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CATALOG

# Blackburn®

## Flexible braids



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**Thomas & Betts is now ABB Installation Products, but our long legacy of quality products and innovation remains the same. From connectors that help wire buildings on Earth to cable ties that help put machines in space, we continue to work every day to make, market, design and sell products that provide a smarter, safer and more reliable flow of electricity, from source to socket.**

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## Flexible braid

### Type FB – Flexible braids



#### Flexible braid in a roll – 10-foot minimum

Cat. no.	Circular mils	Thickness (in.)	Width (in.)
FBBRL	24000	0.140	0.625
FBCRL	48000	0.148	1.000
FBDRL	76800	0.200	1.000
FBXDRL	105600	0.250	1.250

Ferrules or lugs not included.

#### Flexible copper braids for use in substation and grounding applications.

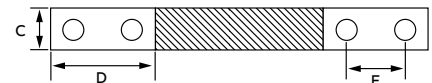
- Tin-plated copper braids and ferrules for high conductivity and corrosion resistance
- Enables linear expansion, equipment vibration and offset connections
- Certified C22.2 no. 41 grounding and bonding equipment
- Listed UL467 and UL486A grounding and bonding equipment

#### Type FB – Flexible braids



Cat. no. <sup>†</sup>	Circular mils	Bolt hole (in.)	No. of braids in ferrule	Thickness	Dimensions (in.)		
					C Width	D Ferrule length	E Distance ctr. to ctr.
FBB12-1*	24000	¼	1	0.140	0.625	0.750	–
FBC12-1*	48000	⅞	1	0.148	1.000	1.300	–
FBD12-1*	76800	⅞	1	0.200	1.000	1.300	–
FBD12*	76800	⅞	1	0.200	1.000	2.500	1.25
FB2D12-1*	153600	⅞	2	0.250	1.250	1.500	–
FB2D12*	153600	⅞	2	0.250	1.250	2.500	1.25
FB3D12-1*	230400	⅞	3	0.350	1.250	1.500	–
FB3D12*	230400	⅞	3	0.350	1.250	2.500	1.25
FBXD12-1*	105600	⅞	1	0.250	1.250	1.500	–
FBXD12*	105600	⅞	1	0.250	1.250	2.500	1.25
FB2XD12-1*	211200	⅞	2	0.350	1.250	1.500	–
FB2XD12	211200	⅞	2	0.350	1.250	2.500	1.25
FB3XD12-1*	316800	⅞	3	0.400	1.250	1.500	–
FB3XD12*	316800	⅞	3	0.400	1.250	2.500	1.25
FBE12-1*	168000	⅞	1	0.500	1.250	2.500	–
FBE12*	168000	⅞	1	0.250	1.250	3.500	1.75
FB2E12-1*	336000	⅞	1	0.500	1.250	2.500	–
FB2E12*	336000	⅞	2	0.500	1.250	3.500	1.75
FB3E12	504000	⅞	3	0.750	1.250	3.500	1.75
FB4E12	672000	⅞	4	1.000	1.250	3.500	1.75
FBF12	230400	⅞	1	0.300	1.500	3.500	1.75
FB2F12	460800	⅞	2	0.450	1.500	3.500	1.75
FB3F12	691200	⅞	3	0.600	1.625	3.500	1.75
FB4F12	921600	⅞	4	0.750	1.625	3.500	1.75
FBG12	307200	⅞	1	0.380	1.500	3.500	1.75
FB2G12	614400	⅞	2	0.630	1.625	3.500	1.75
FB3G12	921600	⅞	3	0.850	1.625	3.500	1.75
FB4G12	1228800	⅞	4	1.000	1.880	3.500	1.75

Diagram



<sup>†</sup>Catalog number shown in 12" lengths. Standard lengths offered in 6, 12, 18, 24, 30 and 36 inches (end to end). Change the 12 in the above catalog numbers to the desired length. (-1) indicates one bolt hole per ferrule. See amperage tables on next page as a reference for grounding and bonding, or continuous current applications. FB4 series is not listed/certified. For custom flexible braids, contact customer service.

