

TECHNICAL SERVICE BULLETIN

Mounting SOL 25 Plus Flat Plate Collectors on New Style Mounting Racks

These procedures show how to mount the SOL 25 Plus Flat Plate Collector on Stiebel Eltron's improved, re-designed mounting rack systems.

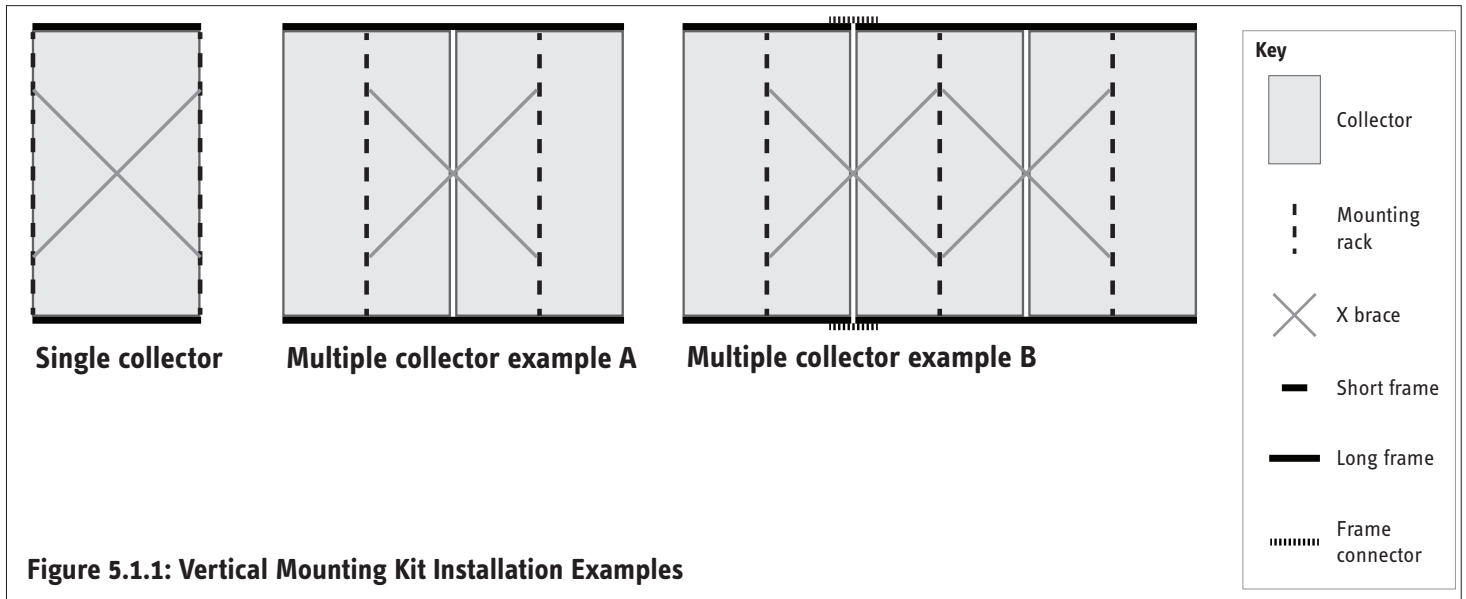


Figure 5.1.1: Vertical Mounting Kit Installation Examples

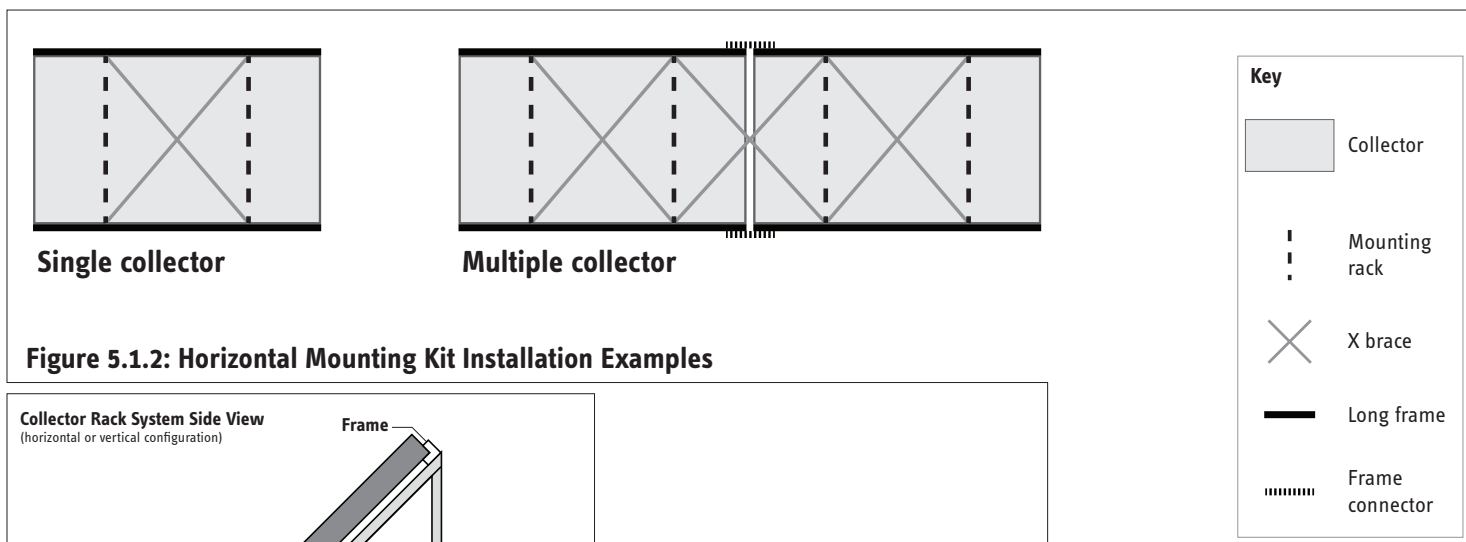


Figure 5.1.2: Horizontal Mounting Kit Installation Examples

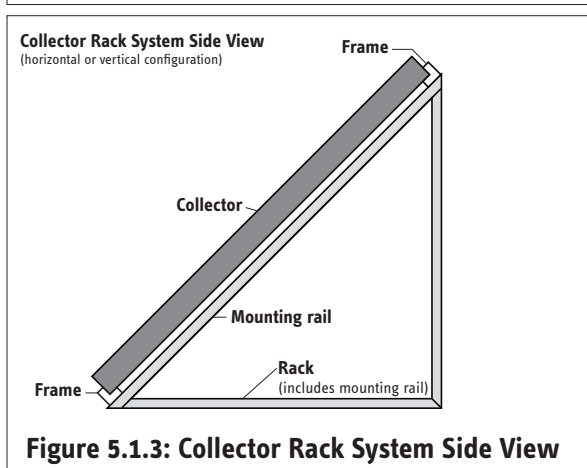


Figure 5.1.3: Collector Rack System Side View

Assembly of 45° SOL 25 Plus Mounting Systems

5.2 45° Industrial Mounting System for SOL 25 Plus (Vertical/Portrait Installation)

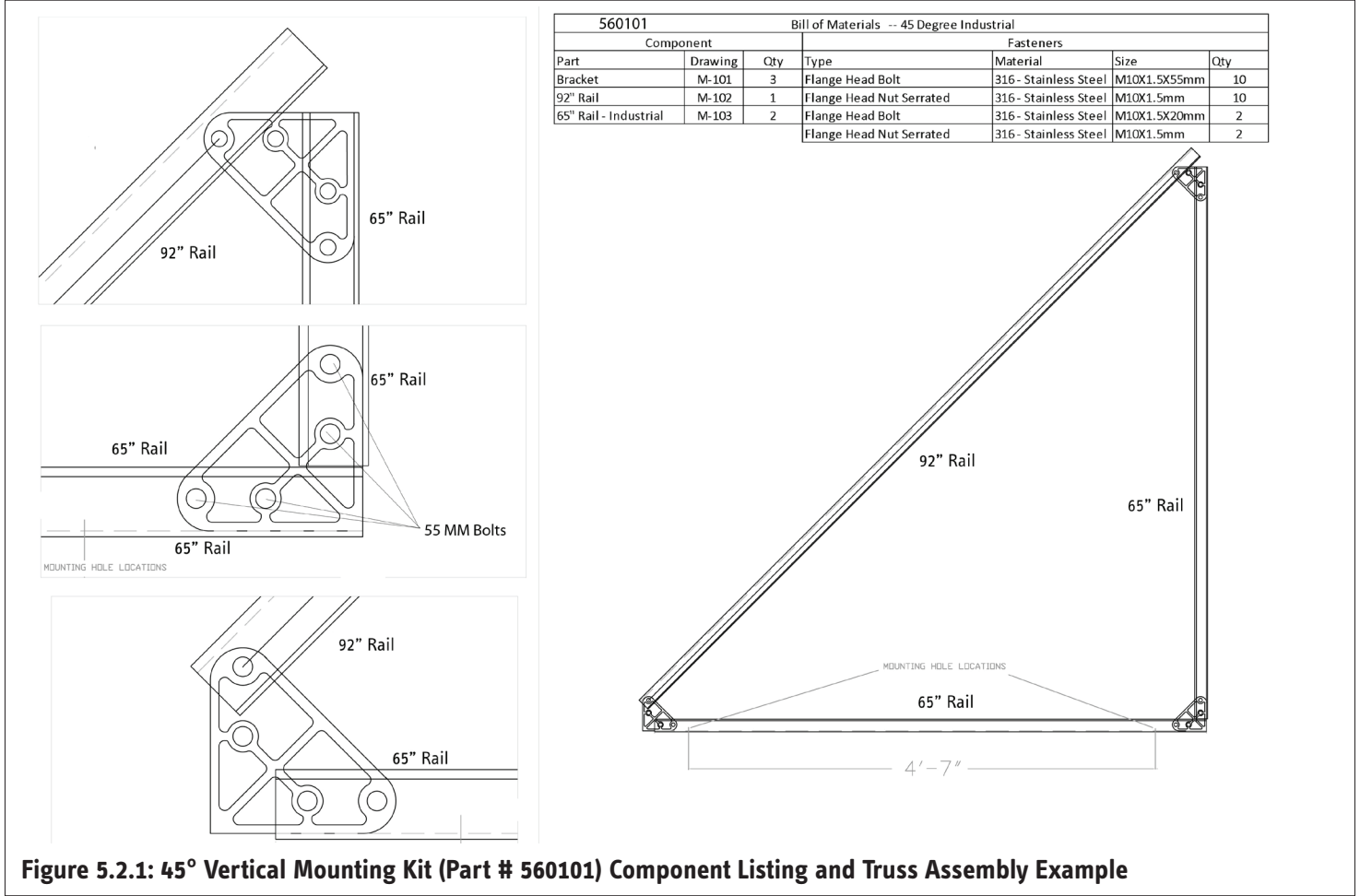


Figure 5.2.1: 45° Vertical Mounting Kit (Part # 560101) Component Listing and Truss Assembly Example

