



TYPE EJ-2 FUSE APPLICATION 2400V & 4160V TRANSFORMER CONTROLLERS

SCOPE This bulletin describes the Type EJ-2 Fuses used in Type 211, 230 and 230-PM controllers and discusses basis of "R" selection for transformer controllers. Portions of this bulletin are extracted or paraphrased from fuse manufacturer's literature.

FUSE DESCRIPTION The EJ-2 fuses are ribbon element, totally-enclosed, and non-vented. When these fuses interrupt, there is no noise and any pressure generated is self-contained and sealed. These fuses exhibit an increase in resistance immediately after melting, so that they have a current limiting effect on major fault currents. For Class I, Division 2 applications, these fuses are completely sealed (without operation indicators).

APPLICATION The EJ-2 fuses provide phase-to-phase fault protection for the transformer controller, leads from controller to transformer, and transformer. The EJ-2 fuses also provide phase-to-ground fault protection on solidly grounded systems but not on resistance-grounded systems. The fuses, in general, interrupt only fault currents that exceed any likely overload. EJ-2 fuses are designed to interrupt fault currents having less than 100-second fuse melting times, and protective devices in series must interrupt lower overcurrents.

SYSTEM CAPACITY The fuses are for controllers used on power systems capable of producing fault currents up to 80,000-amperes RMS asymmetrical. On a 3-phase basis, that corresponds to 200-MVA at 2300-volts and 350-MVA at 4160-volts for symmetrical current calculations. Those MVA values assume 1.6 ratio between asymmetrical current and initial symmetrical current, for first-cycle fault interruption.

BASIS OF FUSE "R" RATING SELECTION The fuse "R" rating is selected so that the maximum load current will be substantially less than the maximum continuous current specified by the fuse manufacturer as shown in Fuse Rating Table. Two other criteria guide the "R" selection when EJ-2 fuses are applied in an ELLIOTT CONTROL transformer controller coordinated with Bulletin 9-31660 Overload Relay --

(A) **INRUSH CURRENTS** The fuse "R" rating is selected to withstand transformer inrush currents. Minimum melting times exceed 12 times full load current for 0.1 seconds and 25 times full load current for 0.01 seconds.

(B) **COORDINATION** The fuse "R" rating and overload-relay heater are selected so that the overload relay operating time is substantially faster than the minimum melting time of the fuse for all operating currents from full load up to 600% of the transformer full load current. This coordination with the overload relay characteristics protects the fuse from unnecessary operation due to transformer overloading. In the Selection Table below, OL Heater Codes are shown for the usual CT ratio. If a different CT ratio is used, then the OL Heater may be selected from Heater Selection Table in Bulletin 9-31660.

SELECTION TABLE, FUSE "R" RATING & OL HEATER CODE

SYSTEM VOLTS PH/PH	3-PH KVA	FUSE "R"	CT RATIO	PROTECT AT 100-110%			PROTECT AT 115-125%		
				100% FLA	OL CODE	TRIP AMPS#	115% FLA	OL CODE	TRIP AMPS#
2400	150	3R	50:5	38	FH29	39.0	43.7	FH31	46.8
	225	4R	75:5	54	FH29	58.5	62.1	FH30	64.4
	300	4R	100:5	75	FH29	78.0	86.2	FH31	93.6
	500	9R	150:5	120	FH30	128.7	138.0	FH31	140.4
	750	12R	200:5	180	FH31	187.2	(CT NOT APPLICABLE)		
	750	12R	300:5	180	FH27	194.4	207.0	FH28	213.0
	1000	18R	300:5	240	FH30	257.4	276.0	FH31	280.8
	1500	24R	400:5	360	FH31	374.4	(CT NOT APPLICABLE)		
4160	150	3R	50:5	20.8	FH23	22.4	23.9	FH24	24.5
	225	3R	50:5	31.2	FH27	32.4	35.9	FH29	39.0
	300	3R	75:5	41.6	FH26	44.2	47.8	FH27	48.6
	500	4R	100:5	69.4	FH28	71.0	79.8	FH30	85.8
	750	6R	150:5	104	FH28	106.5	119.6	FH30	128.7
	1000	9R	200:5	139	FH28	142.0	159.8	FH30	171.6
	1500	12R	300:5	208	FH28	213.0	239.2	FH30	257.4
	2000	18R	400:5	278	FH28	284.0	319.7	FH30	343.2
	2500	24R	400:5	347	FH31	374.4	(CT NOT APPLICABLE)		
	NOTES (a) FLA DENOTES PRIMARY FULL LOAD CURRENT, TRANSFORMER NAMEPLATE. (b) # TRIP AMPS EQUAL HEATER TRIP RATING MULTIPLIED BY CT TURNS RATIO. (c) CONTROLLER AMP RATING EQUALS 180-AMP FOR 200:5 CT OR SMALLER. CONTROLLER AMP RATING IS 360-AMP FOR 300:5 OR 400:5 CT. (d) RECOMMENDED AMPACITY FOR CUSTOMER'S LOAD CABLES IS 125% OF FLA. (e) OTHER CT RATIOS MAY BE USED IF HEATER SELECTED PER BULLETIN 9-31660. (f) SIZE 2R MAY BE USED INSTEAD OF 3R FOR FLA EQUALS 33-AMPS OR LESS.								

"R"	MFRS AMPS*
2R	70
3R	100
4R	130
6R	170
9R	200
12R	230
18R	390
24R	450

*MFRS AMPS" is Max Continuous Current at 40C Ambient as specified by the fuse manufacturer.