OLIVER Technologies, Inc.

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Oliver Technologies 1100 "V" Series All Steel Foundation System Installation Instructions for California for CA-1 All Steel Foundation System Model 1100IV M.H. Engineered TieDown System

INTRODUCTION

The All Steel Foundation 1100 "V" series is designed for both dirt and concrete foundation applications. Where noted the 'ICV' indicates concrete wet or dry; transverse (D) and longitudinal brackets (J) and the "IV" refers to the steel pan dirt set (B). These drawings show foundations details which are applicable to HUD code houses and California HCD code manufactured homes or mobile homes only. The foundation plan shown is general and is to be adjusted to meet the specific house being installed. These design drawings are supplemental to the home installation manual. Refer to the installation manual for mating line and main rail pier locations and for specific support and anchoring requirements for special architectural features. Pier spacings shall be based on soil conditions and roof loads for the site. This system meets the requirements of California Code of Regulations, Title 25, Chapter 2, Article 7, Section 1336.3(a) and California Health and Safety Code 18613.4

GENERAL NOTES

1. All work shall conform to the requirements of this design and of the building code adopted by the agency having jurisdiction.

2. The "V" brace of the All Steel Foundation System has an approved design load as a pier of 4000 lbs. Support piers other than the "V" brace shall be in accordance with the home manufacturer's installation instructions and shall be approved designs of CMU or steel support stands. The "V" brace system may be used in type 5 soils.

3. Design Criteria:

Wind Pressures -	70 Mph (15 psf) and 80 Mph (20 psf) Exposure B and 70 Mph Exposure C
Roof Live Load -	20 Psf min. per house design
Seismic Design Category -	D
Roof Pitch -	6:12 Max
Sidewall Height -	102" Max

4. Determine the appropriate design wind pressure for this site (70 Mph or 80 Mph). Enter the appropriate section of Table 1 to determine the number of All Steel Foundation Brace Systems and/or Tie Downs required.

5. Tie Downs with strap and anchor are required on single section houses and homes with special design criteria only. Strap and anchor shall have a working load capacity of 3150 lbs. with a minimum ultimate capacity of 4725 lbs. Strap shall meet ASTM D3953-91. Strap and anchor shall be installed in accordance with the home manufacturer's installation instructions.

SPECIAL CIRCUMSTANCES:

a) If eave length exceeds 17" to 24": use one additional Transverse System (noted on drawing by T) b) Exposure C in wind zones 75 & 80: Use two (2) additional full systems (from 80 Mph table) noted on drawing by E and additional two (2) anchors per side on single section homes.

If following conditions occur - **STOP!** Contact Oliver Technologies at 1-800-284-7437 for further instruction:

a) System height exceeds 48" (System height cannot exceed 36" on I-beam widths less than 86" apart)
b) Roof eaves exceed 24"
c) Sidewall height exceed 102"
d) Roof pitch greater than 6/12
e) Location is within 1500 feet of coastline in Wind Zones II & III.
f) Footing to surface area exceeds 3 square feet
g) Soil conditions less than type 5 (4b)
h) Main rail spacing exceeds 102"

ENGINEER APPROVAL

ENGINEERED TIEDOWN SYSTEM
APPROVED
SUBJECT TO CORRECTIONS NOTED
Approved does not authorize or approve any omission or deviation from requirements of applicable State laws and regulations.

State of California
Department of Housing and Community Development
DIVISION OF CODES AND STANDARDS
By Mcdwell Date 10/5/10
(Signature)
SPA NO ETS 140A
This Plan Approval Expires 9/4/2012

STATE APPROVAL

SEP 0 1 2010

LONGITUDINAL: When using the 1100 wet set J(W) bracket, simply install the bracket in runner/footer, or when installing in cured concrete, use the 1100 dry set J(D) bracket. The 1100 dry set J(D) bracket is attached to the concrete using (2) 1/2" X 3" concrete wedge bolts. Place the bracket in desired location. Mark bolt hole locations, then using a 1/2" diam. masonry bit, drill a hole to a minimum depth of 3". Make sure all dust and concrete is blown out of the holes. Place wedge bolts into drilled holes, then place 1100 J(D) bracket onto wedge bolts and start wedge bolt nuts. Take a hammer and lightly drive the wedge bolts down by hitting the nut (making sure not to hit the top of threads on bolt). The sleeve of concrete wedge bolt needs to be at or below the top of concrete. Complete by tightening nuts.