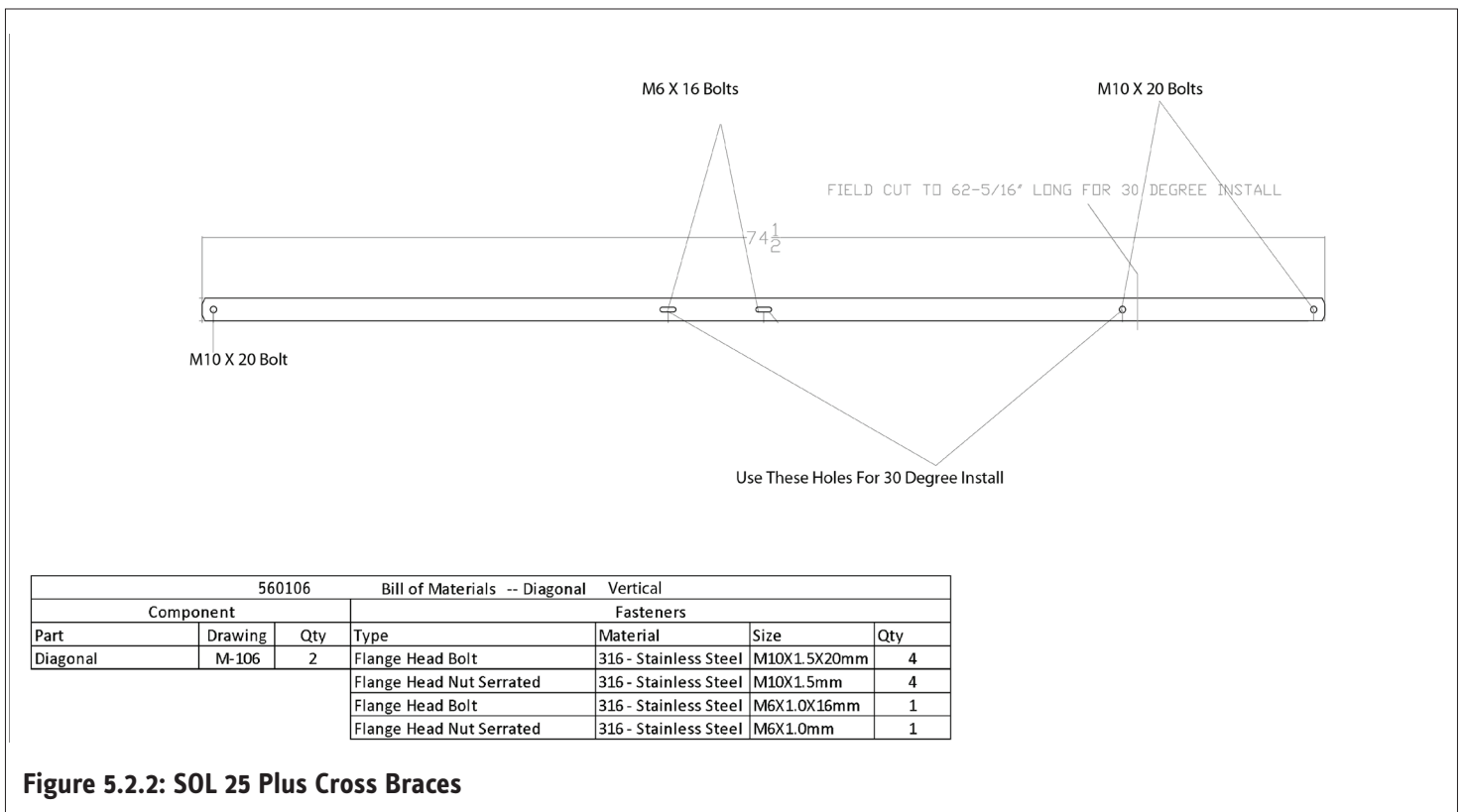


Figure 5.2.2: SOL 25 Plus Cross Braces

5.2.0 Installation of 45° Mounts on Roofs, Walls, or Ground



IMPORTANT: INSTALLED HEIGHT MUST NOT EXCEED 60 FEET.

CHECK THE ROOF STRUCTURE TO ENSURE PROPER SUPPORT FOR COLLECTORS, MOUNTING HARDWARE, WIND LOADS, ETC. (STATIC CALCULATION REQUIRED; IF NECESSARY, CONTACT THE BUILDER).

ALL ROOFING WORK MUST BE CARRIED OUT BY A PROFESSIONAL ROOFING CONTRACTOR. WHEN WORKING ON ROOFS, OBSERVE ALL RELEVANT SAFETY REGULATIONS, IN PARTICULAR: "SAFETY REGULATIONS FOR WORK ON ROOFS" AND "SAFETY AND RECOVERY HARNESSSES"V (OR LOCAL REGULATIONS).

INSTALLERS MUST COMPLY WITH ALL LOCAL, STATE, AND NATIONAL CODES.

ROPE MAY BE USED TO HOIST COLLECTORS, BUT MUST NEVER BE ATTACHED TO THE COLLECTORS' PIPES.

WHEN WORKING ON ROOFS, ALL RELEVANT SAFETY REGULATIONS MUST BE OBSERVED.

Designers and installers should consider how rainwater, snow, and ice accumulation is affected by the installation of the collectors and mounting hardware. Collectors affect the flow of rainwater around them, so appropriate means for conducting the water away from the vicinity of the collectors must be provided. Collectors and mounting hardware are also subject to accumulation of snow and ice in cold climates. Installations must provide protection to people and structures below the solar collectors to avoid hazards due to falling snow and ice as it melts (or is blown off by winds). Installers must also consider the possibility of snow and ice falling onto collectors from any structures located above them and provide appropriate means of protecting them.

Building materials adjacent to solar components must not be exposed to the elevated temperatures that the collectors can generate. Exposed components (that can readily be reached) must be maintained below 140°F or otherwise be insulated/isolated. All other exposed surfaces that can exceed 140°F should be labeled with appropriate burn hazard warnings.



NOTICE: TO PREVENT EXCESSIVE PRESSURE DROP IN THE SOLAR LOOP, NEVER LINK UP MORE THAN 5 COLLECTORS IN SERIES. ARRANGE THE INDIVIDUAL LINEAR ARRAYS PARALLEL TO EACH OTHER.

Building penetrations for plumbing and mounting must not impair enclosure integrity or functionality and must not allow rodent or vermin intrusion. They must meet applicable codes and National Roofing Contractors Assoc. practices. Structural members penetrated by solar system components must not be compromised and penetrations must meet code, particularly penetrations through fire-rated construction. Do not reduce fire resistance below code. Protect control sensor wiring.

Multiple Rows of Collectors:

If multiple arrays of collectors are being installed on a flat roof, one behind another, the recommended spacing between them should be:

- at least 25 ft. (7.6 m) for vertical installation, as shown in **Figure 5.2.10**; or
- at least 14 ft. (4.0 m) for horizontal installation, as shown in **Figure 5.2.11**.

This spacing prevents excessive shading from adjacent rows for latitudes of up to 50°. For latitudes significantly higher than 50°, multiple rows of collectors may not be practical due to low sun altitude angles.

Fastening To Structures

The type of roof or wall is a crucial factor in the choice of fasteners. Remember to take the static and dynamic (live load) forces into account.

The 45° vertical mounting racks can develop significant pull-out forces under heavy wind conditions; therefore it is important to take wind loads into account.

Force data for each collector:

Mounting Ht.	Shear Force	Tensile Force
Up to 26 ft. (8m)	470 lbs. (2.1 kN)	250 lbs. (1.1 kN)
Up to 65 ft. (20m)	790 lbs. (3.5 kN)	700 lbs. (3.1 kN)

Depending on the hardware, installers should consider distributing the shear and tensile forces over the fastening surface with six fasteners.

For anchoring in concrete, use six M8 UPAT Multicones or SM M10 anchors, both of stainless steel, per collector.

For anchoring in wood, use six wood screws in accordance with DIN 571, at least 10 x 80, of stainless steel, per collector.

If installing in a high wind environment, 8 clamps per collector should be used. In vertical installations, 4 clamps per collector are supplied with the collector frames, so 4 additional clamps per collector should be added to the equipment list for the installation. The part number for the clamps is 267510. An M10 nut and bolt should be ordered with each extra clamp. In horizontal installations, 8 clamps per collector are already provided with the collector frames.

5.2.1 Vertical 45° Mounting on a Flat Roof

(Please review section 5.2.0)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Assemble 2 triangular trusses using the 65" rails (M-103), the 92" rails (M-102), the brackets (M-101), and the 55 mm bolts as shown in Figure 5.2.1.

