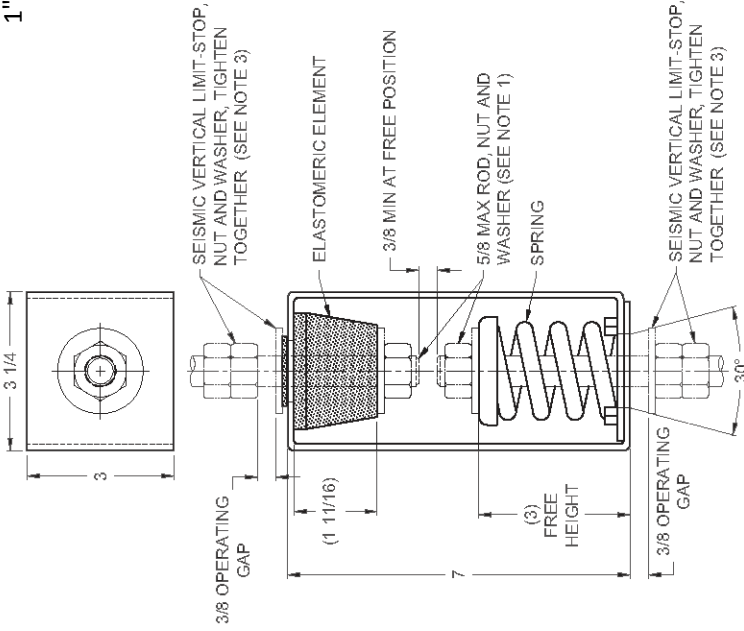
NOTES:

- HANGER RODS, NUTS AND WASHERS, AS SHOWN, NOT BY THE VMC GROUP.
- STANDARD FINISH: HANGER BOX - PAINTED, POWDER COATED OR GALVANIZED STEEL, SPRING - POWDER COAT.
- SEISMIC VERTICAL-STOP HARDWARE REQUIRED FOR SEISMIC APPLICATIONS, NOT BY THE VMC GROUP. INSTALL WASHER .1 THK. MIN. X 1-1/4 O.D. MIN. WITH REQUIRED INSIDE DIAMETER TO ACCOMMODATE ROD SIZE IN USE. THIS CAN BE ACCOMPLISHED BY USING A SINGLE WASHER OR BY STACKING NOT MORE THAN TWO WASHERS.
- ALL DIMENSIONS IN INCHES. INTERPRET PER ANSI Y14.
- ALL DIMENSIONS ARE FOR REFERENCE. DIMENSIONS SHOWN AS NOMINAL.
- ALL SPRINGS ARE DESIGNED WITH MINIMUM 50% OVER-TRAVEL.
- HANGER BOXES ARE AVAILABLE PRE-COMPRESSED UP TO THEIR DESIGNATED MAX. LOAD. PERCENTAGE OF PRE-COMPRESSION TO BE DETERMINED BY ENGINEERED APPLICATION OR AS REQUESTED BY CUSTOMER. CONSULT FACTORY FOR POSSIBLE ADDITIONAL PARAMETERS AND OR LIMITATIONS.
- HANGER BOXES WITH AN ELASTOMERIC ELEMENT HAVE UP TO AN ADDITIONAL 1/2" NOMINAL DEFLECTION.

OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

**MODEL HRSA-1C
ELASTOMERIC & SPRING
ANGULARITY HANGERS
1" NOMINAL DEFLECTION**

Affected Model	Unit Size	Hanger
TFS (F)	(D & E)	HRSA-1C-100



NOTES:

