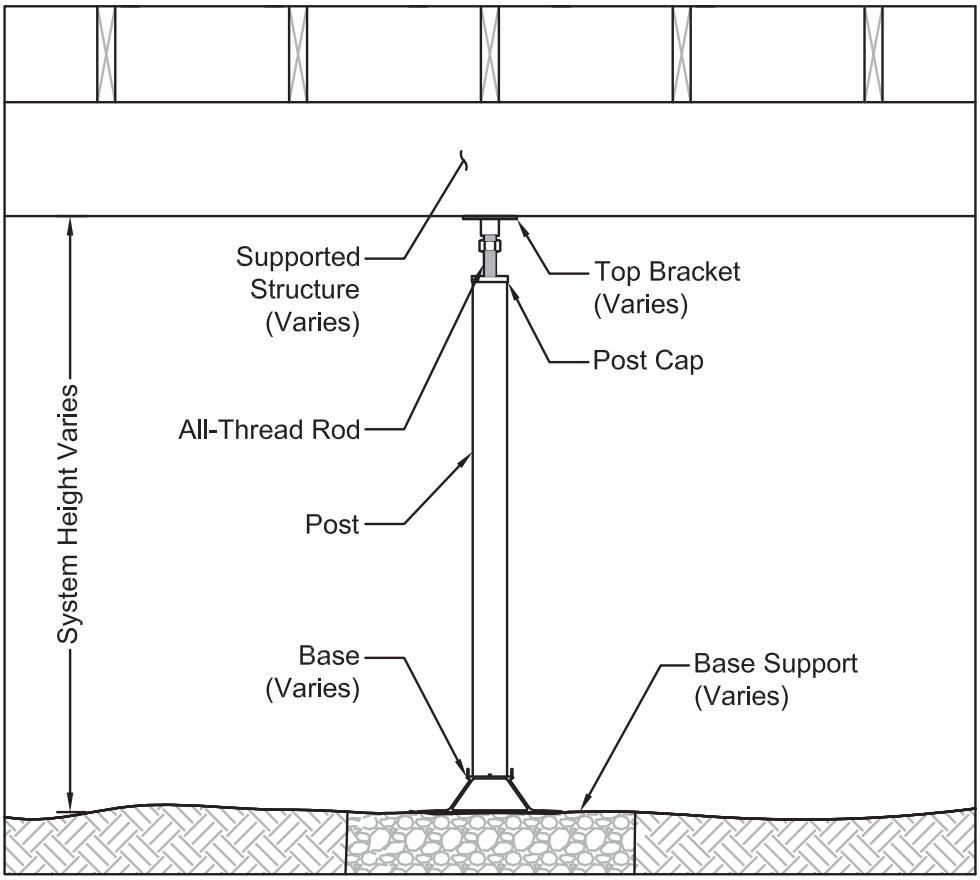
MODEL 288 SMARTJACK® SYSTEM

General Arrangement



Allowable Capacity

The allowable system compression capacity of the assembled 288 SmartJack system is limited to the least value of the component capacities used in the system assembly. The component capacities are listed in the *Technical Specifications* section.

The allowable load applied to the SmartJack system may be limited by the bearing capacity of the existing soil. The well-compacted crushed stone or recycled concrete base is a proven method to increase support for the higher bearing pressure condition immediately below the aluminum base and then to absorb and distribute lower pressures to the existing soils. Should settlement of the SmartJack system occur, adjustments are made easily by extending the all-thread rod.

The SmartJack is designed to support axial compression loads only. The SmartJack should not be used in applications where the system is intended to resist tension or lateral loads.