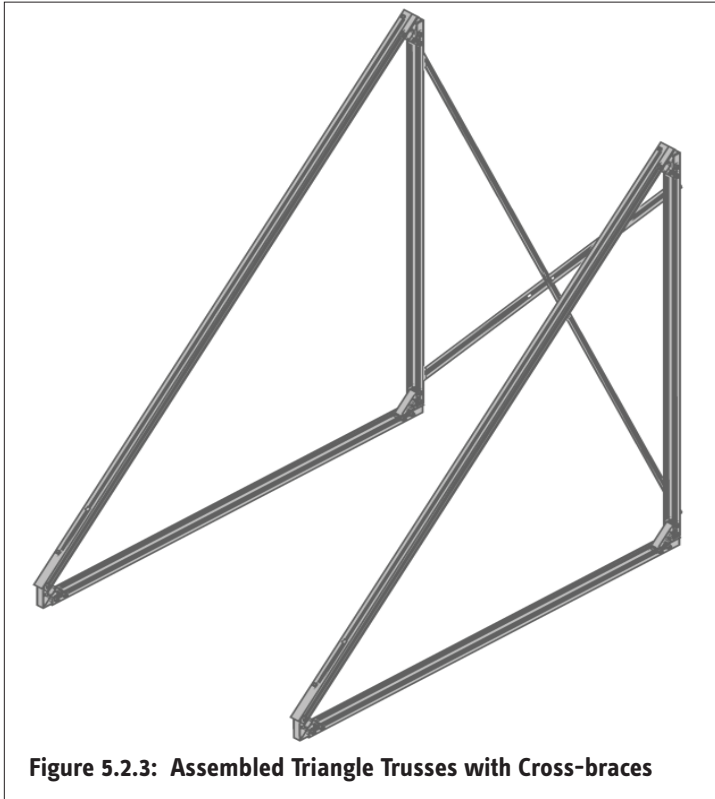


Figure 5.2.3: Assembled Triangle Trusses with Cross-braces

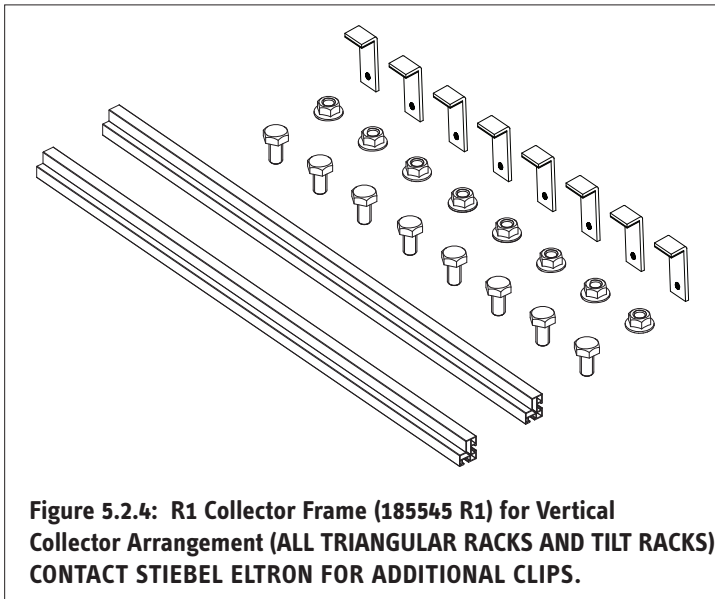


Figure 5.2.4: R1 Collector Frame (185545 R1) for Vertical Collector Arrangement (ALL TRIANGULAR RACKS AND TILT RACKS) CONTACT STIEBEL ELTRON FOR ADDITIONAL CLIPS.

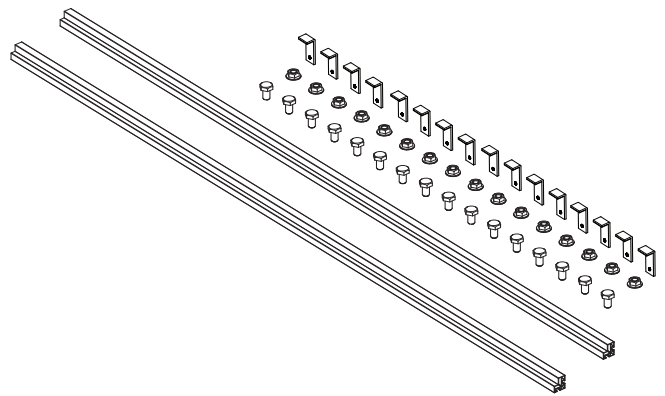


Figure 5.2.5: R2 Collector Frame (185546 R2) for Single Horizontal or Two Vertical Collector Arrangement (ALL TRIANGULAR RACKS AND TILT RACKS) CONTACT STIEBEL ELTRON FOR ADDITIONAL CLIPS.

3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.2.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 92" rails using the 20 mm bolts. The collector frames, as well as the number of trusses used, depends on the number of collectors being installed (see Table 5.1). If multiple flat-roof mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.1, 5.2.7 and 5.2.8.
4. If installing two or more collectors, the triangle trusses with their attached cross braces are to be positioned at the midpoint, behind the collectors. With a 3 collector system the 3 triangular trusses should be equidistant with 2 sets of cross braces interconnecting them as shown in Figure 5.1.1. The resulting assembly should then be centered to support the R1/R2/SFC001 frame assembly as shown in Figure 5.1.1.
5. When installing four or five trusses, brace both end spans with crossbraces, as shown in 5.2.8. For six or more trusses, cross-braces should also be placed in an inside span.
6. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kits (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 4' 7" between the front and back mounting holes and 48" between the bases.

5.2.2 Vertical 45° Mounting on a Wall

Procedures described above for mounting of collectors on a flat roof apply to wall mounting, except for the following:

1. Cross braces should be attached to the 65" rail at the base of the trusses rather than the ones at the rear.
2. Fasten the rear 65" rail of the trusses to the wall using the mounting holes in a suitable manner.
3. Low elevation mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

5.2.3 Vertical 45° Mounting on the Ground

Procedures described above for mounting of collectors on a flat roof apply to ground mounting, except for the following:

1. Installer must ensure that the mounting foundation for the system is not subject to movement, such as frost heaves. Therefore, it is necessary to install footings below the frost line in locations subject to freezing weather. If it is not possible or practical to avoid movement due to frost, etc., it will be necessary to provide a floating frame that does not flex or warp the collectors' mounting frames if the ground shifts or heaves.
2. Ground mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.
3. Ground mounting often requires longer outside piping runs, so proper insulation and protection of collector piping essential. Installers should consider laying pipe runs below grade to avoid damage and to mark the location of these runs to avoid damage from digging operations.

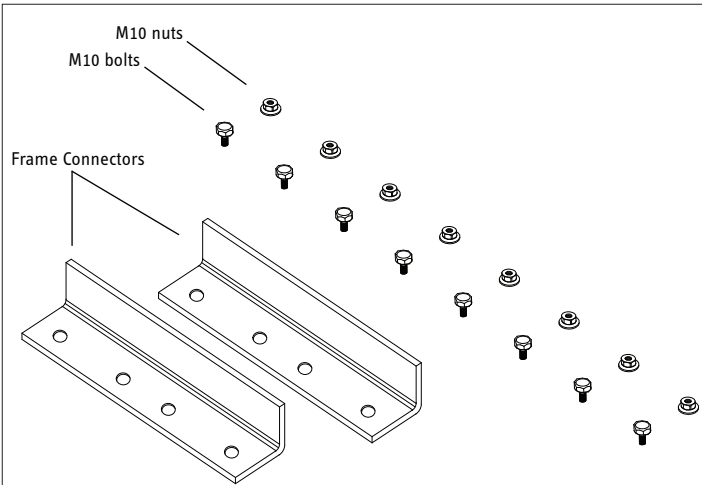


Figure 5.2.6: SFC001 Frame Connector Kit

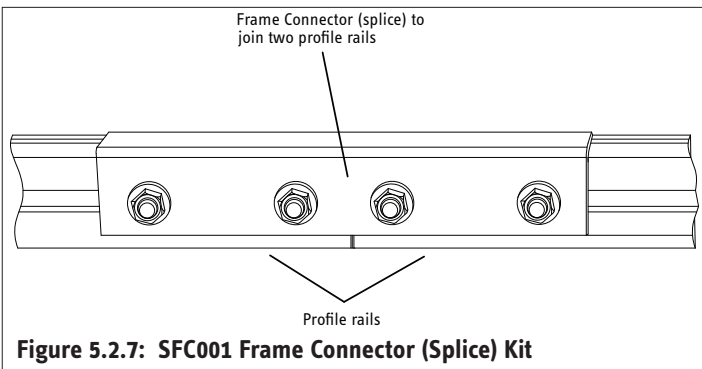


Figure 5.2.7: SFC001 Frame Connector (Splice) Kit

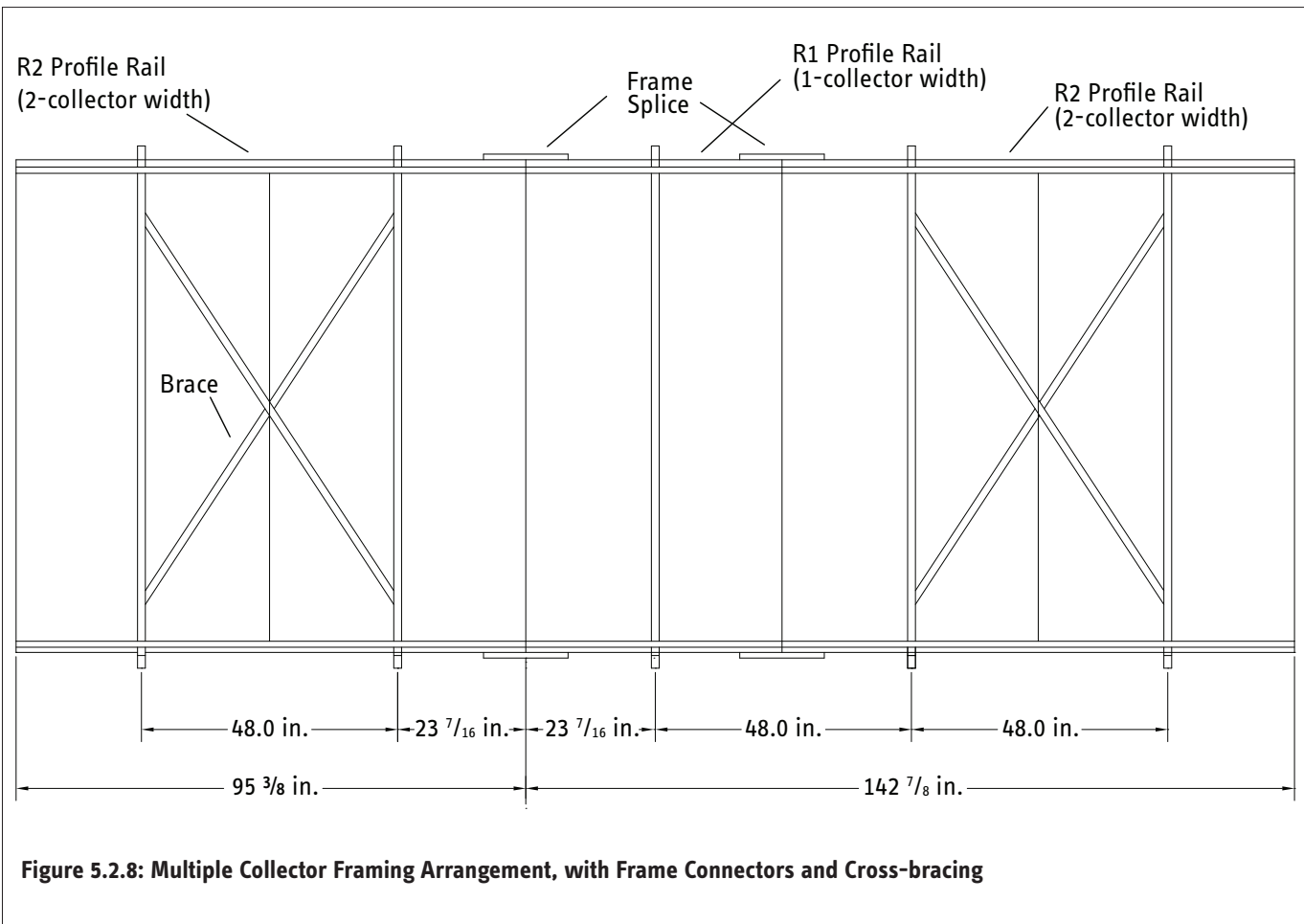


Figure 5.2.8: Multiple Collector Framing Arrangement, with Frame Connectors and Cross-bracing