- HANGER RODS, NUTS AND WASHERS, AS SHOWN, NOT BY THE VMC GROUP.
- STANDARD FINISH: HANGER BOX - PAINTED, POWDER COATED OR GALVANIZED STEEL, SPRING - POWDER COAT.
- SEISMIC VERTICAL-STOP HARDWARE REQUIRED FOR SEISMIC APPLICATIONS, NOT BY THE VMC GROUP. INSTALL WASHER .134 THK. MIN. X 1-3/4 O.D. MIN. WITH REQUIRED INSIDE DIAMETER TO ACCOMMODATE ROD SIZE IN USE. THIS CAN BE ACCOMPLISHED BY USING A SINGLE WASHER OR BY STACKING NOT MORE THAN TWO WASHERS.
- ALL DIMENSIONS IN INCHES. INTERPRET PER ANSI Y14.
- ALL DIMENSIONS ARE FOR REFERENCE, DIMENSIONS SHOWN AS NOMINAL.
- ALL SPRINGS ARE DESIGNED WITH MINIMUM 50% OVER-TRAVEL.
- HANGER BOXES ARE AVAILABLE PRE-COMPRESSED UP TO THEIR DESIGNATED MAX. LOAD. PERCENTAGE OF PRE-COMPRESSION TO BE DETERMINED BY ENGINEERED APPLICATION OR AS REQUESTED BY CUSTOMER. CONSULT FACTORY FOR POSSIBLE ADDITIONAL PARAMETERS AND OR LIMITATIONS.
- HANGER BOXES WITH AN ELASTOMERIC ELEMENT HAVE UP TO AN ADDITIONAL 1/2" NOMINAL DEFLECTION.

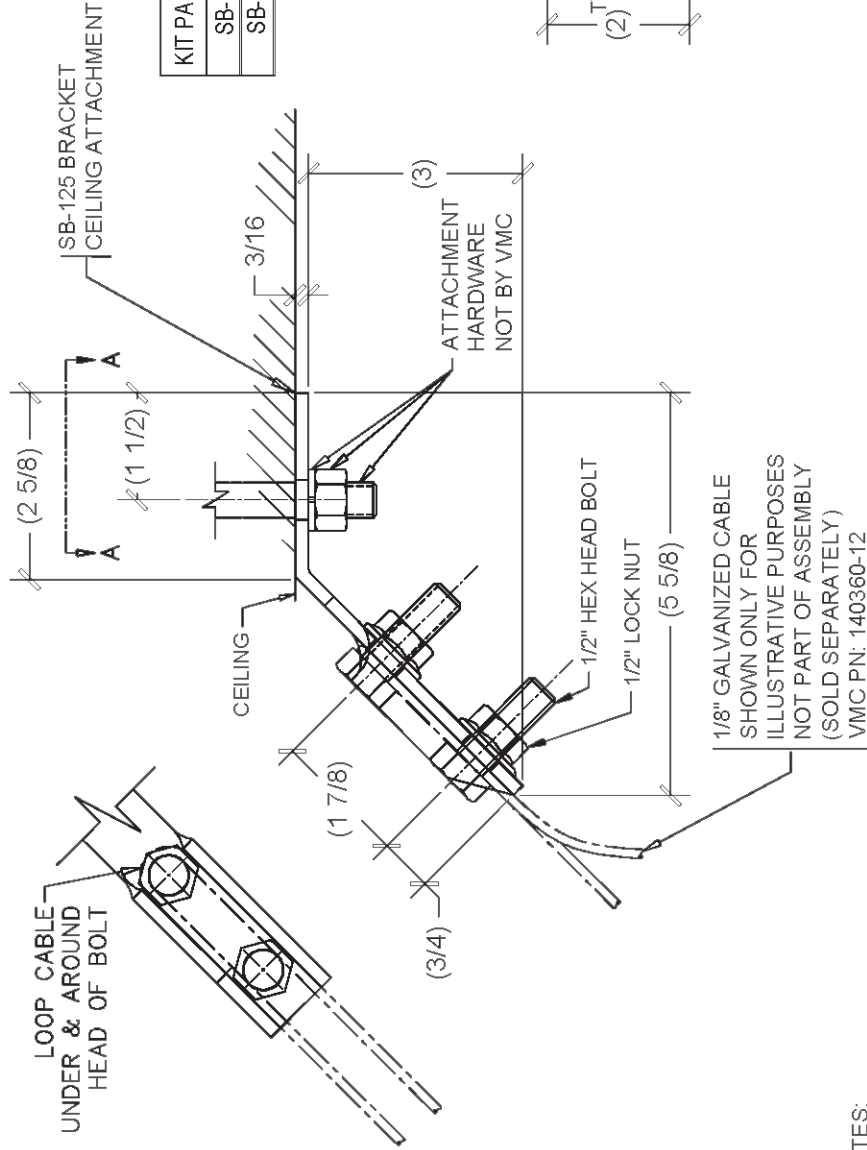
TYPE HRSA-1C ELASTOMERIC & SPRING ANGULARITY HANGERS FOR 1" NOMINAL DEFLECTION					
HANGER	RATED LOAD (LBS)	DEFLECTION (IN)	SPRING RATE (LBS/IN)	SPRING COLOR CODE	ELEMENT LOAD & COLOR CODE
HRSA-1C-50	50	1.15	50	BLUE	RE-B-170 BLACK
HRSA-1C-100	100	1.29	100	TAN	RE-B-170 BLACK
HRSA-1C-150	150	1.44	150	RED	RE-B-170 BLACK
HRSA-1C-250	250	1.16	300	BLACK	RE-B-380 GREEN
HRSA-1C-300	300	1.14	400	DK YELLOW	RE-B-380 GREEN
HRSA-1C-370	370	1.24	493	YELLOW	RE-B-380 GREEN

