S-BT HL ELECTRICAL TECHNICAL SUPPLEMENT GUIDE

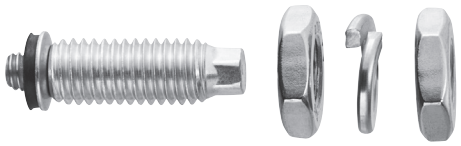
3.2.15.6A S-BT-ER HL AND S-BT-EF HL ELECTRICAL CONNECTION SYSTEMS

3.2.15.6.1A Product description

S-BT-ER HL stainless steel screw-in threaded studs and S-BT-EF HL carbon steel screw-in threaded studs are designed for electrical connections under permanent current, short circuit current, and lightning current conditions. Packaged with two stainless steel nuts and one stainless steel lock washer, the S-BT-ER HL can be used for electrical grounding such as bonding and lightning protection under corrosive environments. The S-BT-EF HL is similarly packaged with two carbon steel nuts and one carbon steel lock washer to be used in non-corrosive environments. High current versions of the S-BT-ER HL and S-BT-EF HL are also available (S-BT-ER HC HL and S-BT-EF HC HL), which are packaged with one nut, one lock washer, and one copper alloy conductivity disc. Additionally, standoff adapters are available for combination with the S-BT-ER W10/15 SN 6. The Hilti standoff adapter W10-MR is stainless steel and can be used for standard currents, while the W10-HC 4/0 standoff adapter is a copper alloy, for high current connections.

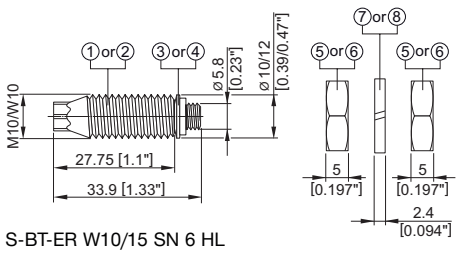
Product Features and benefits

- No propellants required.
- No through penetration of steel base materials 1/4" and thicker.
- Little to no rework of coated steel required for non-through hole applications with base material thickness larger than 1/4''.
- Fastening options available for both stainless and carbon steel materials.
- Easier removal — S-BT fasteners are removable.

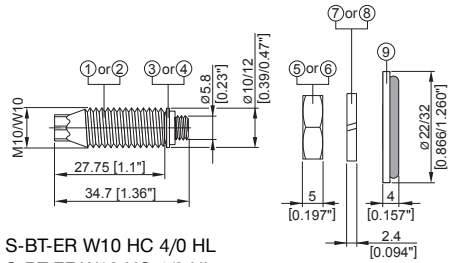


Listings/Approvals

UL (Underwriters Laboratories)
E257069
ABS (American Bureau of Shipping)
LR (Lloyds Register)
DNVGL (Det Norske Veritas)
BV (Bureau Veritas)
RINA Services S.p.A



S-BT-ER W10/15 SN 6 HL
S-BT-EF W10/15 AN 6 HL



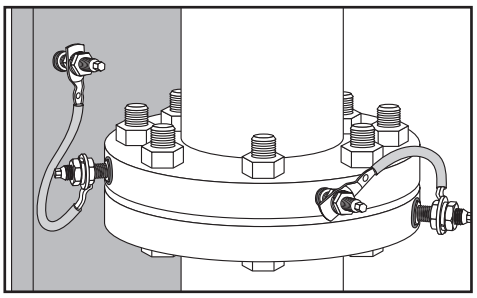
S-BT-ER W10 HC 4/0 HL
S-BT-EF W10 HC 4/0 HL

