Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

AC Magnetic Starters (GE)

Description of Operation

With Local or Remote Start-Stop Selector Switch (LVR) Control

Starting — Turning the selector switch to START energizes “M” and starts the motor.

Stopping — The motor will be stopped by (1) Turning the selector swtich to STOP, by (2) An overload which trips OL, and by (3) Loss of, or low line voltage (LVR).

Restarting — The motor will be restarted after (1) Turning the selector switch to START, after (2) Pressing the “OL” reset button, and after (3) The return to normal line voltage.

Size of Starter	Catalog Number
With Local Pushbuttons	
0	139B2810G1S2
1	139B2811G1S2
2	139B2812G1S2
3	139B2813G1S2
With Remote Pushbuttons	
0	139B6357G1S2
1	149B2103G1S7
2	187B6165G1S2
3	194B8503G1S2

Size of Starter	Catalog Number
With Local Selector Switch	
0	157B2115G1S2
1	194B8502G1S2
2	194B8510G1S2
3	194B8504G1S2
With Remote Selector Switch	
0	194B8505G1S2
1	194B8506G1S2
2	194B8507G1S2
3	194B8508G1S2

Description		Catalog Number
Nonreversing	Dripproof	IC5130B
	Watertight	IC5130D
Reversing	Dripproof	IC5131B
	Watertight	IC5131D

Ward Leonard Electric Company Inc.
401 Watertown Road
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Tel: 860-283-5801

AC Magnetic Starters (GE) Type IC5900

Description of Operation

With Local (And Provisions for Remote) Start-Stop Pushbutton (LVP) Control

Starting — Pressing the START pushbutton energizes "M" and starts the motor.

Stopping — The motor will be stopped by (1) Pressing the STOP pushbutton, by (2) An overload which trips OL, and by (3) Loss of, or low line voltage (LVR).

Restarting — The motor will be restarted after (1) Pressing the START pushbutton, after (2) Pressing the "OL" reset button and then pressing the START pushbutton, and after (3) Pressing the START pushbutton after the return to normal line voltage.

Size	Max. Motor HP Rating 115 Volts	Max. Motor HP Rating 440 Volts	Continuous Current Rating Amps
Single-speed			
0	2	5	18
1	3	10	27
2	7.5	25	45
3	1.5	50	90
4*	25	100	135
5*	–	200	270
6*	–	400	540
Two-speed, One-winding, Constant-torque, Variable-torque, or Constant-horsepower (Max Hp rating for constant-horsepower motors shown in parentheses).			
0	2 (1)	5 (3)	18
1	3 (2)	10 (7.5)	27
2	7.5 (–)	25 (20)	45
3	15 (–)	50 (40)	90
4*	25 (–)	100 (75)	135
Two-speed, Two-winding, Constant-torque, Variable-torque, or Constant-horsepower (Max Hp rating for constant-horsepower motors shown in parentheses).			
0	2 (1)	5 (3)	18
1	3 (2)	10 (7.5)	27
2	7.5 (–)	25 (20)	45
3	15 (–)	50 (40)	90
4*	25 (–)	100 (75)	135

* Select induction type overload relay if third O/L required.

Size of Starter	Catalog Number
0	139B2816G1S2
1	139B2817G1S2
2	139B2818G1S2
3	139B8509G1S2

Controllers for Life Boat Winches

Size	Max. Motor Hp (440 Volts)
0	1
1	5
2	15
3	30
4	60
5	150
6	300

NOTE: Controllers are designed to meet Specification MIL-D-17762. Includes main contactor in addition to reversing contactors.

Contactor Panels

Size	Continuous Current Rating Amps (600 Volts Max.) Heater Load	Tungsten Lighting
0	18	10
1	27	15
2	45	30
3	90	60
4	135	120
5	270	180
6	540	–

NOTE: Construction same as single-speed, full-voltage, nonreversing starter except for omission of overload relay.

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AC Magnetic Starters (GE)

Dripproof Starters (Dimensions and Weights)

Size	Mounting	Dimensions in Inches						Approx. Weight in Lbs.	
		Nonreversing			Reversing				
		Height	Width	Depth	Height	Width	Depth	Nonreversing	Reversing
Accross-the-line, Single-speed									
0	BHD	14	7.75	7.38	22	7.75	7.38	25	40
1	BHD	14	7.75	7.38	22	7.75	7.38	25	40
2	BHD	14	7.75	7.38	22	7.75	7.38	28	48
3	BHD	17	8.88	9	28	8.88	9.13	45	75
4	BHD	18	14	10	20	18	10	80	110
5	BHD	30	22	12	30	24	12	150	210
6	BHD	30	22	14	30	24	14	170	250
Accross-the-line, Two-speed									
0	BHD	22	7.75	7.38	22	18	8	40	75
1	BHD	22	7.75	7.38	22	18	8	40	75
2	BHD	22	7.75	7.38	22	18	8	48	100
3	BHD	28	8.88	8	36	24	10	75	195
4	BHD	20	18	10	36	24	10	110	210
Reduced-voltage, Single-speed									
2	BHD	30	24	10	–	–	–	200	–
3	BHD	36	24	12	–	–	–	265	–
4	BHD	36	24	12	–	–	–	325	–
5	Deck	50	30	20	–	–	–	685	–
6	Deck	70	30	20	–	–	–	1100	–

Contactor Panels

Size	Continuous Current Rating Amps (600 Volts Max.) (440 Volts)
0	1
1	5
2	15
3	30
4	60
5	150
6	300

NOTE: Construction same as single-speed, full-voltage, nonreversing starter except for omission of overload protection.

