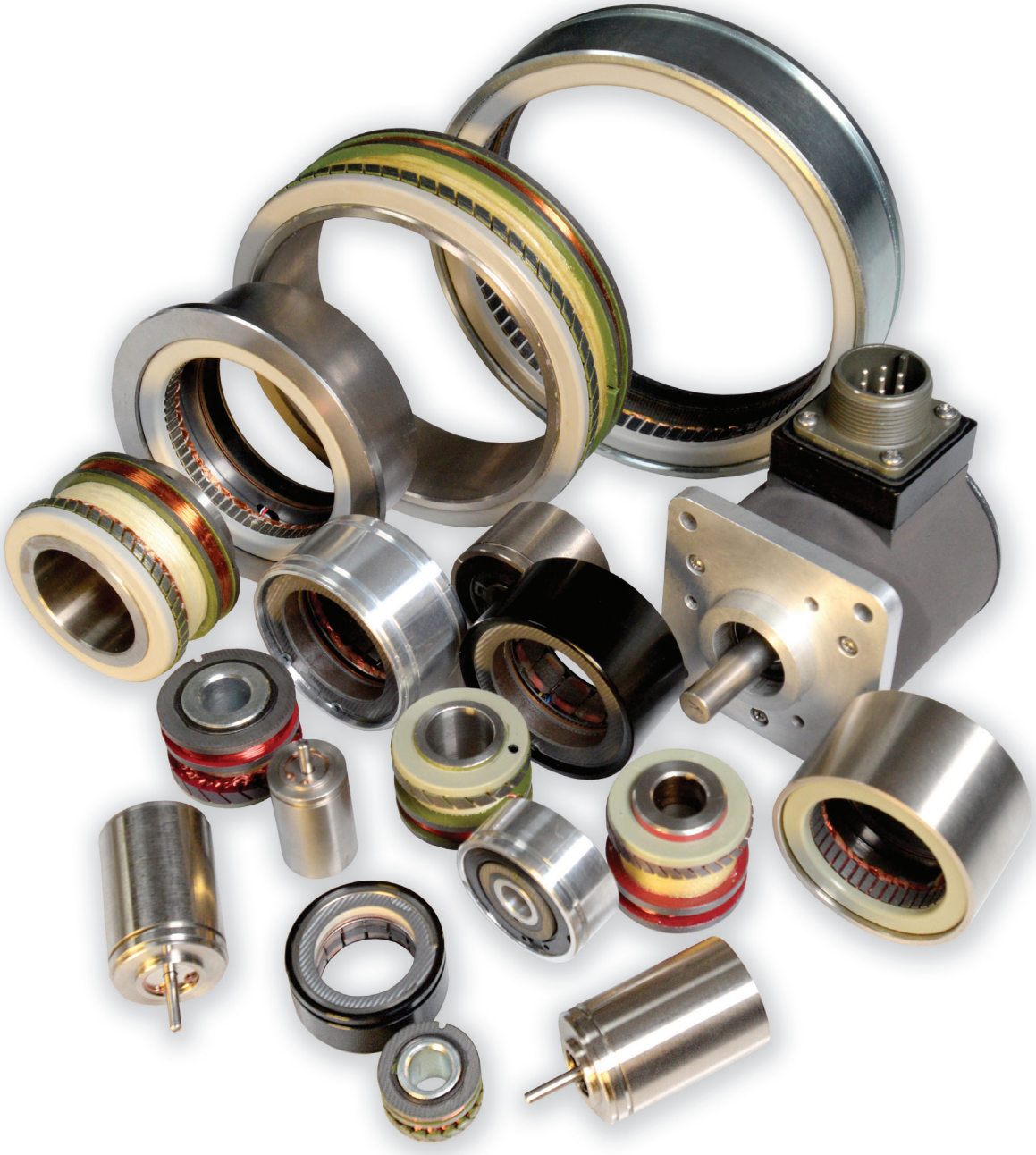
API Delevan®

Resolvers Product Guide



API Delevan® Resolvers

For Position, Commutation, and Velocity Feedback.

Rugged, Reliable and Ideal for Demanding Environments.

Resolvers are self-contained feedback devices that, unlike optical encoders, provide an analog signal with infinite resolution. Not only can the output signal be converted to precise digital position information, but it also provides an accurate velocity signal; eliminating the need for using separate tachometer. Reliability is enhanced using the same resolvers for speed feedback and commutation.

