MagneTek Drives & Systems

For use with Lancer I
Variable Frequency Drives.

OVERLOAD RELAY OPTION

(MOUNTED IN LANCER I ENCLOSURE)

This industrial type control is designated to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check out, safe operation, or maintenance. Care must be exercised to comply with local, state, and national regulations, as well as safety practices, for this class of equipment.

FUNCTIONAL DESCRIPTION

The thermal overload relay is a bimetallic device which, with the properly selected wire and heaters, will provide motor protection for running and stalled rotor overloads. The Size 1, 3 and 4 relays have a maximum current rating of 26.2, 90 and 133 amperes respectively.

At 125HP and above, current tranformers are used along with the overload relay.

The strip bimetals in the relay are indirectly heated by the replaceable heater elements which carry the motor current. Excess heat is generated in these heater elements by an overloaded motor. The heated bimetals deflect to open the normally closed contact, thereby opening the FAULT circuit of the Lancer I. After approximately 2 minutes, the relay (if set for "HAND" reset) may be reset by pressing the reset rod. For relays in the "AUTO" position, resetting occurs automatically.

An immediate visible indication of trip is standard on the relay. When an overload occurs, which causes the relay to operate, a trip indicator projects out through a small opening at the bottom of the relay.

IMPORTANT

Do not tamper with this trip indicator as it is an integral part in the calibration and tampering therewith may cause changes in trip characteristics.

The thermal overload relay is ambient compensated and has substantially the same trip characteristics for ambient temperatures from -40°C to 75°C (-40°F to 167°F). Because of a compensating bimetal, which maintains a constant travel to trip distance independent of ambient conditions, operation of this bimetallic relay is responsive only to heat generated by the motor overcurrent passing through the heater element. The compensating feature is fully automatic and no adjustments are required over normal fluctuations in ambient temperatures.

HEATERS

Heaters are normally included with the overload relay. If the rated motor current does not fall within the standard Lancer I ratings, heaters must be ordered separately. Select the appropriate heaters from Table 2. Controllers rated greater than 100HP use current transformers to reduce motor overload relay currents. See Table 1 for applicable C.T. ratios. When installing heaters be sure that connecting surfaces are clean and heaters are attached securely to the relay in the proper

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TABLE 1.

MOTOR HP	OVERLOAD RELAY		STANDARD OVERLOAD HEATERS				
	NEMA SIZE	LOUIS ALLIS PART NUMBER	CODE MARKING	LOUIS ALLIS PART NUMBER	C.T. RATIO (NOTE 1)	MOTOR FULL LOAD CURRENT	TRIP CURRENT (NOTE 2)
40	3	05P00037-0133	FH 81	05P00004-0162	None	45-52	58
40			FH 82	05P00004-0163	None	50-58	64
50			FH 83	05P00004-0164	None	56-61	70
50			FH 84	05P00004-0165	None	61-70	78
60			FH 85	05P00004-0166	None	70-77	84
60			FH 87	05P00004-0167	None	75-83	99
75	4	05P00037-0134	FH 87	05P00004-0167	None	84-90	99
75			FH 89	05P00004-0168	None	89-90	116
100			FH 92	05P00004-0169	None	112-133	154
125	1	05P00037-0132	FH 26	05P00004-0157	60	139-159	177
150			FH 25	05P00004-0156	80	168-195	216
200			FH 28	05P00004-0158	80	222-250	284
250			FH 28	05P00004-0158	100	275-310	355
300			FH 28	05P00004-0158	120	333-370	426
350			FH 26	05P00004-0157	160	382-420	472
400			FH 28	05P00004-0158	160	430-480	568
450			FH 29	05P00004-0159	160	495-540	624
500			FH 30	05P00004-0160	160	550-600	686
600			FH 32	05P00004-0161	160	645-720	816

NOTES: 1. C.T. ratio is primary current divided by secondary current.
2. Trip current can be adjusted over a range of approximately 85% to 115%.

Table 2.

