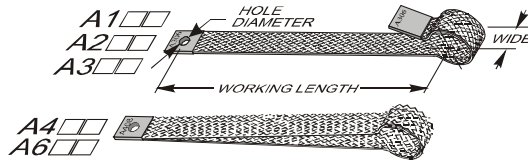


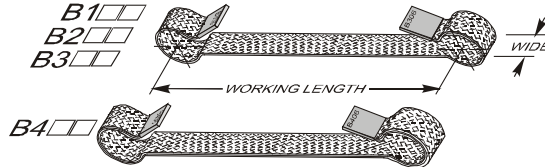
STARBAR ACCESSORIES

ELECTRICAL CONNECTORS: Held in place by stainless steel spring clamps, braided aluminum terminal straps in 25, 50, 100, and 200 amperage ratings are available in three primary styles:

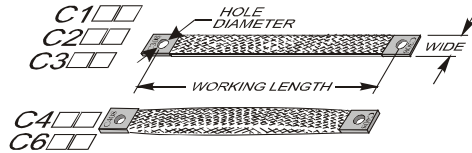
Single Loop
(A Type) -- for connecting binding post to Starbar.



Double Loop
(B Type) -- for connecting Starbar to Starbar.



Post to Post
(C Type) -- for connecting binding post to binding post.



IDENTIFICATION: Aluminum straps are stamped with the part number for easy identification and proper matching to the correct diameter Starbars.

A, B and C-Type Terminal Straps

Starbar Diameter		Part Number Designation	Rated Current	Width		Hole Diameter A & C Type Only	
MM	Inch	Strap type (A, B, or C)	Amperage	MM	Inch	MM	Inch
13	0.50	A, B, or C 1__	25	13	0.50	7	0.28
16	0.63	A, B, or C 2__	50	17	0.69	10	0.41
19	0.75						
25	1.00	A, B, or C 3__	100	33	1.31	14	0.56
32	1.25						
35	1.38	A, B, or C 4__	200	33	1.31	14	0.56
38	1.50						
44	1.75						
54	2.12						
70	2.75	A6__ or C6__	400	35	1.38	18	0.69

ORDERING SPECIFICATIONS: A letter A, B, or C identifies the type of strap. The next number indicates the current capacity 1 = 25 amps, 2 = 50 amps, 3 = 100 amps, or 4 = 200 amps. The last two digits indicate the working length in inches. To convert from millimeters to inches, divide by 25.4. Example, $254 \text{ mm} \div 25.4 = 10 \text{ inches}$. If you have a strap and want to reorder, it is easier to measure the overall length. Subtract the following from the overall length in inches to determine the working length for ordering: Type A1 -3", A2 -3.5", A3 -6", A4 -3", A6 -3.75", B1 -4.87", B2 -7", B3 -10", B4 -14", C1 -0.75", C2 -1", C3, C4 and C6 -1".

AVAILABILITY: Available from stock in one week or less.



Silicon Carbide Heating Elements



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TERMINAL CLAMPS: The terminal clamps are used to hold the aluminum straps in compression around the circumference of the Starbars. The aluminum strap and terminal clamp should be installed at the very end of the Starbar. There are two types of clamps:

- "M" -- which derives its name from its similarity to the letter M, and manual.
- "T" -- which is used with an expansion tool.

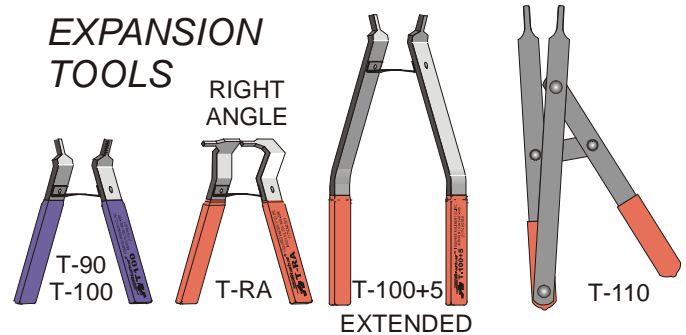
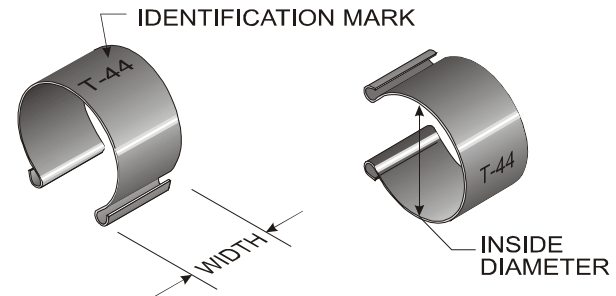
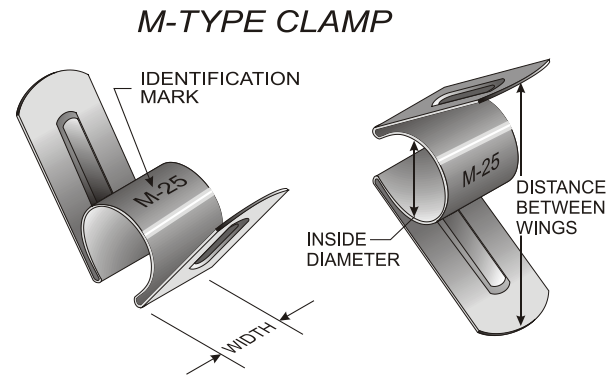
The T type clamp is useful for installations where space is limited.

