

CATALOG

# Dragon Tooth<sup>®</sup> magnet wire termination system

*Dragon Tooth<sup>®</sup>*



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**To meet the essential requirements of magnet wire connections, ABB offers insulation-piercing Dragon Tooth<sup>®</sup> compression connectors. This highly reliable connection solution for magnet wire eliminates welding, requires no insulation removal and can be installed in seconds. No special operator skills are needed. The connector and matching tooling do the entire job.**

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# Dragon Tooth® magnet wire termination system

Splice, tap and terminate magnet wire quickly and easily!

- 01 Transformer manufacturers depend on Dragon Tooth connectors for reliable magnet wire applications.
- 02 Splice application
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- 04 Parallel splice application
- 05 Tap application

## Splice, tap and terminate magnet wire quickly and easily!

The tough, high-temperature insulation on magnet wire used by electrical motor and transformer manufacturers creates problems in splicing and terminating. The durability of magnet wire insulation has made dip-soldering or brazing extremely difficult without stripping the insulation.

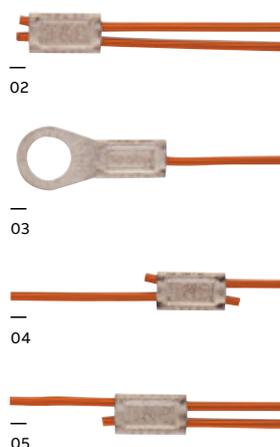
Another splicing and terminating challenge involves the use of aluminum for magnet applications. A manufacturer connecting aluminum magnet wire to copper is faced with the problem of the different coefficients of thermal expansion of the two metals, galvanic corrosion, cold flow and the rapid formation of oxide film on the wire surface.

ABB offers a solution for a highly reliable connection method for magnet wire. It eliminates welding, no longer requires removal of insulation and it can be installed in seconds. No special operator skills are needed. The connector and matching tooling do the entire job. To meet the essential requirements of magnet wire connections, ABB offers the insulation piercing Dragon Tooth compression connector.

## Dragon Tooth magnet wire connectors

Dragon Tooth connectors and installing tools are designed to splice, tap and terminate magnet wire from #32 AWG to 460,000 CMA copper and from #18 AWG to 460,000 CMA aluminum conductors in motor and transformer applications. Dragon Tooth magnet wire connectors penetrate the insulation and oxide layers to make electrical contact on magnet wiring. The result is permanent, low-resistance electrical connections, capable of maintaining contact integrity throughout the life of the connection.

- Designed to penetrate magnet wire insulation during application, eliminating the need for stripping, brazing, welding or other methods of joining magnet wire
- Can be installed in seconds
- Requires minimal training for installation
- Made of copper alloy, tin plated, with teeth on the inner surface
- Splices and taps have an open side enabling easy access to wire and making internal coil tapping possible
- For aluminum to copper, aluminum to aluminum or copper to copper magnet wire connections
- Supplied with bolt holes to accommodate #6 through ½" studs and includes male and female 0.250" x 0.032" disconnects
- Rings and fork terminals accommodate wire sizes #24 to #12 AWG in a variety of combinations, including combining magnet wire with stripped wire lead. For solid or stranded wire #20 to 4/0 AWG
- Larger connectors accommodate circular mil range from 50,000 to 460,000 CMA
- Connector and matching tooling do the entire job





Dragon Tooth connectors transform the perpendicular compression force, which would normally contribute to conductor creep, into distributive forces that effectively resist cold flow, as indicated by the illustration below.



These connectors are made of copper alloy, tin plated, with a number of teeth on the inner surface. When compressed onto an insulated magnet wire, the sharp, hardened teeth penetrate both the insulation and oxide and bite into the conductor. An electrically sound, low-resistance connection is established as a result of the combination of high pressures at the edges of the teeth, and the sliding action between the teeth and the conductor. The open barrel design permits midspan splicing and tapping.

#### How to select a connector

- 1) Determine total circular mil area (CMA).  
All wires to be installed in a connector barrel including stripped, stranded wire.  
For example, two #6 AWG = 52,480 CMA.
- 2) Refer to circular mil column of chart and find the connector series corresponding to the total CMA. For example, 204XXX.
- 3) Next, refer to either round wire column or rectangular wire column, depending on the type you are using, and check for any limitations, (such as max. wire width/height). If there are limitations, you may have to make a selection from the next larger size.
- 4) Select the tool and die appropriate for the application.