OTHER MATERIALS, COMPOUNDS, OR FINISHES WITH EQUAL OR SUPERIOR PROPERTIES MAY BE SUBSTITUTED AS THEY BECOME AVAILABLE.

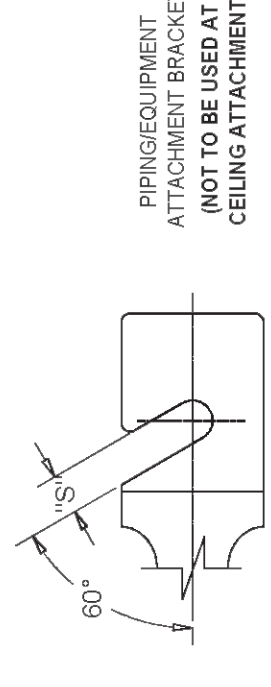
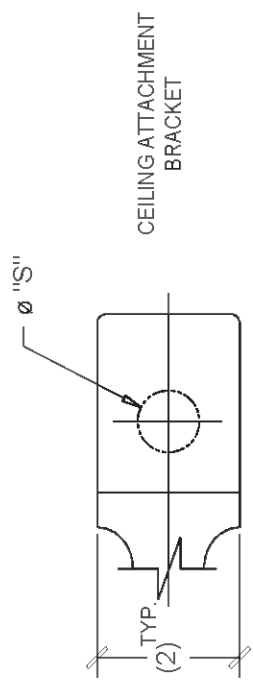


SB-125 SEISMIC CABLE RESTRAINT KIT

Affected Model	Unit Size
ESV	4, 5, 6, 7, 8, 9, 10



KIT PART NUMBER	"S"	COLOR CODE	MAX. TENSION ALLOWABLE
SB-125-01	9/16" KIT	CLEAR ZINC COATED	667 LBS.
SB-125-02	11/16" KIT	YELLOW/ZINC COATED	667 LBS.