CODE MARKING	FULL LOAD CURRENT OF MOTOR (AMPERES) (40°C AMBIENT)	MAX. PROTECT. DEVICE (AMP)	LOAD WIRE SIZE
	FOR SIZE 1		
FH03	.25 - .27	1*	#14
FH04	.28 - .31	1*	#14
FH05	.32 - .34	1*	#14
FH06	.35 - .38	1*	#14
FH07	.39 - .42	1*	#14
FH08	.43 - .46	2*	#14
FH09	.47 - .50	2*	#14
FH10	.51 - .55	2*	#14
FH11	.56 - .62	3*	#14
FH12	.63 - .68	3*	#14
FH13	.69 - .75	3*	#14
FH14	.76 - .83	3*	#14
FH15	.84 - .91	3*	#14
FH16	.92 - 1.00	3*	#14
FH17	1.01 - 1.11	3*	#14
FH18	1.12 - 1.22	3*	#14
FH19	1.23 - 1.34	5*	#14
FH20	1.35 - 1.47	6*	#14
FH21	1.48 - 1.62	6*	#14
FH22	1.63 - 1.78	6*	#14
FH23	1.79 - 1.95	6*	#14
FH24	1.96 - 2.15	6*	#14
FH25	2.16 - 2.35	10*	#14
FH26	2.36 - 2.58	10*	#14
FH27	2.59 - 2.83	10*	#14
FH28	2.84 - 3.11	15	#14
FH29	3.12 - 3.42	15	#14
FH30	3.43 - 3.73	15	#14
FH31	3.74 - 4.07	15	#14
FH32	4.08 - 4.39	15	#14
FH33	4.40 - 4.87	15	#14
FH34	4.88 - 5.3	20	#14
FH35	5.4 - 5.9	20	#14
FH36	6.0 - 6.4	20	#14
FH37	6.5 - 7.1	25	#14
FH38	7.2 - 7.8	25	#14
FH39	7.9 - 8.5	30	#14
FH40	8.6 - 9.4	30	#14
FH41	9.5 - 10.3	35	#14
FH42	10.4 - 11.3	35	#14
FH43	11.4 - 12.4	40	#14
FH44	12.5 - 13.5	45	#14
FH45	13.6 - 14.9	45	#14
FH46	15.0 - 16.3	50	#12
FH47	16.4 - 18.0	60	#12
FH48	18.1 - 19.8	60	#12
FH49	19.9 - 21.7	70	#10
FH50	21.8 - 23.9	80	#10
FH51	24.0 - 26.2	80	#10
	FOR SIZE 3 (90 AMPS MAX.		
FH72	19.0 - 20.8	80	#10
FH73	20.9 - 22.9	90	#10
FH74	23.0 - 25.2	100	#10
FH75	25.3 - 27.8	100	#10
FH76	27.9 - 30.8	110	#8
FH77	30.7 - 33.5	125	#8
FH78	33.6 - 37.5	150	#8
FH79	37.6 - 41.5	150	#6
FH80	41.6 - 46.3	175	#6
FH81	46.4 - 50	200	#6
FH82	51 - 55	200	#4
FH83	56 - 61	225	#4
FH84	62 - 66	250	#4
FH85	67 - 73	250	#3
FH86	74 - 78	250	#3
FH87	79 - 84	300	#2
FH88	85 - 92	350	#2
	FOR SIZE 4		
FH89	93 - 101	350	#00
FH90	102 - 110	350	#00
FH91	111 - 122	400	#000
FH92	123 - 129	400	#000
FH93	130 - 133	400	#0000

* 15 Ampere protective device is permitted by NEC. Fuse size shown in table limits fault current.

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location with the screws provided. The trip rating of a heater in a 40°C ambient is 125% of the minimum full load current. When tested at 600 percent of its trip rating, the relay will trip in 20 seconds or less (class 20).

Heaters should be selected on the basis of the actual full load current and service factor as shown on the motor nameplate or in the manufacturer's published literature. When the service factory of the motor is 1.15 to 1.25, select heaters as listed in Table 1. If the service factor of the motor is 1.0, or there is no service factor shown, or a maximum of 115% protection is desired, select one size smaller heater than indicated. When motor and overload relay are in different ambients (for ambient compensated overload relays) no adjustment in heater selection is necessary for normal variations in ambient temperatures.

SHORT CIRCUIT PROTECTION

The relay will provide protection against abnormal load conditions to current values exceeding normal locked rotor current; however, to protect the relay from short circuit currents, branch circuit protection must be provided per the National Electric Code. Protective device ratings should not exceed the maximum values listed in the heater application table. The relays, as protected, are suitable for use on a circuit capable of delivering not more than 5000 RMS symmetrical amperes, 600 volts maximum.

WIRING

Wire with copper conductors only.

Connections (see Figure 1 and Table 3) should be made with the proper wire size for the application using 75°C rated wire. All wires must be securely fastened.