TEMPERATURE LIMITATION: Clamps are made from heat resistant steel and should never be operated in an ambient temperature over 500°F (260°C).

EXPANSION TOOL: These tools are used for installation and removal of the T type clamps. Besides the standard in-line type there are two special types, a RA right ange and extended in-line type.

IDENTIFICATION: The stainless steel clamps are stamped with a number for easy identification and proper matching to the correct diameter Starbars. The expansion tools have the part numbers marked on the handle.

AVAILABILITY: Most sizes are available from stock. Others can be shipped in one week or quicker for emergencies.



Starbar Diameter		M - Type Terminal Clamps							T - Type Terminal Clamps					*Tool
		(M) Part Number	Inside Diameter		Width		Distance Between Wings		(T) Part Number	Inside Diameter		Width		
MM	Inch	P/N	MM	Inch	MM	Inch	MM	Inch	P/N	MM	Inch	MM	Inch	P/N
7	0.25	M-07	7	0.25	13	0.50	32	1.25	N/A					
10	0.38	M-10	10	0.40	13	0.50	34	1.30	T-10	11	0.40	13	0.50	T-90
11	0.44	M-11/13	13	0.50	13	0.50	37	1.50	T-11/13	13	0.50	13	0.50	T-90
13	0.50	M-11/13	13	0.50	13	0.50	37	1.50	T-11/13	13	0.50	13	0.50	T-90
16	0.63	M-16	16	0.65	13	0.50	56	2.20	T-16	16	0.65	13	0.50	T-90
19	0.75	M-19	19	0.75	19	0.75	58	2.30	T-19	19	0.75	19	0.75	T-90
25	1.00	M-25	25	1.00	25	1.00	77	3.00	T-25	25	1.00	25	1.00	T-90
32	1.25	M-32	30	1.20	32	1.25	81	3.20	T-32	30	1.20	32	1.25	T-100
35	1.38	M-35/38	35	1.40	32	1.25	97	3.80	T-35/38	35	1.40	32	1.25	T-100
38	1.50	M-35/38	35	1.40	32	1.25	97	3.80	T-35/38	35	1.40	32	1.25	T-100
44	1.75	M-44	40	1.60	38	1.50	118	4.60	T-44	40	1.60	38	1.50	T-100
54	2.12	M-54	51	2.00	38	1.50	114	4.50	T-54	51	2.00	38	1.50	T-100
70	2.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	T-70	63	2.50	38	1.50	T-110

The T-100+5 is an extended tool that can be used as a substitute for the T-100. An extended tool is not available for the T-90.

*The T-RA (right angle tool) can be used on any of the T-type clamps.

CLAMP STRAP COMBINATION:

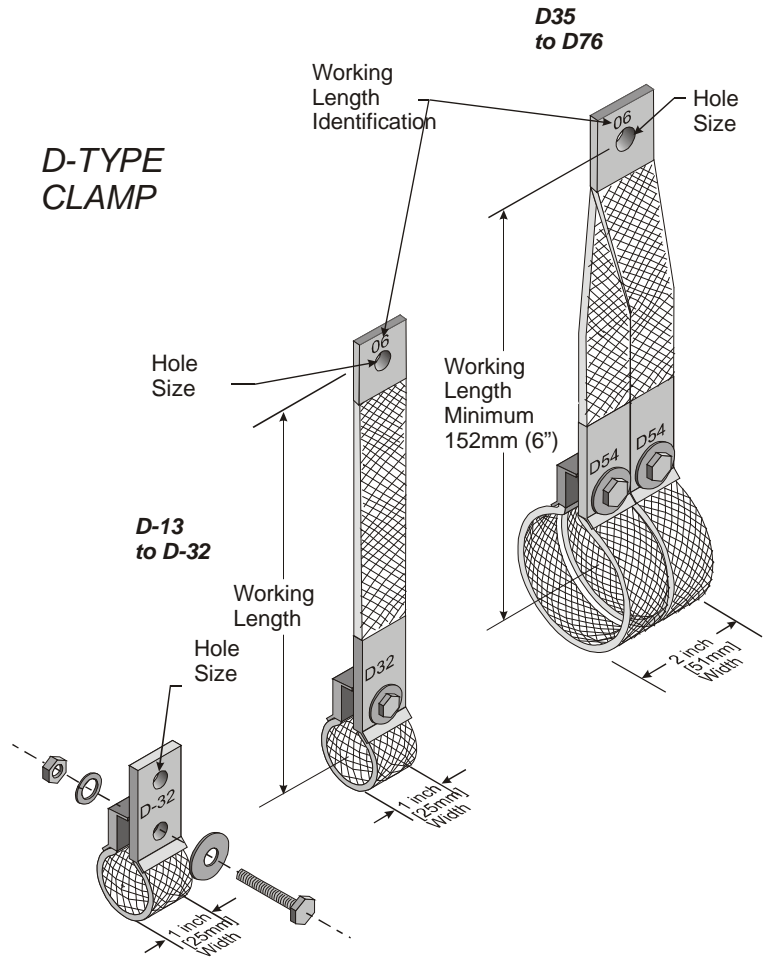
The "D" type clamp strap does not require an additional clamp. It is secured around the circumference of the Starbar by the use of a bolt.

The strap connection must be flexible so that no physical stress is transmitted to the Starbars. Avoid using large gauge, heavy wire.

IDENTIFICATION: Some of the D-clamps are stamped with two part numbers. The number on the clamp's end identifies the element diameter in mm. The number on the opposite end is the working length in inches.

ORDERING SPECIFICATIONS: When ordering D type straps for Starbar diameter 13mm (0.50 inch) to 32mm (1.25 inch) specify the standard D-clamp or optional D-clamp with a long lead. The working length, measured from the center of the Starbar to the center of the hole in binding post, is used to determine the length of the long lead. The 35mm (1.38inch) to 76mm (3.00 inch) Starbar has two 100 amp aluminum braided straps held together by a common end clip. When ordering, specify the working length; minimum is 152mm (6 inch).

AVAILABILITY: Most sizes are available from stock. Others can be shipped in one week or quicker for emergencies.



D – Type Clamps								
Starbar Diameter		Part Number		Width		Rated Current	Hole Diameter	
MM	Inch	P/N	P/N Long Lead	MM	Inch	Amperage	MM	Inch
13	0.50	D-13	WL=XX	24	0.95	50	10	0.41
14	0.56	D-14	WL=XX	24	0.95	50	10	0.41
16	0.63	D-16	WL=XX	24	0.95	50	10	0.41
19	0.75	D-19	WL=XX	24	0.95	75	10	0.41
22	0.88	D-22	WL=XX	24	0.95	100	10	0.41
25	1.00	D-25	WL=XX	24	0.95	100	10	0.41
28	1.10	D-28	WL=XX	24	0.95	75	10	0.41
32	1.25	D-32	WL=XX	24	0.95	100	10	0.41
35	1.38	D-35	WL=XX	51	2	200	14	0.55
38	1.50	D-38	WL=XX	51	2	200	14	0.55
44	1.75	D-44	WL=XX	51	2	200	14	0.55
50	2.00	D-50	WL=XX	51	2	200	14	0.55
54	2.12	D-54	WL=XX	51	2	200	14	0.55
60	2.38	D-38	WL=XX	51	2	200	14	0.55
64	2.50	D-64	WL=XX	51	2	200	14	0.55
70	2.75	D-70	WL=XX	51	2	200	14	0.55
76	3.00	D-76	WL=XX	51	2	200	14	0.55

