



OVERLOAD RELAY HEATER & CURRENT TRANSFORMER SELECTIONS

2400V & 4160V MOTOR CONTROLLERS

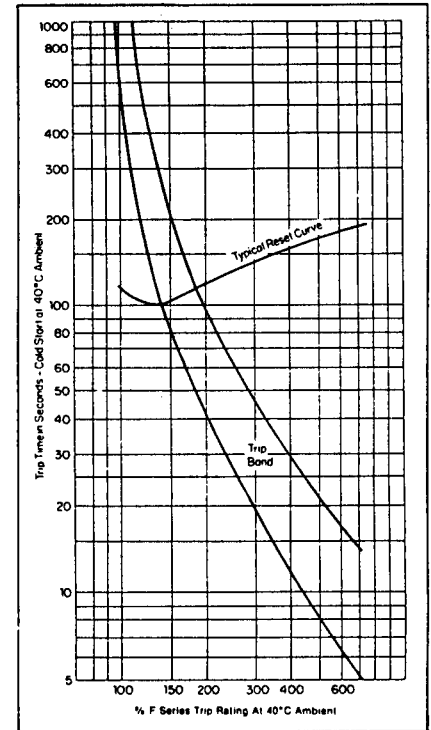
**SCOPE** This bulletin describes the thermal overload relay usually included in the Type 211, 230, and 230-PM controllers and tabulates the heater and current transformer selections.

**OVERLOAD RELAY** The thermal overload relay, designated symbol "OL" on schematic diagrams, is Cutler Hammer AA13 ambient compensated type, 3-element, intended to protect the motor against running overloads and stalled rotor. When tested at 600% of its trip rating, the relay trips in less than 20 seconds (class 20). The relay is a bimetallic device, and the strip bimetal is indirectly heated by the replaceable heater elements, energized from current transformers.

**RESET** Reset may be effected after the strip bimetal cools in about 2-3 minutes after tripout as shown by Typical Reset Curve. The relay may be arranged for either "HAND" or "AUTO" reset, whichever is specified. Automatic reset may be used with 3-wire control circuits but not with 2-wire control circuits where automatic re-starting of the motor may be hazardous. When "HAND" reset is specified, the relay enclosure is equipped with an external reset mechanism operated by reset handle on the door.

**OVERLOAD HEATERS** Heaters are selected for actual full load current and motor service factor, after considering current transformer ratio provided, as shown in Heater Selection Table below. The trip rating in a 40C ambient of each size heater is shown in this table. The trip rating of a specific heater element can be adjusted over a range of 85%-115% by turning an adjustment knob on the bottom of the relay. The factory setting is 100%.

**CURRENT TRANSFORMER SELECTION** Current transformers are usually selected so that the full load current will read as high as practical on the ammeter, as shown in CT Ratio Table. Other ratios may be used, so long as heater may still be selected according to Heater Selection Table.



Time/Current Trip and Reset Curves

HEATER SELECTION TABLE											
SERVICE FACTOR	HEATER CODE	TRIP RATING	SECONDARY AMPS	FULL LOAD CURRENTS, RANGE OR MAXIMUM							
				50:5	75:5	100:5	150:5	200:5	300:5	400:5	
1.15	FH23	2.24	1.79-1.95	17.9-19.5	26.8-29.2	35.8-39.0	53.7-58.5	71.5-78.0	107.4-117.0	143.2-156.0	
	FH24	2.45	1.96-2.15	21.5	32.25	43.0	64.5	86.0	129.0	172.0	
	FH25	2.70	2.16-2.35	23.5	35.2	47.0	70.5	94.0	141.0	188.0	
	FH26	2.95	2.36-2.58	25.8	38.7	51.6	77.4	103.2	154.8	206.4	
	FH27	3.24	2.59-2.83	28.3	42.4	56.6	84.9	113.2	169.8	226.4	
	FH28	3.55	2.84-3.11	31.1	46.6	62.2	93.3	124.4	186.6	248.8	
	FH29	3.90	3.12-3.42	34.2	51.3	68.4	102.6	136.8	205.2	273.6	
	FH30	4.29	3.43-3.73	37.3	55.9	74.6	111.9	149.2	223.8	298.4	
	FH31	4.68	3.74-4.07	40.7	61.0	81.4	122.1	162.8	244.2	325.6	
	FH32	5.10	4.08-4.39	43.9	65.8	87.8	131.7	175.6	263.4	351.2	
	1.0	FH23	2.24	1.99-2.17	19.9-21.7	29.8-32.5	39.8-43.4	59.7-65.1	79.6-86.8	119.4-130.2	159.2-173.6
		FH24	2.45	2.18-2.38	23.8	35.7	47.6	71.4	95.2	142.8	190.4
FH25		2.70	2.39-2.61	26.1	39.1	52.2	78.3	104.4	156.6	208.8	
FH26		2.95	2.62-2.87	28.7	43.0	57.4	86.1	114.8	172.2	229.6	
FH27		3.24	2.88-3.14	31.4	47.1	62.8	94.2	125.6	188.4	251.2	
FH28		3.55	3.15-3.45	34.5	51.7	69.0	103.5	138.0	207.0	276.0	
FH29		3.90	3.46-3.80	38.0	57.0	76.0	114.0	152.0	228.0	304.0	
FH30		4.29	3.81-4.14	41.4	62.1	82.8	124.2	165.6	248.4	331.2	
FH31		4.68	4.15-4.52	45.2	67.8	90.4	135.6	180.8	271.2	361.6	
FH32		5.10	4.53-4.87	48.7	73.0	97.4	146.1	194.8	292.2	389.6	

CT RATIO TABLE	
FULL LOAD AMPS	CT RATIO
18 - 40	50:5
41 - 60	75:5
61 - 80	100:5
81 - 125	150:5
126 - 170	200:5
171 - 250	300:5
251 - 350	400:5