## Flexible braid

### Flexible braid selection guide & grounding and bonding applications



**Minimum size flexible braid for continuous-current applications**

Cat. no.	Circular mils	Amperage capacity
FBB12-1	24000	95
FBC12-1	48000	145
FBD12-1	76800	190
FBD12	76800	190
FB2D12-1	153600	330
FB2D12	153600	630
FB3D12-1	230400	470
FB312	230400	470
FBXD12-1	105600	235
FBXD12	105600	235
FB2XD12-1	211200	400
FB2XD12	211200	400
FB3XD12-1	316800	600
FB3XD12	316800	600

Cat. no.	Circular mils	Amperage capacity
FBE12-1	16800	340
FBE12	16800	340
FB2E12-1	336000	530
FB2E12	336000	530
FB3E12	504000	700
FB4E12	672000	805
FBF12	230400	360
FB2F12	460800	600
FB3F12	691200	820
FB4F12	921600	1000
FBG12	307200	415
FB2G12	614400	700
FB3G12	921600	960
FB4G12	1228800	1200

## Grounding and bonding applications

**Minimum size conductors for bonding raceways and equipment**

Rating or setting of overcurrent device in circuit ahead of equipment, conduit, etc. not exceeding – amps	Copper wire circular mils
200	26240 (6 AWG)
300	41740 (4 AWG)
400	52620 (3 AWG)
500	66360 (2 AWG)
600	83690 (1 AWG)
800	105600 (1/0 AWG)
1000	133100 (2/0 AWG)
1200	167800 (3/0 AWG)
1600	211600 (4/0 AWG)
2000	250000
2500	350000
3000	400000
4000	500000
5000	700000
6000	800000

Based on table 16 C.E.C.

**Minimum size of bare copper grounding conductor**

Maximum available in short circuit current amps	Maximum fault duration with exothermic weld, compression or bolted joint	
	0.5 seconds circular mils	1.0 second circular mils
5 000	26240	41740
10 000	52620	83690
15 000	83690	105600
20 000	105600	167800
25 000	133100	211600
35 000	211600	250000
40 000	211600	300000
50 000	250000	350000
60 000	300000	500000
70 000	350000	600000
80 000	400000	600000
90 000	500000	700000
100 000	500000	700000

Based on table 51 C.E.C.  
Size calculated in accordance with IEEE No. 80.

## Flexible braid

### 1-Hole NEMA extra-flexible jumpers – FBE1H™ series



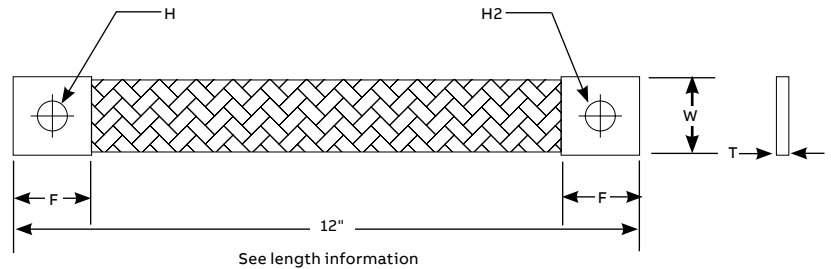
**Connect transformers, generators or busbars wherever there is severe vibration or misalignment.**

- 36 AWG individual wires in braid construction for extra flexibility
- 99.9% pure copper ferrules on each end provide high conductivity
- Individual wires are tinned prior to weaving to deliver maximum protection from corrosion

#### 1-Hole NEMA extra-flexible jumpers – FBE1H series

Cat. no.	Ampacity Δ 65 °C*	No. of braids in assembly	W in. (mm)	F in. (mm)	H in. (mm)	H2 in. (mm)	T in. (mm)	Weight lb. (kg)
FBE1H035A1	350	1	1½ (38.1)	1½ (38.1)	9/16 (14.3)	9/16 (14.3)	3/16 (4.7)	0.49 (0.22)
FBE1H035A2					9/16 (14.3)	7/16 (11.1)		
FBE1H035A3					7/16 (11.1)	7/16 (11.1)		
FBE1H050A1	500	2	1½ (38.1)	1½ (38.1)	9/16 (14.3)	9/16 (14.3)	¼ (6.4)	0.84 (0.38)
FBE1H050A2					9/16 (14.3)	7/16 (11.1)		
FBE1H050A3					7/16 (11.1)	7/16 (11.1)		
FBE1H070A1	700	4	1½ (38.1)	1½ (38.1)	9/16 (14.3)	9/16 (14.3)	3/8 (9.5)	1.54 (0.70)
FBE1H070A2					9/16 (14.3)	7/16 (11.1)		
FBE1H070A3					7/16 (11.1)	7/16 (11.1)		
FBE1H100A1	1000	6	1¾ (39.6)	1¾ (39.6)	9/16 (14.3)	9/16 (14.3)	½ (12.7)	2.31 (1.05)
FBE1H100A2					9/16 (14.3)	7/16 (11.1)		
FBE1H100A3					7/16 (11.1)	7/16 (11.1)		