3.2.15.6.2A Material Specifications

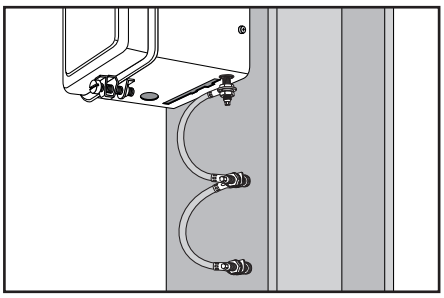
Part Designation		Diagram indicator and Material designation	
		S-BT-ER HL	S-BT-EF HL
Threaded Shank		① Corrosion resistant stainless steel S 31803 (1.4462), zinc coated	② Carbon steel 1038 duplex coated
Washer		③ SN12-R, Corrosion resistant stainless steel S 31603 (1.4404), Ø 0.47" (12mm)	④ AN10-F, Aluminum Ø 0.39" (10mm)
Nut		⑤ Corrosion resistant stainless steel grade A4 / AISI 316	⑥ Carbon steel HDG
Lock Washer		⑦ Corrosion resistant stainless steel grade A4 / AISI 316	⑧ Carbon steel HDG
Conductivity disc High Current (HC) studs only		⑨ Copper alloy CuSn8 (tin coated) with sealing ring Ø 1.260" (32 mm)	
Sealing ring	Of sealing washer	Chloroprene runner CR 3.1107, black, resistant to UV, salt water, water, ozone, oils, etc.	
	Of conductivity disk	FKM, resistant to UV, salt water, water, ozone, atmospheric conditions, oils, etc.	
Hilti W10-MR Standoff Adapter		1.4401 (Grade 316) Stainless Steel	Not applicable
Hilti W10-HC4/0 HC Standoff Adapter		Copper alloy CuSn8 (tin coated)	Not applicable

3.2.15.6.3A Technical data

Application examples



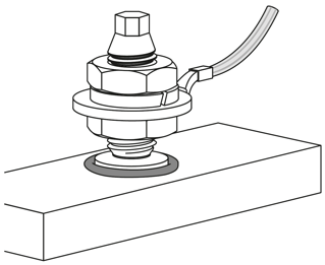
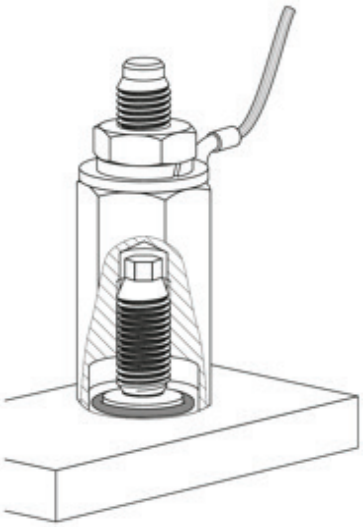
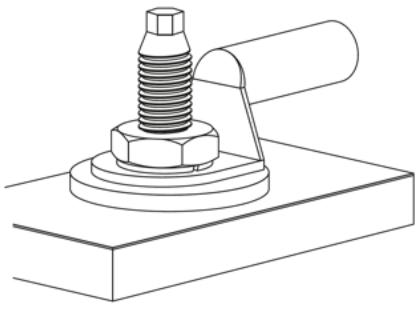
Functional and protective bonding of pipes (outer diameter of installed surface ≥ 5.9”). Only for Type A cable connections



Protective bonding circuit – double point connection

Functional bonding and terminal connection in a circuit

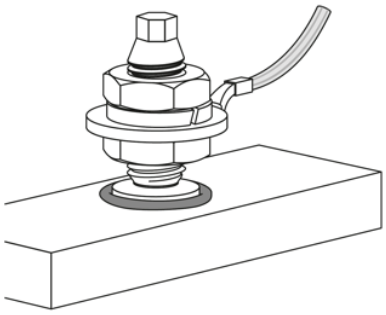
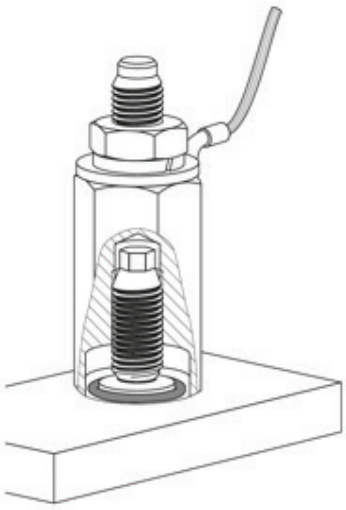
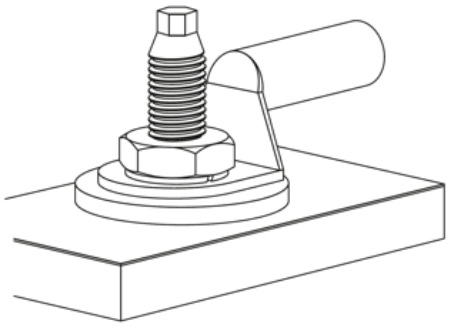
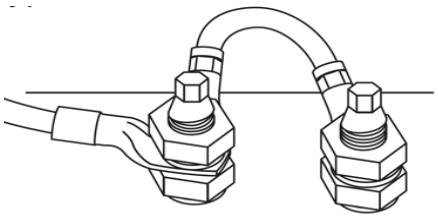
For permanent current (leakage current) due to static charge built up in pipes or when closing an electrical circuit.