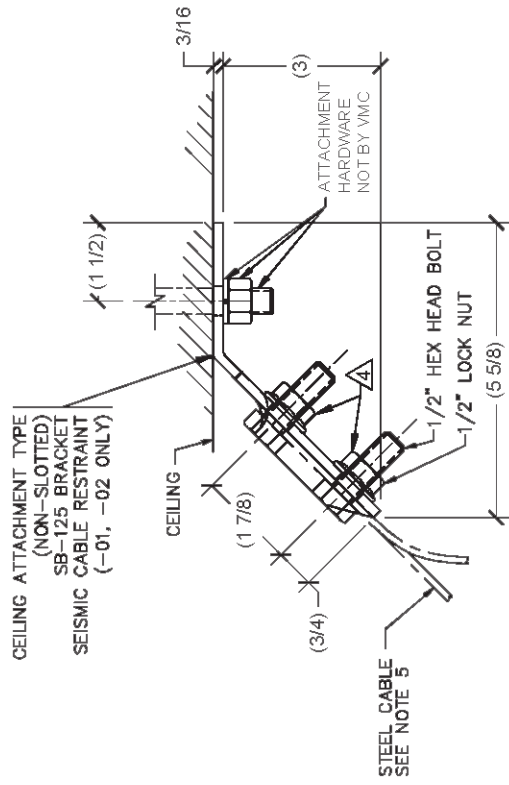
- NOTES:**
- 1) MATERIAL: COLD ROLLED STEEL
 - 2) HARDWARE & BRACKETS ZINC ELECTROPLATE
 - 3) FIELD TORQUE 1/2" LOCK NUTS TO 75 FT.- LBS.
 - 4) 1 KIT CONSISTS OF EITHER 9/16 OR 11/16 ASSEMBLIES CONSISTING OF :
 - 2 SLOTTED BRACKETS
 - 2 HOLED BRACKETS
 - 8 BOLTS
 - 8 SERRATED FLANGE NUTS
 - 5) CABLE SOLD SEPARATELY.

ALTERNATE VIEW A-A



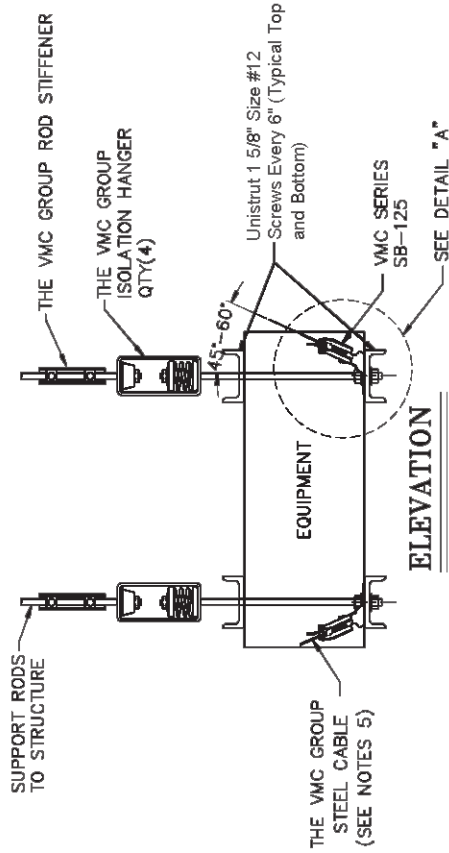
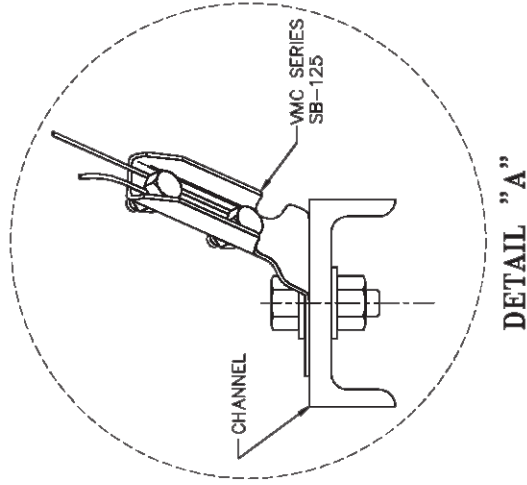
SB-125 TYPICAL TRANSVERSE AND LONGITUDINAL CABLE BRACING FOR EQUIPMENT