Top Bracket Variations

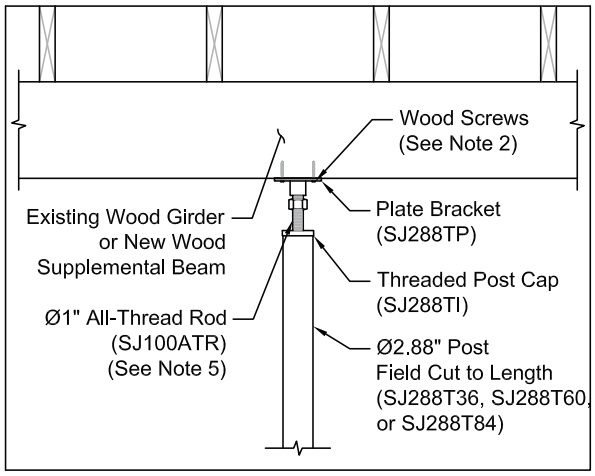


Plate bracket with new or existing wood girder

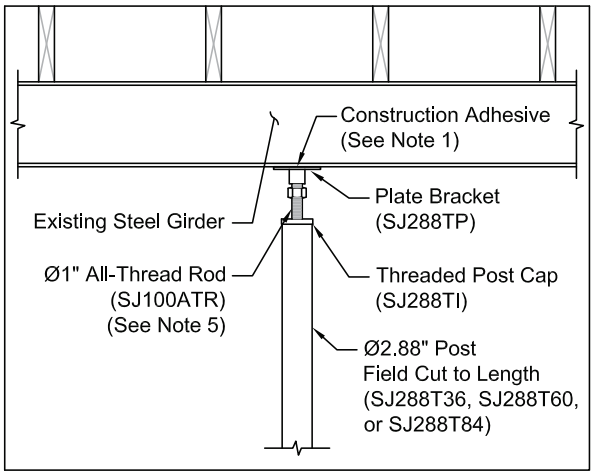
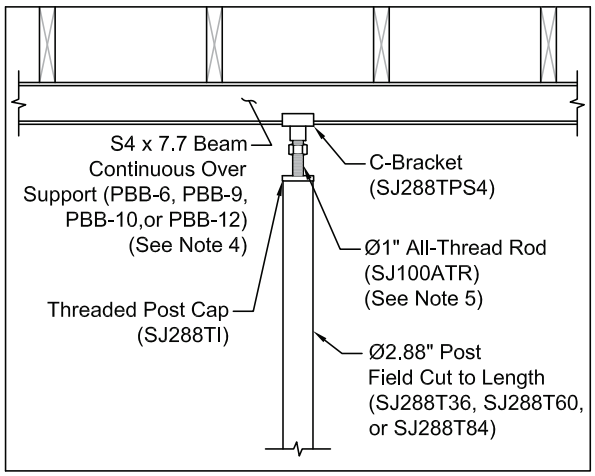
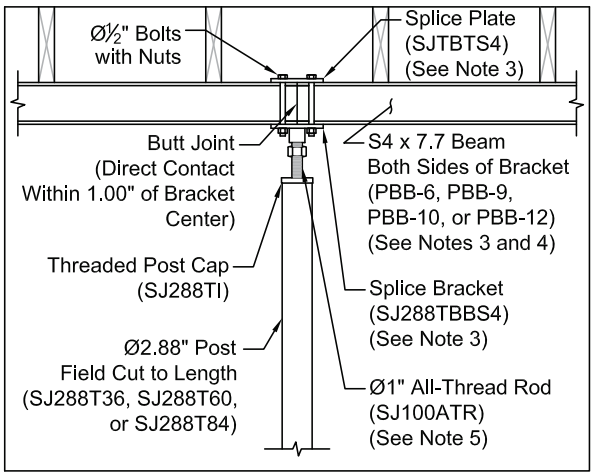


Plate bracket with existing steel girder



C-bracket with S4 x 7.7 supplemental beam



Splice bracket with new S4 x 7.7 supplemental beam

(1) Construction adhesive should be used in interior basement applications to maintain positive attachment to a supported steel beam.

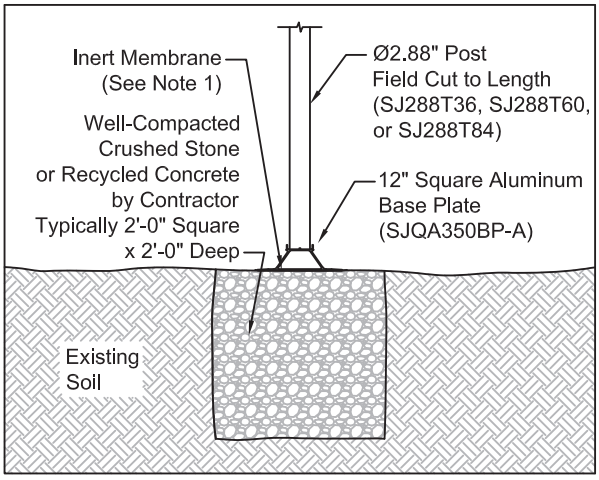
(2) Wood screws may be used as an optional feature to maintain positive attachment to a supported wood beam.