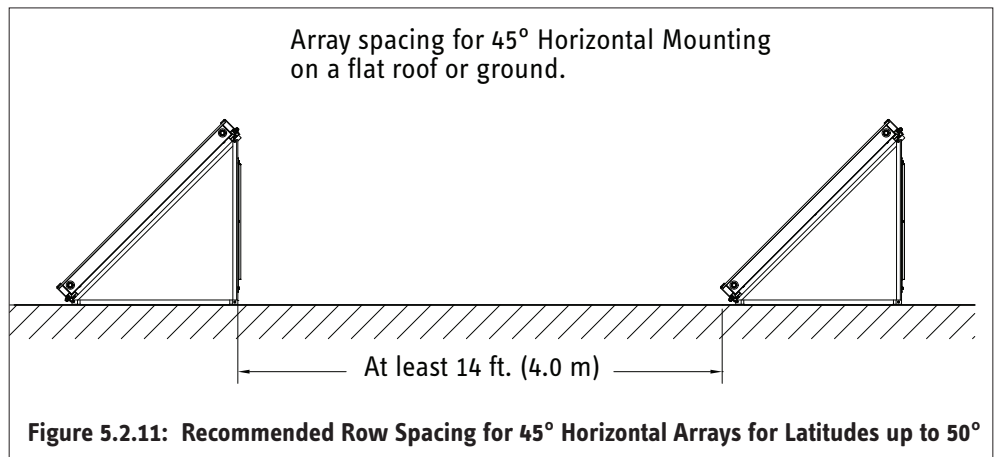
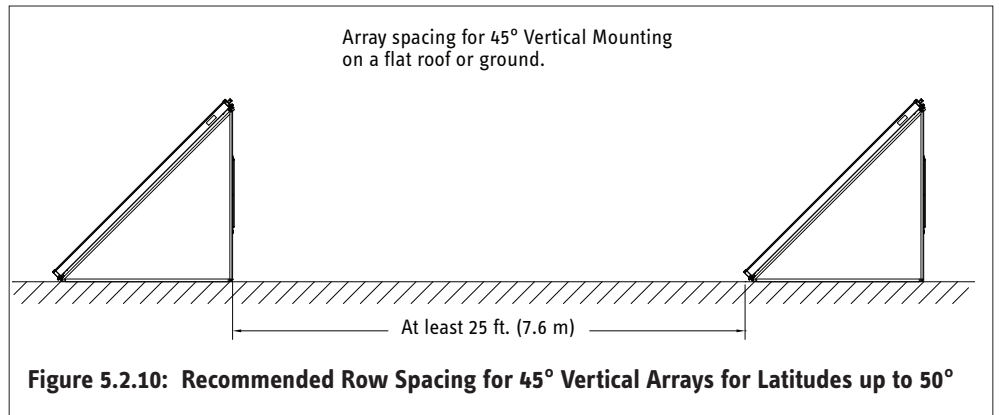
Table 5.2.9: Resulting Inclination Angle When Mounting a 45° Kit to Various Roof Pitches

Roof Pitch (rise-to-run)	Roof Pitch Angle	Tilt Angle with 45° Mount	Tilt Angle with 30° Mount	Tilt Angle with 60° Mount
1-in-12	4.8°	49.8°	34.8°	64.8°
2-in-12	9.5°	54.5°	39.5°	69.5°
3-in-12	14.0°	59.0°	44.0°	74.0°
4-in-12	18.4°	63.4°	48.4°	78.4°
5-in-12	22.6°	67.6°	52.6°	not recommended
6-in-12	26.6°	71.6°	56.6°	not recommended
7-in-12	30.3°	75.3°	60.3°	not recommended
8-in-12	33.7°	78.7°	63.7°	not recommended
9-in-12	36.9°	not recommended	66.9°	not recommended
10-in-12	39.8°	not recommended	69.8°	not recommended
11-in-12	42.5°	not recommended	72.5°	not recommended
12-in-12	45.0°	not recommended	75.0°	not recommended

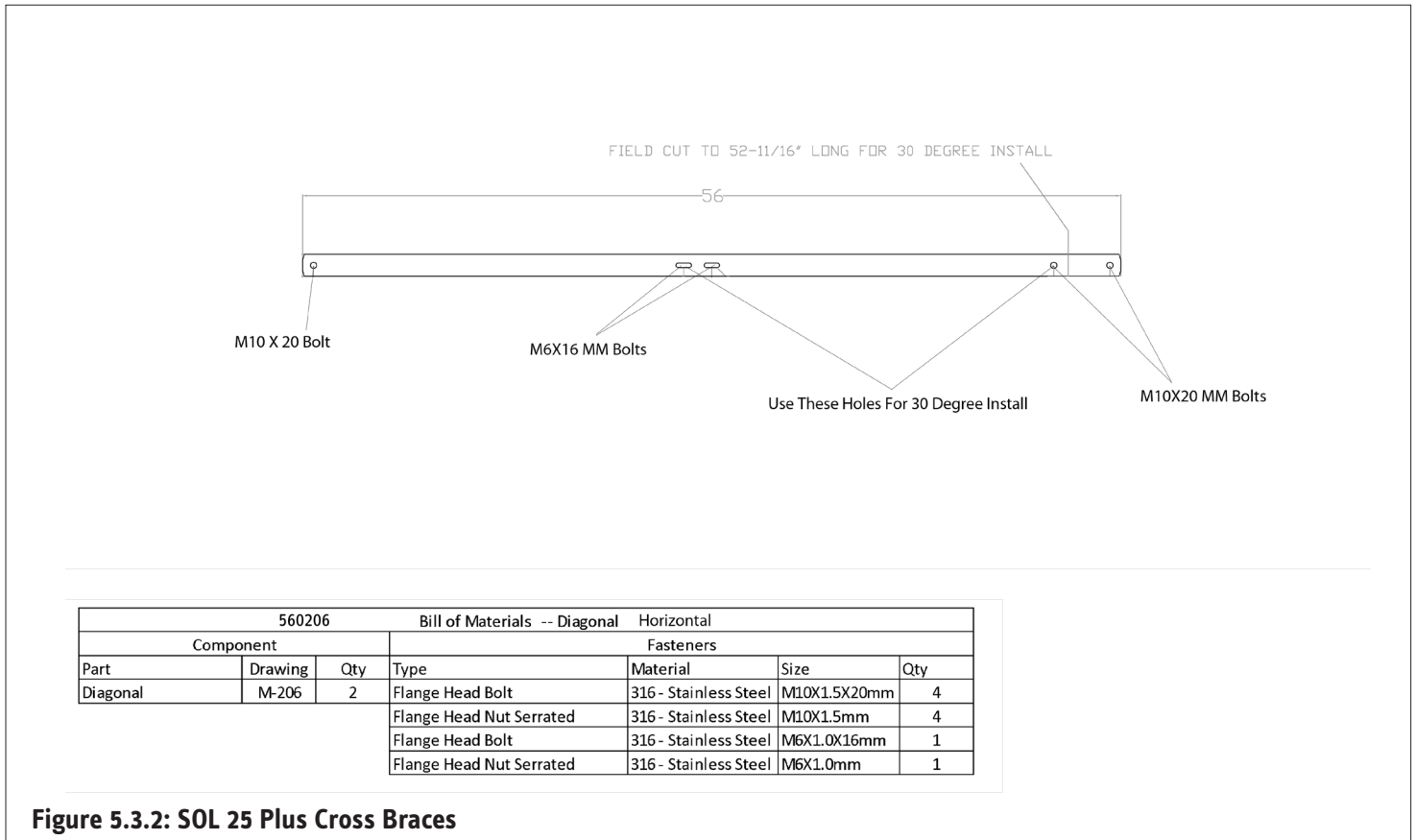
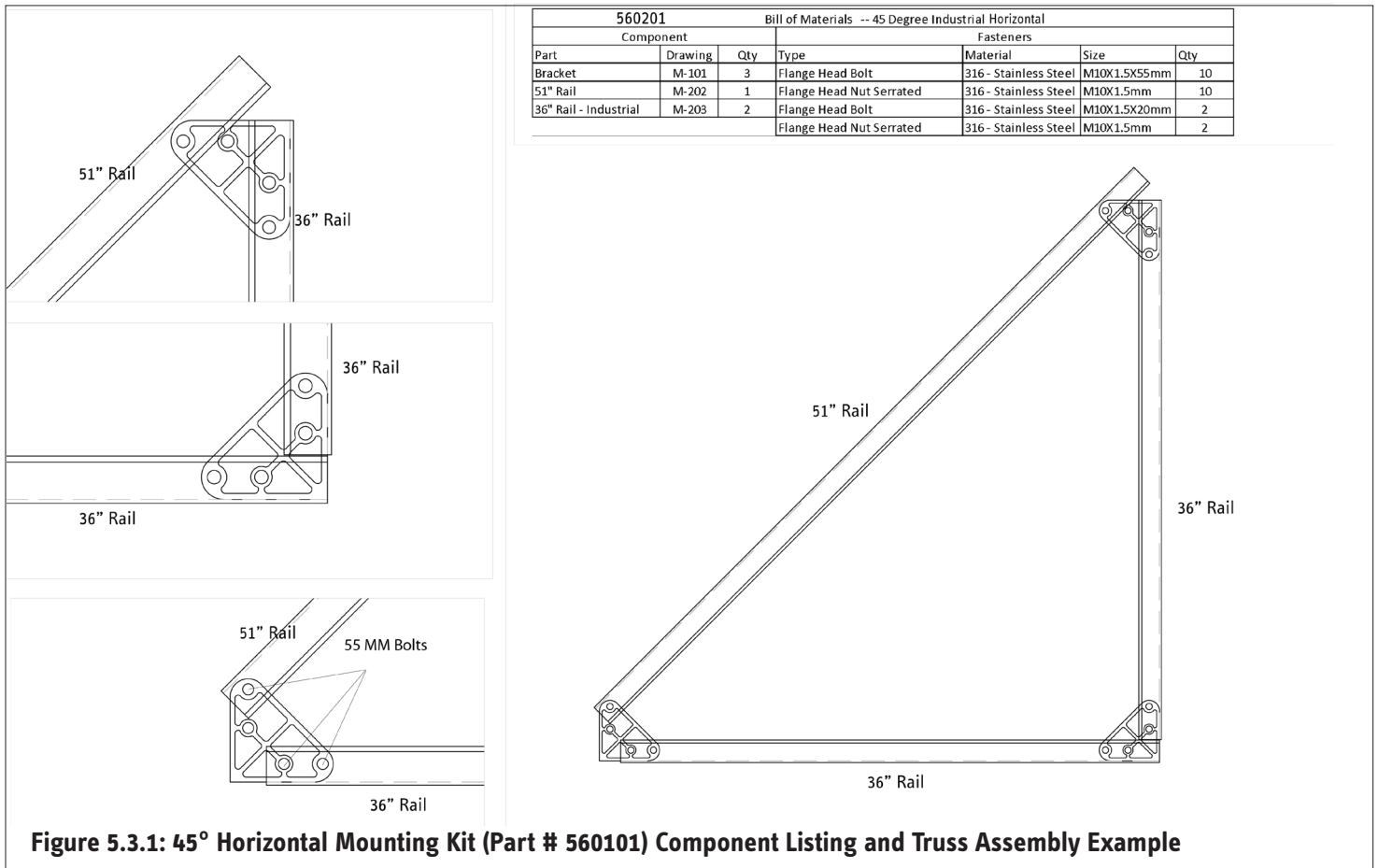
5.2.4 Vertical 45° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 45° mounting kits add 45° to an existing roof pitch, as shown in table 5.2.9. Roofs with pitches above 9-in-12 generally should not use this mounting kit, as the resulting collector tilt angle will be too steep for almost any location.