Affected Model	Unit Size
ESV	4, 5, 6, 7, 8, 9, 10

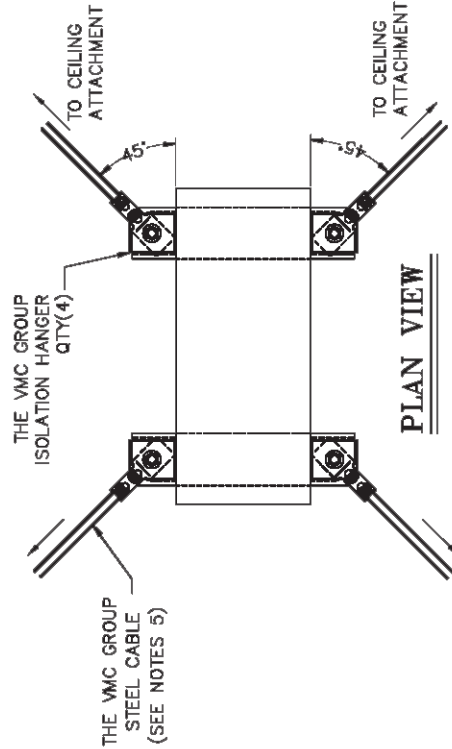


**CEILING ATTACHMENT
DETAIL**

- NOTES:**
1. MATERIAL: COLD ROLLED STEEL
 2. ELECTRO ZINC PLATED
 3. FIELD TORQUE 1/2" LOCK NUT TO 75 FT. LBS.
 4. 1 KIT CONSISTS OF:
2 SLOTTED BRACKETS
2 HOLED BRACKETS
8 BOLTS
8 SERRATED FLANGE NUTS
 5. CABLE SOLD SEPARATELY.



ELEVATION



PLAN VIEW

PART NUMBER	"H"	CONSIST OF ASSEMBLIES	COLOR CODE
SB-125-01	9/16" KIT	154A-100794-01 & -03	CLEAR ZINC COATED
SB-125-02	1 1/16" KIT	154A-100794-02 & -04	YELLOW ZINC COATED

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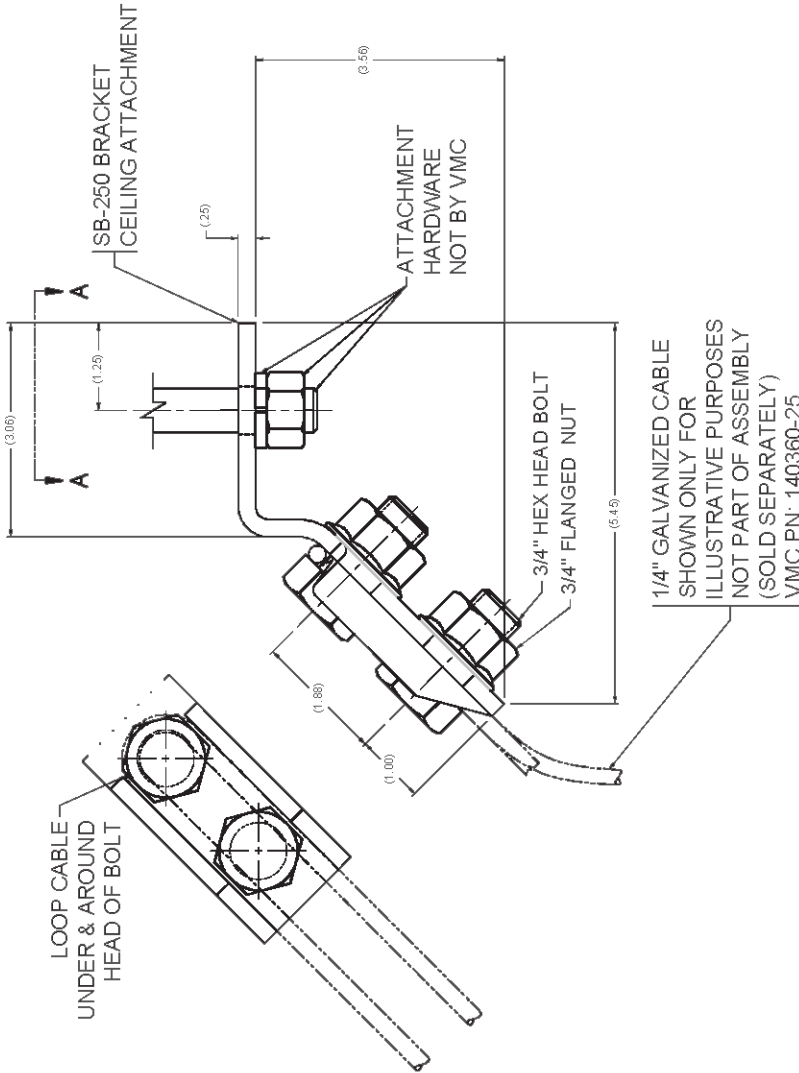