Single Point Connection		Recommended Electrical Connectors	Maximum allowable permanent current	Maximum Cable
Type A		S-BT-ER W10/15 SN 6 HL S-BT-EF W10/15 AN 6 HL	= 57 A	8 AWG copper
Type A w/ Standoff Adapter		S-BT-ER W10/15 SN 6 HL with Hilti standoff adapter W10-MR	= 57 A	8 AWG copper
		S-BT-ER W10/15 SN 6 HL with Hilti standoff adapter W10-HC 4/0	=269 A	4/0 AWG copper
Type B		S-BT-ER W10 HC 4/0 HL S-BT-EF W10 HC 4/0 HL	=269 A	4/0 AWG copper

Recommended maximum cross section of connected cables according to IEC 60947-7-2 and IEC 60947-7-1
Fastening of thicker cable is acceptable, if the maximum allowable permanent current is not exceeded and the provisions on cable lug thickness are observed.

Protective bonding circuit

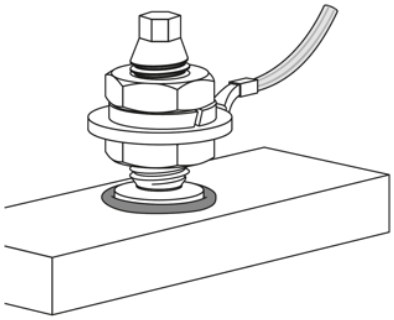
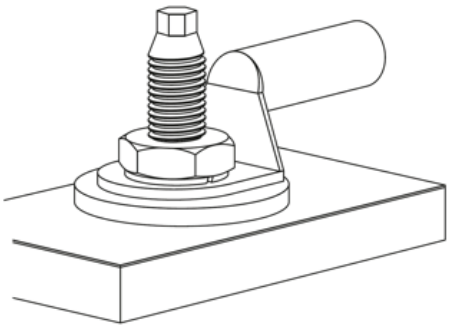
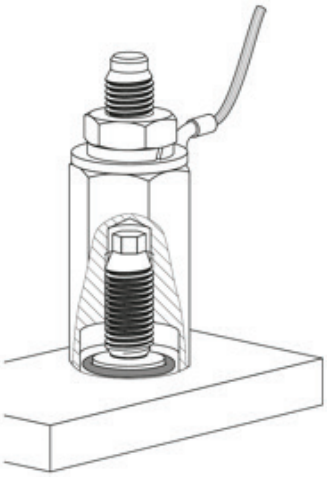
For discharging short circuit current while protecting electrical equipment or earth / ground cable trays and ladders.

Single Point Connection		Recommended Electrical Connectors	Maximum short circuit current according to IEC & UL	Maximum Cable
Type A		S-BT-ER W10/15 SN 6 HL S-BT-EF W10/15 AN 6 HL	Per IEC, 1.20 kA for 1 second Per UL, 0.75 kA for 4 seconds	8 AWG Copper per IEC 10 AWG Copper per UL
Type A w/ Standoff Adapter		S-BT-ER W10/15 SN 6 HL with Hilti standoff adapter W10-MR	Per IEC, 1.20 kA for 1 second Per UL, 0.75 kA for 4 seconds	8 AWG Copper per IEC 10 AWG Copper per UL
		S-BT-ER W10/15 SN 6 HL with Hilti standoff adapter W10-HC 4/0	Per IEC, 14.40 kA for 1 second Per UL, 10.10 kA for 9 seconds	4/0 AWG Copper
Type B		S-BT-ER W10 HC 4/0 HL S-BT-EF W10 HC 4/0 HL	Per IEC, 14.40 kA for 1 second Per UL, 10.10 kA for 9 seconds	4/0 AWG Copper
Double Point Connection		**Recommended Electrical Connectors**	**Maximum short circuit current according to IEC & UL**	**Maximum Cable**
Type A		S-BT-ER W10/15 SN 6 HL S-BT-EF W10/15 AN 6 HL	Per IEC, 1.92 kA for 1 second	6 AWG Copper

Recommended maximum cross section of connected cables according to IEC 60947-7-2 and IEC 60947-7-1 or UL 467, dependent upon standard used.
Fastening of thicker cable is acceptable, if the maximum allowable permanent current is not exceeded and the provisions on cable lug thickness are observed.