OPERATIONAL ADJUSTMENTS

Manual or Automatic Reset

The overload relay is normally furnished set for "HAND" reset operation. The relay may be set for either "HAND" or "AUTO" reset by slightly loosening the screw holding the reset plate, moving the plate to the proper position marked on the molded case (away from the panel for "Auto" reset) and retightening the screw.

Automatic reset should not be used with 2-wire control circuits where automatic starting of the motor may be hazardous.

Adjustable Trip

See Figure 2 and 3. The trip rating of a specific heater element can be adjusted over a range of approximately 85% to 115%, either to alleviate nuisance tripping or, conversely, to gain closer protection when desired. This is accomplished by turning the adjustment knob on the bottom of the relay to the respective stop position.

MAINTENANCE

Other than the normal tightening of all wire and heater connections, no maintenance should be attempted on the unit. Complete replacement of the unit must be made in the event of damage.

WARNING

TO PROVIDE CONTINUED PROTECTION AGAINST FIRE AND SHOCK HAZARD, THE COMPLETE OVERLOAD RELAY MUST BE REPLACED IF BURNOUT OF A CURRENT ELEMENT OCCURS.

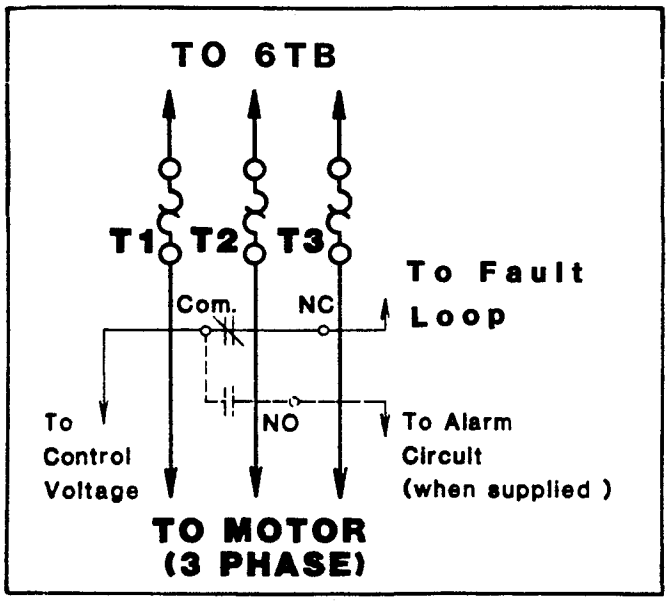


Figure 1. Connection Diagram

Table 3.

I - CONTROL CONTACT RATINGS

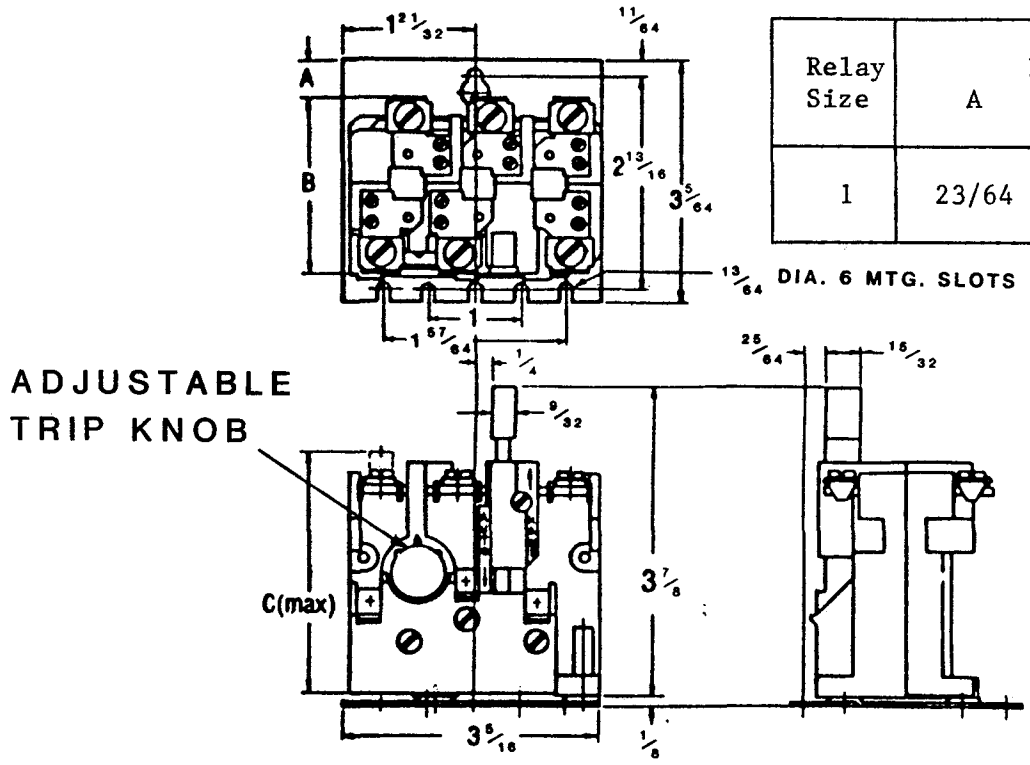
AC VOLTS	NORMALLY CLOSED		NORMALLY OPEN	
	MAKE	BREAK	MAKE	BREAK
24-120	20A	2A	5A	.5A
120-600	2400VA	240 VA	600 VA	60 VA

