

COMPACT POWER TWIN RELAY

1 POLE x 2—30A (Dual relay)

(FOR AUTOMOTIVE APPLICATIONS)

FBR512, 522 SERIES

■ FEATURES

- Two independent relays mounted in a single package
- Miniature size
(54% of the volume of the FBR160 relays)
- High current contact capacity
(carrying current: 35 A/10 minutes, 25 A/1 hour)
- High resistance to vibration and shock
- Improved heat resistance and extended operating range
- Two contact gap options
(FBR510: 0.3 mm, FBR520: 0.6 mm)
- Two types of contact material



■ ORDERING INFORMATION

FBR512 (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LL) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MM) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NN) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)

[Example] —(a)— (b)— (c)— (d)— (e)— (f)— (g)— (h)— (i)— (j)— (k)— (l)— (m)— (n)— (o)— (p)— (q)— (r)— (s)— (t)— (u)— (v)— (w)— (x)— (y)— (z)— (AA)— (AB)— (AC)— (AD)— (AE)— (AF)— (AG)— (AH)— (AI)— (AJ)— (AK)— (AL)— (AM)— (AN)— (AO)— (AP)— (AQ)— (AR)— (AS)— (AT)— (AU)— (AV)— (AW)— (AX)— (AY)— (AZ)— (BA)— (BB)— (BC)— (BD)— (BE)— (BF)— (BG)— (BH)— (BI)— (BJ)— (BK)— (BL)— (BM)— (BN)— (BO)— (BP)— (BQ)— (BR)— (BS)— (BT)— (BU)— (BV)— (BW)— (BX)— (BY)— (BZ)— (CA)— (CB)— (CC)— (CD)— (CE)— (CF)— (CG)— (CH)— (CI)— (CJ)— (CK)— (CL)— (CM)— (CN)— (CO)— (CP)— (CQ)— (CR)— (CS)— (CT)— (CU)— (CV)— (CW)— (CX)— (CY)— (CZ)— (DA)— (DB)— (DC)— (DD)— (DE)— (DF)— (DG)— (DH)— (DI)— (DJ)— (DK)— (DL)— (DM)— (DN)— (DO)— (DP)— (DQ)— (DR)— (DS)— (DT)— (DU)— (DV)— (DW)— (DX)— (DY)— (DZ)— (EA)— (EB)— (EC)— (ED)— (EE)— (EF)— (EG)— (EH)— (EI)— (EJ)— (EK)— (EL)— (EM)— (EN)— (EO)— (EP)— (EQ)— (ER)— (ES)— (ET)— (EU)— (EV)— (EW)— (EX)— (EY)— (EZ)— (FA)— (FB)— (FC)— (FD)— (FE)— (FF)— (FG)— (FH)— (FI)— (FJ)— (FK)— (FL)— (FM)— (FN)— (FO)— (FP)— (FQ)— (FR)— (FS)— (FT)— (FU)— (FV)— (FW)— (FX)— (FY)— (FZ)— (GA)— (GB)— (GC)— (GD)— (GE)— (GF)— (GG)— (GH)— (GI)— (GJ)— (GK)— (GL)— (GM)— (GN)— (GO)— (GP)— (GQ)— (GR)— (GS)— (GT)— (GU)— (GV)— (GW)— (GX)— (GY)— (GZ)— (HA)— (HB)— (HC)— (HD)— (HE)— (HF)— (HG)— (HH)— (HI)— (HJ)— (HK)— (HL)— (HM)— (HN)— (HO)— (HP)— (HQ)— (HR)— (HS)— (HT)— (HU)— (HV)— (HW)— (HX)— (HY)— (HZ)— (IA)— (IB)— (IC)— (ID)— (IE)— (IF)— (IG)— (IH)— (II)— (IJ)— (IK)— (IL)— (IM)— (IN)— (IO)— (IP)— (IQ)— (IR)— (IS)— (IT)— (IU)— (IV)— (IW)— (IX)— (IY)— (IZ)— (JA)— (JB)— (JC)— (JD)— (JE)— (JF)— (JG)— (JH)— (JI)— (JJ)— (JK)— (JL)— (JM)— (JN)— (JO)— (JP)— (JQ)— (JR)— (JS)— (JT)— (JU)— (JV)— (JW)— (JX)— (JY)— (JZ)— (KA)— (KB)— (KC