(3) Splice bracket should only be used at interior supports when supporting beams of similar length on both sides. Splice brackets shall not be used to support cantilevered beams.

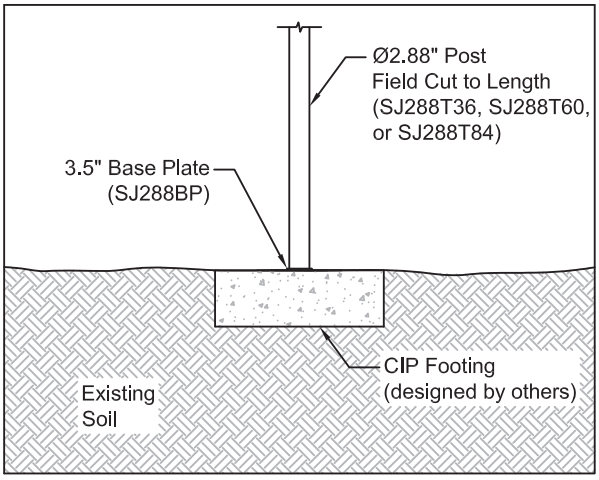
(4) Additional requirements for the support of cantilevered beams can be found within the design example later in this appendix.

(5) All-thread rod must be fully engaged through the thickness of the threaded post cap.