Installation Manual

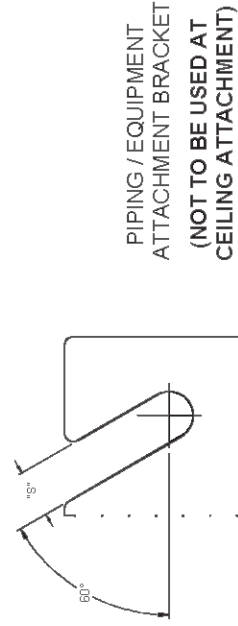
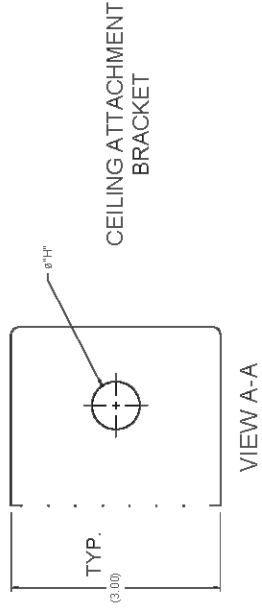
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SB-250 SEISMIC CABLE RESTRAINT KIT

Affected Model	Unit Size
TFS	A
TFS (F)	(B, C, D, & E)
TFS	G
ESV	12, 14, 16, 24 x 16



KIT PART NUMBER	"H"	"S"	COLOR CODE	MAX. TENSION ALLOWABLE
SB-250	11/16"	15/16"	CLEAR ZINC COATED	2333 LBS.



NOTES:

- 1) MATERIAL: COLD ROLLED STEEL
- 2) HARDWARE & BRACKETS ZINC ELECTROPLATE
- 3) FIELD TORQUE 3/4" FLANGE NUTS TO 100 FT- LBS.
- 4) 1 KIT CONSISTS OF:
 - 2 SLOTTED BRACKETS
 - 2 HOLED BRACKETS
 - 8 BOLTS
 - 8 SERRATED FLANGE NUTS
- 5) CABLE SOLD SEPARATELY.