)— (KD)— (KE)— (KF)— (KG)— (KH)— (KI)— (KJ)— (KK)— (KL)— (KM)— (KN)— (KO)— (KP)— (KQ)— (KR)— (KS)— (KT)— (KU)— (KV)— (KW)— (KX)— (KY)— (KZ)— (LA)— (LB)— (LC)— (LD)— (LE)— (LF)— (LG)— (LH)— (LI)— (LJ)— (LK)— (LL)— (LM)— (LN)— (LO)— (LP)— (LQ)— (LR)— (LS)— (LT)— (LU)— (LV)— (LW)— (LX)— (LY)— (LZ)— (MA)— (MB)— (MC)— (MD)— (ME)— (MF)— (MG)— (MH)— (MI)— (MJ)— (MK)— (ML)— (MM)— (MN)— (MO)— (MP)— (MQ)— (MR)— (MS)— (MT)— (MU)— (MV)— (MW)— (MX)— (MY)— (MZ)— (NA)— (NB)— (NC)— (ND)— (NE)— (NF)— (NG)— (NH)— (NI)— (NJ)— (NK)— (NL)— (NM)— (NN)— (NO)— (NP)— (NQ)— (NR)— (NS)— (NT)— (NU)— (NV)— (NW)— (NX)— (NY)— (NZ)— (OA)— (OB)— (OC)— (OD)— (OE)— (OF)— (OG)— (OH)— (OI)— (OJ)— (OK)— (OL)— (OM)— (ON)— (OO)— (OP)— (OQ)— (OR)— (OS)— (OT)— (OU)— (OV)— (OW)— (OX)— (OY)— (OZ)— (PA)— (PB)— (PC)— (PD)— (PE)— (PF)— (PG)— (PH)— (PI)— (PJ)— (PK)— (PL)— (PM)— (PN)— (PO)— (PP)— (PQ)— (PR)— (PS)— (PT)— (PU)— (PV)— (PW)— (PX)— (PY)— (PZ)— (QA)— (QB)— (QC)— (QD)— (QE)— (QF)— (QG)— (QH)— (QI)— (QJ)— (QK)— (QL)— (QM)— (QN)— (QO)— (QP)— (QQ)— (QR)— (QS)— (QT)— (QU)— (QV)— (QW)— (QX)— (QY)— (QZ)— (RA)— (RB)— (RC)— (RD)— (RE)— (RF)— (RG)— (RH)— (RI)— (RJ)— (RK)— (RL)— (RM)— (RN)— (RO)— (RP)— (RQ)— (RR)— (RS)— (RT)— (RU)— (RV)— (RW)— (RX)— (RY)— (RZ)— (SA)— (SB)— (SC)— (SD)— (SE)— (SF)— (SG)— (SH)— (SI)— (SJ)— (SK)— (SL)— (SM)— (SN)— (SO)— (SP)— (SQ)— (SR)— (SS)— (ST)— (SU)— (SV)— (SW)— (SX)— (SY)— (SZ)— (TA)— (TB)— (TC)— (TD)— (TE)— (TF)— (TG)— (TH)— (TI)— (TJ)— (TK)— (TL)— (TM)— (TN)— (TO)— (TP)— (TQ)— (TR)— (TS)— (TT)— (TU)— (TV)— (TW)— (TX)— (TY)— (TZ)— (UA)— (UB)— (UC)— (UD)— (UE)— (UF)— (UG)— (UH)— (UI)— (UJ)— (UK)— (UL)— (UM)— (UN)— (UO)— (UP)— (UQ)— (UR)— (US)— (UT)— (UU)— (UV)— (UW)— (UX)— (UY)— (UZ)— (VA)— (VB)— (VC)— (VD)— (VE)— (VF)— (VG)— (VH)— (VI)— (VJ)— (VK)— (VL)— (VM)— (VN)— (VO)— (VP)— (VQ)— (VR)— (VS)— (VT)— (VU)— (VV)— (VW)— (VX)— (VY)— (VZ)— (WA)— (WB)— (WC)— (WD)— (WE)— (WF)— (WG)— (WH)— (WI)— (WJ)— (WK)— (WL)— (WM)— (WN)— (WO)— (WP)— (WQ)— (WR)— (WS)— (WT)— (WU)— (WV)— (WW)— (WX)— (WY)— (WZ)— (XA)— (XB)— (XC)— (XD)— (XE)— (XF)— (XG)— (XH)— (XI)— (XJ)— (XK)— (XL)— (XM)— (XN)— (XO)— (XP)— (XQ)— (XR)— (XS)— (XT)— (XU)— (XV)— (XW)— (XX)— (XY)— (XZ)— (YA)— (YB)— (YC)— (YD)— (YE)— (YF)— (YG)— (YH)— (YI)— (YJ)— (YK)— (YL)— (YM)— (YN)— (YO)— (YP)— (YQ)— (YR)— (YS)— (YT)— (YU)— (YV)— (YW)— (YX)— (YZ)— (ZA)— (ZB)— (ZC)— (ZD)— (ZE)— (ZF)— (ZG)— (ZH)— (ZI)— (ZJ)— (ZK)— (ZL)— (ZM)— (ZN)— (ZO)— (ZP)— (ZQ)— (ZR)— (ZS)— (ZT)— (ZU)— (ZV)— (ZW)— (ZX)— (ZY)— (ZZ)