Diagram



\* Temperature rise test per CEI60694, IEEE/ANSI C37.34-1994.

Note: Standard total lengths are 12". For different lengths, add your desired length to the end of the catalog number (e.g., FBE1H035A1-16 for 16" long). Ferrules are tinned. For other options, please consult your ABB representative.

## Flexible braid

### 2-Hole NEMA extra-flexible jumpers – FBE2H™ series



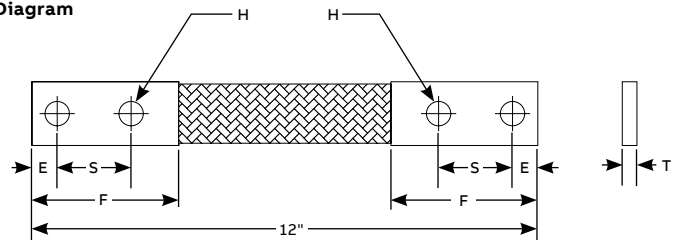
#### Connect your equipment in high-vibration areas.

- 36 AWG individual wires in braid construction for extra flexibility
- 99.9% pure copper ferrules on each end provide high conductivity
- Individual wires are tinned prior to weaving to deliver maximum protection from corrosion

#### 2-Hole NEMA extra-flexible jumpers – FBE2H series

Cat. no.	Ampacity $\Delta$ 65 °C*	No. of braids in assembly	W in. (mm)	F in. (mm)	E in. (mm)	S in. (mm)	H in. (mm)	T in. (mm)	Weight lb. (kg)
FBE2H040A1	400	1	1½ (38.1)	1½ (38.1)	⅝ (15.9)	1¾ (44.4)	⅜ (14.3)	⅜ (4.7)	0.63 (0.286)
FBE2H070A1	700	2	1½ (38.1)					¼ (6.4)	0.97 (0.440)
FBE2H090A1	900	3	1½ (38.1)					11/32 (8.7)	1.30 (0.590)
FBE2H110A1	1100	4	1½ (38.1)					⅜ (9.5)	1.66 (0.753)
FBE2H150A1	1500	6	1½ (38.1)					½ (12.7)	2.26 (1.025)
FBE2H170A1	1700	9	1⅞ (39.6)					¾ (19)	3.71 (1.683)
FBE2H200A1	2000	13	1⅞ (39.6)					1 (25.4)	5.21 (2.363)

Diagram



\* Temperature rise test per CEI60694, IEEE/ANSI C37.34–1994.

Note: Standard total lengths are 12". For different lengths, add your desired length to the end of the catalog number (e.g., FBE2H040A1-16 for 16" long).

Ferrules are tinned. For other options, please consult your ABB representative.

## Flexible braid

### 4-Hole NEMA extra-flexible jumpers – FBE4H™ series



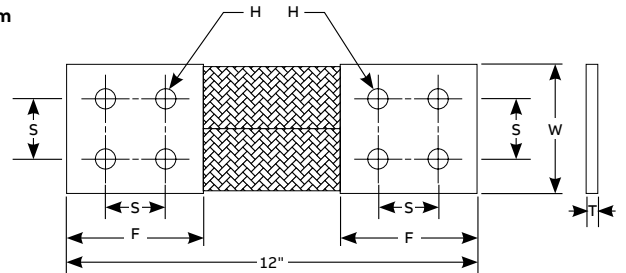
#### Misalignments? Now you can properly connect your equipment.