#### Formula for calculating circular mil area (CMA)

##### For square or rectangular wire:

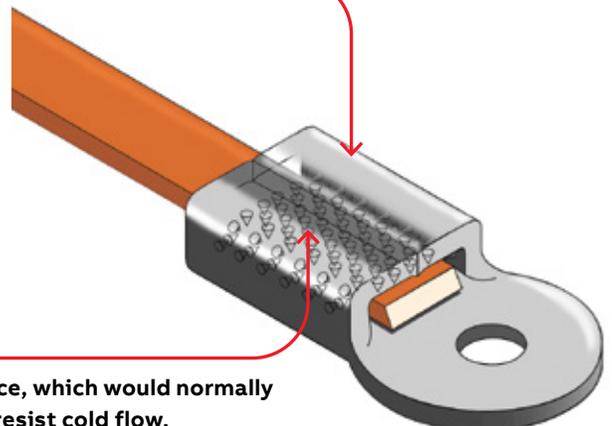
$$\text{Thickness} \times \text{width} \times 1.273 \times 10^6 = \text{CMA}$$

##### For round wire:

$$\text{Diameter}^2 \times 10^6 = \text{CMA (or see chart on p. 11)}$$

For wire sizes and combinations other than shown, contact ABB technical services at 888-862-3289.

These connectors are made of copper alloy, tin plated, with a number of teeth on the inner surface. When the connector is compressed onto an insulated magnet wire, the sharp, hardened teeth penetrate the insulation and the oxide and bite into the conductor. An electrically sound, low-resistance connection is established as a result of the combination of high pressures at the tip and edges of the teeth, and the sliding action between the teeth and the conductor.



Dragon Tooth connectors transform the perpendicular compression force, which would normally contribute to conductor creep, into distributive forces that effectively resist cold flow.

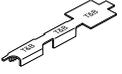
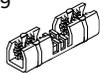
## Dragon Tooth® splices



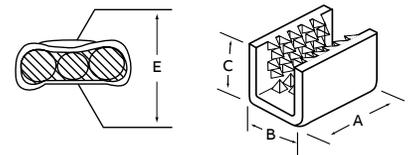
### Splices for copper and aluminum magnet wire!

- Penetrate all standard copper and aluminum magnet wire insulations
- Perfect for heavy Formvar, poly-thermaleze, polyester and polyurethane insulations
- For special insulations, consult technical services.

### Splices

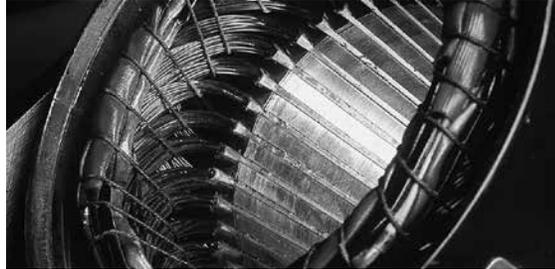
	Cat. no.	Dimensions (in.)				Circular mil area	Round wire range (AWG) min.-max.	Rectangular wire range (in.)		Pkg. qty.
		A	B	C	E*			Thickness	Width	
1 	214420	0.43	0.25	0.22	0.135	-	21 (4)-13 (2)	-	-	1000
2 	220004	0.17	0.11	0.08	0.03	468-1,724	32-24**	-	-	8400 <sup>†</sup>
	220001	0.34	0.17	0.14	0.09	1,277-4,205	26-17**	0.02-0.04	0.02-0.09	3000 <sup>†</sup>
	220002-TB	0.34	0.25	0.18	0.09	2,985-6,687	24-14**	0.02-0.05	0.02-0.10	3000 <sup>†</sup>
	220006	0.47	0.25	0.19	0.09	5,162-12,330	16-12	0.05-0.08	0.05-0.16	2500 <sup>†</sup>
3 	22L004	0.15	0.11	0.09	0.03	128-2,028	32-24**	-	-	1000
	22L001	0.32	0.16	0.16	0.10	808-5,162	26-17**	0.02-0.04	0.02-0.10	1000
	22L002	0.32	0.25	0.19	0.10	2,048-9,110	24-15**	0.02-0.05	0.02-0.11	1000
	22L006	0.44	0.25	0.22	0.13	2,580-12,330	16-12	0.05-0.08	0.05-0.16	1000
	22L008	0.70	0.50	0.35	0.13	12,960-30,550	18-14	0.04-0.06	0.06-0.38	100
	22L009	0.70	0.55	0.46	0.20	36,120-86,000	16-5	0.08-0.18	0.08-0.38	100
	22L010	0.70	0.78	0.71	0.22	69,750-173,090 (f)	-	0.10-0.23 (Cu) 0.10-0.18 (Al)	0.30-0.63	50
4 	210214S	0.63	0.38	0.37	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
	204210S	0.69	0.53	0.53	0.25	10,380-52,480	12(b)-4(e)	0.10-0.16	0.10-0.26	100
5 	204210SH	0.69	0.53	1.05	0.48	20,760-104,960	12(c)-2(d)	0.10-0.16	0.10-0.26	100
6 	22L009H	0.70	0.55	0.93	0.37	72,000-132,000	16-5	0.08-0.18	0.08-0.38	100
7 	220015	1.50	0.88	0.77	(e)	50,000-115,000	10-6	0.100-0.175	0.300-0.625	50
	220019-TB	1.50	0.88	0.85	(e)	110,000-175,000	6-2	0.175-0.250	0.300-0.625	25
	220023-TB	1.75	0.88	0.93	(e)	165,000-230,000	2-1/0	0.250-0.325	0.300-0.625	25
8 	314118S	0.63	0.38	0.30	0.14	3,260-12,330	15-13	0.05-0.06	0.05-0.18	250
9 	220016	3.13	0.88	0.77	(e)	50,000-115,000	10-6	0.100-0.175	0.300-0.625	25
	220020-TB	3.13	0.88	0.85	(e)	110,000-175,000	6-2	0.175-0.250	0.300-0.625	25
	220024-TB	3.63	0.88	0.93	(e)	165,000-230,000	2-1/0	0.250-0.325	0.300-0.625	25