(a)	Series Name	FBR512: Standard type (contact gap 0.3 mm) FBR522: Wider contact gap type (contact gap 0.6 mm)
(b)	Enclosure	N : Plastic seal type
(c)	Nominal Voltage	D06 : 6 VDC D09 : 9 VDC D10 : 10 VDC D12 : 12 VDC
(d)	Contact Material	W1 : Silver-tin oxide indium (nickel power type)
(e)	Custom Designation	To be assigned custom specification

FBR512, 522 SERIES

■ SPECIFICATIONS

Item		Specifications	
		W1 contact	
Contact	Arrangement	1 form C × 2 (SPDT × 2)	
	Material	Silver-tin oxide indium (high power type)	
	Voltage Drop (Resistance)	Maximum 100 mV (at 1 A 12 VDC)	
	Rating	14 VDC 25 A (locked motor load)	
	Maximum Carrying Current*1	35 A/10 minutes, 30 A/1 hour (25°C, 100% rated coil voltage)	
	Max. Inrush Current (Reference)	60 A	
	Max. Switching Current (Reference)	35 A 16 VDC	
	Min. Switching Load*2 (Reference)	1 A 6 VDC	
Coil	Operating Temperature	-40°C to + 85°C (no frost)	
	Storage Temperature	-40°C to +100°C (no frost)	
Time Value	Operate (at nominal voltage)	Maximum 10 ms	
	Release (at nominal voltage)	Maximum 5 ms	
Life	Mechanical	1 × 10 ⁷ operations minimum	
	Electrical	2 × 10 ⁶ operations minimum 14 VDC 25 A (locked motor load)	
Other	Vibration Resistance		10 to 55 Hz (double amplitude of 1.5 mm)
	Shock Resistance	Misoperation	100 m/s ²
		Endurance	1,000 m/s ²
	Weight		Approximately 13 g

*1 Need to consider the head from PCB when max. current is more than 10A

*2 Values when switching a resistive load at normal room temperature and humidity, and in a clean environment. The minimum switching load varies with the switching frequency and operating environment.

■ COIL DATA CHART

1. FBR512 SERIES

MODEL	Nominal voltage	Coil resistance (±10%) (at 20°C)	Must operate voltage*	Thermal resistance
W1 contact				
FBR512ND06-W1	6 VDC	60 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	73°C/W
FBR512ND09-W1	9 VDC	135 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	
FBR512ND10-W1	10 VDC	180 Ω	6.3 VDC (at 20°C) 7.9 VDC (at 85°C)	
FBR512ND12-W1	12 VDC	240 Ω	7.3 VDC (at 20°C) 9.2 VDC (at 85°C)	