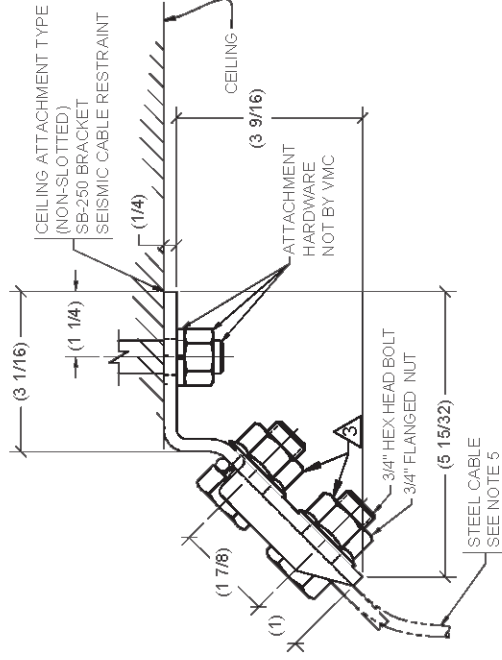
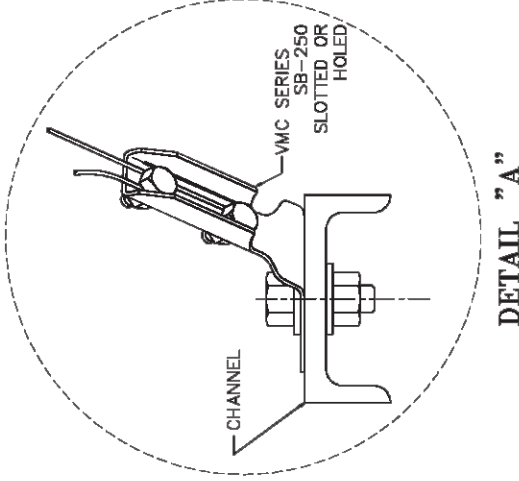
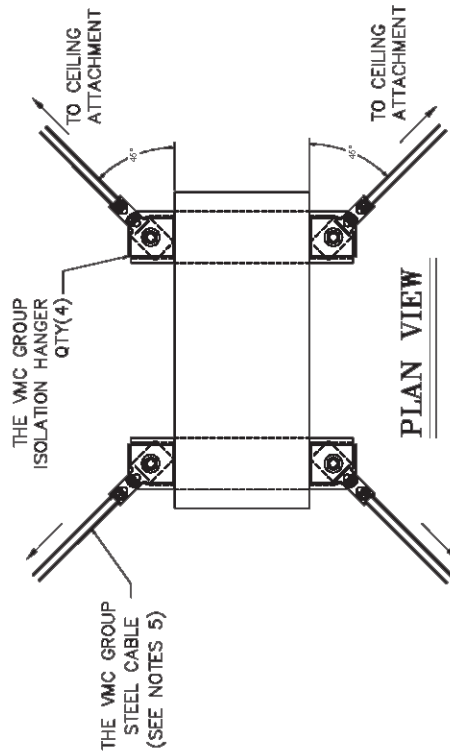
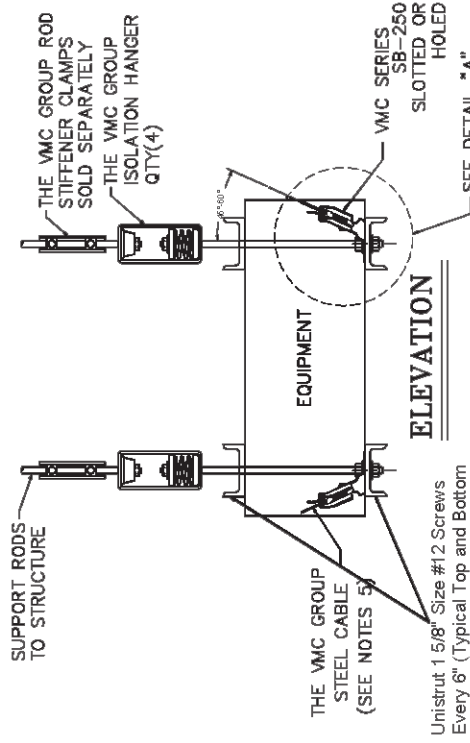
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SB-250

TYPICAL TRANSVERSE AND LONGITUDINAL CABLE BRACING FOR EQUIPMENT

Affected Model	Unit Size
TFS	A
TFS (F)	(B, C, D, & E)
TFS	G
ESV	12, 14, 16, 24 x 16