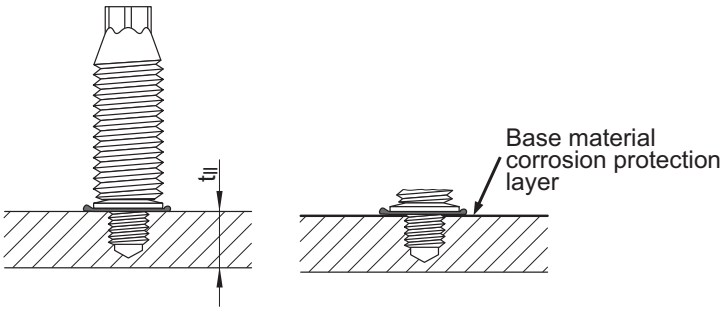
Lightning protection

For high temporary current due to lightning.

Single Point Connection		Recommended Electrical Connectors	Maximum lightning current	Notes
Classification N (acc. IEC62561-1): Type A		S-BT-ER W10/15 SN 6 HL S-BT-EF W10/15 AN 6 HL	= 50 kA for ≤ 5 ms (IEC 62561-1)	
Classification H (acc. IEC62561-1): Type B		S-BT-ER W10 HC 4/0 HL S-BT-EF W10 HC 4/0 HL	= 100 kA for ≤ 5 ms (IEC 62561-1)	For class H applications only type B cable connections are allowed. Tightening torque must be observed accurately.
Classification H (acc. IEC62561-1): Type A, with Hilti Standoff Adapter W10-HC4/0		S-BT-ER W10/15 SN 6 HL with Hilti standoff adapter W10-HC 4/0		

Application requirements

Base material thickness t_{II} ≥ 6 mm

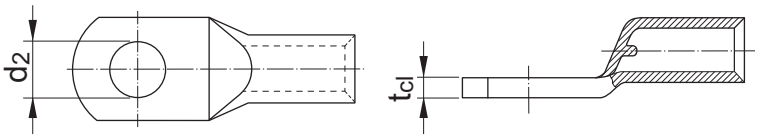


Thickness of base material corrosion protection layer ≤ 0.0315" (0.8 mm). For thicker coatings, please contact Hilti.

For connections with High Current (HC) standoff adapter and connections with High Current (HC) conductivity disc, the High Current (HC) adapter or High Current (HC) conductivity disc must be in direct contact with non-coated base material. For coated materials, the coating must be removed with the coating removal drill bit.

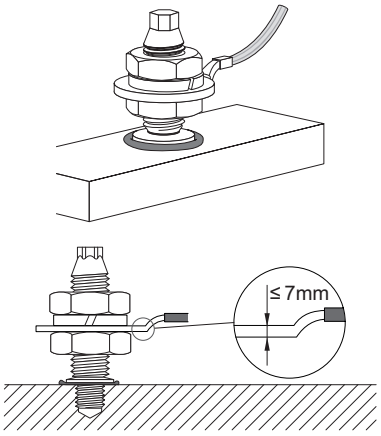
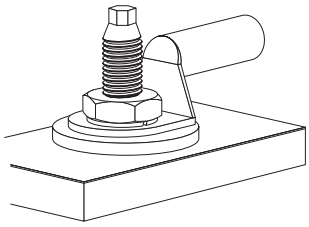
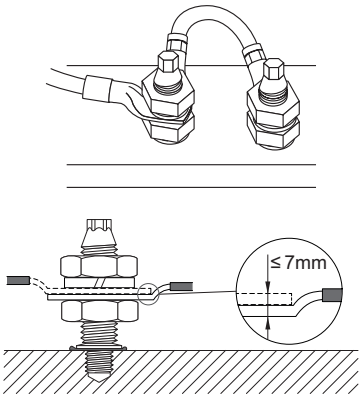
Cable lug characteristics and connector types