- 36 AWG individual wires in braid construction for extra flexibility
- 99.9% pure copper ferrules on each end provide high conductivity
- Individual wires are tinned prior to weaving to deliver maximum protection from corrosion

#### 4-Hole NEMA extra-flexible jumpers – FBE4H series

Cat. no.	Ampacity $\Delta$ 65 °C*	No. of braids in assembly	W in. (mm)	F in. (mm)	S in. (mm)	H in. (mm)	T in. (mm)	Weight lb. (kg)
FBE4H140A1	1400	4	3 (76.2)	3 (76.2)	1 $\frac{3}{4}$ (44)	$\frac{5}{16}$ (14.3)	$\frac{1}{4}$ (6.4)	1.91 (0.866)
FBE4H150A1	1500	6	3 (76.2)	3 (76.2)			$\frac{11}{32}$ (8.7)	2.57 (1.166)
FBE4H235A1	2350	8	3 $\frac{3}{4}$ (95.3)	4 (101.6)			$\frac{3}{8}$ (9.5)	4.00 (1.814)
FBE4H245A1	2450	12	3 $\frac{3}{4}$ (95.3)	4 (101.6)			$\frac{1}{2}$ (12.7)	5.32 (2.413)
FBE4H250A1	2500	16	3 $\frac{3}{8}$ (92.1)	4 (101.6)			$\frac{5}{8}$ (15.9)	6.60 (2.994)
FBE4H340A1	3400	30	4 (101.6)	4 (101.6)			$\frac{7}{8}$ (22.2)	11.36 (5.153)
FBE4H400A1	4000	40	4 (101.6)	4 (101.6)			1 $\frac{1}{8}$ (28.6)	15.57 (7.062)

Diagram



\* Temperature rise test per CEI60694, IEEE/ANSI C37.34–1994.

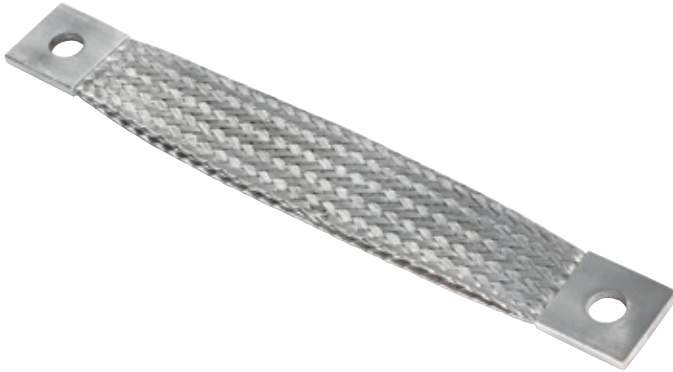
Note: Standard total lengths are 12". For different lengths, add your desired length to the end of the catalog number (e.g., FBE4H140A1-16 for 16" long).

Ferrules are tinned. For other options, please consult your ABB representative.



## Flexible braid

### 1-Hole NEMA flexible jumpers – FBS1H™ series



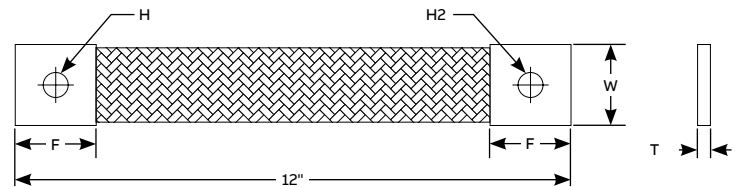
#### Get the flexibility you need to connect transformers, generators or busbars.

- 30 AWG individual wires in braid construction for extra flexibility
- 99.9% pure copper ferrules on each end provide high conductivity
- Individual wires are tinned prior to weaving to deliver maximum protection from corrosion