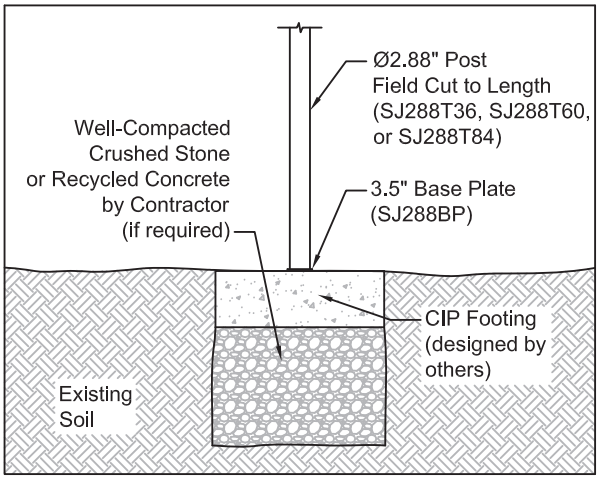
Base Plate Variations



Base plate over crushed stone



Base plate with CIP footing



Base plate with CIP footing over crushed stone

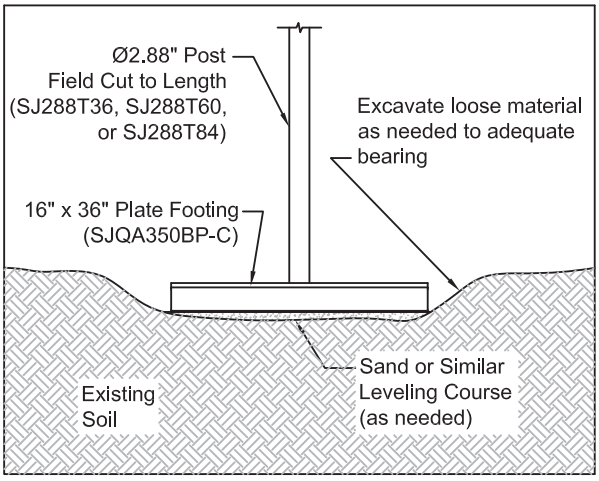
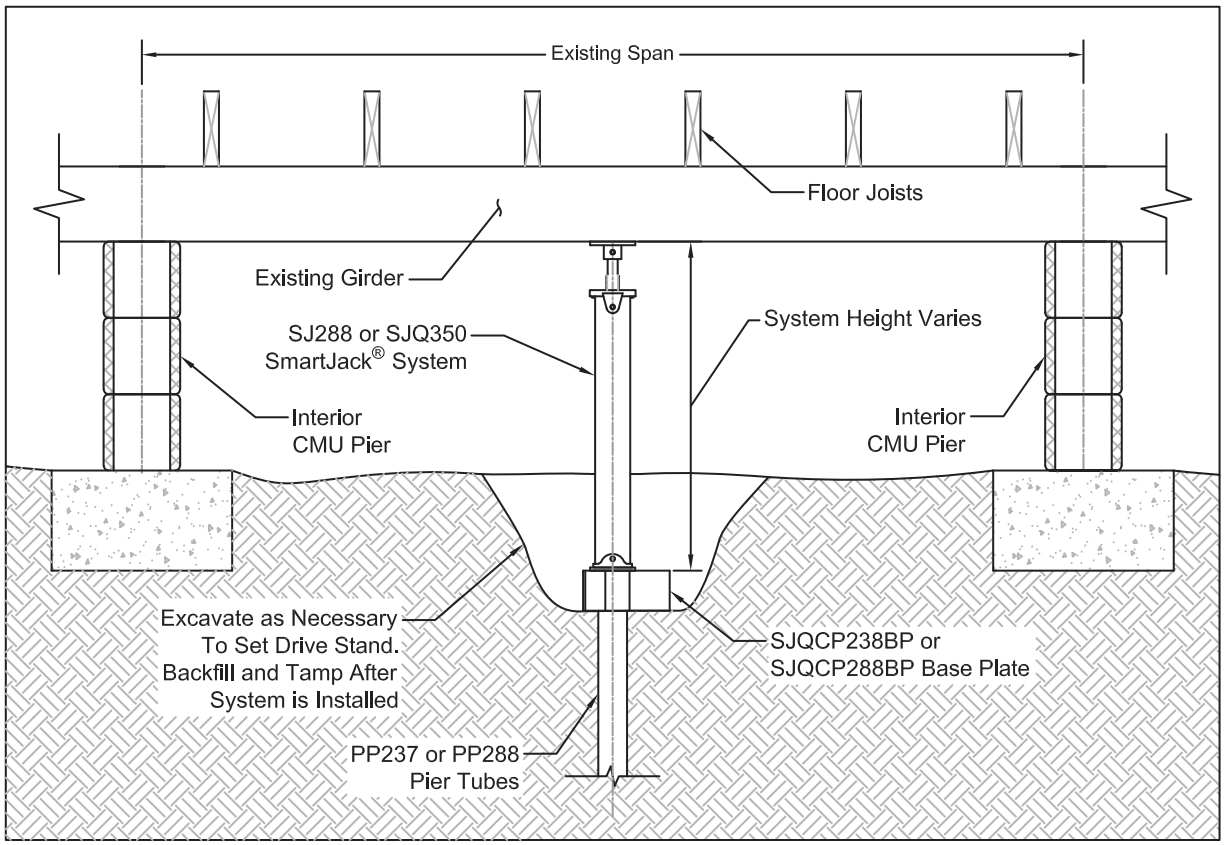


Plate footing with leveling course

(1) An inert membrane is recommended beneath the aluminum base to separate it from recycled concrete fill or poured concrete.

SJ288/SJQ350 to PP237/PP288



(1) Angular variance between the centerlines of the SmartJack post and concentric pier tube should not exceed 2.5 degrees.

(2) Soil shall be adequately compacted around the base plate.

SJ288TP (Plate Bracket):
¼" x 4.50" square ASTM A36 plate
Ø1.50" x 0.250" wall x 1.38" long CDS or DOM confining ring
Allowable compression with sawn lumber girder = 4.0 kips
Allowable compression with structural steel girder = (will not govern)

SJ288TPS4 (C-Bracket):
For use in combination with PowerBrace™ (S4x7.7) beams
3⁄16" x 3.00" x 6.00" ASTM A36 bent plate
Ø1.50" x 0.250" wall x 1.38" long CDS or DOM
Allowable compression = (will not govern)

SJ288TBBS4, SJTBTS4 (Beam Splice Bracket):
For use in combination with PowerBrace™ (S4x7.7) beams
(2) - ⅜" x 4.50" x 5.00" ASTM A36 plates
Ø1.50" x 0.250" wall x 1.38" long CDS or DOM
(4) - Ø½" x 5.50" bolts with nuts
Allowable compression = 8.3 kips

SJ100ATR (All-Thread Rod):
Ø1" x 8.00" long ASTM F1554 Grade 55 all-thread rod with welded heavy hex nut
Yield strength = 54 ksi (min.)
Tensile strength = 64 ksi (min.)
Allowable compression for system for system heights up to 9 feet = 16.9 kips

SJ288TI (Threaded Post Cap):
Ø3.00" OD x 1.00" thick ASTM A108 Grade 1018 machined and tapped insert
Yield strength = 54 ksi (min.)
Tensile strength = 64 ksi (min.)
Allowable compression for system heights up to 9 feet = (will not govern)