API Delevan's modular approach allows the designers to easily select a single or multi-speed resolver that will meet almost any desired level of accuracy. The resolvers are designed in the most commonly used frame sizes: 8, 10, 11, 15, 21 & others.
All housed models feature high quality motor-grade or instrument grade ball bearings. The heavy-duty size 25 units are enclosed in rugged black anodized aluminum housings with either flange, face or servo-type mounting and utilize MS-style connectors.

FEATURES

- Single- and Multi-speed electrical configurations
- Patented Flux Shield technology
- Frequencies up to 10 kHz
- Tooth-wound winding construction available
- Brush and brushless configurations

APPLICATIONS

- Motor commutation and velocity feedback
- Engine fuel control
- Missile fin actuator control
- Hydraulic system control
- Target acquisition system

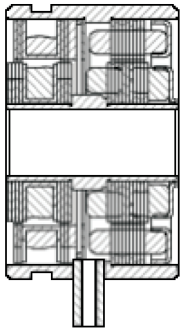
Mechanical Parameters and Schematics of Resolvers

Frameless Resolvers

Frameless, or “pancake”, resolvers consist of two separate assemblies: rotor and stator. Rotor is normally supplied with a sleeve, which can be designed to fit the customer’s interface. Similarly, stator comes with a highly customizable housing. Since they have no internal bearings, frameless resolvers are typically mounted directly into the customer’s assembly. They can be used for position, commutation and velocity feedback. API Delevan’s frameless resolver lineup ranges from size 10 up to size 55.

API Delevan’s frameless resolvers can be supplied either with or without a rotary transformer. Resolvers without the rotary transformer are typically used in limited rotation applications, whereas resolvers with the rotary transformer (brushless resolvers) have no angular displacement limitations. Brushless resolvers, however, tend to be longer than the resolvers without the rotary transformer.

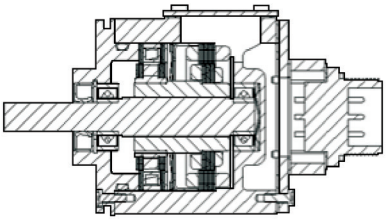
Figure 1 - Size 10 Frameless Resolver



Packaged Resolvers

Packaged, or housed, resolvers contain a shaft and a set of ball bearings that maintains a constant air gap between the stator and the rotor. Both housing and shaft can be customized to fit the customer’s envelop requirements. Packaged resolvers can be environmentally sealed to prevent dust and moisture ingress. API Delevan can supply multi-channel resolvers which come in both tandem and cluster configurations. Geared resolvers are also available. API Delevan’s standard packaged resolver offering includes size 8, size 10, size 11 and size 25 configurations.

Figure 2 - Size 25 Packaged Resolver



API Delevan manufactures both brush and brushless packaged resolvers. Just like brushless frameless resolvers, brushless packaged resolvers incorporate a rotary transformer.

Winding Configurations

API Delevan resolvers come with one of three distinct winding constructions: hand-inserted, variable pitch machine wound and constant pitch machine wound. Machine wound resolvers are only available in size 15 and size 21 configurations. Resolvers with constant pitch winding construction offer superior repeatability and reliability at a very competitive price.

In addition to resolvers, API Delevan manufactures synchros, which unlike resolvers, have their stator coils 120° apart (Figures 3 & 4). Both resolvers and synchros can be supplied in transmitter, controller or differential configurations.

API Delevan offers multi-speed windings in all of its frame sizes. Multi-speed resolvers typically have better accuracy than their one speed counterparts, however they normally do not provide an absolute position feedback. To address this problem, Harowe manufactures resolvers that have both one speed (course) and multi-speed (fine) windings inserted into a single stator.