### Diagrams

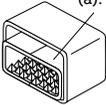
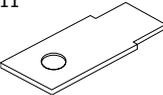
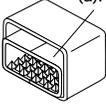
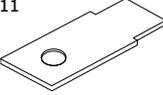


\* Reference dimension. See installing die illustration for gauging. \*\* Not recommended for aluminum magnet wire finer than 21 gauge. (a) Four wires max. (b) Six wires max. (c) Six wires max. each barrel. (d) Conductors heavier than #6 AWG require special dies. Contact ABB for assistance. (e) Crimping dies may not bottom. Connector height will depend on number and size of wires in barrel. Pump must deliver 9800 psi minimum. (f) Copper CMA, aluminum CMA=52,136-124,561. <sup>†</sup> On a reel. Note: Wire sizes and combinations shown have been tested to and meet or exceed ABB specifications. Connectors may be suitable for other wire sizes or combinations. ABB sells these connectors with the understanding that the user will perform necessary tests to determine their suitability for the intended purpose.

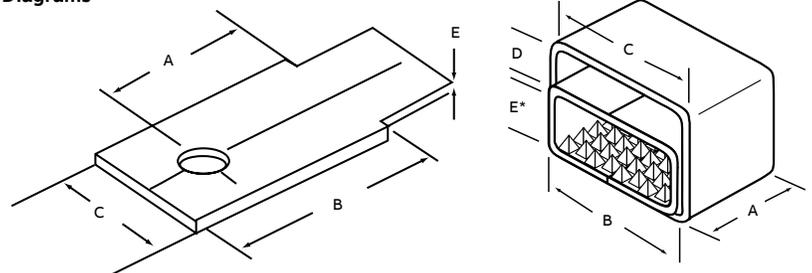
# Dragon Tooth® splices



## Splices

Cat. no.	Stud size (in.)	Dimensions (in.)					Circular mil area	Round wire range (AWG)	Rectangular wire range (in.)		Pkg. qty.
		A	B	C	D	E			Thickness	Width	
10 See Note (a). 	210214MT	-	0.63	0.63	0.75	0.25	0.19*	20,000-105,000	5-13	Lower half	250
										0.08-0.15	0.08-0.49
										Upper half	
										0.25 max.	0.75 max.
11 	210MT14	1/4	1.00	1.44	0.81	-	0.08		5-13	For conn	25
	210MT38	3/8	1.00	1.44	0.81	-	0.08		5-13	210214MT	25
10 See Note (a). 	204210MT	-	0.92	0.94	1.03	0.25	0.25*	90,000-215,000	3-10	Lower half	100
										0.10-0.25	0.10-0.92
										Upper half	
										0.25 max.	1.03 max.
11 	204MT14	1/4	1.00	1.44	0.91	-	0.10		3-10	For conn	25
	204MT38	3/8	1.00	1.44	0.91	-	0.10		3-10	204210MT	25

## Diagrams



(a) This space may be used for terminal tongue insert, stripped stranded copper wire, stripped copper magnet wire or left empty.

\* Between teeth.

Note: Wire sizes and combinations shown have been tested to and meet or exceed ABB specifications. Connectors may be suitable for other wire sizes or combinations. ABB sells these connectors with the understanding that the user will perform necessary tests to determine their suitability for the intended purpose.

## Dragon Tooth® ring terminals

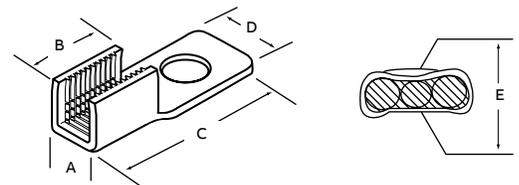


Secure connections easily!

