

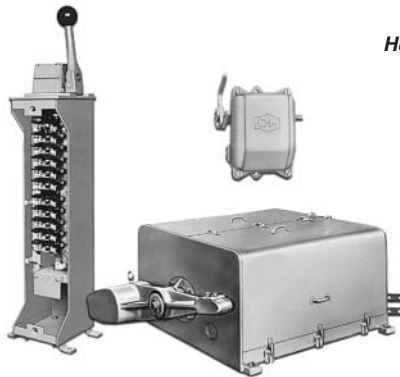
# Crane Control

## Contents

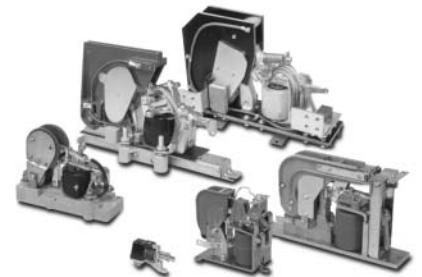
<i>Description</i>	<i>Page</i>
<b>Heavy-Duty Brakes</b>	
Shoe Brakes — Magnetically Operated . . . . .	2
<b>Master and Limit Switches</b>	
Type F Master Switches — GH101 . . . . .	22
Type C Master Switches — GH103 . . . . .	28
Crane Power Limit Switches . . . . .	30
Heavy-Duty Control Limit Switches — Type E84 . . . . .	35
High Speed Limit Switches . . . . .	40
Foot-Operated Limit Switches . . . . .	41
Cable-Operated Limit Switches . . . . .	42
<b>Contactors and Relays</b>	
DC Contactors . . . . .	43
DC Timers — Static In-Line . . . . .	66
Low Voltage Monitoring Relays . . . . .	67
DC Relays . . . . .	68
DC Timing Relays — 7313 VTH and 7313 CTH . . . . .	78



*Heavy-Duty Brakes*



*Master and Limit Switch Family*



*Contactors and Relays*



*Limit Switch with Standard Duty Forked Lever*

**Product Description**

These Heavy-Duty Control Limit Switches are designed for use with cranes, hoists, conveyors and similar types of moving machinery. They are supplied with three non-overlapping contacts — and with spring return or maintained lever operation. The spring return capability and circuit arrangement can readily be converted in the field. Standard spring return switches operate in one direction only (contacts change state when lever is moved in one direction from center). The spring return type is optionally available with lever operation in either direction (contacts change state when lever is moved in either direction).

**Standards and Certifications**

- NEMA ICS2-225.
- NEMA ICS2-125.21.02.

**Technical Data and Specifications**

- Voltage: 600 V maximum, ac or dc.
- Current Rating:
  - 1.25 A at 250 Vdc continuous, breaking ratings per **Table 60**
- Ambient Temperature:
  - 100°C maximum, operating
- Operation: Mechanical trip.
- Types of Operators:
  - Roller lever
  - Forks
  - Weighted levers
- Operating Speeds:
  - Roller lever — 460 FPM
  - Standard fork lever — 700 FPM
  - Heavy-duty fork lever — 340 FPM

**Table 60. E84 Control Circuit Ratings**

Maximum Current Amperes							
ac						dc Inductive	
120 V		240 V		480 V		125 V	250 V
Make	Break	Make	Break	Make	Break	Make	Break
60	6.0	30	3.0	15	1.5	2.2	1.1

**Options**

- Operation of spring return contacts in either direction — Contacts change state when lever is moved in either direction from center — Spring return to center. To order, add suffix **2** to listed Catalog Number. Example: E84AAN2
- For switch with overlapping circuits, order by description.