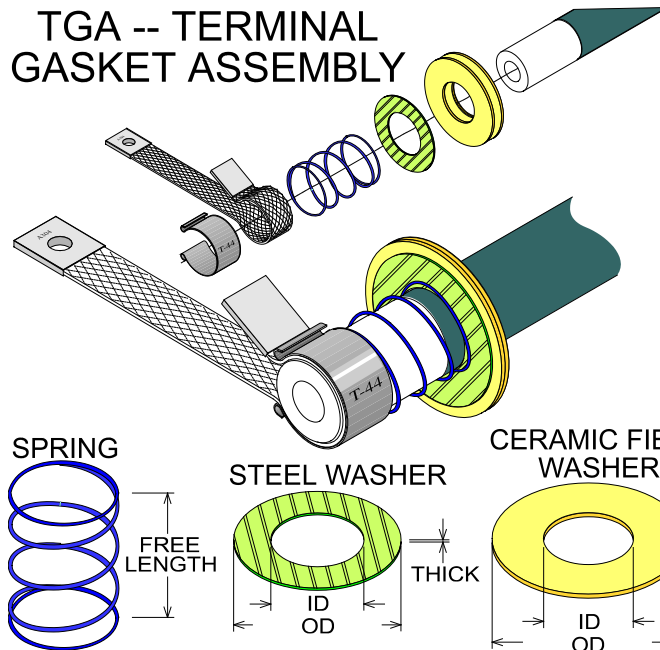
TERMINAL GASKET ASSEMBLY: The TGA consists of two ceramic fiber washers, one steel washer, and a spring.

AVAILABILITY: Most sizes are available from stock. Others can be shipped in one week, or quicker for emergencies.

The TGA is used as an alternative to packing ceramic fiber insulation around the Starbar cold end. Ceramic fiber insulation is often used at the cold face of the furnace to help reduce furnace energy losses.

There are advantages to using the TGA rather than packing ceramic fiber insulation around the Starbar. Because the TGA is spring-loaded it allows the Starbar freedom of movement. If ceramic fiber is packed too tightly it can cause tremendous physical stresses to be exerted to the Starbars, possibly leading to failures due to breakage. Freedom of movement is important because there is movement between the Starbars and the furnace walls created by different thermal expansion rates.

Installing of TGA is also quicker than packing with ceramic fiber.



Note: The strap and clamp are shown for illustrative purposes and are not supplied with the TGA assembly.

Neither of these methods are intended to be an atmosphere seal. It is to help reduce radiant energy losses, and to a smaller degree some convection heat losses.

There are two free spring lengths, 1 inch (25mm) and 3 inches (75mm). The last digit of the part number is used to call out the free spring length.

TERMINAL GASKET ASSEMBLY										
Starbar Diameter		* Part Number	Steel Washer ID		Steel Washer OD		Ceramic Fiber Washer ID		Ceramic Fiber Washer OD	
MM	Inch		MM	Inch	MM	Inch	MM	Inch	MM	Inch
10	0.38	TGA-10-__	11	0.44	25	1.00	9.5	0.38	32	1.25
11	0.44	TGA-11-__	13	0.50	32	1.25	11	0.44	38	1.50
13	0.50	TGA-13-__	14	0.56	32	1.25	13	0.50	38	1.50
16	0.63	TGA-16-__	17	0.69	33	1.32	16	0.63	44	1.75
19	0.75	TGA-19-__	21	0.84	38	1.50	19	0.75	44	1.75
25	1.00	TGA-25-__	27	1.06	55	2.15	25	1.00	64	2.50
32	1.25	TGA-32-__	33	1.31	70	2.75	30	1.18	83	3.25
35	1.38	TGA-35-__	36	1.44	70	2.75	35	1.38	83	3.25
38	1.50	TGA-38-__	40	1.56	70	2.75	37	1.44	83	3.25
44	1.75	TGA-44-__	47	1.88	84	3.31	43	1.69	95	3.75
54	2.12	TGA-54-__	56	2.20	84	3.31	51	2.00	101	4.00
64	2.50	TGA-64-__	63	2.50	105	4.12	63	2.50	114	4.50
70	2.75	TGA-70-__	73	2.88	105	4.12	70	2.75	114	4.50
For All TGA:			MM	Inch						
Free Spring Length			25 or 75	1 or 3						
Ceramic Fiber Washer Thickness			Approx. 3.2	Approx. 0.125						
* The last digit of the part number represents the Free Spring Length in Inches, either 1 or 3.										
Parts can also be purchased separately. When ordering separately the steel washers, ceramic fiber washers, and springs are designated by TW-__, TG-__, and TS-__-1 or TS-__-3 respectively.										

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