* Pulse drive

FBR512, 522 SERIES

2. FBR522 SERIES

MODEL	Nominal voltage	Coil resistance ($\pm 10\%$) (at 20°C)	Must operate voltage*	Thermal resistance
W1 contact				
FBR522ND06-W1	6 VDC	45 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	65°C/W
FBR522ND09-W1	9 VDC	100 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	
FBR522ND10-W1	10 VDC	135 Ω	6.3 VDC (at 20°C) 7.9 VDC (at 85°C)	
FBR522ND12-W1	12 VDC	180 Ω	7.3 VDC (at 20°C) 9.2 VDC (at 85°C)	

* Pulse drive

■ SUITABLE APPLICATIONS

Application	Normal load current (12 VDC system)	Description	Recommended model (example)	
			For 16 V or less motor load voltage	For instantaneous 20 V or more load voltage
Power Windows	20 to 25 A (switching at motor locking)	forward and reverse motor control	FBR512N□ -W1	FBR522N□ -W1
Automatic Door Lock	18 to 25 A (switching at motor locking)	forward and reverse motor control	FBR512N□ -W1	FBR522N□ -W1
Automatic Antenna	8 to 12 A (INRUSH) break 2 A maximum (motor-free)	forward and reverse motor control	FBR512N□ -W1	
Intermittent Wipers (Front and Rear)	15 to 30 A break 2 to 8 A (motor-free)	forward only	FBR512N□ -W1	FBR522N□ -W1
Tilt-Lock Wheel	20 A (switching at motor locking)	forward and reverse motor control	FBR512N□ -W1	FBR522N□ -W1
Power Seat	20 to 30 A (switching at motor locking)	forward and reverse motor control	FBR512N□ -W1	FBR522N□ -W1
Sunroof	20 to 30 A (switching at motor locking)	forward and reverse motor control	FBR512N□ -W1	FBR522N□ -W1

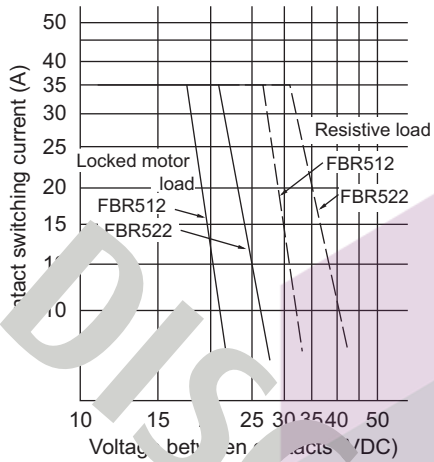
- For the load condition where higher voltage would be encountered during contact break, FBR522 series with wider contact gap is recommended.

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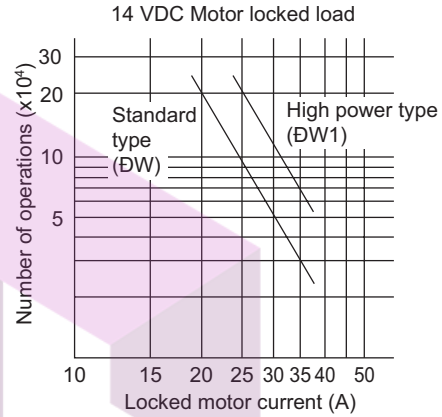
FBR512, 522 SERIES

CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY



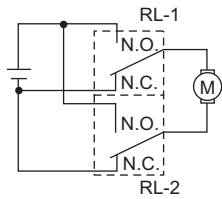
2. LIFE



3. LIFE TEST (EXAMPLE)

- Test item
14 V DC-20 A
Motor lock
200,000 operations minimum (FBR512 □-W type)