**Renewal Parts**

**Table 61. Type E84 Renewal Parts**

Description	Part Number
Contact Block Assembly	83-530-5

**Note:** For prices, refer to Eaton's parts distributor or consult factory.

Discount Symbol ..... **18CD-4**  
\* Consult Sales Office for Pricing

Dimensions

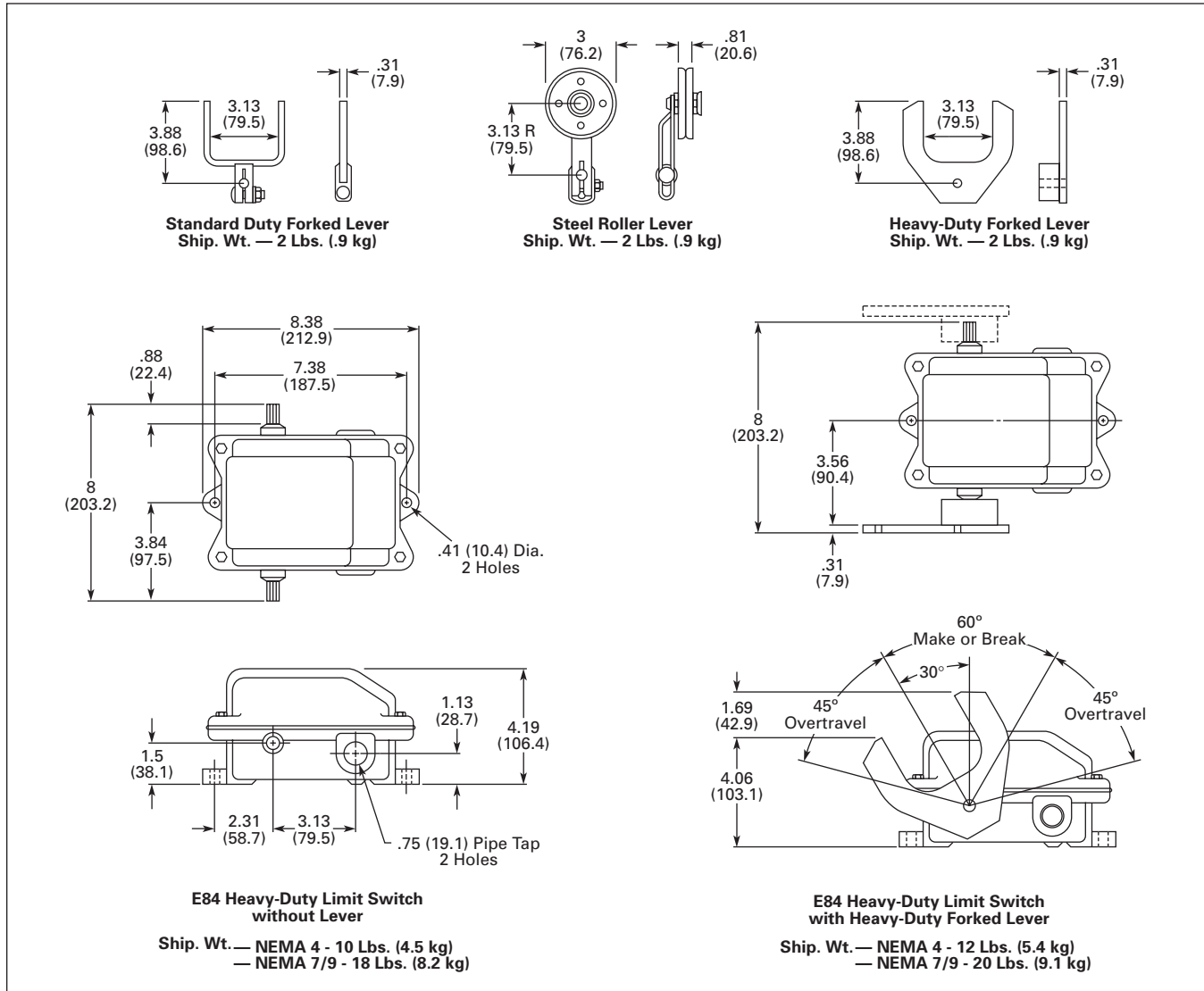
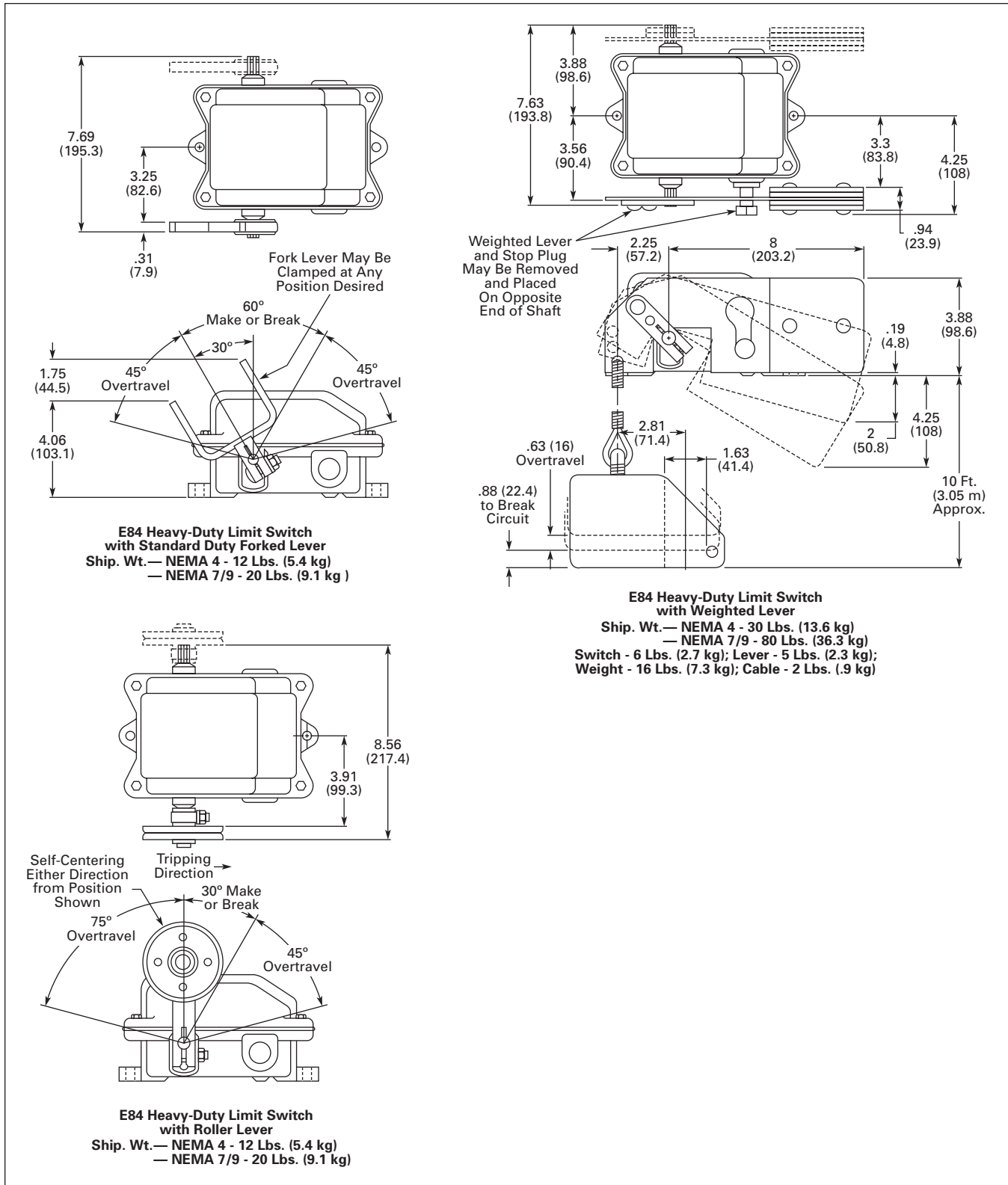