Cable lug thickness t_{cl} and inner hole diameter d_2

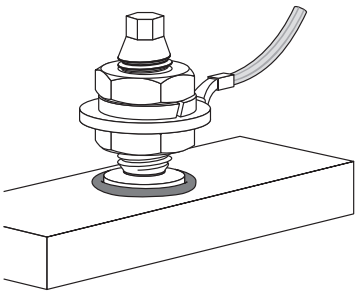


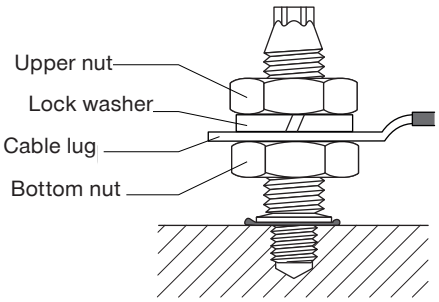
Fastener	Single point connector				Double point connector	
	Type A		Type B		Type A	
	t_{cl}[1] in. (mm)	d_2 in. (mm)	t_{cl}[1] in. (mm)	d_2 in. (mm)	t_{cl}[1] in. (mm)	d_2 in. (mm)
S-BT-ER W10/15 SN 6 HL	≤ 0.28 (7)	3/8 to 1/2 (9.5 to 12.5)	–	–	≤ 0.28 (7)	3/8 to 1/2 (9.5 to 12.5)
S-BT-EF W10/15 AN6 HL	≤ 0.28 (7)	3/8 to 1/2 (9.5 to 12.5)	–	–	≤ 0.28 (7)	3/8 to 1/2 (9.5 to 12.5)
S-BT-ER W10 HC 4/0 HL	–	–	≤ 0.47 (12)	3/8 to 1/2 (9.5 to 12.5)	–	–
S-BT-EF W10 HC 4/0 HL	–	–	≤ 0.47 (12)	3/8 to 1/2 (9.5 to 12.5)	–	–
S-BT-ER W10/15 SN6 HL w/ Hilti Standoff Adaptor	≤ 0.47 (12)	3/8 to 1/2 (9.5 to 12.5)	–	–	–	–

1 Design current must be considered when determining cable lug thickness.

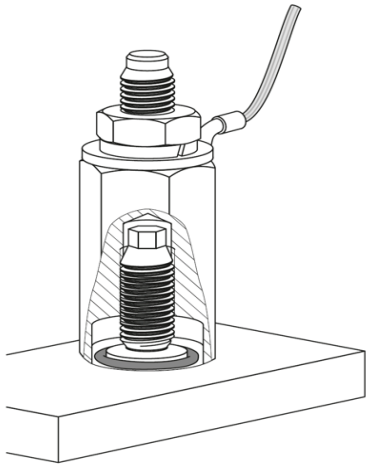
Single point connector		Double point connector
Type A	Type B	Type A
		

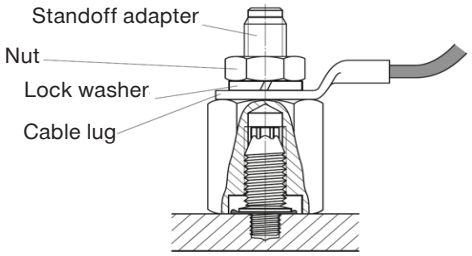
Single point connection type A:



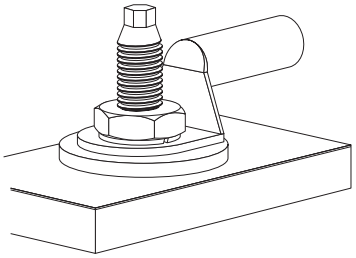


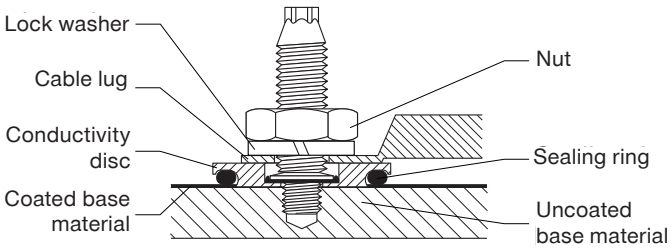
Single point connection with Hilti standoff adapter:



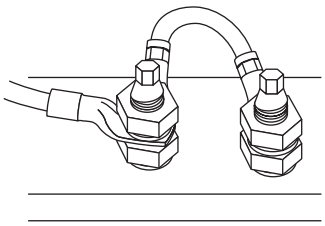


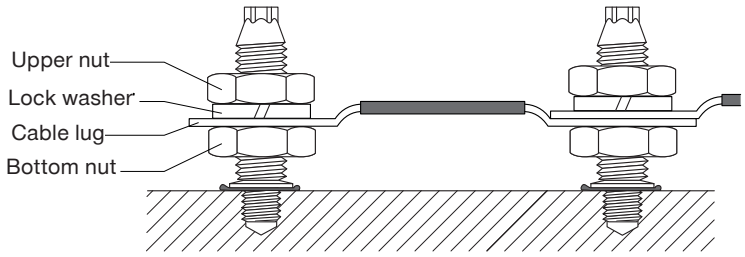
Single point connection type B:



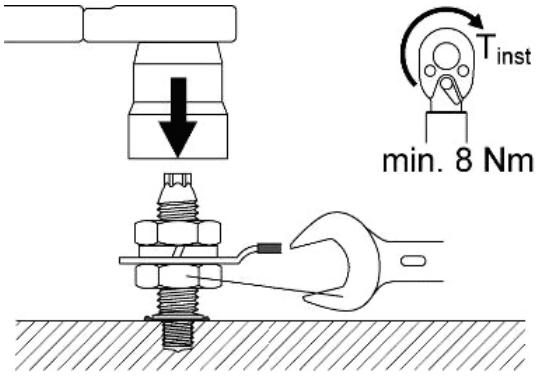
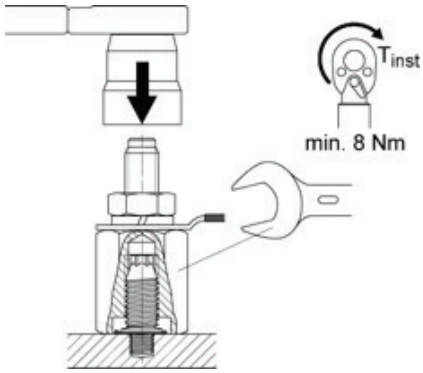
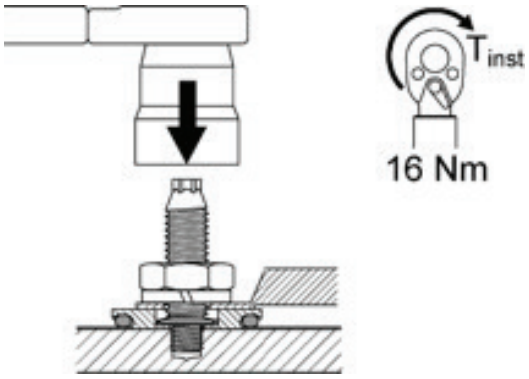


Double point connection type A:





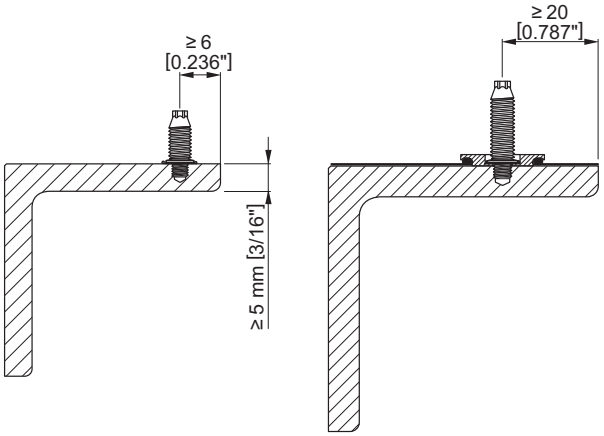
Torque recommendation

Type	Diagram	Instructions
Single or double point connection type A		Hold the bottom nut with a wrench while tightening the upper nut. Tightening torque of upper nut: Min 5.9 ft-lb (8 Nm) Max 14.8 ft-lb (20 Nm)
Single point connection with Hilti Standoff Adapter		Install standoff adapter torque before proceding. Standoff adapter torque: 5.9 ft-lb (8 Nm) Hold the standoff adapter in place with a wrench while tightening the upper nut. Tightening torque of upper nut: Min 5.9 ft-lb (8 Nm) Max 14.8 ft-lb (20 Nm)
Single point connection type B		Install nut with tightening torque: Min 5.9 ft-lb (8 Nm) Max 11.8 ft-lb (16 Nm)