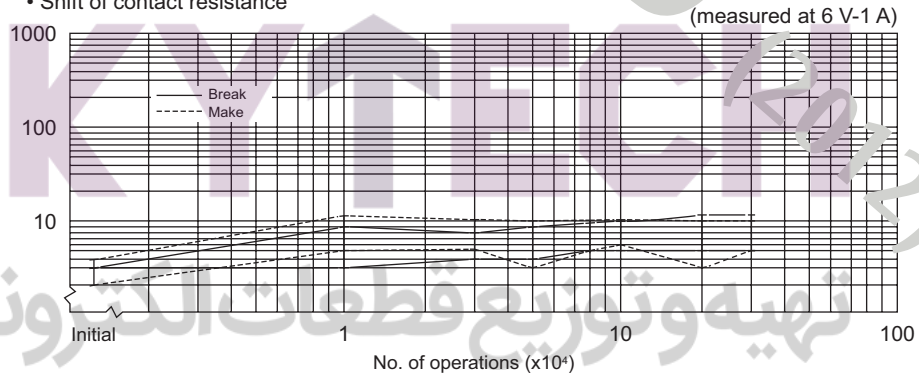
- Test circuit



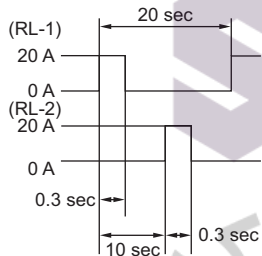
- Shift of pick-up and drop-out voltage



- Shift of contact resistance

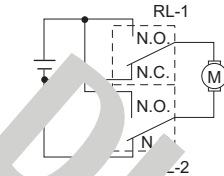


- Current wave form

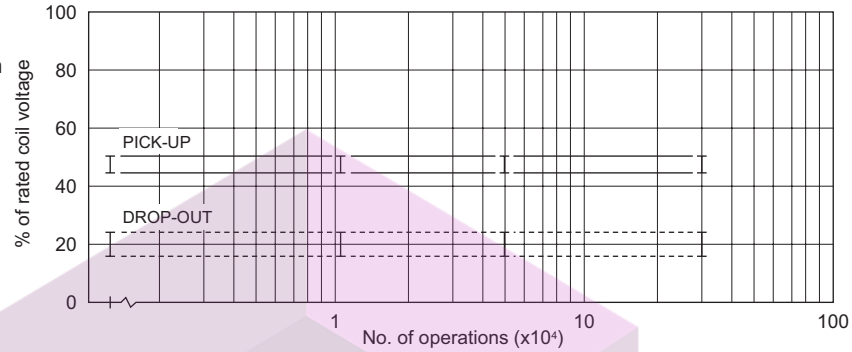


FBR512, 522 SERIES

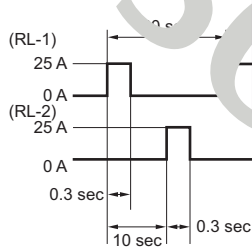
- Test item
14 V DC-25 A
Motor lock
200,000 operations minimum
(FBR512 □-W1 type)
- Test circuit



- Shift of pick-up and drop-out voltage



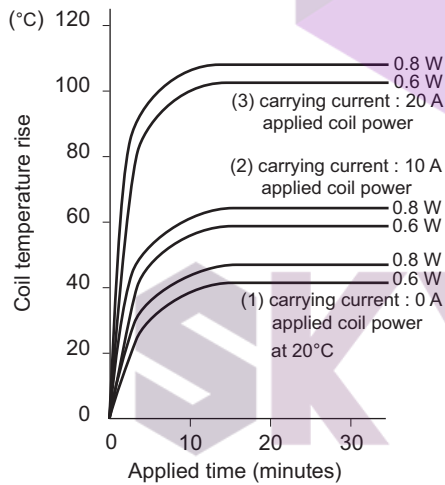
- Current wave form



- Shift of contact resistance



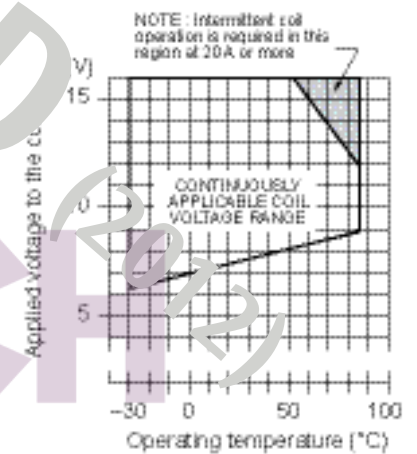
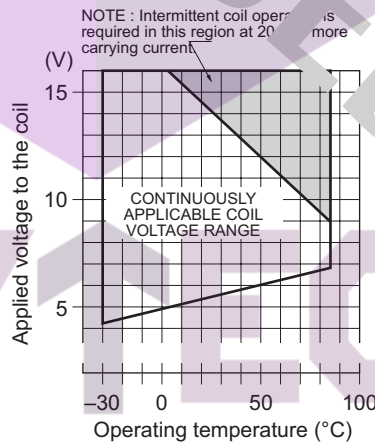
4. COIL TEMPERATURE RISE