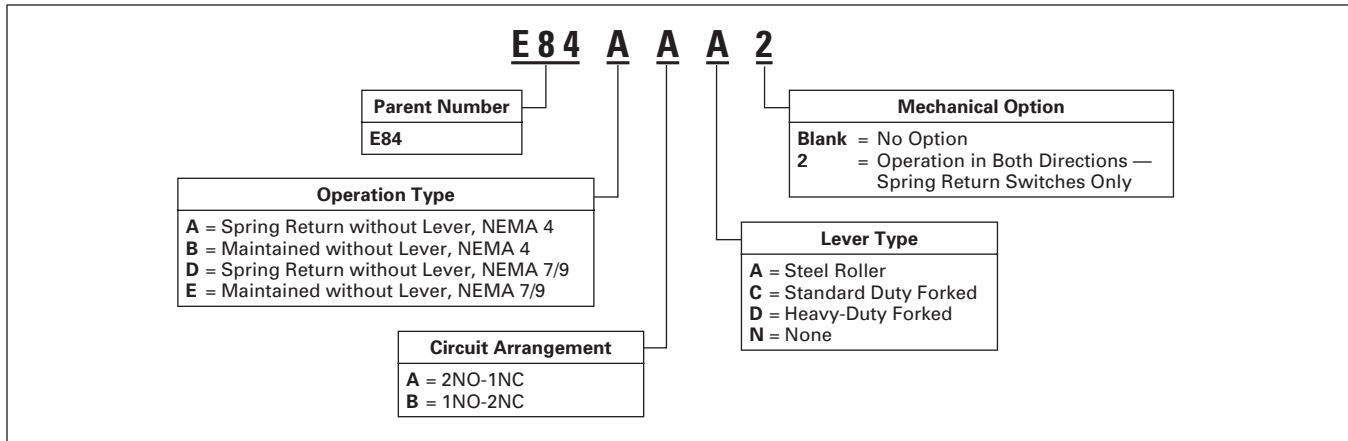
Figure 19. Approximate Dimensions in Inches (mm) and Shipping Weights