II - POWER CIRCUIT TERMINALS

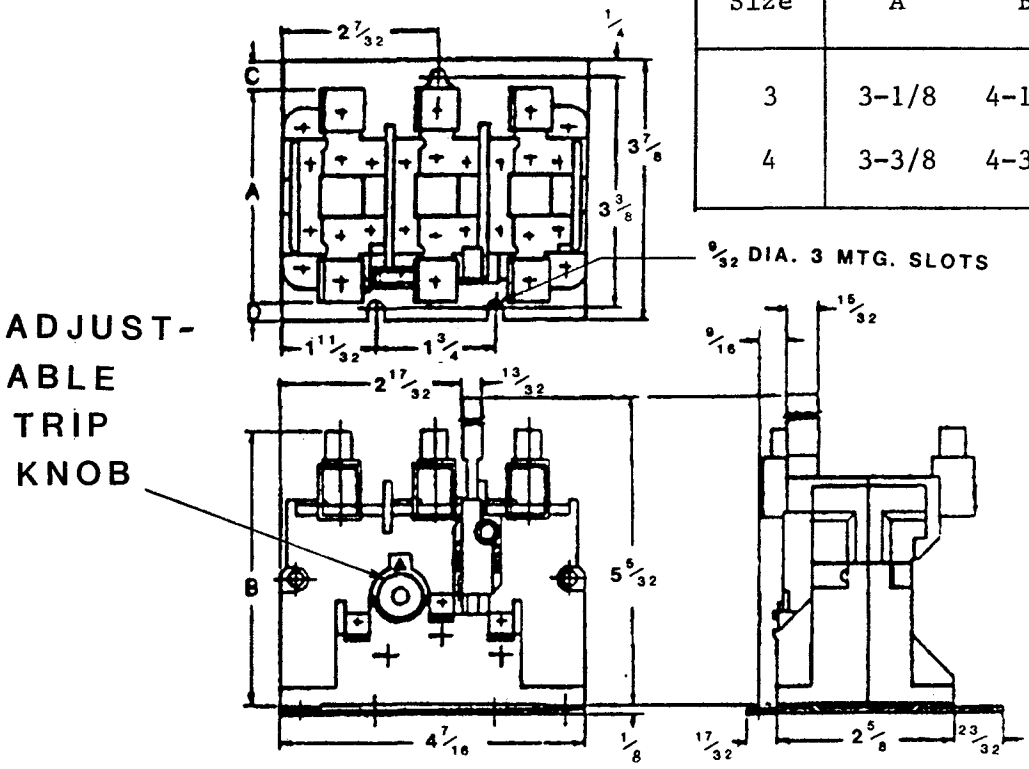
NEMA SIZE	WIRE SIZE
1	#14 - 8 AWG
3	#12 - 2/0 AWG
4	#12 - 4/0 AWG

III - RECOMMENDED DRIVING TORQUE

LOCATION (QTY.)	DRIVING TORQUE (Lb.-In.)
Main Power Connections (6)	18-20 (Size 1) 90-100 (Size 3,4
Control Connections (2)	8-9
Heater Mtg. Screws (2/pole)	18-20 (Size 1) 45-50 (Size 3,4)



Relay Size	Dimension A	B	C
1	23/64	2-3/8	3-1/8



Relay Size	Dimension A	B	C	D
3	3-1/8	4-1/16	7/16	5/16
4	3-3/8	4-3/8	5/16	3/16

Figure 2. Dimensions (Inches)