5. OPERATING COIL VOLTAGE RANGE (EXAMPLE)

[FBR512ND09-W]

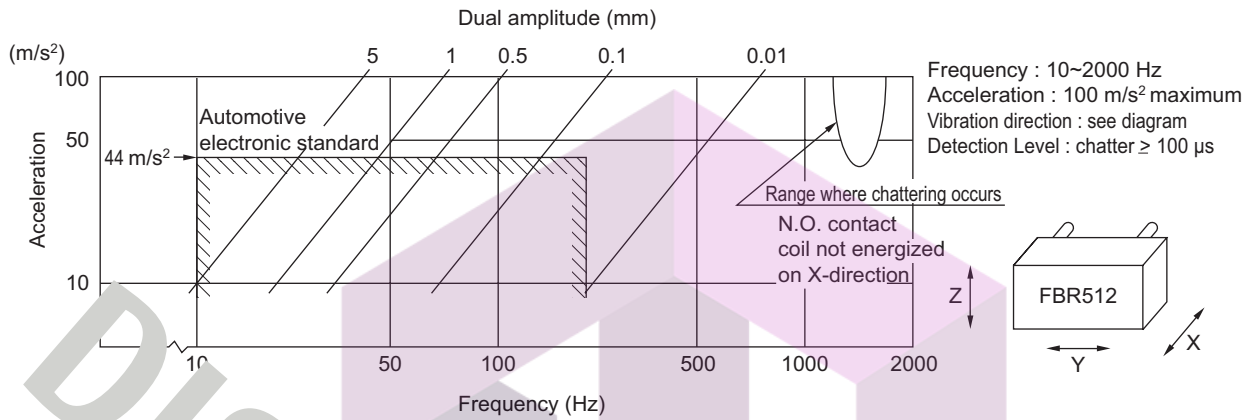
[FBR512ND12-W]



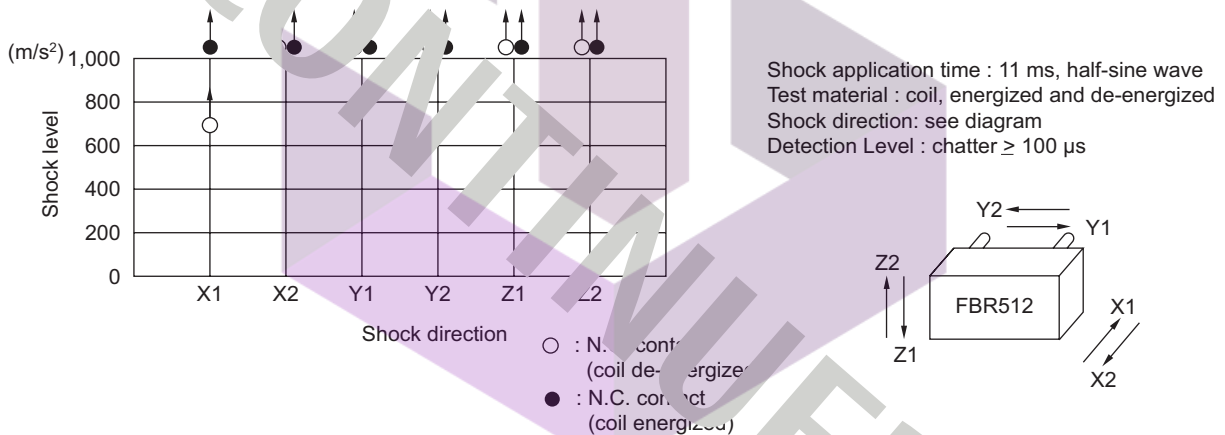
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FBR512, 522 SERIES