LATERAL: (a) For wet set installation set the transverse anchor bracket D(W) into runner/footer at desired location. (b) For dry set installation the transverse bracket D(D) is attached to the concrete using (2) 1/2" X 3" concrete wedge bolts. Mark bolt hole locations, then using a 1/2" diam. masonry bit, drill holes to a minimum depth of 3". Make sure all dust and concrete is blown out of the holes. Place wedge bolts into drilled holes. Attach transverse connector bracket D(D). If needed, take a hammer and lightly drive the wedge bolts down by hitting the nut (making sure not to hit the top of threads on bolt.) Complete by tightening nuts.

SPECIAL NOTE: The longitudinal "V" brace system serves as a pier under the home and should be loaded as any other pier. It is recommended that after leveling piers, and one-quarter (1/4") to one-half inch (1/2") before home is lowered completely on to piers, complete items 1 through 5 below.

INSTALLATION OF LONGITUDINAL "V" BRACE SYSTEM

1. Select the correct square tube brace (E) length for set-up (pier) height at support location.

PIER HEIGHT (Approx. 40-60 degrees Max.) — 1.50" Tube Length

PIER HEIGHT = the dimension from the top of the pan to the bottom of the I-Beam

14" to 19"	20"
18" to 25"	28"
24" to 35"	39"
30" to 40"	44"
36" to 48"	54"

NOTE:

a) Installation of the longitudinal system eliminates the need for the longitudinal anchors.
b) Installation of the transverse system eliminates the need for the diagonal frame ties and stabilization plates.
c) All other home manufacturer's installation instructions of stabilizing devices must be followed, including installation of sidewall tie-down anchors, shear wall or center-line tie-down anchors.
d) If the home manufacturer's installation instructions are not available, the home must be installed in accordance with any state promulgated rules, or as required by the authority having jurisdiction.
e) Installation of this system on single wide homes require the installation of 4 ground anchors (rated min. 3150 lbs.) 1 at each corner not more than 2 ft. from the end of the home.

2. Install both of the 1.5" square tubes (E) into the "V" bracket (J), insert carriage bolt and leave nut loose for final adjustment.
3. Place I-beam connector (F) loosely on the bottom flange of the I-beam.
4. Attach the selected 1.5" tubes (E) to the I-beam connectors (F) and fasten loosely with bolts and nuts. NOTE: The footer must be level in both directions to ensure the angle markings on the center point connector are correct from the horizontal plane of the footer. The angle is not to exceed 60 degrees and not less than 40 degrees. The "V" bracket (J) is stamped with the angles to verify correct degree. Use proper length tube or cut and drill tube to achieve proper length. (The tube may be cut using any appropriate steel cutting method such as steel saw, cutting torch, etc. New holes must be drilled to the dimension, and at the location as shown for part (E).
5. Using standard hand tools, tighten all nuts and bolts. When connecting the brace tube to the I-beam connector (F) tighten at least one and a half to two full turn past hand tight.

INSTALLATION OF LATERAL TELESCOPING TRANSVERSE ARM SYSTEM

6. Select the correct square tube brace (H) length for set-up lateral transverse at support location. The 60" length is standard, (with the 1.5" tube as the bottom tube, and the 1.25" tube as the inserted tube.) The 72" tube is used on extended frame widths greater than 99.5".
7. Install the 1.5" transverse brace (H) to the footer/ground pan connector (D) with the bolt and nut.
8. Slide 1.25" transverse brace arm into the 1.5" brace and attach to adjacent I-beam connector (I) with bolt and nut.
9. Secure 1.5" transverse arm to 1.25" transverse are using four (4) 1/4" - 14 x 3/4" self-tapping screws in pre-drilled pilot holes.
10. **System Placement - SEE DRAWINGS:** A) Second pier from the end at the opposite sides. B) Same as 'A' add third system placed at center pier, outside rail, either side. C) Second pier from end, all four sides. D) Repeat 'C', place 5th system at center pier, outside rail, either side. When placing systems under ***Special Design*** always set full systems at end positions.
11. **When Tie Downs are required, placement is as follows: (SEE DRAWINGS)** Single-wide homes require a minimum of 3 anchors per side, two (2) of those anchors shall be located not more than 2 feet from each end. Any additional anchors (as specified on Table 1) are to be spaced evenly along each side.