SJ288T36, SJ288T60, SJ288T84 (Post):
Ø2.88" OD x 0.165" wall x 36", 60", or 84" long, field cut to length, ASTM A500 Grade C triple-coated in-line galvanized tube
Yield strength = 50 ksi (min.)
Tensile strength = 55 ksi (min.)
Allowable compression varies by system height - see table on the next page

SJQA350BP-A (Bottom Plate):
For use with crushed stone support
3.00" tall x 12.00" square 6005A-T61 or 6061-T6 extruded aluminum with 0.10" and 0.16" thick capture tabs
Allowable compression = 9.5 kips

SJ288BP (Bottom Plate):
¼" x 3.50" square ASTM A36 plate
HSS 2.00" x 2.00" x 0.25" wall tube x 0.75" long ASTM A500 Grade B tube
Allowable compression (when used against concrete with minimum f'_c = 2,500 psi) = 10.7 kips

SJQCP238BP/SJQCP288BP (SmartJack to Push Pier Base Plate):
For use with PP237 (SJQCP238BP)
Ø2.75" x 0.156 wall x 4.00" long ASTM A513 Type 5 pipe
¼" x 4.00" x 4.00" and 5/16" x 4.50 x 4.50 ASTM A36 bearing plate
¼" ASTM A36 bent capture plate
For use with PP288 (SJQCP288BP)
Ø3.38" x 0.188" wall x 4.00" long ASTM A53 Grade B pipe
¼" x 4.00" x 4.00" and 5/16" x 4.50 x 4.50 ASTM A36 bearing plate
¼" ASTM A36 bent capture plate
Electrozinc plated per ASTM B633
Allowable compression = (will not govern)

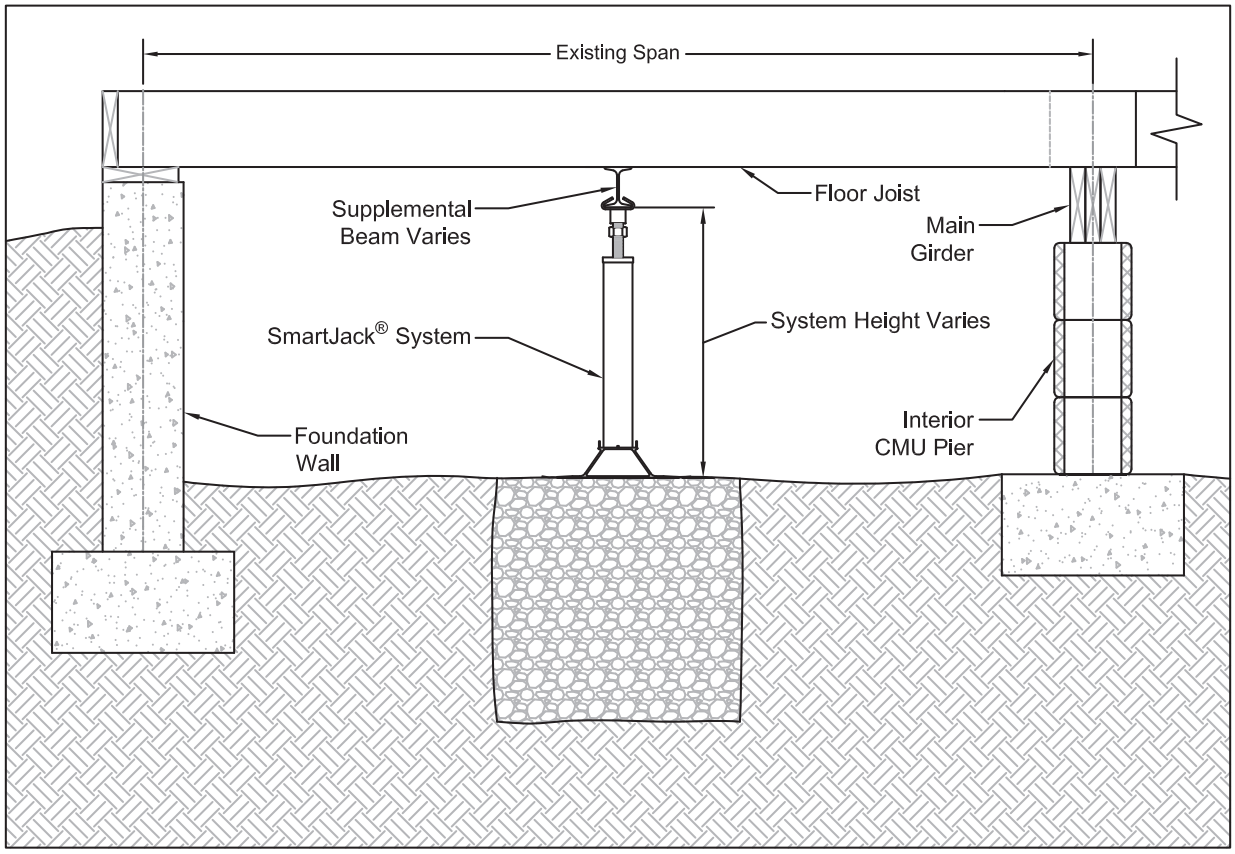
PBB-6, PBB-9, PBB-10, PBB-12 (PowerBrace Beam):
S4 x 7.7 x 6', 9', 10', or 12' long, field cut to length, ASTM A572 Grade 50, hot-dip galvanized (ASTM A123) or electrozinc plated (ASTM B633)
Yield strength = 50 ksi (min.)
Tensile strength = 65 ksi (min.)
Allowable load varies by length of span – see table in Design Example