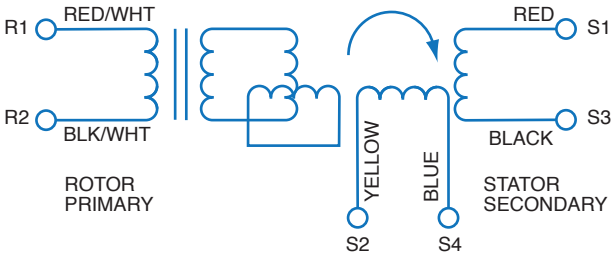


Figure 3 – Brushless Resolver Wiring Configuration

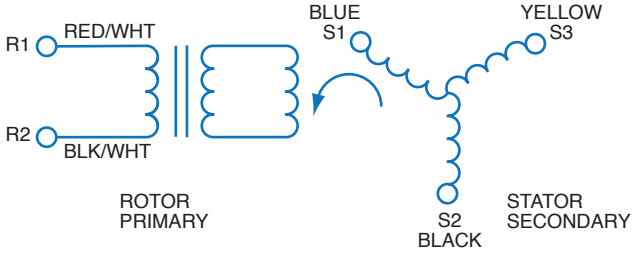


Figure 4 - Brushless Synchro Wiring Configuration

API Delevan® Resolvers

Frameless Resolvers

API Delevan Frame Size	Bore Diameter (inches)	Pilot Diameter (inches)	Excitation Data Voltage (Vrms)	Excitation Data Frequency (KHz)	Max.Input Current (mA)	Trans. Ratio (Vout/Vin)	Phase Shift (degrees)	Zro (ohm)	Zso (ohm)	Max. Null Voltage (mV)	Speed	Max. Error Spread (arc-min)	Max. +/- Error (arc-min)
10BRCX-400-B1A/15*	6mm	0.984	5	5	43	0.5	+7	73+J115	185+J305	20	1	X	15
10BRCX-401-A1/20*	6mm	1.040	7	10	50	0.5	-5	184	493	20	1	X	20
10BRCX-401-H1/15*	6mm	1.040	7	5	70	0.5	+7	52+J92	150+J245	20	1	X	15
10BRCX-401-J1A/15*	6mm	1.040	4.25	7	55	0.47	+3	50+J80	85+J135	20	1	X	15
10BRCX-401-K1*	6mm	1.040	7	10	30	0.5	-9	276	687	20	1	30	X
10BRCX-401-P1*	6mm	1.040	3.5	10	65	1	-7	71	687	50	1	30	X
15BRCT-401-A21/20*	8mm	1.417	3.5	5	6	0.5	+11	735+J1435	270+J580	30	2	x	20
15BRCX-401-A21/10*	8mm	1.417	10	4.5	58	0.5	+12	110+J165	280+J370	30	1	X	10
15BRCX-402-A10A/10*	0.375	1.449	8	4	22	0.25	+12	210+J375	155+J255	20	1	X	10
15BRCX-402-B10A/10*	0.375	1.449	7	10	40	0.5	-7	78+J190	45+J130	20	1	X	10
15BRCX-402-L10/8*	0.375	1.449	7	10	25	0.3	+5	160+J330	155+J380	20	3	X	8
15BRCX-500-C4A-10*	0.375	1.449	7.5	6.6	55	1	-1	75+J145	360+J600	30	1	X	10
15BRCX-500-F4*	0.375	1.449	4	10	14	0.5	-7	165+J295	260+J470	25	1	X	7
15BRCX-500-F40/10*	.375 (setscrew)	1.449	4	5	23	0.5	+6	105+J170	200+J270	25	1	X	10
15BRCX-500-J36/15*	.375 (key)	1.449	4.25	10	44	0.459	-3	55+J95	80+J145	20	1	X	15
15BRCX-510-L36P*	.375 (key)	1.449	4.25	10	35	0.47	+7	65+J135	155+J380	20	3	10	X
15BRCX-600-G4*	0.375	1.449	2	6	45	1	+5	28 +J41	167 + J270	15	1	X	7
15BRCX-600-J17*	.437in	1.449	4.25	7	55	0.47	+4	42 +J72	70 + J107	20	1	X	7
15BRCX-601-A46*	12mm	1.417	10	7.5	50	0.5	-1	242	705	30	1	X	10
15BRCX-601-K10*	0.375	1.449	7	10	32	0.5	-9	279	697	50	1	16	X
15BRCX-601-P10*	0.375	1.449	3.5	10	65	1	-9	67	697	50	1	16	X
15BRCX-602-A46*	12mm	1.449	7	8	50	0.5	-1	250	722	30	1	X	10
15BRCX-602-B10E*	0.375	1.449	7	10	40	0.5	-7	205	495	20	1	20	X
15BRCX-602-B10F*	0.375	1.449	7	10	45	0.5	+3	193	507	20	1	X	10
15BRCX-602-B10G*	0.375	1.449	7	10	40	0.5	-7	205	495	20	1	20	X
15BRCX-602-B36*	.375 (key)	1.449	7	5	65	0.5	+7	47+J105	165+J250	20	1	20	X
15BRCX-602-B46C*	12mm	1.449	7	10	40	0.5	-7	78+J190	245+J430	20	1	X	30
15BRCX-602-BA47/10*	.250 (key)	1.449	3	4.8	45	0.5	+9	36+J88	165+J220	15	1	X	10
15BRCX-602-D10*	0.375	1.449	4	10	16	0.474	-4	322	856	20	2	20	X