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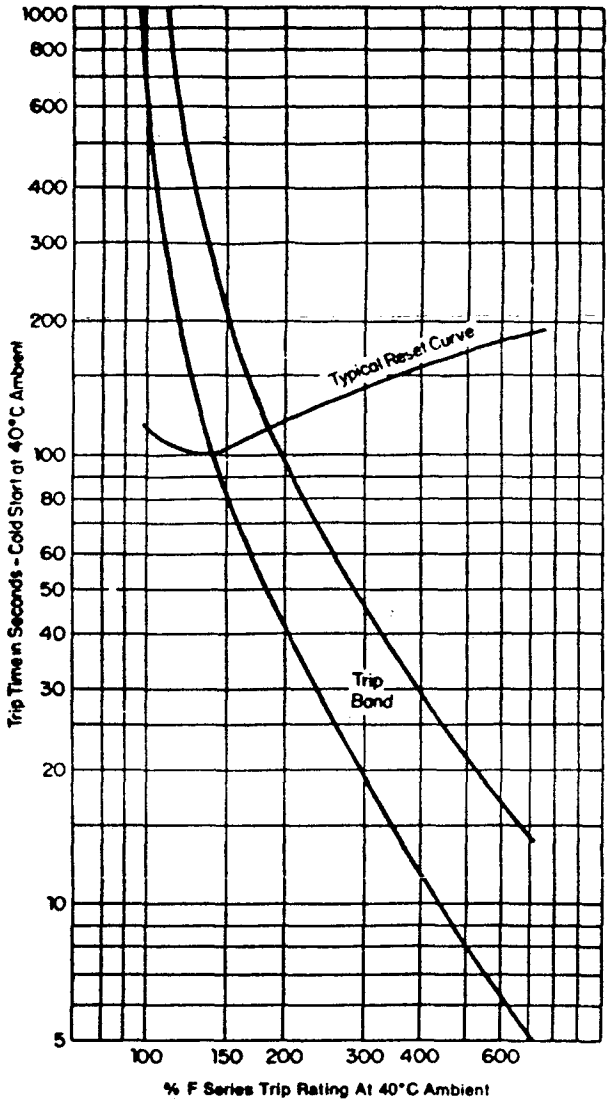
SIZE 1



SIZE 3 & 4

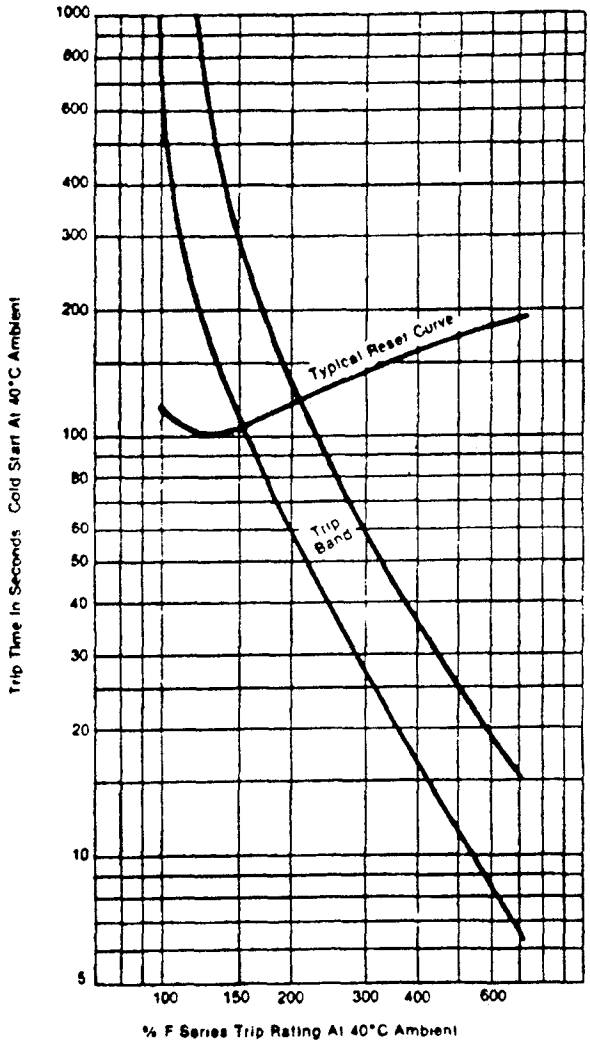


Figure 3. Time/Current Trim and Reset Curves

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