5.3 45° Industrial Mounting System for SOL 25 Plus (Horizontal/Landscape Installation)



5.3.1 Horizontal 45° Mounting on a Flat Roof

(Please review section 5.2.0)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Assemble 2 triangular trusses using the 36" rails (M-203), the 51" rails (M-202), the brackets (M-101), and the 55 mm bolts as shown in Figure 5.3.1.
3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.3.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 51" rails using the 20 mm bolts. The triangular truss assemblies with cross braces should be attached to the center of the R2 collector frames (Figure 5.6.2) i.e. there should be an equal amount of the profile rail to the right and left hand sides of each of the triangular trusses. If multiple flat-roof mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.2, 5.2.7 and 5.2.8. Note that there is an additional cross brace between the collectors.
4. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kits (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 25 53/64" between the front and back mounting holes and 48" between the bases.

5.3.2 Horizontal 45° Mounting on a Wall

Procedures described above for mounting of collectors on a flat roof apply to wall mounting, except for the following:

1. Cross braces should be attached to the 36" rail at the base of the trusses rather than the ones at the rear.
2. Fasten the rear 36" rail of the trusses to the wall using the mounting holes in a suitable manner.
3. Low elevation mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

5.3.3 Horizontal 45° Mounting on the Ground

Procedures described above for mounting of collectors on a flat roof apply to ground mounting, except for the following:

1. Installer must ensure that the mounting foundation for the system is not subject to movement, such as frost heaves. Therefore, it is necessary to install footings below the frost line in locations subject to freezing weather. If it is not possible or practical to avoid movement due to frost, etc., it will be necessary to provide a floating frame that does not flex or warp the collectors' mounting frames if the ground shifts or heaves.
2. Ground mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

3. Ground mounting often requires longer outside piping runs, so proper insulation and protection of collector piping essential. Installers should consider laying pipe runs below grade to avoid damage and to mark the location of these runs to avoid damage from digging operations.

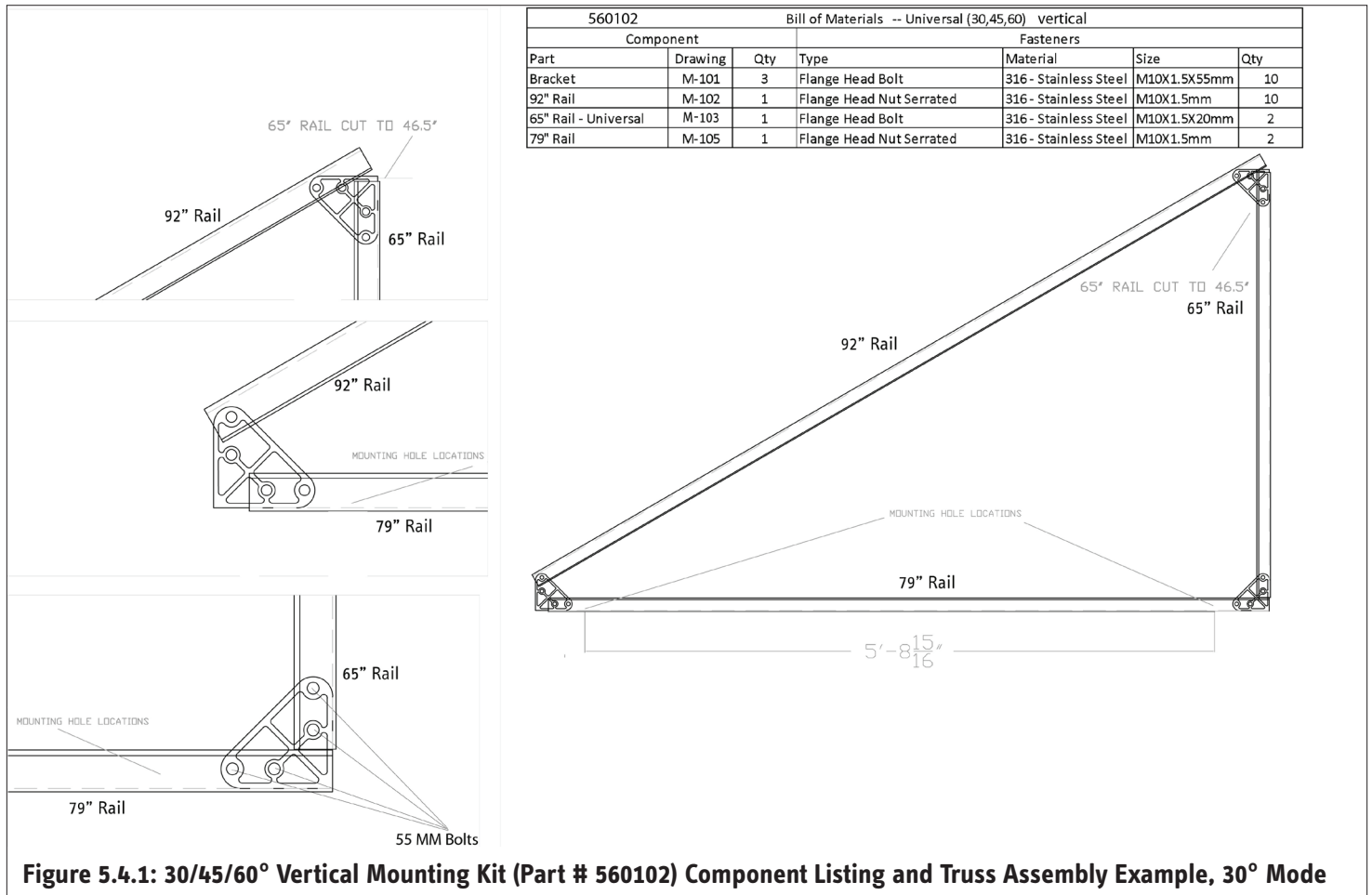
5.3.4 Horizontal 45° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 45° mounting kits add 45° to an existing roof pitch, as shown in table 5.2.9. Roofs with pitches above 9-in-12 generally should not use this mounting kit, as the resulting collector tilt angle will be too steep for almost any location.

Assembly of 30/45/60° SOL 25 Plus Mounting Systems

5.4 30/45/60° Mounting System for SOL 25 Plus (Vertical/Portrait Installation)



5.4.0 Installation of 30/45/60° Mounts on Roofs, Walls, or Ground



IMPORTANT: INSTALLED HEIGHT MUST NOT EXCEED 60 FEET.

CHECK THE ROOF STRUCTURE TO ENSURE PROPER SUPPORT FOR COLLECTORS, MOUNTING HARDWARE, WIND LOADS, ETC. (STATIC CALCULATION REQUIRED; IF NECESSARY, CONTACT THE BUILDER).

ALL ROOFING WORK MUST BE CARRIED OUT BY A PROFESSIONAL ROOFING CONTRACTOR. WHEN WORKING ON ROOFS, OBSERVE ALL RELEVANT SAFETY REGULATIONS, IN PARTICULAR: "SAFETY REGULATIONS FOR WORK ON ROOFS" AND "SAFETY AND RECOVERY HARNESSSES" (OR LOCAL REGULATIONS).

INSTALLERS MUST COMPLY WITH ALL LOCAL, STATE, AND NATIONAL CODES.

ROPE MAY BE USED TO HOIST COLLECTORS, BUT MUST NEVER BE ATTACHED TO THE COLLECTORS' PIPES.