*Other mechanical and/or electrical configurations available. Permanent part numbers are assigned upon order placement.

Frameless Resolvers

API Delevan Frame Size	Bore Diameter (inches)	Pilot Diameter (inches)	Excitation Data Voltage (Vrms)	Excitation Data Frequency (KHz)	Max.Input Current (mA)	Trans. Ratio (Vout/Vin)	Phase Shift (degrees)	Zro (ohm)	Zso (ohm)	Max. Null Voltage (mV)	Speed	Max. Error Spread (arc-min)	Max. +/- Error (arc-min)
15BRCX-602-D47/4*	.250 (key)	1.449	6	4.3	50	0.5	+13	53+J132	195+J360	20	2	X	4
15BRCX-602-F15A/15*	.250 (key)	1.449	4	5	25	0.5	+6	105+J170	200+J270	25	1	X	15
15BRCX-602-T10C*	0.375	1.449	7	8	45	0.5	+21	169	1210	20	4	8	X
15BRW-401-A51/20*	6mm (setscrew)	1.449	3.5	5	7	0.5	+15	800+J1450	300+J490	30	1	X	20
15BRX700-B04AB*	0.375	1.449	5	10	20	0.42	-8	295	820	20	1	20	X
15BRX700-B10AA*	0.375	1.449	2	10	50	0.98	+10	50	810	30	1	20	X
15BRX700-D10AA*	0.375	1.449	8	8	50	0.5	0	182	627	30	1	16	X
21BRCT-510-A7B/10*	0.500	2.061	7.8	9.3	12	0.425	-10	615+J1760	245+J685	30	2	X	10
21BRCT-610-LD12A*	0.800	2.061	3.55	5	3.3	0.5	+1	2410+J5520	410+J1200	20	3	8	X
21BRCX-500-E66*	0.500	2.061	2	2	20	1	+9	60+J110	315+J545	20	1	X	7
21BRCX-500-F10*	0.800	2.061	7	2.5	25	0.5	+6	165+J270	240+J385	25	1	X	7
21BRCX-500-H20A*	0.670	2.061	4	3.4	28	0.5	0	80+J145	110+J205	25	1	X	7
21BRCX-500-H49*	.500 (key)	2.061	4	5	25	0.5	-6	105+J180	150+J280	25	1	X	7
21BRCX-500-HC28*	0.787	2.061	4	2	34	0.5	+21	152	247	25	1	X	7
21BRCX-500-J60P/15*	.670 (key)	2.061	4.25	10	42	0.47	-2	96+J179	73+J88	25	1	X	15
21BRCX-500-JC7A*	0.500	2.061	6	7.5	55	0.33	-1	75+J105	55+J95	30	1	20	X
21BRCX-500-LE60P*	.670 (key)	2.061	4.25	7.5	55	0.47	+5	55+J76	60+J38	10	3	6	X
21BRCX-501-A42/20*	.500 (key)	2.061	7.5	6.6	55	1.04	-2	85+J135	455+J860	25	1	X	20
21BRCX-501-F45*	.500 (key)	1.997	7	2.5	25	0.5	+6	316	454	25	1	X	7
21BRCX-501-F80/12*	0.800	1.997	7	2.5	25	0.5	+6	150+J180	200+J365	25	1	X	12
21BRCX-501-HG80/12*	0.800	1.997	7	10	30	0.5	-8	145+J240	265+J485	30	1	X	12
21BRCX-510-T60P/3*	.670 (key)	2.061	4	10	20	0.5	0	290+J720	120+J195	20	4	X	3
21BRCX-511-L42/5*	.500 (key)	1.997	7	4	30	0.5	+8	130+J260	190+J400	25	3	X	5
21BRCX-511-LC42*	.500 (key)	1.997	6.7	6.4	50	1	-2	70+J155	490+J1120	25	3	X	7
21BRCX-600-B042A*	0.500	2.061	7	10	31	0.5	-21	250	538	50	1	20	X
21BRCX-600-B042B*	0.500	2.061	8	8	52	0.5	-3	173	412	30	1	20	X
21BRCX-600-B091H*	0.750	2.061	7	7	40	0.5	0	204	370	30	1	X	5
21BRCX-600-D39A/5*	0.667	2.061	4.25	7	55	0.47	+4	50+J75	95+J190	20	2	X	5
21BRCX-600-H12*	0.800	2.061	7	5	77	0.5	+6	63+J92	77+J150	30	1	X	7