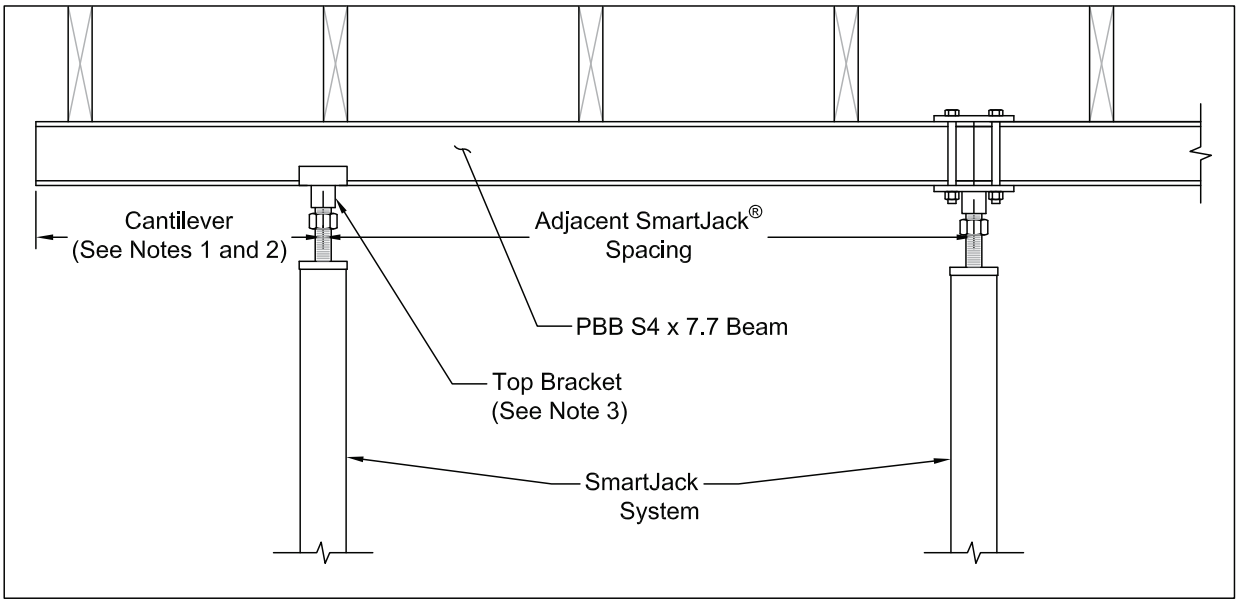
Corrosion Protection
The tube steel used for the 288 SmartJack® is manufactured with a triple-layer, in-line galvanized coating. This coating process consists of: (1) a uniform hot-dip galvanizing layer; (2) an intermediate conversion coating to inhibit the formation of white rust and enhance corrosion resistance; and (3) a clear organic top coating to further enhance appearance and durability. The inside of the tube also has a zinc-rich coating. Unless noted otherwise, all other components are provided as electrozinc plated per ASTM B633.