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CALL OUT	PART #	NAME	MATERIAL	FINISH	COMMENT SEE KEY B
B	1100-1A-G	GROUND PAN	ASTM # A-36	**SEE KEY A	
C	CONCRETE	CONCRETE BASE			A
D	1100-3-G	GROUND PAN TRANSVERSE CONNECTOR "U" BRACKET	ASTM # A-36	**SEE KEY A	B
D(W)	1100-W-TAC	CONCRETE WET SET TRANSVERSE ANCHOR "U" BRACKET	ASTM # A-36	*RRBP	B
D(D)	1100-D-TAC	CONCRETE DRY SET TRANSVERSE CONNECTOR "U" BRACKET	ASTM # A-36	*RRBP	B
E	1.50-20-P	"V" BRACE 1 1/2" SQ. TUBE 20" LONG	ASTM # A513	*RRBP	
	1.50-28-P	"V" BRACE 1 1/2" SQ. TUBE 28" LONG	ASTM # A513	*RRBP	
	1.50-39-P	"V" BRACE 1 1/2" SQ. TUBE 39" LONG	ASTM # A513	*RRBP	
	1.50-44-P	"V" BRACE 1 1/2" SQ. TUBE 44" LONG	ASTM # A513	*RRBP	
	1.50-54-P	"V" BRACE 1 1/2" SQ. TUBE 54" LONG	ASTM # A513	*RRBP	
F	1100-10-P	"V" BRACE I-BEAM CONNECTOR	ASTM # A-36	*RRBP	B
H	1.50-60-P	TELESCOPING TRANSVERSE ARM 1 1/2" SQ. TUBE 60" LONG	ASTM # A513	*RRBP	D
	1.50-72-P	TELESCOPING TRANSVERSE ARM 1 1/2" SQ. TUBE 72" LONG	ASTM # A513	*RRBP	D
	1.25-60-P	TELESCOPING TRANSVERSE ARM 1 1/4" SQ. TUBE 60" LONG	ASTM # A513	*RRBP	
	1.25-72-P	TELESCOPING TRANSVERSE ARM 1 1/4" SQ. TUBE 72" LONG	ASTM # A513	*RRBP	
I	1100-9-P	TRANSVERSE ARM I-BEAM CONNECTOR 2 PIECES	ASTM # A-36	*RRBP	C
J	1100-11-G	"V" PAN BRACKET - CENTER POINT	ASTM # A-36	**SEE KEY A	C
J(W)	1100-W-CPCA	CONCRETE WET "V" ANCHOR BRACKET	ASTM # A-36	*RRBP	A
J(D)	1100-D-CPCA	CONCRETE DRY "V" CONNECTOR BRACKET	ASTM # A-36	*RRBP	A

KEY A **ASTM A123-89A or A929/A929M-96
*RUST RESISTANT BLACK PAINT

KEY B
A - SEE INSTALLATION USING CONCRETE RUNNER ETC.
B - CARRIAGE BOLT & HEX NUT, GRADE 2, 1 REQUIRED
C - CARRIAGE BOLT & HEX NUT, GRADE 2, 2 REQUIRED
D - SELF TAPPING SCREWS, 1/4"-#14X3/4", 4 REQUIRED

TABLE 1
NUMBER OF FOUNDATION BRACE SYSTEMS REQUIRED WIND LOAD and SEISMIC DESIGN CATEGORY D

70 B WIND AREAS (15PSF)

FOUNDATION BRACE MODEL 1100 I "V

WIDTH	HOUSE LENGTH		
	2 BRACES (A)	3 BRACES (B)	4 BRACES (C)
12'	up to **56'**	over **56'** to **76'**	—
14'	up to **56'**	over **56'** to **76'**	—
16'	up to **54'**	over **54'** to **76'**	—
24'	up to **50'**	over **50'** to **76'**	—
28'	up to **50'**	over **50'** to **74'**	over **74'** to **76'**
32'	up to **48'**	over **48'** to **72'**	over **72'** to **76'**
33' to 48"	—	**Up to 62'**	over **62'** to **76'**

TIEDOWN/ANCHOR REQUIRED PER SIDE OF HOUSE

HOUSE LENGTH	
3 ANCHORS	4 ANCHORS
up to **72'**	over **72'** to **76'**
up to **76'**	—
up to **76'**	—
NONE REQ.	**NONE REQ.**
NONE REQ.	**NONE REQ.**
NONE REQ.	**NONE REQ.**
NONE REQ.	**NONE REQ.**

80 B & 70 C WIND AREAS (20PSF)

FOUNDATION BRACE MODEL 1100 I "V"

WIDTH	HOUSE LENGTH			
	2 BRACES (A)	3 BRACES (B)	4 BRACES (C)	5 BRACES (C)
12'	up to **42'**	over **42'** to **64'**	over **64'** to **76'**	—
14'	up to **42'**	over **42'** to **62'**	over **62'** to **76'**	—
16'	up to **40'**	over **40'** to **62'**	over **62'** to **76'**	—
24'	up to **38'**	over **38'** to **58'**	over **58'** to **76'**	—
28'	up to **36'**	over **36'** to **56'**	over **56'** to **74'**	over **74'** & **76'**
32'	up to **36'**	over **36'** to **54'**	over **54'** to **72'**	over **72'** to **76'**
33' to 48"	—	—	up to **64'**	over **64'** to **76'**