*Other mechanical and/or electrical configurations available. Permanent part numbers are assigned upon order placement.

API Delevan® Resolvers

Frameless Resolvers

API Delevan Frame Size	Bore Diameter (inches)	Pilot Diameter (inches)	Excitation Data Voltage (Vrms)	Excitation Data Frequency (KHz)	Max.Input Current (mA)	Trans. Ratio (Vout/Vin)	Phase Shift (degrees)	Zro (ohm)	Zso (ohm)	Max. Null Voltage (mV)	Speed	Max. Error Spread (arc-min)	Max. +/- Error (arc-min)
21BRCX-600-J12*	0.800	2.061	4.25	7.5	55	0.47	+4	62+J61	80+J137	20	1	X	7
21BRCX-600-M12/10*	0.800	2.061	8	2.6	10	1	+5	420+J780	1955+J432	35	1	X	10
21BRCX-601-H110D/10*	0.748	2.061	4	5	25	0.5	-6	105+J180	185+j315	25	1	X	10
21BRCX-607-D42B/5*	.500 (key)	2.061	4	5	27	0.5	+2	85+J160	105+J240	25	2	X	5
21BRCX-607-HG72*	0.500	2.061	4	10	30	0.5	-10	135+J195	290+J455	30	1	X	7
21BRCX-607-HG72/10*	0.500	2.061	7	10	30	0.5	-8	145+J240	265+J485	30	1	X	10
21BRCX-607-HG72A*	0.500	2.061	7	5	44	0.5	+9	110+J140	165+J295	30	1	10	6
21BRCX-607-HG72D*	0.500	2.061	7	10	40	0.5	-3	198	477	30	1	X	10
21BRCX-610-L12/2*	0.800	2.061	4.25	7.5	55	0.47	+5	94	150	10	3	X	2
21BRCX-616-H68/10*	0.500	2.360	7	10	25	0.47	-7	185+J230	270+J480	25	1	X	10
21BRCX-616-L68/2*	0.500	2.360	7	10	15	0.29	+1	300+J500	160+J435	15	3	X	2
21BRCX-616-LE68/5*	0.500	2.360	7	10	13.5	0.5	-2	175+J305	280+J815	15	3	X	5
21BRCX-621-JA84/15*	0.590	1.850	6	7.5	55	0.28	-1	129	81	20	1	X	15
21BRX700-B42AA*	0.500	2.061	2	10	46	1	-3	56	602	30	1	18	X
21BRX700-D110D*	0.500	1.997	8	8	46	0.5	+1	260	565	30	1	18	X
21BRX701-C84AB*	0.590	1.850	6	7.5	25	0.33	-13	306	456	20	1	X	12
21BRX708-H06AA*	0.630	1.968	4	4	55	0.45	+10	94	143	25	1	20	X
31BRCX-500-B1/10*	1.500	3.050	4	5	30	0.5	+1	90+J140	185+J280	20	1	X	10
31BRCX-500-B7/10*	1.560	3.050	4	5	30	0.5	+1	75+J120	225+J385	20	1	X	10
31BRCX-500-D1/10*	1.500	3.050	7	4	30	0.5	+3	273	678	30	1	X	10
31BRCX-500-J16/P*	1.181	3.050	4.25	7	55	0.47	+4	58+J78	115+J210	20	1	X	10
31BRCX-500-JD7*	1.570	3.050	4.25	7	75	0.472	+22	63	728	75	4	12	X
31BRCX-502-F3/20*	1.370 (key)	3.620	8	6.5	75	0.5	+2	72+J105	170+J355	30	1	X	20
31BRCX-503-D21/15*	1.342	3.540	7	4	30	0.5	+3	155+J225	315+J600	30	1	X	15
55BRCX-520-J5/30*	3.650	5.500	4.25	7	55	0.47	+4	91	468	30	1	X	30
55BRCX-520-JA5/2*	3.650	5.500	4.25	7	55	0.47	+1	41+J77	175+J420	30	12	4	X
55BRCX-520-JB5/4*	3.650	5.500	4.25	7	55	0.47	-1	46+J84	140+J255	20	8	8	X
55BRCX-520-JC5/2*	3.650	5.500	4.25	7	55	0.47	+3	42+J83	205+J625	20	16	4	X