#### 1-Hole NEMA flexible jumpers – FBS1H series

Cat. no.	Ampacity Δ 65 °C*	W in. (mm)	F in. (mm)	H in. (mm)	H2 in. (mm)	T in. (mm)	Weight lb. (kg)
FBS1H035A1	350	1¼ (31.8)	1½ (38.1)	⅜ (14.3)	⅜ (14.3)	¼ (6.4)	0.48 (0.218)
FBS1H035A2		1¼ (31.8)	1½ (38.1)	⅜ (14.3)	⅞ (11.1)		
FBS1H035A3		1¼ (31.8)	1½ (38.1)	⅞ (11.1)	⅞ (11.1)		
FBS1H055A1	500	1⅜ (34.9)	1½ (38.1)	⅜ (14.3)	⅜ (14.3)	⅜ (5.6)	0.63 (0.286)
FBS1H055A2		1⅜ (34.9)	1½ (38.1)	⅜ (14.3)	⅞ (11.1)		
FBS1H055A3		1⅜ (34.9)	1½ (38.1)	⅞ (11.1)	⅞ (11.1)		
FBS1H070A1	700	1½ (38.1)	1½ (38.1)	⅜ (14.3)	⅜ (14.3)	¼ (6.4)	0.95 (0.431)
FBS1H070A2		1½ (38.1)	1½ (38.1)	⅜ (14.3)	⅞ (11.1)		
FBS1H070A3		1½ (38.1)	1½ (38.1)	⅞ (11.1)	⅞ (11.1)		
FBS1H070A4		2 (50.8)	2 (50.8)	⅜ (14.3)	⅜ (14.3)		
FBS1H100A1	1000	1¾ (44.4)	2 (50.8)	⅜ (14.3)	⅜ (14.3)	½ (12.7)	1.23 (0.558)
FBS1H100A2		1¾ (44.4)	2 (50.8)	⅜ (14.3)	⅞ (11.1)		
FBS1H100A3		1¾ (44.4)	2 (50.8)	⅞ (11.1)	⅞ (11.1)		

Diagram



\* Temperature rise test per CEI60694, IEEE/ANSI C37.34–1994.

Note: Standard total lengths are 12". For different lengths, add your desired length to the end of the catalog number (e.g., FBS1H035A1-16 for 16" long).

Ferrules are tinned. For other options, please consult your ABB representative.

## Flexible braid

### 2-Hole NEMA flexible jumpers – FBS2H™ series



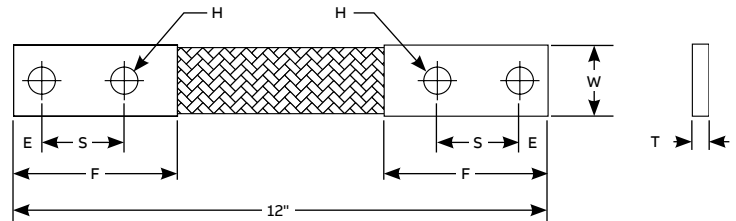
**These 2-hole jumpers make connections wherever there is severe vibration.**

- 30 AWG individual wires in braid construction for flexibility with connections
- 99.9% pure copper ferrules on each end provide high conductivity
- Individual wires are tinned prior to weaving to deliver maximum protection from corrosion

#### 2-Hole NEMA flexible jumpers – FBS2H series

Cat. no.	Ampacity Δ 65 °C*	No. of braids in assembly	W in. (mm)	F in. (mm)	E in. (mm)	S in. (mm)	H in. (mm)	T in. (mm)	Weight lb. (kg)
FBS2H040A1	400	1	1½ (38.1)	3½ (88.9)	⅝ (15.9)	1¾ (44.4)	⅝ (14.3)	⅜ (4.7)	0.63 (0.286)
FBS2H070A1	700	2	1½ (38.1)					¼ (6.4)	0.98 (0.445)
FBS2H090A1	900	3	1½ (38.1)					11/32 (8.7)	1.31 (0.594)
FBS2H110A1	1100	4	1½ (38.1)					⅜ (9.5)	1.67 (0.757)
FBS2H150A1	1500	6	1½ (38.1)					½ (12.7)	2.29 (1.039)
FBS2H170A1	1700	9	1¾ (39.6)					¾ (19)	3.76 (1.706)
FBS2H200A1	2000	13	1¾ (39.6)					1 (25.4)	5.26 (2.386)

Diagram



\* Temperature rise test per CEI60694, IEEE/ANSI C37.34–1994.

Note: Standard total lengths are 12". For different lengths, add your desired length to the end of the catalog number (e.g., FBS1H035A1-16 for 16" long).

Ferrules are tinned. For other options, please consult your ABB representative.