TIEDOWN/ANCHOR REQUIRED PER SIDE OF HOUSE

HOUSE LENGTH	
3 ANCHORS	4 ANCHORS
up to **66'**	over **66'** to **76'**
up to **66'**	over **66'** to **76'**
NONE REQ.	over **69' to 76'**
NONE REQ.	**NONE REQ.**
NONE REQ.	**NONE REQ.**
NONE REQ.	**NONE REQ.**
NONE REQ.	**NONE REQ.**

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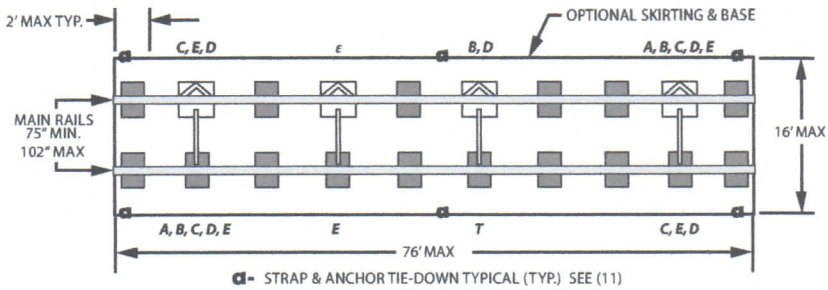
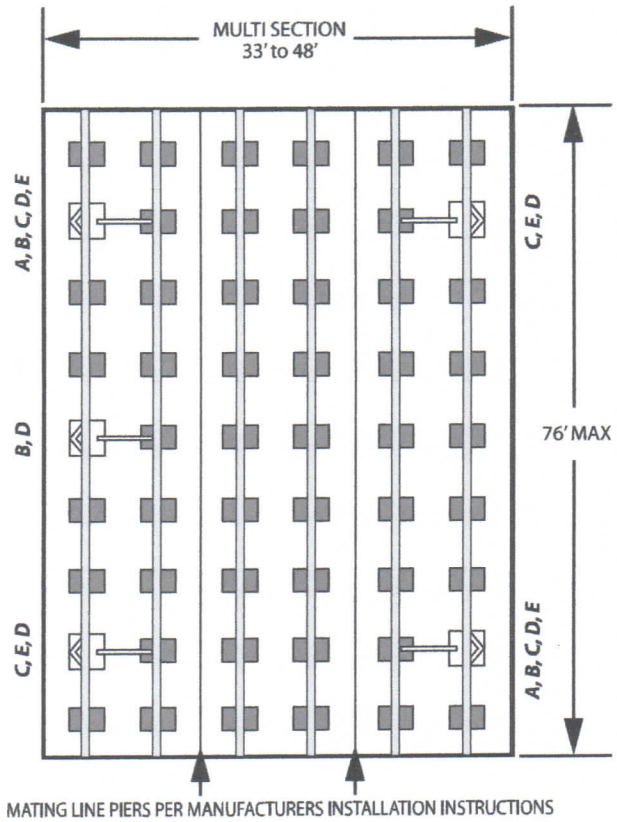
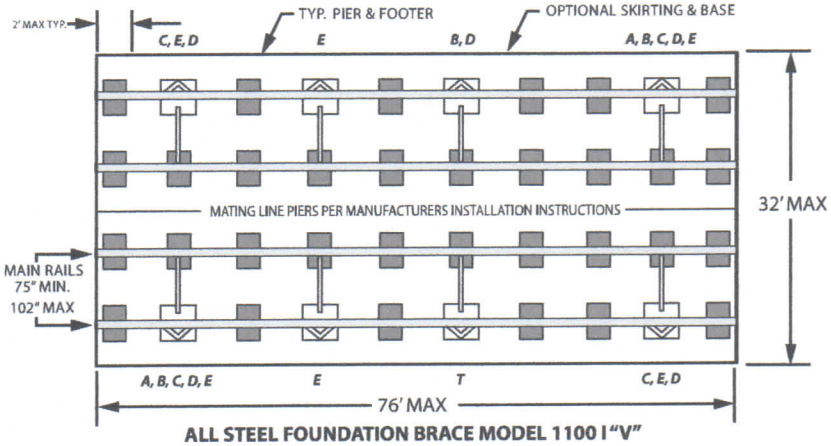
PIER ON FOOTER PER HOUSE MANUFACTURER INSTALLATION INSTRUCTIONS 8' O.C. MAX