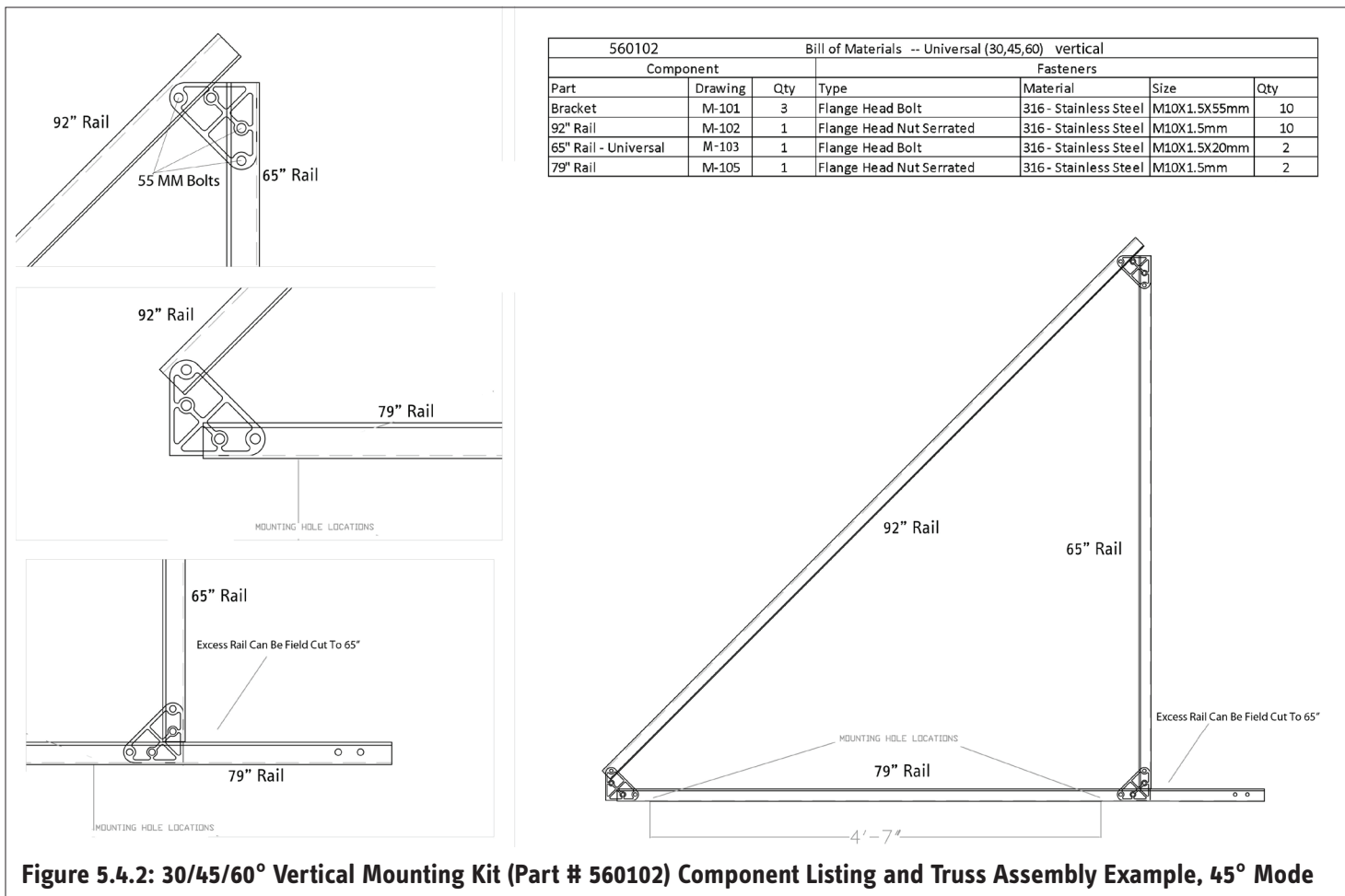
WHEN WORKING ON ROOFS, ALL RELEVANT SAFETY REGULATIONS MUST BE OBSERVED.

Designers and installers should consider how rainwater, snow, and ice accumulation is affected by the installation of the collectors and mounting hardware. Collectors affect the flow of rainwater around them, so appropriate means for conducting the water away from the vicinity of the collectors must be provided. Collectors and mounting hardware are also subject to accumulation of snow and ice in cold climates. Installations must provide protection to people and structures below the solar collectors to avoid hazards due to falling snow and ice as it melts (or is blown off by winds). Installers must also consider the possibility of snow and ice falling onto collectors from any structures located above them and provide appropriate means of protecting them.

Building materials adjacent to solar components must not be exposed to the elevated temperatures that the collectors can generate. Exposed components (that can readily be reached) must be maintained below 140°F or otherwise be insulated/isolated. All other exposed surfaces that can exceed 140°F should be labeled with appropriate burn hazard warnings.



NOTICE: TO PREVENT EXCESSIVE PRESSURE DROP IN THE SOLAR LOOP, NEVER LINK UP MORE THAN 5 COLLECTORS IN SERIES. ARRANGE THE INDIVIDUAL LINEAR ARRAYS PARALLEL TO EACH OTHER.



Building penetrations for plumbing and mounting must not impair enclosure integrity or functionality and must not allow rodent or vermin intrusion. They must meet applicable codes and National Roofing Contractors Assoc. practices. Structural members penetrated by solar system components must not be compromised and penetrations must meet code, particularly penetrations through fire-rated construction. Do not reduce fire resistance below code. Protect control sensor wiring.

If multiple arrays of collectors are being installed on a flat roof, one behind another, the recommended spacing between them should be:

- at least 30 ft. (9.3 m) for 60° vertical installation, as shown in Figure 21; or
- at least 18 ft. (5.3 m) for 30° vertical installation, as shown in Figure 22.

This spacing prevents excessive shading from adjacent rows for latitudes of up to 50°. For latitudes significantly higher than 50°, multiple rows of collectors may not be practical due to low sun altitude angles.

Fastening To Structures

The type of roof or wall is a crucial factor in the choice of fasteners. Remember to take the static and dynamic (live load) forces into account.

The 30/60° vertical mounting racks can develop significant pull-out forces under heavy wind conditions, particularly in the 60°

tilt orientation; therefore it is important to take wind loads into account.

Mounting Ht.	Shear Force	Tensile Force
Up to 26 ft. (8m)	470 lbs. (2.1 kN)	250 lbs. (1.1 kN)
Up to 65 ft. (20m)	790 lbs. (3.5 kN)	700 lbs. (3.1 kN)

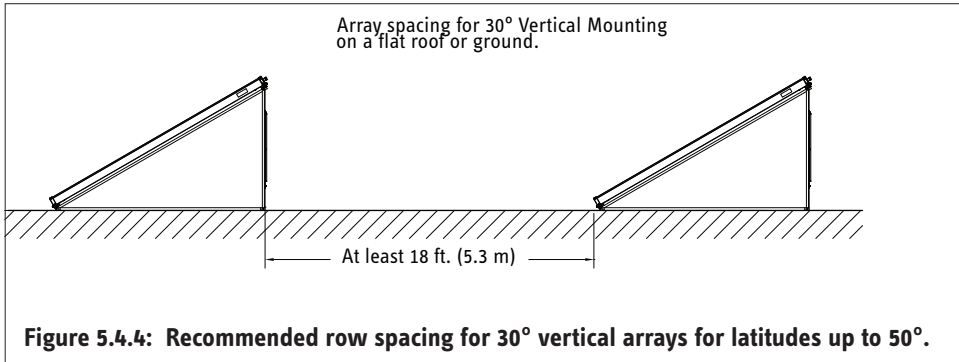
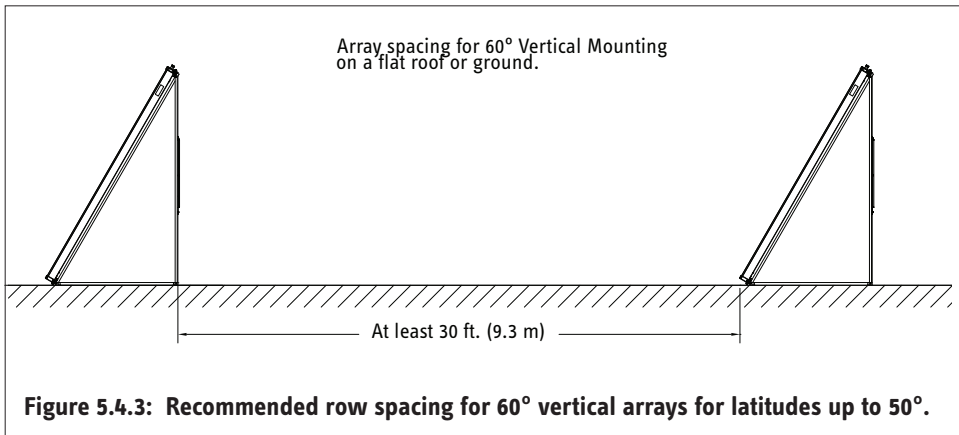
To handle shear forces along the fastening surface, 6 fasteners over which the shear force is distributed are recommended.

To handle tensile forces perpendicular to the fastening surface, 6 fasteners over which the tensile force is distributed are recommended.

For anchoring in concrete, use six M8 UPAT Multicones or SM M10 anchors, both of stainless steel, per collector.

For anchoring in wood, use six wood screws in accordance with DIN 571, at least 10 x 80, of stainless steel, per collector.

If installing in a high wind environment, 8 clamps per collector should be used. In vertical installations, 4 clamps per collector are supplied with the collector frames, so 4 additional clamps per collector should be added to the equipment list for the installation. The part number for the clamps is 267510. An M10 nut and bolt should be ordered with each extra clamp. In horizontal installations, 8 clamps per collector are already provided with the collector frames.



5.4.1 Vertical 30° Mounting on a Flat Roof

(Please review section 5.4.0)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Assemble 2 triangular trusses using the 65" rails (M-103), the 92" rails (M-102), the 79" rails (M-105), the brackets (M-101), and the 55 mm bolts as shown in Figure 5.4.1. Note that the 65" rails are cut to 46.5".
3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.2.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 92" rails using the 20 mm bolts. The collector frames, as well as the number of trusses used, depends on the number of collectors being installed (see Table 5.1). If multiple mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.1, 5.2.7 and 5.2.8.
4. If installing two or more collectors, the triangle trusses with their attached cross braces are to be positioned at the midpoint, behind the collectors. With a 3 collector system the 3 triangular trusses should be equidistant with 2 sets of cross braces interconnecting them. The resulting assembly should then be centered to support the R1/R2/SFC001 frame assembly as shown in Figure 5.1.1.
5. When installing four or five trusses, brace both end spans with crossbraces, as shown in 5.2.8. For six or more trusses, cross-braces should also be placed in an inside span.
6. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kit (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 5' 15/16" between the front and back mounting holes and 48" between the bases.

5.4.2 Vertical 30° Mounting on a Wall

Mounting the vertical 30° system on a wall is not recommended.

5.4.3 Vertical 30° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 30° mounting kits add 30° to an existing roof pitch, as shown in table 5.2.9.

5.4.4 Vertical 60° Mounting on a Flat Roof

(Please review section 5.4.0)

1. Choose attachment site, allowing for subsequent pipe penetration.

2. Assemble 2 triangular trusses using the 65" rails (M-103), the 92" rails (M-102), the 79" rails (M-105), the brackets (M-101), and the 55 mm bolts similar to the manner shown in Figure 5.4.1 with the following change: the 92" rails should be reversed such that the 65" rail connects to the end with the holes closest, and the 79" rail connects to the end with the holes further away. If desired, the 65" rails can be cut to 46.5".

3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.2.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 92" rails using the 20 mm bolts. The collector frames, as well as the number of trusses used, depends on the number of collectors being installed (see Table 5.1). If multiple mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.1, 5.2.7 and 5.2.8.

4. If installing two or more collectors, the triangle trusses with their attached cross braces are to be positioned at the midpoint, behind the collectors. With a 3 collector system the 3 triangular trusses should be equidistant with 2 sets of cross braces interconnecting them. The resulting assembly should then be centered to support the R1/R2/SFC001 frame assembly as shown in Figure 5.1.1.

5. When installing four or five trusses, brace both end spans with crossbraces, as shown in 5.2.8. For six or more trusses, cross-braces should also be placed in an inside span.

6. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kit (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 36 1/2" between the front and back mounting holes and 48" between the bases.