## Flexible braid

### 4-Hole NEMA flexible jumpers – FBS4H™ series



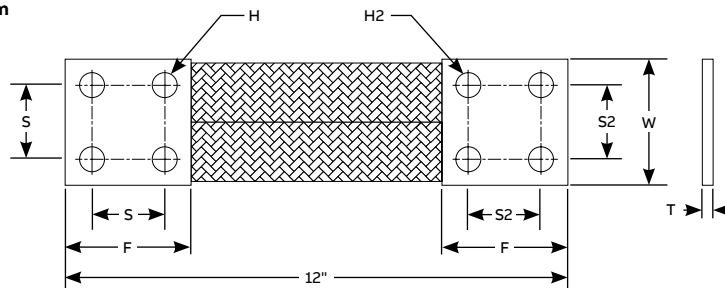
**Make the most secure connections wherever there is severe vibration or misalignment.**

- 30 AWG individual wires in braid construction for flexibility with connections
- 99.9% pure copper ferrules on each end provide high conductivity
- Individual wires are tinned prior to weaving to deliver maximum protection from corrosion

#### 4-Hole NEMA flexible jumpers – FBS4H series

Cat. no.	Ampacity Δ 65 °C*	W in. (mm)	F in. (mm)	S in. (mm)	H in. (mm)	S2 in. (mm)	H2 in. (mm)	T in. (mm)	Weight lb. (kg)
FBS4H130A1	1300	3 (76.2)	3 (76.2)	1¾ (44.4)	⅞ (14.3)	1¾ (44.4)	⅞ (14.3)	¼ (6.4)	1.93 (0.875)
FBS4H130A2				1¾ (44.4)	⅞ (14.3)	1½ (38.1)	⅞ (11.1)		
FBS4H130A3				1½ (38.1)	⅞ (11.1)	1½ (38.1)	⅞ (11.1)		
FBS4H150A1	1500			1¾ (44.4)	⅞ (14.3)	1¾ (44.4)	⅞ (14.3)	⅝ (7.9)	2.62 (1.188)
FBS4H150A2				1¾ (44.4)	⅞ (14.3)	1½ (38.1)	⅞ (11.1)		
FBS4H150A3				1½ (38.1)	⅞ (11.1)	1½ (38.1)	⅞ (11.1)		
FBS4H215A1	2150			1¾ (44.4)	⅞ (14.3)	1¾ (44.4)	⅞ (14.3)	⅜ (9.5)	3.31 (1.501)
FBS4H215A2				1¾ (44.4)	⅞ (14.3)	1½ (38.1)	⅞ (11.1)		
FBS4H215A3				1½ (38.1)	⅞ (11.1)	1½ (38.1)	⅞ (11.1)		
FBS4H235A1	2350			1¾ (44.4)	⅞ (14.3)	1¾ (44.4)	⅞ (14.3)	½ (12.7)	4.69 (2.127)
FBS4H235A2				1¾ (44.4)	⅞ (14.3)	1½ (38.1)	⅞ (11.1)		
FBS4H235A3				1½ (38.1)	⅞ (11.1)	1½ (38.1)	⅞ (11.1)		

Diagram



\* Temperature rise test per CEI60694, IEEE/ANSI C37.34–1994.

Note: Standard total lengths are 12". For different lengths, add your desired length to the end of the catalog number (e.g., FBS4H130A1-16 for 16" long).

Ferrules are tinned. For other options, please consult your ABB representative.

## Appendix

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FB4F12	4-5	FBS1H100A3	9
FB4G12	4-5	FBS2H040A1	10
FBB12-1	4-5	FBS2H070A1	10
FBBRL	4	FBS2H090A1	10
FBC12-1	4-5	FBS2H110A1	10
FBCRL	4	FBS2H150A1	10
FBD12	4-5	FBS2H170A1	10
FBD12-1	4-5	FBS2H200A1	10
FBDRL	4	FBS4H130A1	11
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FBE2H040A1	7		
FBE2H070A1	7		
FBE2H090A1	7		
FBE2H110A1	7		
FBE2H150A1	7		
FBE2H170A1	7		
FBE2H200A1	7		
FBE4H140A1	8		
FBE4H150A1	8		
FBE4H235A1	8		
FBE4H245A1	8		



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