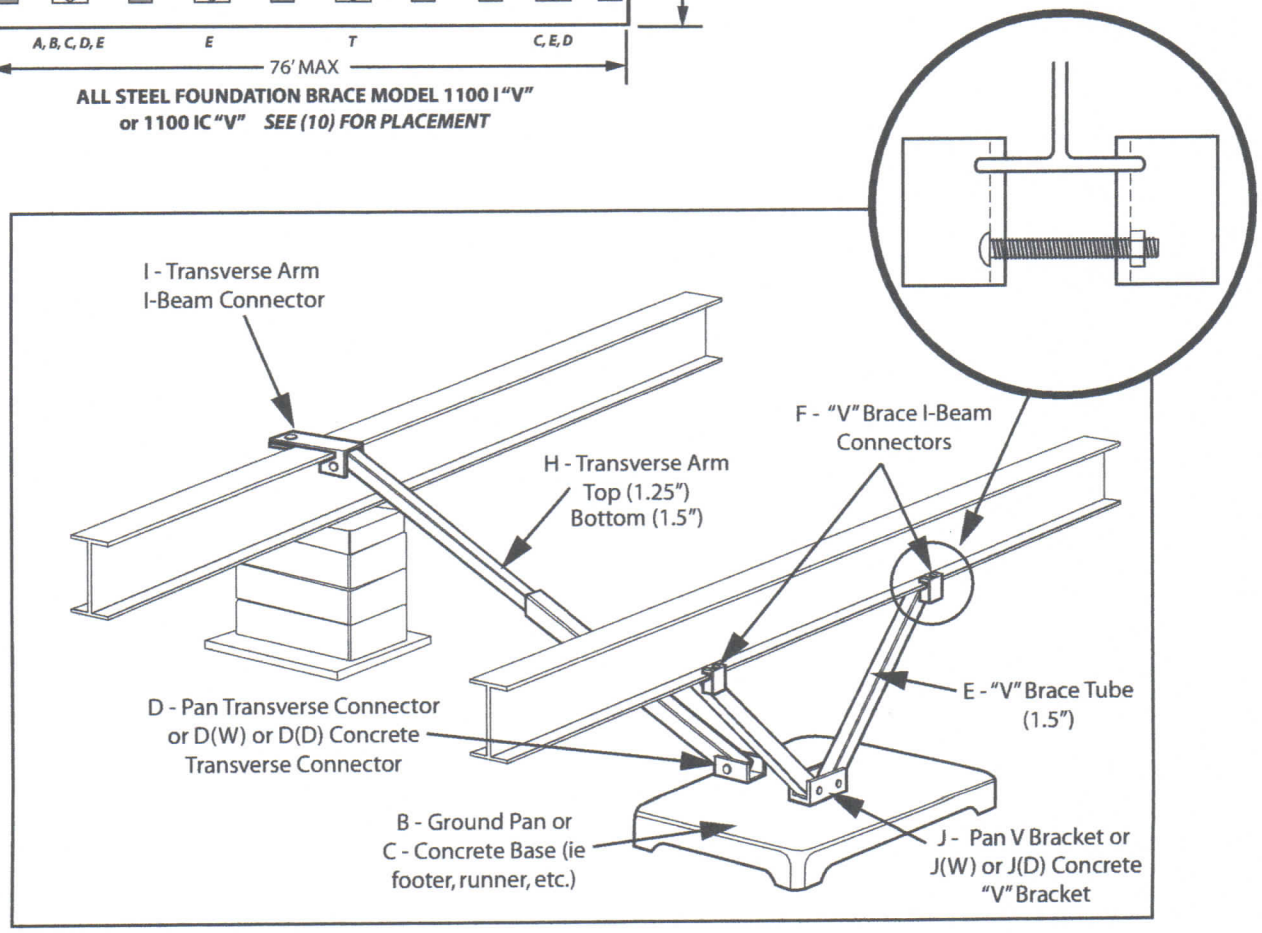
a- STRAP & ANCHOR TIE-DOWN TYPICAL (TYP.) SEE (11)
FOR PLACEMENT WHEN REQUIRED BY TABLE 1
ALL STEEL FOUNDATION BRACE MODEL 1100 I "V" or 1100 IC "V"
SEE (10) FOR PLACEMENT DESCRIPTION



PIER ON FOOTER PER HOUSE MANUFACTURER INSTALLATION INSTRUCTIONS 8' O.C. MAX



ALL STEEL FOUNDATION BRACE MODEL 1100 I "V"
or 1100 IC "V" ***SEE (10) FOR PLACEMENT***



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