5.4.5 Vertical 60° Mounting on a Wall

Procedures described above for mounting of collectors on a flat roof apply to wall mounting, except for the following:

1. Cross braces should be attached to the 65" (cut down to 46.5")

rail at the base of the trusses rather than the ones at the rear (as pictured in figure 5.4.5).

2. Fasten the rear 79" rail of the trusses to the wall using the mounting holes in a suitable manner.

3. Low elevation mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

5.4.6 Vertical 60° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 60° mounting kits add 60° to an existing roof pitch, as shown in table 5.2.9. Roofs with pitches above 4-in-12 generally should not use this mounting kit, as the resulting collector tilt angle will be too steep for almost any location.

5.4.7 Vertical 45° Mounting on a Flat Roof

(Please review section 5.4.0)

1. Choose attachment site, allowing for subsequent pipe penetration.

2. Assemble 2 triangular trusses using the 65" rails (M-103), the 92" rails (M-102), the 79" rails (M-105), the brackets (M-101), and the 55 mm bolts as shown in Figure 5.4.2. If desired, the 79" rails can be cut to 65".

3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.2.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 92" rails using the 20 mm bolts. The collector frames, as well as the number of trusses used, depends on the number of collectors being installed (see Table 5.1). If multiple mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.2.7 and 5.2.8.

4. If installing two or more collectors, the triangle trusses with their attached cross braces are to be positioned at the midpoint, behind the collectors. With a 3 collector system the 3 triangular trusses should be equidistant with 2 sets of cross braces interconnecting them. The resulting assembly should then be centered to support the R1/R2/SFC001 frame assembly as shown in Figure 5.1.1.

5. When installing four or five trusses, brace both end spans with crossbraces, as shown in 5.2.8. For six or more trusses, cross-braces should also be placed in an inside span.

6. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kit (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 4' 7" between the front and back mounting holes and 48" between the bases.

5.4.8 Vertical 45° Mounting on a Wall

Procedures described above for mounting of collectors on a flat roof apply to wall mounting, except for the following:

1. Cross braces should be attached to the 79" (cut down to 65") rail at the base of the trusses rather than the ones at the rear (as pictured in figure 5.4.5).
2. Fasten the rear 65" rail of the trusses to the wall using the mounting holes in a suitable manner.
3. Low elevation mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

5.4.9 Vertical 30/45/60° Mounting on the Ground

Procedures described above for mounting of collectors on a flat roof apply to ground mounting, except for the following:

1. Installer must ensure that the mounting foundation for the system is not subject to movement, such as frost heaves. Therefore, it is necessary to install footings below the frost line in locations subject to freezing weather. If it is not possible or practical to avoid movement due to frost, etc., it will be necessary to provide a floating frame that does not flex or warp the collectors' mounting frames if the ground shifts or heaves.
2. Ground mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.
3. Ground mounting often requires longer outside piping runs, so proper insulation and protection of collector piping essential. Installers should consider laying pipe runs below grade to avoid damage and to mark the location of these runs to avoid damage from digging operations.

5.4.10 Vertical 45° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 45° mounting kits add 45° to an existing roof pitch, as shown in table 5.2.9. Roofs with pitches above 9-in-12 generally should not use this mounting kit, as the resulting collector tilt angle will be too steep for almost any location.

5.5 30/45/60° Mounting System for SOL 25 Plus (Horizontal/Landscape Installation)

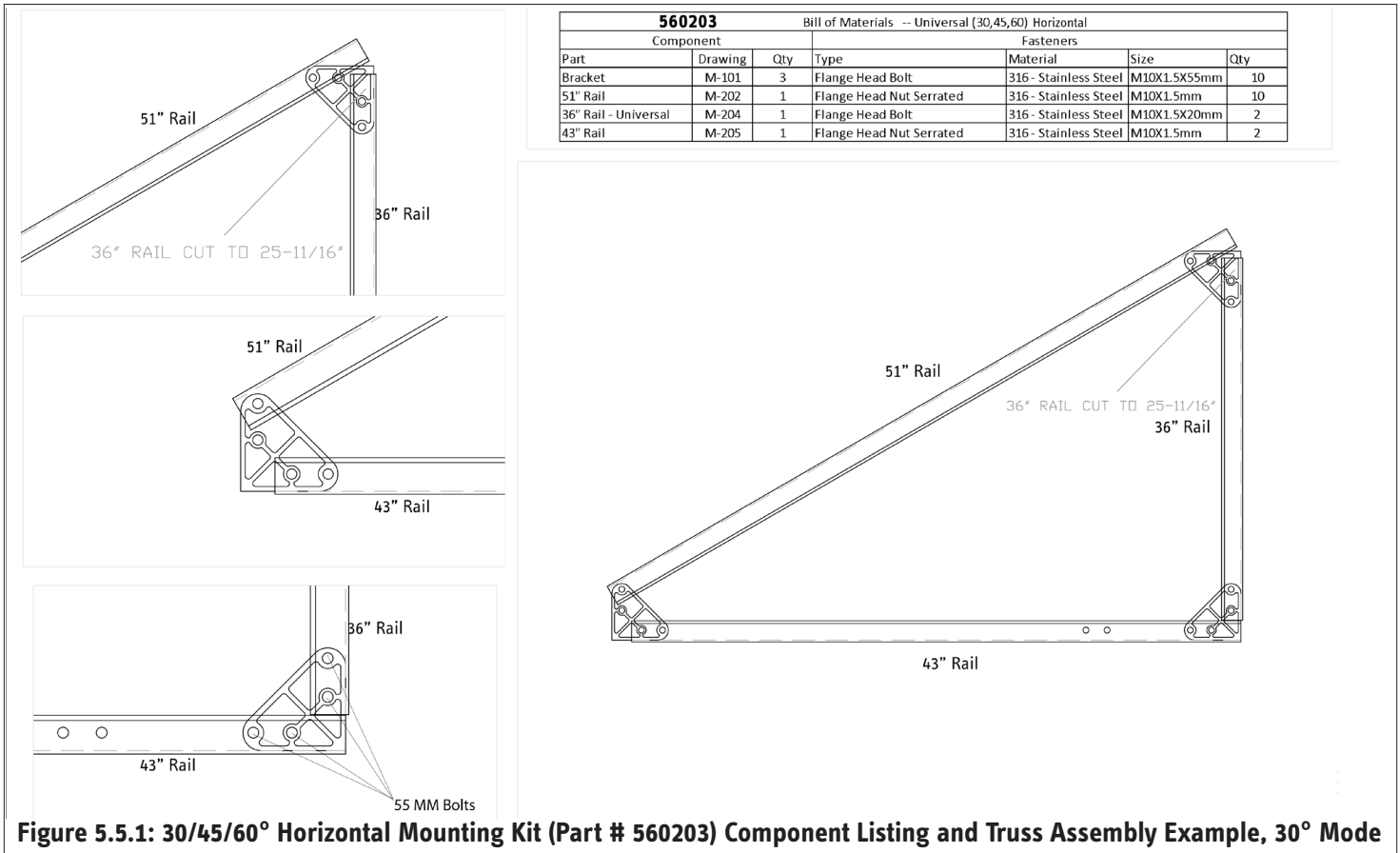


Figure 5.5.1: 30/45/60° Horizontal Mounting Kit (Part # 560203) Component Listing and Truss Assembly Example, 30° Mode

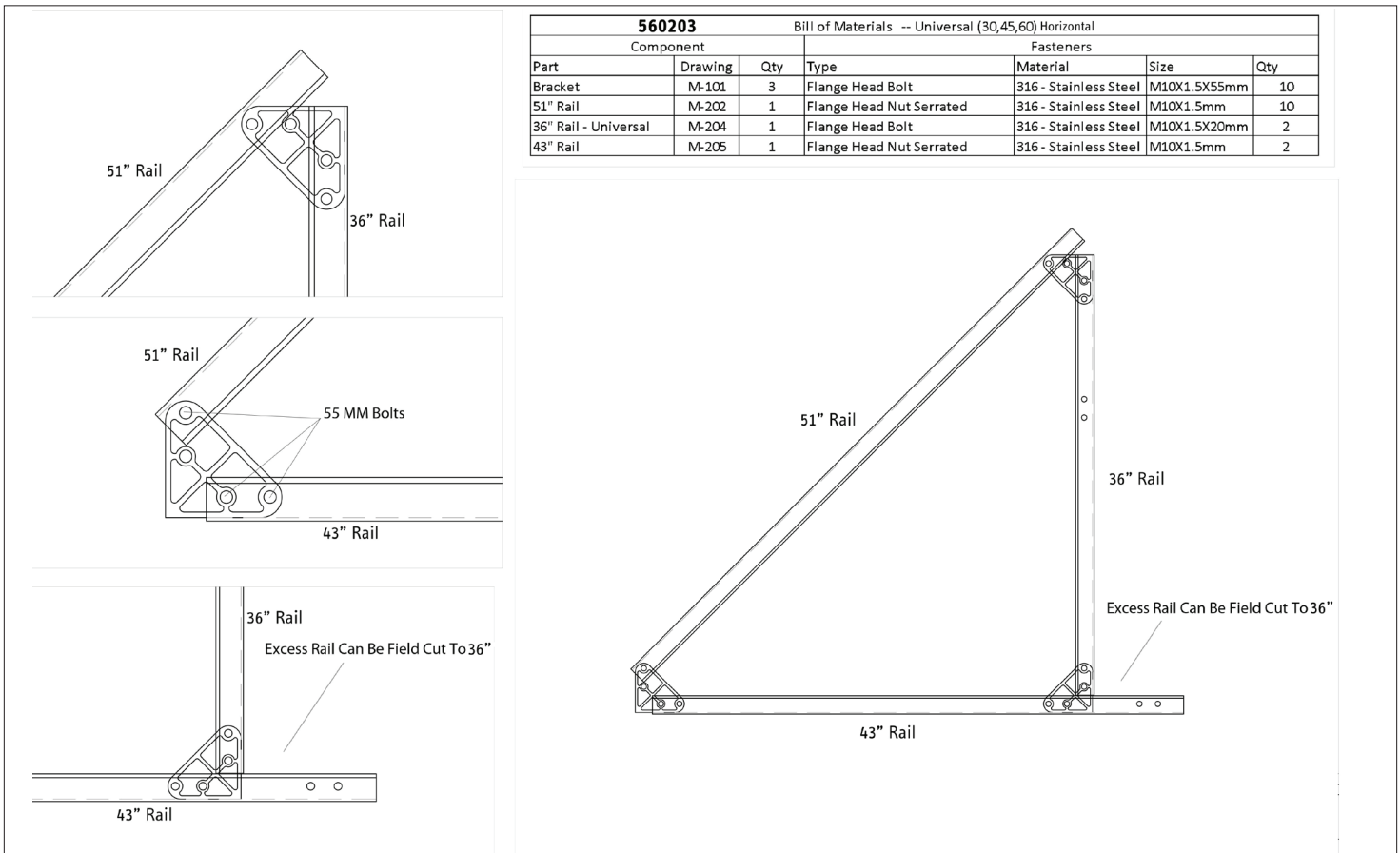


Figure 5.5.2: 30/45/60° Horizontal Mounting Kit (Part # 560203) Component Listing and Truss Assembly Example, 45° Mode

5.5.1 Horizontal 30° Mounting on a Flat Roof

(Please review section 5.4.0)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Assemble 2 triangular trusses using the 36" rails (M-204), the 51" rails (M-202), the 43" rails (M-205), the brackets (M-101), and the 55 mm bolts as shown in Figure 5.5.1. Note that the 36" rail is cut to 25 11/16".
3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.3.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 51" rails using the 20 mm bolts. The triangular truss assemblies with cross braces should be attached to the center of the R2 collector frames (Figure 5.6.2) i.e. there should be an equal amount of the profile rail to the right and left hand sides of each of the triangular trusses. If multiple flat-roof mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.2, 5.2.7 and 5.2.8. Note that there is an additional cross brace between the collectors.
4. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kit (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 33 15/64" between the front and back mounting holes and 48" between the bases.