*Other mechanical and/or electrical configurations available. Permanent part numbers are assigned upon order placement.

Housed Resolvers

API Delevan Frame Size	Housing Length (inches)	Pilot Diameter (inches)	Excitation Data Voltage (Vrms)	Excitation Data Frequency (KHz)	Max.Input Current (mA)	Trans. Ratio (Vout/Vin)	Phase Shift (degrees)	Zro (ohm)	Zso (ohm)	Max. Null Voltage (mV)	Speed	Max. Error Spread (arc-min)	Max. +/- Error (arc-min)
8BRCX-300-E11*	1.240	0.75	6	1000	11	0.454	+10	450+j625	170+j200	30	1	X	7
8BRCX-300-F11T*	1.240	0.75	5.9	2500	12	1.000	+9	300+j500	425+j1000	30	1	X	7
8BRCX-300-G11T*	1.240	0.75	26	400	33	0.454	+19	495+j750	275+j325	30	1	X	7
11BRCT-300-F*	1.590	1.062	12	2500	8.3	0.500	0	350+j945	600+j1550	15	2	X	10
11BRCT-300-M*	1.590	1.062	11.8	2500	70	1.020	-1	250+j350	95+j170	30	2	X	10
11BRCT-300-P*	1.590	1.062	12	2500	1.4	0.390	-7	4100+j9150	2500+j10000	15	5	X	4
11BRCT-300-T*	1.590	1.062	12	2500	6	0.530	-2	1375+j2950	440+j2400	15	4	X	5
11BRCX-300-A*	1.590	1.062	7.5	4000	13.5	0.540	-2	455+j450	265+j335	20	1	X	7
11BRCX-300-B*	1.590	1.062	7.5	4000	40	1.070	-2	165+j150	335+j395	15	1	X	7
11BRCX-300-C*	1.590	1.062	6	1000	15	0.450	+4	325+j320	140+j145	15	1	X	7
11BRCX-300-G*	1.590	1.062	26	400	40	0.450	+12	540+j540	375+j320	30	1	X	7
11BRCX-300-J*	1.590	1.062	7	5000	10.9	0.950	-6	570+j565	800+j1300	15	1	X	7
11BRCX-300-M*	1.590	1.062	7	5000	10.9	0.950	-2	360+j620	800+j1500	30	2	X	7
11BRCX-300-N*	1.590	1.062	8.5	1000	14	1.000	+3	190+j300	440+j570	30	1	X	7
11BRCX-300-P*	1.590	1.062	10	5000	5	0.550	-3	480+j725	665+j2015	20	5	X	6
11BRCX-300-T*	1.590	1.062	7	5000	11	0.840	+7	440+j690	1000+j3875	20	4	X	7
11BRW-300-B*	1.590	1.062	12	400	10.9	1.750	+12	3400+j6500	500+j1250	30	1	X	10
11BRW-300-F*	1.590	1.062	12	2500	3.1	0.500	-2	1150+j2050	2500+j4800	30	1	X	7
11BRW-300-M*	1.590	1.062	10	5000	8.3	0.500	-5	345+j515	750+j1150	30	1	X	7
R11-S01F1A*	1.595	1.062	1.88	2250	21	1.400	+11	57+j104	480+j850	15	1	X	20
R11-S01F1B*	1.595	1.062	6	2000	12	0.454	+8.5	644	634	15	1	X	20

*Other mechanical and/or electrical configurations available. Permanent part numbers are assigned upon order placement.

For a complete product listing email:
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