**Figure 20. Approximate Dimensions in Inches (mm) and Shipping Weights**

## Catalog Number Selection

Table 62. Type E84 Limit Switch Catalog Numbering System



## Product Selection

### Lever Switches

#### When Ordering Specify

- Catalog Number of basic switch from **Table 63**.
- Catalog Number for lever from **Table 64**, or for switch with lever

assembled, change the last digit of the basic switch Catalog Number from **N** to the Suffix Code listed in **Table 64**.

- Add Suffix Number of optional feature. See Options, **Page 35**.

Table 63. Basic Switch Selection — Lever Switches

Operator Type	Circuit Arrangement	Enclosure Type			
		NEMA 4 Cast Aluminum		NEMA 7/9 Cast Iron	
		Catalog Number	*	Catalog Number	*
Spring Return without Lever ①	2NO-1NC ②	E84AAN		E84DAN	
Maintained Position without Lever ③④	2NO-1NC ②	E84BAN		E84EAN	

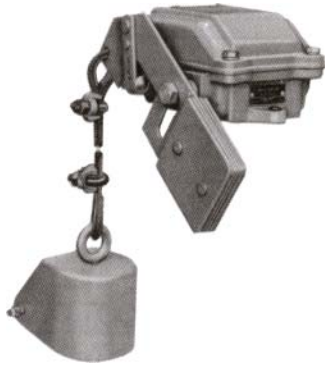
- ① Contacts change state when lever is moved in one direction only. (See dimension drawings, **Pages 36 – 37**.)
- ② Circuits are non-overlapping. Field convertible to 2NC-1NO, 3NO or 3NC.
- ③ Field convertible from spring return type.
- ④ Suffix 2 option not available with maintained position switches.

Table 64. Operating Lever

Lever Type		Code Suffix Change Last Digit of Listed Catalog Number	Lever Only Catalog Number	*
Steel Roller		A	E84XA	
Standard Duty Forked		C	E84XC	
Heavy-Duty Forked		D	E84XD	

Cross-Reference to  
 Previous Products..... **Page 39**  
 Dimensions..... **Pages 36, 37**  
 Discount Symbol..... **18CD-4**

\* Consult Sales Office for Pricing



*Hoist Service with Weighted Lever*

**Hoist Switches**

**When Ordering Specify**

- Catalog Number for basic switch from **Table 65**.

**Table 65. Basic Switch Selection — Hoist Limit**

Operator Type	Circuit Arrangement	Enclosure Type			
		NEMA 4 Cast Aluminum		NEMA 7/9 Cast Iron	
		Catalog Number	*	Catalog Number	*
Maintained Position with Weighted Lever Only	2NC-1NO ①	E84CBF		E84FBF	
Maintained Position with Weighted Lever, Cable and Reset Weight	2NC-1NO ①	E84CBE		E84FBE	

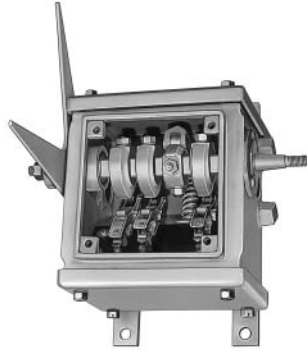
① Circuits are non-overlapping. Field convertible to 2NO-1NC, 3NO or 3NC.