5.5.2 Horizontal 30° Mounting on a Wall

Mounting the horizontal 30° system on a wall is not recommended.

5.5.3 Horizontal 30° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 30° mounting kits add 30° to an existing roof pitch, as shown in table 5.2.9.

5.5.4 Horizontal 60° Mounting on a Flat Roof

(Please review section 5.4.0)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Assemble 2 triangular trusses using the 36" rails (M-204), the 51" rails (M-202), the 43" rails (M-205), the brackets (M-101), and the 55 mm bolts similar to the manner shown in Figure 5.4.1 with the following change: the 51" rails should be reversed such that the 36" rail connects to the end with the holes closest, and the 43" rail connects to the end with the holes further away. If desired, the 36" rail can be cut to 25 11/16".
3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.3.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 51" rails using the 20 mm bolts. The triangular truss assemblies with cross braces should be attached to the center of the R2 collector

frames (Figure 5.6.2) i.e. there should be an equal amount of the profile rail to the right and left hand sides of each of the triangular trusses. If multiple flat-roof mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.2, 5.2.7 and 5.2.8. Note that there is an additional cross brace between the collectors.

4. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kit (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 16 11/64" between the front and back mounting holes and 48" between the bases.

5.5.5 Horizontal 60° Mounting on a Wall

Procedures described above for mounting of collectors on a flat roof apply to wall mounting, except for the following:

1. Cross braces should be attached to the 36" (cut down to 25 11/16") rail at the base of the trusses rather than the ones at the rear (as pictured in figure 5.4.5).
2. Fasten the rear 43" rail of the trusses to the wall using the mounting holes in a suitable manner.
3. Low elevation mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

5.5.6 Horizontal 60° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 60° mounting kits add 60° to an existing roof pitch, as shown in table 5.2.9. Roofs with pitches above 4-in-12 generally should not use this mounting kit, as the resulting collector tilt angle will be too steep for almost any location.

5.5.7 Horizontal 45° Mounting on a Flat Roof

(Please review section 5.4.0)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Assemble 2 triangular trusses using the 36" rails (M-204), the 51" rails (M-202), the 43" rails (M-205), the brackets (M-101), and the 55 mm bolts as shown in Figure 5.5.2. If desired, the 43" rails can be cut to 36".
3. Bolt the trusses to the cross braces connecting the bolts as shown in Figure 5.3.2. The resulting assembly should look similar to Figure 5.2.3. The collector frames may then be bolted to the holes in the 51" rails using the 20 mm bolts. The collector frames, as well as the number of trusses used, depends on the number of collectors being installed (see Table 5.1). If multiple mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.2, 5.2.7 and 5.2.8. Note that there is an additional cross brace between the collectors.

4. Fasten the base of the flat-roof mounting racks to the solar roof mount flashing kit (560105SQ). Remember to take the static and dynamic (e.g., wind) loading into account for the roof structure. Nominal distance is 25 53/64" between the front and back mounting holes and 48" between the bases.

5.5.8 Horizontal 45° Mounting on a Wall

Procedures described above for mounting of collectors on a flat roof apply to wall mounting, except for the following:

1. Cross braces should be attached to the 43" (cut down to 36") rail at the base of the trusses rather than the ones at the rear (as pictured in figure 5.4.5).
2. Fasten the rear 36" rail of the trusses to the wall using the mounting holes in a suitable manner.
3. Low elevation mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

5.5.9 Horizontal 30/45/60° Mounting on the Ground

Procedures described above for mounting of collectors on a flat roof apply to ground mounting, except for the following:

1. Installer must ensure that the mounting foundation for the system is not subject to movement, such as frost heaves. Therefore, it is necessary to install footings below the frost line in locations subject to freezing weather. If it is not possible or practical to avoid movement due to frost, etc., it will be necessary to provide a floating frame that does not flex or warp the collectors' mounting frames if the ground shifts or heaves.

2. Ground mounting configurations may be prone to damage from falling ice or nearby vehicles or other hazards. Appropriate precautions should be taken to mitigate these hazards.

3. Ground mounting often requires longer outside piping runs, so proper insulation and protection of collector piping essential. Installers should consider laying pipe runs below grade to avoid damage and marking the location of these runs to avoid damage from digging operations.

5.5.10 Horizontal 45° Mounting on a Pitched Roof

Procedures described above for mounting of collectors on a flat roof apply to mounting on a pitched (sloped) roof, except for the following:

1. The 45° mounting kits add 45° to an existing roof pitch, as shown in table 5.2.9. Roofs with pitches above 9-in-12 generally should not use this mounting kit, as the resulting collector tilt angle will be too steep for almost any location.

5.6 SOL 25 Plus Flush Mounting Systems

5.6.1 Vertical Flush Mounting on a Pitched Roof Using L Brackets (560105L)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Bolt the collector frames to the vertical flush mount rails using the M10 nuts and bolts. The collector frames, as well as the number of flush mount rails used, depends on the number of collectors being installed (see Table 5.1). If multiple flush mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.1, 5.2.7 and 5.2.8, except no cross braces are used.
3. Attach the top and bottom collector frames of the assembled flush mounting system to the roof mount flashing kits' L brackets using the supplied hardware. The nominal distance between the top and bottom attachment points is 89 1/2 inches.

5.6.2 Vertical Flush Mounting on a Pitched Roof Using Z Brackets (560105Z)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Bolt the collector frames to the vertical flush mount rails using the M10 nuts and bolts. The collector frames, as well as the number of flush mount rails used, depends on the number of collectors being installed (see Table 5.1). If multiple flush mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.1, 5.2.7 and 5.2.8, except no cross braces are used.
3. Attach each Z bracket to the points at which each vertical flush mount rail is attached to the collector frame(s) using the supplied hardware. The nominal distance between the top and bottom attachment points is 85 1/2 inches.

5.6.3 Horizontal Flush Mounting on a Pitched Roof Using [560105L] L Brackets

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Bolt the collector frames to the vertical flush mount rails using the M10 nuts and bolts. The collector frames, as well as the number of flush mount rails used, depends on the number of collectors being installed (see Table 5.1). If multiple flush mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.2, 5.2.7 and 5.2.8, except no cross braces are used.
3. Attach the top and bottom collector frames of the assembled flush mounting system to the roof mount flashing kits' L brackets using the supplied hardware. The nominal distance between the top and bottom attachment points is 50 1/8 inches.

5.6.4 Vertical Flush Mounting on a Pitched Roof Using Z Brackets (560105Z)

1. Choose attachment site, allowing for subsequent pipe penetration.
2. Bolt the collector frames to the vertical flush mount rails using the M10 nuts and bolts. The collector frames, as well as the number of flush mount rails used, depends on the number of collectors being installed (see Table 5.1). If multiple flush mounting frames are being set up next to one another, use frame connector kits (SFC001, shown in Figure 5.2.6) to join them, as shown in Figures 5.1.2, 5.2.7 and 5.2.8, except no cross braces are used.
3. Attach each Z bracket to the points at which each vertical flush mount rail is attached to the collector frame(s) using the supplied hardware. The nominal distance between the top and bottom attachment points is 46 1/8 inches.

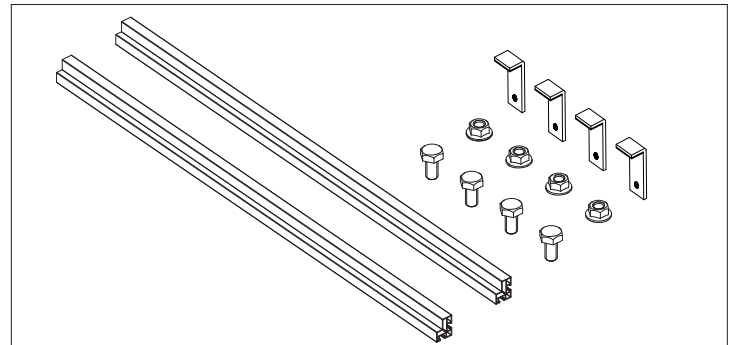


Figure 5.6.1: R1 Collector Frame (185545 R1) for Vertical Collector Flush Mount Arrangement ONLY

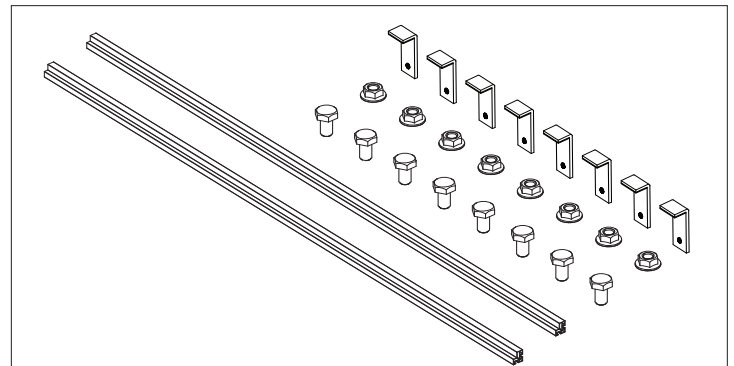


Figure 5.6.2: R2 Collector Frame (185546 R2) for Single Horizontal or Two Vertical Collector Arrangement Flush Mount ONLY

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Due to our continuous process of engineering and technological advancement, specifications may change without notice.

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