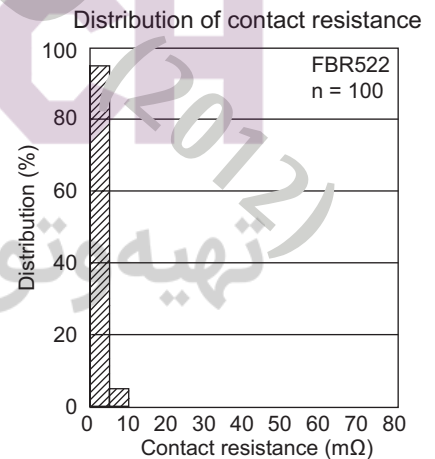
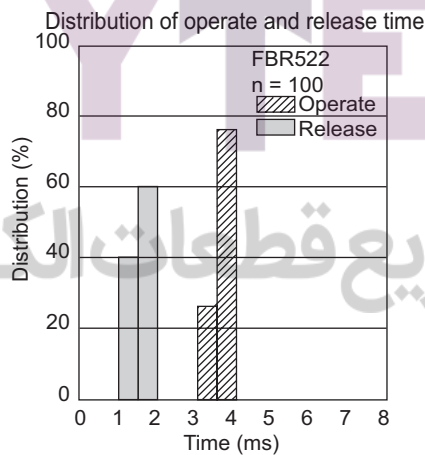
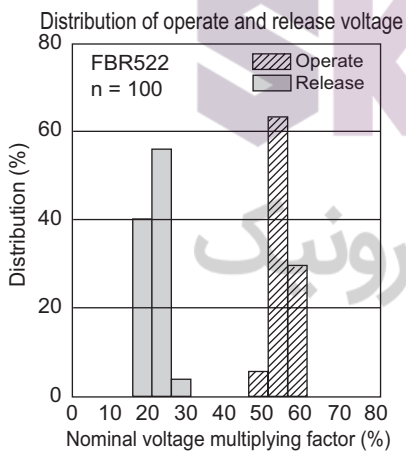
6. VIBRATION RESISTANCE CHARACTERISTICS



7. SHOCK RESISTANCE CHARACTERISTICS



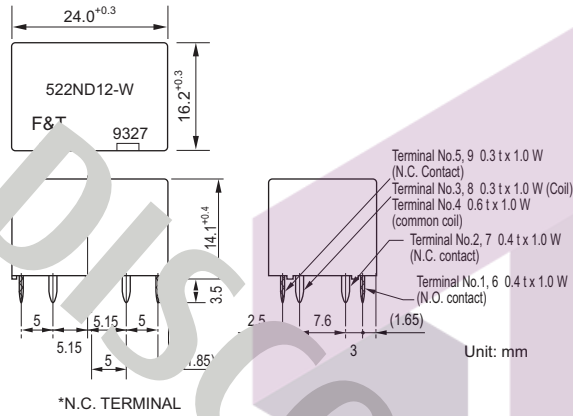
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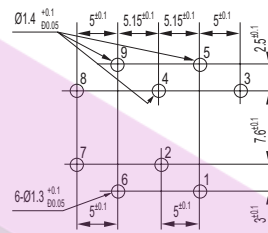
FBR512, 522 SERIES

■ DIMENSIONS

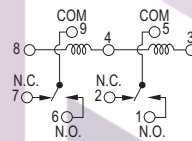
● Dimensions



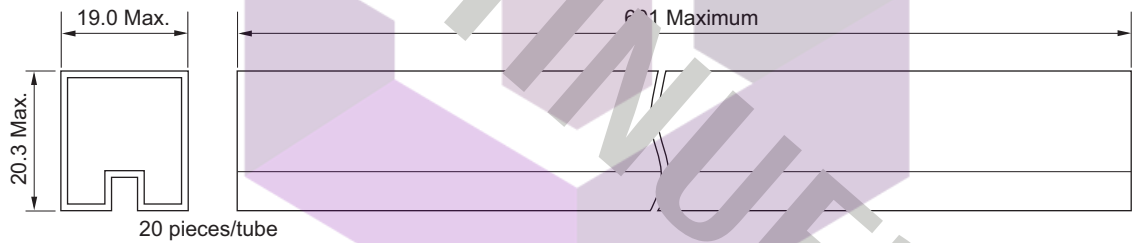
● PC board mounting hole layout (BOTTOM VIEW)



● Schematic (BOTTOM VIEW)



● Tube carrier



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