**Cross-Reference to Previous Product**

**Table 66. Control Limit Switch Cross-Reference**

Catalog Number			Catalog Number			Catalog Number		
Old	New		Old	New		Old	New	
	Limit Switch	Operating Lever		Limit Switch	Operating Lever		Limit Switch	Operating Lever
14977H10	E84AAN	E84XA	14977H27	E84CBE	—	14977H42	—	E84XC
14977H11	E84AAN	E84XA	14977H29	E84BAN	E84XD	14977H43	—	E84XB
14977H12	E84AAN	E84XA	14977H30	E84BAN	E84XD	14977ED12-2	E84EAD w/Overlap	—
14977H13	E84ABA	—	14977H31	E84BAN	E84XD	14977ED15-5	E84FAE	—
14977H14	E84ABA	—	14977H32	E84EAN	E84XD	14977ED18-1	E84DAN	E84XA
14977H15	E84ABA	—	14977H33	E84AAN	—	14977ED23-1	E84DAN	E84XA
14977H16	E84AAN	E84XA	14977H34	E84AAN	—	14977ED23-2	E84DBA	—
14977H17	E84AAN	E84XA	14977H35	E84AAN	—	14977ED26-1	E84DAA2	—
14977H18	E84AAN	E84XA	14977H36	E84BAN	—	14977ED26-2	E84DBA2	—
14977H19	E84BAN	E84XC	14977H37	E84BAN	—	14977ED26-3	E84DAA2	—
14977H20	E84BAN	E84XC	14977H38	E84BAN	—	14977ED27-2	E84DBA w/Overlap	—
14977H21	E84BAN	E84XC	14977H39	E84EAN	—	14977ED28-1	E84EBD w/Overlap	—
14977H25	E84CBE	—	14977H40	—	E84XA	—	—	—
14977H26	E84CBE	—	14977H41	—	E84XD	—	—	—

## High Speed Limit Switches



*High Speed Limit Switch  
with Cover Removed*

### Product Description

These rugged, heavy-duty limit switches are designed for use in high-speed applications such as crane trolleys, conveyors and similar types of moving machinery. Our High Speed Limit Switches are supplied with three non-overlapping contacts and maintained lever operation. Only the forked lever version is available.

### Standards and Certifications

- CMAA 70-5.9.5.
- NEMA ICS2-215.07.
- NEMA ICS2-125.21.02.

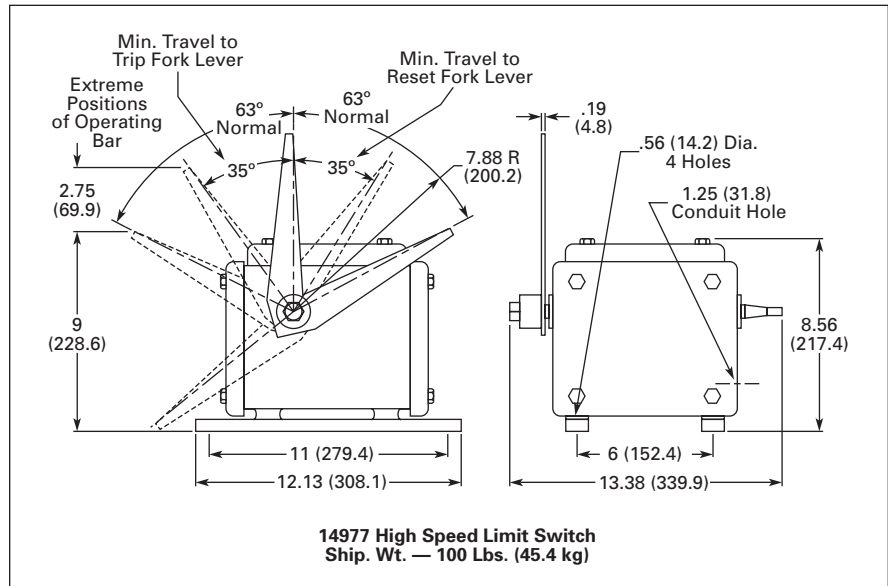
## Technical Data and Specifications

- Voltage: 600 V maximum, ac or dc.
- Current Rating:
  - 1.25 A at 250 Vdc continuous
- Ambient Temperature: 100°C maximum, operating.
- Operation: Mechanical trip.
- Operating Speeds:
  - 1200 feet per minute

**Table 67. 14977 Control Circuit Ratings**

Maximum Current Amperes							
ac						dc Inductive	
120 V		240 V		480 V		125 V	250 V
Make	Break	Make	Break	Make	Break	Make	Break
60	6.0	30	3.0	15	1.5	2.2	1.1

## Dimensions



**Figure 21. Approximate Dimensions in Inches (mm) and Shipping Weights**

## Product Selection

### When Ordering Specify

- Catalog Number.

**Table 68. Type 14977 Direct Acting Limit Switches**

Type of Operating Lever	With or without Spring Return	Number of Circuits	NEMA Type Enclosure	Catalog Number	*
<b>1N0-2NC Circuits (Without Overlap)</b>					
Forked Lever 1200 ft./min. Maximum	Without	3	4	<b>14977H28</b>	

Discount Symbol ..... **18CD-4**

\* Consult Sales Office for Pricing