### Ring terminals

	Cat. no.	Stud size (in.)	Dimensions (in.)					Circular mil area	Round wire range (AWG)	Rectangular wire range (in.)		Pkg. qty.	
			A	B	C	D	E*			Thickness	Width		
	1	314125	10	0.38	0.56	1.22	0.41	0.14	3,260-12,330	15-13	0.05-0.06	0.05-0.18	250
		314123	1/4"	0.38	0.56	1.41	0.41	0.14	3,260-12,330	15-13	0.05-0.06	0.05-0.18	250
		210219	8	0.38	0.56	1.22	0.41	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
		210217	10	0.38	0.56	1.22	0.41	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
		210216	1/4	0.38	0.56	1.41	0.41	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
		204217	10	0.53	0.61	1.58	0.50	0.25	10,380-52,480	12(b)-4(c)	0.10-0.16	0.10-0.26	100
		204212	1/4	0.53	0.61	1.58	0.50	0.25	10,380-52,480	12(b)-4(c)	0.10-0.16	0.10-0.26	100
	2	210214-1	1/4	0.38	0.56	1.41	0.69	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
		210214-2	5/16	0.38	0.56	1.41	0.69	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
		210214-3	3/8	0.38	0.56	1.41	0.69	0.17	4,110-20,760	14(a)-10	0.08-0.09	0.08-0.18	250
		204210-1	1/4	0.53	0.61	1.58	0.81	0.25	10,380-52,480	12(b)-4(c)	0.10-0.16	0.10-0.26	100
		204210-2	5/16	0.53	0.61	1.58	0.81	0.25	10,380-52,480	12(b)-4(c)	0.10-0.16	0.10-0.26	100
		204210-3	3/8	0.53	0.61	1.58	0.81	0.25	10,380-52,480	12(b)-4(c)	0.10-0.16	0.10-0.26	100
		204210-5	1/2	0.53	0.61	1.58	0.81	0.25	10,380-52,480	12(b)-4(c)	0.10-0.16	0.10-0.26	100
	3	204210-1H	1/4	0.53	0.61	1.58	0.81	0.47	20,760-104,960	12(b)-4(c)	0.10-0.16	0.10-0.26	100
		204210-3H	3/8	0.53	0.61	1.58	0.81	0.47	20,760-104,960	12(b)-4(c)	0.10-0.16	0.10-0.26	100
	4	220017	3/8	0.88	1.50	2.76	1.06	(d)	50,000-115,000	0.100-0.175	-	0.300-0.625	25
		220018	1/2	0.88	1.50	2.76	1.06	(d)	50,000-115,000	0.100-0.175	-	0.300-0.625	25
		220021-TB	3/8	0.88	1.50	2.76	1.06	(d)	110,000-175,000	-	0.175-0.250	0.300-0.625	25
		220022	1/2	0.88	1.50	2.76	1.06	(d)	110,000-175,000	-	0.175-0.250	0.300-0.625	25
		220025	3/8	0.88	1.50	2.76	1.06	(d)	110,000-230,000	-	0.175-0.325	0.300-0.625	25
		220026-TB	1/2	0.88	1.50	2.76	1.06	(d)	110,000-230,000	-	0.175-0.325	0.300-0.625	25
		22R061**	6	0.16	0.32	0.78	0.30	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
		22R081**	8	0.16	0.32	0.78	0.30	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
		22R101**	10	0.16	0.32	0.78	0.30	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
		22R086	8	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
		22R106	10	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
	6	22R146	1/4	0.25	0.45	0.95	0.42	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000

### Diagrams



\* Reference dimension. See installing die illustration for gauging. (a) Four wires max. (b) Six wires max. (c) Conductors heavier than #6 AWG require special dies. Contact ABB for assistance. (d) Crimping dies may not bottom. Connector height will depend on number and size of wires in barrel. Pump must deliver 9800 psi minimum.

Note: Wire sizes and combinations shown have been tested to and meet or exceed ABB specifications. Connectors may be suitable for other wire sizes or combinations. ABB sells these connectors with the understanding that the user will perform necessary tests to determine their suitability for the intended purpose.

\*\* #22-#24 AWG and equivalent rectangular CMA, copper only.

## Dragon Tooth® fork terminals and disconnects

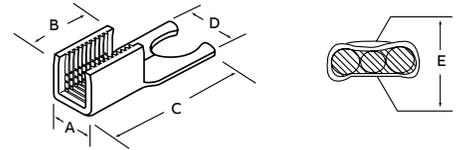


Connectors for every application!

### Fork terminals

	Cat. no.	Stud size (in.)	Dimensions (in.)					Circular mil area	Round wire range (AWG)	Rectangular wire range (in.)		Pkg. qty.
			A	B	C	D	E*			Thickness	Width	
1	22F061**	6	0.16	0.32	0.78	0.30	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
	22F081**	8	0.16	0.32	0.78	0.30	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
	22F101**	10	0.16	0.32	0.78	0.30	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
	22F066	6	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
	22F086	8	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
	22F106	10	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
2	210219F	6	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
	210217F	8	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
	210216F	10	0.25	0.45	0.91	0.30	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000

### Diagrams



\* Reference dimension. See installing die illustration for gauging.

\*\* #22-#24 AWG and equivalent rectangular CMA, copper only.