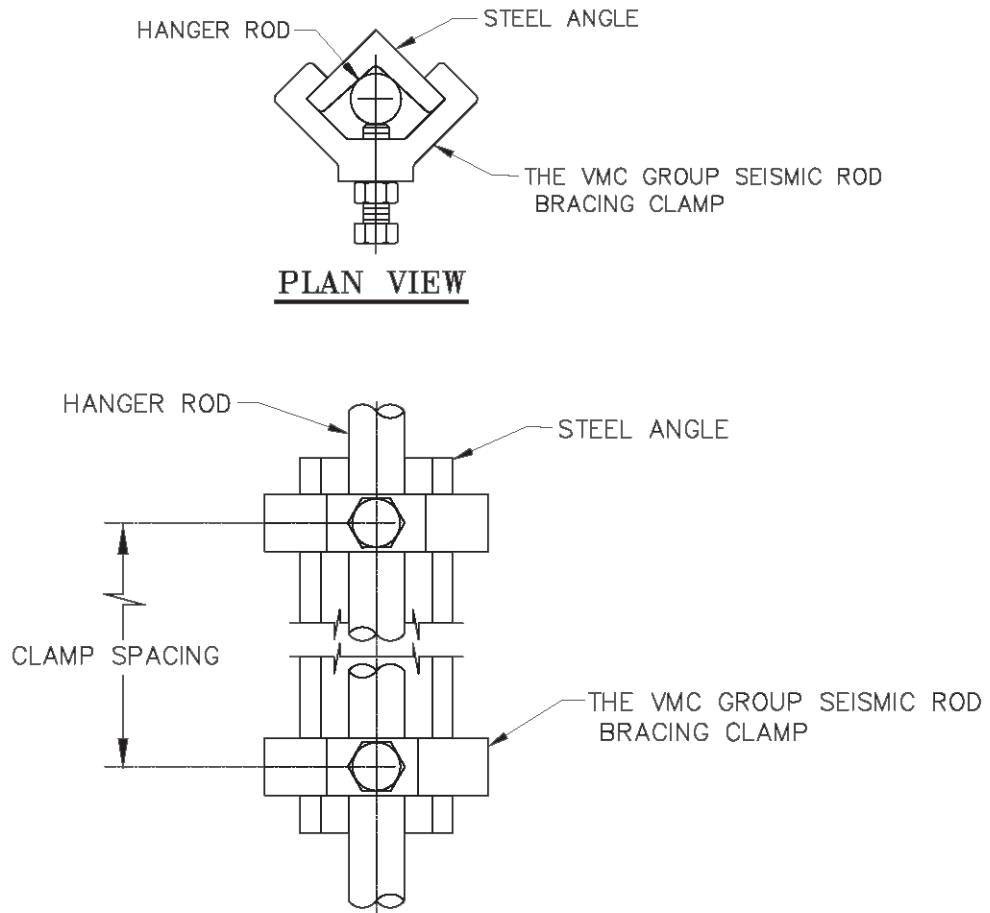
CEILING ATTACHMENT DETAIL

NOTES:

- 1) MATERIAL: COLD ROLLED STEEL
- 2) HARDWARE & BRACKETS ZINC ELECTROPLATE
- 3) FIELD TORQUE 3/4" LOCK NUTS TO 100 FT.-LBS.
- 4) SB-250 KITS:
 - SB-250-01 KIT CONSISTS OF :
 - 2 - 11/16 HOLED BRACKETS; 2 - 15/16 SLOTTED BRACKETS
 - 8 BOLTS; 8 SERRATED FLANGE NUTS
 - SB-250-02 KIT CONSISTS OF :
 - 4 - 11/16 HOLED BRACKETS
 - 8 BOLTS; 8 SERRATED FLANGE NUTS
- 5) CABLE SOLD SEPARATELY PN: 140360-25.

PART NUMBER	"H"	CONSIST OF ASSEMBLIES	COLOR CODE	KIT TYPE
SB-250-01	11/16" BRACKET ASSEMBLIES	154A-101893-01 & 02	CLEAR ZINC COATED	HOLE
	15/16" BRACKET ASSEMBLIES		CLEAR ZINC COATED	SLOT
SB-250-02	11/16" BRACKET ASSEMBLIES	154A-101893-02	CLEAR ZINC COATED	HOLE

SEISMIC ROD BRACING CLAP



SRBC TABLE

VERTICAL HANGER ROD INSTALLATION DETAILS					
VMC ROD BRACING CLAMP No.	ROD DIA (INCHES)	ROD LENGTHS OVER "X" INCHES	STEEL ANGLE SIZE (INCHES)	CLAMP SPACING	MIN # OF CLAMPS PER STIFFENER
SRBC - 1	3/8"	20"	1 X 1 X 1/4"	16"	3
SRBC - 1	1/2"	25"	1 X 1 X 1/4"	20"	3
SRBC - 1	5/8"	31"	1 X 1 X 1/4"	12"	3
SRBC - 1 1/2	3/4"	37"	1 1/2 X 1 1/2 X 1/4"	16"	3
SRBC - 1 1/2	7/8"	43"	1 1/2 X 1 1/2 X 1/4"	12"	4
SRBC - 1 1/2	1"	50"	1 1/2 X 1 1/2 X 1/4"	16"	4
SRBC - 1 1/2	1 1/8"	62"	1 1/2 X 1 1/2 X 1/4"	20"	4