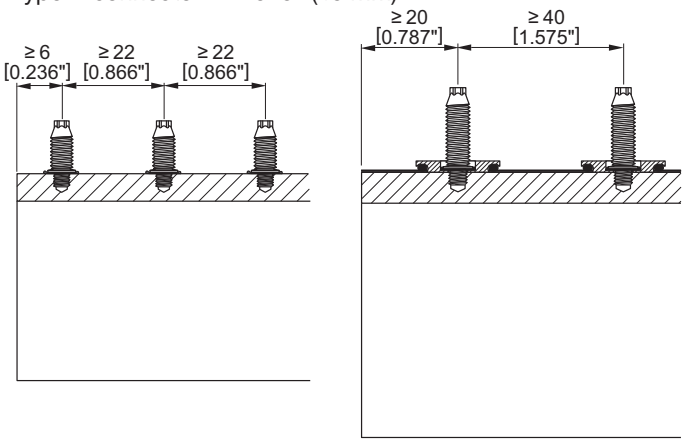
For single point connections with high current (HC) standoff adapter or high current (HC) conductivity disc, the, conductivity disc or standoff adapter W10-HC 4/0 must be in direct contact with an uncoated portion of the base material or the portion of the base material where coating has been removed.
These are abbreviated instructions, which may vary by application. Always review and follow the instruction accompanying the product.

Spacing and edge distances:

Edge distance:
Type A connector: ≥ 0.236” (6 mm)
Type A connector with standoff adapter: ≥ 0.591” (15 mm)
Type B connector: ≥ 0.787” (20 mm)



Spacing:
Type A connector: ≥ 0.866” (22 mm)
Type A connector with standoff adapter: ≥ 1.181” (30 mm)
Type B connector: ≥ 1.575” (40 mm)



3.2.15.6.5A Ordering information[1]

Ordering Designation	Description	Item No.
Electrical Connections[2]		
S-BT-ER W10/15 SN 6 HL	Stainless steel threaded stud for electrical connections (Includes two nuts and one lock washer for each stud)	2346075
S-BT-EF W10/15 AN 6 HL	Carbon steel threaded stud for electrical connections (Includes two nuts and one lock washer for each stud)	2346072
S-BT-ER W10 HC 4/0 HL[3]	Stainless steel threaded stud for high current electrical connections (Includes one nut, one lock washer, and one conductivity disc for each stud)	2346080
S-BT-EF W10 HC 4/0 HL[3]	Carbon steel threaded stud for high current electrical connections. (Includes one nut, one lock washer, and one conductivity disc for each stud)	2346078
Standoff Adapters		
Standoff Adapter W10-MR 50	Stainless steel standoff adapter for 50 mm standoff	2281191
Standoff Adapter W10-MR 75	Stainless steel standoff adapter for 75 mm standoff	2394869
Standoff Adapter W10-MR 100	Stainless steel standoff adapter for 100 mm standoff	2395330
Standoff Adapter W10-HC 4/0 50	Copper alloy standoff adapter for 50 mm standoff of high current electrical connections	Contact Hilti
Standoff Adapter W10-HC 4/0 100	Copper alloy standoff adapter for 100 mm standoff of high current electrical connections	Contact Hilti

1 Ordering information for tooling and accessories can be found on page 89 of Hilti Direct Fastening Product Technical Guide.
2 Each box of studs includes one stepped drill bit (de-coating bit for HC designated studs) and instructions for use.
3 Specialized check gauge included in each box

In the US:
Hilti, Inc.
7250 Dallas Parkway, Suite 1000, Plano, TX 75024
Customer Service: 1-800-879-8000
en español: 1-800-879-5000
Fax: 1-800-879-7000

www.hilti.com

In Canada:
Hilti (Canada) Corporation
2201 Bristol Circle, Oakville ON | L6H 0J8
Canada
Customer Service: 1-800-363-4458
Fax: 1-800-363-4459

www.hilti.ca

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SQS
ISO 9001 / ISO 14001*
Reg. No. 12455-02
*14001 US only

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The data contained in this literature was current as of the date of publication. Updates and changes may be made based on later testing. If verification is needed that the data is still current, please contact the Hilt Technical Support Specialists at 1-800-879-8000 (U.S.) or 1-800-363-4458 (Canada). All published load values contained in this literature represent the results of testing by Hilti or test organizations. Local base materials were used. Because of variations in materials, on-site testing is necessary to determine performance at any specific site.

DBS • 07/24