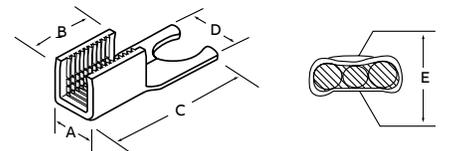


Durable and convenient!

### Disconnects

	Cat. no.	Tab size (in.)	Dimensions (in.)					Circular mil area	Round wire range (AWG)	Rectangular wire range (in.)		Pkg. qty.
			A	B	C	D	E*			Thickness	Width	
1	22LM01**	0.250 x 0.032	0.16	0.32	0.76	0.25	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
	22LM06	0.250 x 0.032	0.25	0.45	0.91	0.25	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000
2	22LF01**	0.250 x 0.032	0.16	0.32	0.79	0.25	0.10	404-4100	15-24	0.02-0.05	0.02-0.10	1000
	22LF06	0.250 x 0.032	0.25	0.45	0.91	0.25	0.13	2,580-12,330	12-16	0.05-0.08	0.05-0.16	1000

### Diagrams



\* Reference dimension. See installing die illustration for gauging.

Note: Wire sizes and combinations shown have been tested to and meet or exceed ABB specifications. Connectors may be suitable for other wire sizes or combinations. ABB sells these connectors with the understanding that the user will perform necessary tests to determine their suitability for the intended purpose.

\*\* #22-#24 AWG and equivalent rectangular CMA, copper only.

## Dragon Tooth® washers



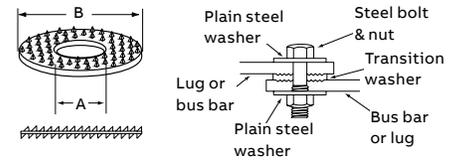
### Copper to aluminum connections!

- Teeth on the transition washers penetrate aluminum and copper oxides
- Enables copper to aluminum connections to be made in a bolted joint without the use of inhibiting compounds
- Accommodates the difference in thermal expansion between copper and aluminum, and enhances the efficiency of bolted grounding connections

### Washers

Cat. no.	Bolt size (in.)	Dimensions (in.)		Recommended installing torque in.-lbs.	Pkg. qty.
		A	B		
FPW14	$\frac{1}{4}$	0.27	0.68	50–80	250
FPW516	$\frac{5}{16}$	0.34	1.00	125–160	250
FPW38	$\frac{3}{8}$	0.43	1.00	160–240	250
FPW12	$\frac{1}{2}$	0.56	1.25	390–540	250
FPW58	$\frac{5}{8}$	0.68	1.40	540–730	250

### Diagrams



Note: Wire sizes and combinations shown have been tested to and meet or exceed ABB specifications. Connectors may be suitable for other wire sizes or combinations. ABB sells these connectors with the understanding that the user will perform necessary tests to determine their suitability for the intended purpose.

## Dragon Tooth® technical data

### Conversion of AWG to circular mils and decimal equivalents

#### Conversion of AWG to circular mils

Wire size AWG	Nom. diameter		Circular mils
	(in.)	(mm)	
4/0	0.4600	11.68	211,600
3/0	0.4096	11.40	167,800
2/0	0.3648	9.266	133,100
1/0	0.3249	08.52	105,600
1	0.2893	7.348	83,690
2	0.2576	6.543	66,360
3	0.2294	5.827	52,620
4	0.2043	5.189	41,740
5	0.1819	4.620	33,090
6	0.1620	4.115	26,240
7	0.1443	3.665	20,820
8	0.1285	3.264	16,510
9	0.1144	2.906	13,090
10	0.1019	2.588	10,380
11	0.0907	2.30	8230
12	0.0808	2.05	6530
13	0.0720	1.83	5180
14	0.0641	1.63	4110
15	0.0571	1.45	3260
16	0.0508	1.29	2580
17	0.0453	1.15	2050
18	0.0403	1.02	1620
19	0.0359	0.912	1290
20	0.032	0.813	1020
21	0.0285	0.724	812
22	0.0253	0.643	640
23	0.0226	0.574	511
24	0.0201	0.511	404

#### Additional magnet wire ordering information

- 1) For wire sizes and combinations other than shown, consult factory.
- 2) Maximum of two layers of conductors in each connector.
- 3) Consult factory for gauging other than shown.
- 4) When terminating wires with an AWG size difference of four or more, samples should be tested in completed connections before using.

#### Decimal equivalents

Wire size AWG	Nom. diameter		Circular mils
	(in.)	(mm)	
1/64	0.0156	3/16	0.1875
1/32	0.0312	13/64	0.2031
3/64	0.0469	7/32	0.2188
1/16	0.0625	15/64	0.2344
5/64	0.0784	1/4	0.25
3/32	0.0938	–	–
7/64	0.1094	17/64	0.2656
1/8	0.125	9/32	0.2812
9/64	0.1406	19/64	0.2969
5/32	0.1562	5/16	0.3125
11/64	0.1719	211/64	0.3281
11/32	0.3438	33/64	0.5156
23/64	0.3594	17/32	0.5312
3/8	0.375	35/64	0.5469
25/64	0.3906	9/16	0.5625
13/32	0.4062	37/64	0.5781
27/64	0.4219	19/32	0.5938
7/16	0.4375	39/64	0.6094
29/64	0.4531	5/8	0.625
15.32	0.4688	41/64	0.6406
31/64	0.4844	21/32	0.6562
1/2	0.5	43/64	0.6719

Note: Multiply inches x 25.4 to get millimeters.  
Example: .5" x 25.4 = 12.7 mm.