SJ288T36, SJ288T60, and SJ288T84 Posts		
Post Length (ft)	**Maximum System Height (ft)**	**Allowable Axial Compression $P_c = P_n/\Omega$ (kips)**
1 to 5	5.6	27.4
6	6.6	23.9
7	7.6	20.4
8	8.6	16.9
9	9.6	13.8
10	10.6	11.3

The aluminum base is far less susceptible to corrosion than the steel components that surround it. There are, however, chlorides in some concrete that can be reactive with aluminum. It is recommended that an inert membrane be placed under the aluminum base to separate it from recycled or poured concrete. Crushed limestone or other crushed stone alternatives do not have similar considerations.

Design Example





SJ288 Cantilever Arrangement

(1) Beam should extend past the centerline of the SmartJack system at least as far as the edge of the top bracket.

(2) The new supplemental beam may be cantilevered over the end support by a distance of 30 inches or by a distance of approximately 50% of the adjacent SmartJack spacing, whichever is less. Each beam segment must be supported by at least two SmartJack posts.

(3) Support of cantilevers requires use of top brackets that allow the supplemental beam to be continuous over the support. Splice brackets shall not be used to support cantilevered beams.

Step 1

Determine the load which will be supported by the new supplemental beam in pounds per linear foot:

Supplemental Beam Load (plf) = Existing Span (ft) × Total Floor Load (psf) ÷ 2

Note: Typical residential wood-framed construction may have an approximate floor load (15 psf dead load + 40 psf live load) = 55 psf total floor load.

Step 2

Determine the load on the interior SmartJack posts by multiplying the calculated supplemental beam load (plf) by the spacing of the SmartJack posts:

SmartJack Load (lb) = Supplemental Beam Load (plf) × SmartJack Spacing (ft)

Step 3

Verify that the calculated SmartJack load is less than the allowable capacity provided by the various system components, as well as the well-compacted crushed stone base and the bearing soils.

Note: Without a detailed soil investigation, typical installations should assume no more than 1,500 psf allowable soil bearing pressure. This would equate to an allowable soil capacity of 6,000 lb for a 2' square cast-in-place concrete footing, a 2' cube of well-compacted crushed stone, or the 16" x 36" plate footing. Extremely soft soils may prohibit the use of a crushed stone base or plate footing and require that a larger poured concrete footing be utilized.

Step 4

Size the new supplemental beam by using the following table with both the SmartJack post spacing (ft) and the calculated supplemental beam load (plf). Choose a beam size that has an allowable load (plf) greater than the calculated supplemental beam load (plf) in step 1.

	Supplemental Beam Size	Supplemental Beam Allowable Load (plf)[1,2,3]					SmartJack Post Spacing
		4 ft	5 ft	6 ft	7 ft	8 ft	
Sawn Lumber[4]	(3) – 2 x 8	1,170	750	520	380	290	
	(3) – 2 x 10	1,760	1,120	780	570	440	
	(3) – 2 x 12	2,360	1,510	1,050	770	590	
	(1) – 4 x 6	850	550	380	280	210	
	(1) – 6 x 6	1,030	660	460	330	250	
Engineered Lumber[5]	3.5 x 5.5	1,250	740	420	270	180	
Structural Steel[6]	S4 x 7.7 (PowerBrace™ Beam)	3,780	2,070	1,200	750	500	
	W4 x 13	6,820	3,850	2,240	1,400	940	
	HSS 4 x 4 x ¼	5,190	2,650	1,530	960	640	
	HSS 4 x 2 x ¼ (Lying Flat in Plank Orientation)	990	500	290	180	120	

(1) This table makes no evaluation of the components of the existing structure.

(2) Allowable loads in this table assume the supplemental beam is sufficiently restrained against lateral torsional buckling at an interval equal to or less than the SmartJack post spacing.

(3) The new girder may be cantilevered over the end support by a distance of 30 inches or by a distance of approximately 50% of the adjacent SmartJack spacing, whichever is less. Each beam segment must be supported by at least two SmartJack posts.

(4) Sawn lumber is assumed to be Douglas Fir Larch - No. 2 or better.

(5) Engineered lumber is assumed to be iLevel 1.3E TimberStrand LSL or equivalent.

(6) Structural steel is assumed to be ASTM A572 Grade 50 or equivalent for wide flange shapes, and ASTM A500 Grade B or equivalent for HSS tube shapes.

Step 5

If the required supplemental beam size is undesirable, adjust spacing of the SmartJack posts and return to Step 2.