Stud size (in.)	#6	#8	#10	3/4"	5/16"	3/8"	1/2"
Hole Dia. (in.)	0.143	0.169	0.196	0.260	0.323	0.386	0.516

## Dragon Tooth® installation tools — manual

### Ergonomic manual installation tools

—  
01 ERG4801  
—  
02 ERG4806



01

02

- Fixed die tool
- Incorporates the ergonomically designed Comfort Crimp® tool handles, which distribute the force more evenly across the hand
- Shure-Stake® mechanism ensures a complete crimp cycle before the tool releases
- Ergonomically advanced, soft, over-molded handle grips reduce strain and enhance user comfort
- Two-piece movable die nest provides easy connector removal (ERG4811 has a fixed die nest)
- Crimp with comfort!

#### Ergonomic manual installation tools

Cat. no.	Tool gauging (in.)	Connector	Pkg. qty.
ERG4801	0.069 max.	22F, L, R-1 Series	1
ERG4802	0.076 max.	22L002	1
ERG4804	0.034 max.	22L004	1
ERG4806	0.095 max.	22F, L, R-6 Series	1
ERG4811	0.103 max.	214420	1

Contact customer services for availability and most recent additions to the ergonomic tool series.

## ABB tool warranty

You can choose ABB tools with confidence, because we stand behind them with our warranty. The chart below shows the standard length of warranty for different types of tools. See below for additional warranty details.

#### ABB tool warranty

90 Days	1 Year	2 Years	5 Years	Lifetime
Batteries	Pneumatic tools	Mechanical hand tools with	Lithium-ion	Mechanical hand tools
Individual dies	Cable cutters & strippers	ratchet or Shure-Stake	battery-operated tools	without ratchet or Shure-
Duct tools	Ty-Rap® tools	mechanism		Stake mechanism
		Hydraulic pumps		
		Battery-operated tools		
		Manual hydraulic tools		

#### Limited warranty for tools

ABB sells tools with the understanding that the user will perform all necessary tests to determine the suitability of each tool for the user's intended application. ABB warrants that its tools will be free from defects in materials and workmanship for the period of time specified above. Upon prompt notification of any warranted defect, ABB will, at its option, repair or replace the defective product or refund the purchase price. Proof of purchase is required. Misuse or unauthorized modification of the product voids all warranties.

#### Limitations and exclusions

The warranty above is the sole warranty concerning this product, and is in lieu of all other warranties expressed or implied, including but not limited

to any implied warranty of merchantability or fitness for a particular purpose, which are specifically disclaimed. Liability for breach of the above warranty is limited to cost of repair or replacement of the product, and under no circumstances will ABB be liable for any indirect, special, incidental or consequential damages.

Direct all warranty inquiries to ABB tool services:  
1-800-284-TOOL (8665).

#### Replacement batteries and chargers

can be purchased from ABB Tool Services:

Call Toll-Free 1-800-284-TOOL (8665)

For more information about ABB Tool Services:

E-mail us at [us.elip.toolservice@abb.com](mailto:us.elip.toolservice@abb.com)

## Dragon Tooth® installation tools — battery-powered

### Battery-powered crimping tool – BAT22-6NV2

01 BAT22-6NV2 includes tool, extra battery, charger and carrying case (crimp dies sold separately)



01



#### More charge at no extra charge

Keep on crimping with the BAT22-6NV2 electromechanical crimping tool. It comes with an extra battery, a charger and a handy carrying case. All so you can carry the day. The go-to kit for panel builders, system integrators, electrical contractors, OEMs and MROs, the BAT22-6NV2 delivers outstanding performance in a wide range of industries from data centers to utilities to rail.

#### It's the complete package:

- Exclusive UL listing\*
- Extra battery, charger and carrying case included
- Powerful lithium-ion batteries with charge level indicator
- Single-lever motorized operation for easy manual preclamping, automatic crimping and auto-retract functions
- Extremely light and super fast
- Motor stall protection in case of faulty operation
- LED task illumination

\*When used with UL listed die sets.



Cat. no.	Product description
BAT22-6NV2 <sup>†</sup>	Electromechanical crimping tool
RAML1	Battery 10.8 V/1.5 Ah, Li-on (16,2 Wh)
LGML1110	Charger for 10.8 V Li-on batteries, 110 V
Cat. no. — die sets	Product description
DIE1801*	Dragon Tooth 22Fm L R-1 Series
DIE1802*	Dragon Tooth 22L002
DIE1804*	Dragon Tooth 22L004
DIE1806*	Dragon Tooth 22F, L, R-6 series

<sup>†</sup>Includes 2 batteries, 1 charger and case.

\*Not UL or CSA listed.

## Dragon Tooth® installation tools — air-operated

Heavy-duty air crimp tools



BAIR22-6 – Heavy-duty bench-top air crimp tool

### Perfect for high-speed installation!

- Bench mounted for stability and operator control
- Compact size, all-metallic construction
- Delivers 1.8 tons of crimping force at 100 psi
- Heavy-duty and installs wide range of Dragon Tooth connectors

### Specifications

- Height: 12"
- Operating pressure: 85–100 psi
- Base: 8" square
- Weight: 17 lbs.

Cat. no.	Description
BAIR22-6	Equipped with Shure-Stake® mechanism, ensuring full crimp cycle before release



PAIR22-6 – Heavy-duty portable air crimp tool

### Pneumatic power!

- Installs Dragon Tooth® terminals
- Hand actuated
- Delivers 1.25 tons of crimping force at 100 psi
- Three interchangeable dies can crimp the 22xxx1, 22xxx2, 22xxx4 and 22xxx6 series terminals

### Specifications

- Overall length: 14"
- Diameter: 2¼"
- Operating pressure: 90–100 psi
- Weight: 2.5 lbs.

Cat. no.	Description
PAIR22-6	Open "C" yoke; hand actuated

### Installing dies for BAIR22-6 and PAIR22-6

Cat. no.	Description	Pkg. qty.
<b>Crimp dies</b>		
DIE1801	22 F, L, R-1 series	1
DIE1802	22L002	1
DIE1804	22L004	1
DIE1806	22 F,L,R-6 series	1

**Dragon tooth® installation tools — air-operated**  
 6-ton hydraulic head and 12-ton crimping tool



**Rugged and portable!**

- Lightweight design – Weighs less than 7 lbs. including dies
- Includes steel carrying case
- Tool carrying case included
- Dies are ordered as a set (two pieces)

**Specifications**

- Output force: 6 tons nominal
- Operating pressure: 10,000 psi nominal
- Tool weight: 6½ lbs. (Without dies)
- Tool dimensions: 13½" long, 3½" wide

**6-ton hydraulic head**

Cat. no.	Description
TBM6H	The TBM6H remote hydraulic crimping head is a lightweight but powerful compression tool. The TBM6H operates from any 10,000-psi hydraulic pump.

See die chart on page 18–19 for complete listing of dies and connectors used with TBM6H.



**Military listed and 12 tons of crimping power!**

**12-ton crimping tool (Military Spec. MS25441-1)**

Cat. no.	Description	Pkg. qty.
13642M	Hydraulic-operated 12-ton tool installs #8 AWG through 250 kcmil Sta-Kon® terminals (dies ordered separately)	1

See die chart on page 18–19 for complete listing of dies and connectors used with 13642M.

## Dragon tooth® installation tools — air-operated

Type WASC-CF and 14-ton hydraulic head



### Powerful and reliable!

- 12-ton hydraulic head
- 12 tons output (nominal)
- 10,000 psi max. hydraulic operating pressure
- Weighs 15 lbs.

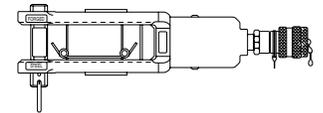
### Specifications

- Output: 12 tons (nominal)
- Hydraulic operating pressure: 10,000 psi (max.)
- Length (with coupling): 14½"
- Width: 3¼"
- Weight (without dies): 15 lbs.

### Type WASC-CF – Weld spherical coupler, pipe to pipe

Cat. no.	Description	Pkg. Qty.
13400	12-ton crimping tool supplied with adapter TBM12D-AR is used for installing both insulated and non-insulated Sta-Kon® terminals #8 AWG to 250 kcmil (dies ordered separately)	1

### Diagram



See die chart on page 18–19 for complete listing of dies and connectors used with 13400.



### Lightweight design!

- 14 tons output (nominal)
- 10,000-psi max. hydraulic operating pressure
- Weighs 10 lbs.

### Specifications

- Output: 14 tons (nominal)
- Hydraulic operating pressure: 10,000 psi (max.)
- Length (with coupling): 11½"
- Width: 2½"
- Height: 4¾"
- Weight (without dies): 10 lbs.

### 14-ton hydraulic head

Cat. no.	Description	Pkg. qty.
13100A	Remote 14-ton hydraulic head (dies ordered separately)	1

See die chart on page 18–19 for complete listing of dies and connectors used with 13100A.

## Dragon tooth® installation tools — air-operated and hydraulic pumps

### 15-ton hydraulic head and electric hydraulic pumps



#### Crimp larger connectors easily!

- Longer, slimmer profile enables easier access into tight spaces
- Wider jaw opening eases crimping of larger connectors
- Head made of forged steel and insulated with rubber boot
- Steel carrying case is included

#### Specifications

- Output force: 15 tons nominal
- Operating pressure: 10,000 psi nominal
- Tool weight: 16½ lbs. (without dies)
- Installs:
  - #8 AWG–1500 kcmil copper; #10 AWG–1000 kcmil aluminum

#### 15-ton hydraulic head

Cat. no.	Description	Pkg. qty.
TBM15I	Insulated 15-ton hydraulic tool; carrying case included	1

See die chart on page 18–19 for complete listing of dies and connectors used with TBM15I.

- Up to 10,000-psi output pressure
- Durable construction
- Hand or foot actuated



#### 13600 electric hydraulic pump

Cat. no.	Description	Pkg. qty.
13600	Electric hydraulic pump – Hand or foot switch and non-metallic hose (sold separately) required for operation	1

Cat. no.	Description	Pkg. qty.
<b>You may also need...for 13600</b>		
13620	Hand switch	1
13589A	Foot switch	1
13619	10-ft. non-metallic hose	1
13618	20-ft. non-metallic hose	1

## Dragon tooth® reference guide

An easy-to-use reference guide for tools and connectors!

	Manual	BAT22-6NV2 BAIR22-6 PAIR22-6	TBM6H	13100A	13400 13642M	TBM15I
<b>Splices</b>						<b>Dies</b>
214420	ERG4811					
22L004	ERG4804	DIE1804				
22L001	ERG4801	DIE1801				
22L002	ERG4802	DIE1802				
22L006	ERG4806	DIE1806				
22L008			6TON-MW-08	13683B	13683	13683B with 15500-TB
22L009			6TON-MW-09	13684B	13684	13684B with 15500-TB
22L010				13690B		
210214S				13670B	13670A	13670B with 15500-TB
204210S				13671B	13671A	13671B with 15500-TB
204210SH				13673B	13673	13673B with 15500-TB
22L009H				13686B	13686	13686B with 15500-TB
220015				13713B		13713
220019-TB				13713B		13713
220023-TB				13713B		13713
314118S				13685B	13685	13685B with 15500-TB
220016				13713B		13713
220020-TB				13713B		13713
220024-TB				13713B		13713
210214MT				13681B	13681	13681B with 15500-TB
204210MT					13682	
<b>Ring terminals</b>						
314125				13685B	13685	13685B with 15500-TB
314123				13685B	13685	13685B with 15500-TB
210219				13670B	13670A	13670B with 15500-TB
210217				13670B	13670A	13670B with 15500-TB
210216				13670B	13670A	13670B with 15500-TB
204217				13671B	13671A	13671B with 15500-TB
204212				13671B	13671A	13671B with 15500-TB
210214-1				13670B	13670A	13670B with 15500-TB
210214-2				13670B	13670A	13670B with 15500-TB
210214-3				13670B	13670A	13670B with 15500-TB
204210-1				13671B	13671A	13671B with 15500-TB
204210-2				13671B	13671A	13671B with 15500-TB
204210-3				13671B	13671A	13671B with 15500-TB
204210-5				13671B	13671A	13671B with 15500-TB
204210-1H				13673B	13673	13673B with 15500-TB
204210-3H				13673B	13673	13673B with 15500-TB
220017				13713B		13713
220018				13713B		13713
220021-TB				13713B		13713
220022				13713B		13713
220025				13713B		13713
220026-TB				13713B		13713

(Continued on next page)

## Dragon tooth® reference guide

An easy-to-use reference guide for tools and connectors! (continued)

	Manual	BAT22-6NV2 BAIR22-6 PAIR22-6	TBM6H	13100A	13400 13642M	TBM15I
<b>Ring terminals</b>						
22R061	ERG4801	DIE1801				
22R081	ERG4801	DIE1801				
22R101	ERG4801	DIE1801				
22R086	ERG4806	DIE1806				
22R106	ERG4806	DIE1806				
22R146	ERG4806	DIE1806				
<b>Fork terminals</b>						
22F061	ERG4801	DIE1801				
22F081	ERG4801	DIE1801				
22F101	ERG4801	DIE1801				
22F066	ERG4806	DIE1806				
22F086	ERG4806	DIE1806				
22F106	ERG4806	DIE1806				
210219F				13670B	13670A	13670B with 15500-TB
210217F				13670B	13670A	13670B with 15500-TB
210216F				13670B	13670A	13670B with 15500-TB
<b>Disconnects</b>						
22LM01	ERG4801	DIE1801				
22LM06	ERG4806	DIE1806				
22LF01	ERG4801	DIE1801				
22LF06	ERG4806	DIE1806				



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**ABB Installation Products Inc.**

Electrification Business  
860 Ridge Lake Blvd.  
Memphis, TN 38120

**[electrification.us.abb.com](http://electrification.us.abb.com)**

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