Size of Starter	Catalog Number
0	139B2816G1S2
1	139B2817G1S2
2	139B2818G1S2
3	139B8509G1S2

Ward Leonard Electric Company Inc.
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AC Magnetic Starters (WL)

Size Starter	Max. Motor Hp (3 Ph. 60 Hz) 115 V	Max. Motor Hp (3 Ph. 60 Hz) 440 V	Non-reversing Dripproof	Non-reversing Watertight	Reversing Dripproof	Reversing Watertight
			Catalog Number*			
Accross-the-line, Single-speed						
0	2	5	4010-3801-	4010-3401-	4210-3801-	4210-3401-
1	3	10	4011-3801-	4011-3401-	4211-3801-	4211-3401-
2	7.5	25	4012-3801-	4012-3401-	4212-3801-	4212-3401-
3	15	50	4013-3801-	4013-3401-	4213-3801-	4213-3401-
4	25	100	4014-3801-	4014-3401-	4214-3801-	4214-3401-
5	–	200	4015-3801-	4015-3401-	4215-3801-	4215-3401-
6	–	400	4016-3801-	4016-3401-	4216-3801-	4216-3401-
Accross-the-line, Two-speed, One Winding Constant or Variable Torque						
0	2	5	4310-1801-	4310-1401-	4910-1801-	4910-1401-
1	3	10	4311-1801-	4311-1401-	4911-1801-	4911-1401-
2	7.5	25	4312-1801-	4312-1401-	4912-1801-	4912-1401-
3	15	50	4313-1801-	4313-1401-	4913-1801-	4913-1401-
4	25	100	4314-1801-	4314-1401-	4914-1801-	4914-1401-
5	–	200	4315-1801-	4315-1401-	4915-1801-	4915-1401-
6	–	400	4316-1801-	4316-1401-	4916-1801-	4916-1401-
Accross-the-line, Two-speed, One Winding Constant or Variable Torque						
0	2	5	4310-2802-	4310-2402-	4910-2802-	4910-2402-
1	3	10	4311-2802-	4311-2402-	4911-2802-	4911-2402-
2	7.5	25	4312-2802-	4312-2402-	4912-2802-	4912-2402-
3	15	50	4313-2802-	4313-2402-	4913-2802-	4913-2402-
4	25	100	4314-2802-	4314-2402-	4914-2802-	4914-2402-
5	–	200	4315-2802-	4315-2402-	4915-2802-	4915-2402-
6	–	400	4316-2802-	4316-2402-	4916-2802-	4916-2402-

* For complete catalog number add coil soffic numbers from next page.

Ward Leonard Electric Company Inc.
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AC Magnetic Starters (WL)

Size Starter	Max. Motor Hp (3 Ph., 440 V, 60 Hz)	Nonreversing Dripproof Catalog Number*	Nonreversing Watertight Catalog Number*
Reduced Voltage Autotransformer – Single-speed			
1	3	10	27
2	7.5	25	45
3	1.5	50	90
4*	25	100	135
5*	–	200	270
6*	–	400	540
Reduced Voltage Autotransformer – Two-speed, Two Winding Constant or Variable Torque			
1	3	10	27
2	7.5	25	45
3	1.5	50	90
4*	25	100	135
5*	–	200	270
6*	–	400	540
Reduced Voltage Autotransformer – Two-speed, One Winding Constant or Variable Torque			
1	3	10	27
2	7.5	25	45
3	1.5	50	90
4*	25	100	135
5*	–	200	270
6*	–	400	540

* For complete Catalog Number add coil suffix numbers from above table.

Coil Suffix Numbers

A.C. Volts (60 Hz)	Suffix Nos.
115	11
220	21
440	41

Ward Leonard Electric Company Inc.
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AC Control Centers

Across-the-Line Starters - Nonreversing, Single speed

Starter Size	Dripproof Enclosure Dimensions Approx. in Inches			Weight lbs.
	A	B	C	
0, 1, 2	8 1/2	13	7	18
3, 4	16	20	8	24
5, 6	17	34 3/8	10 1/4	105

Ward Leonard Electric Company Inc.
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Manual Starters

Type IC5900

Specification	MIL-C-2212
Rating	Size 0
Rated Ambient	50° C
Duty	Designed for continuous duty and general-purpose service unless otherwised specified.
Enclosure	Dripproof
Forms	Flush mounting for panel installation. Dripproof enclosure for surface mounting. Dripproof lockable with provisions for locking in open position by maximum of two padlocks (not supplied).
Overload Protection	Thermostatic bimetal
Low-voltage release effect	Contacts remain closed on low voltage, allowing motor to restart upon return of power.
Poles	Three-pole (for single-phase A.C. or D.C., use the two outside poles).
Cable Entrance	Provisions for cable entrance at both top and bottom.

Surface-mounted starter

Ordering Information

Specify form number of starter (e.g., IC5900B2) and catalog number of heaters required (e.g., 81D900) from heater table.

Description	IC5900 Form	Weight in Ounces
Surface-mounted	B2	42
Flush-mounted	M1	26
Lockable, surface-mounted	B5	44
Switch mechanism (replacement only)	A1	16

Max Motor Hp Rating

AC, 3 Ph, 60 Hz		AC, 1 Ph, 60 Hz		DC	
Volts	Hp	Volts	Hp	Volts	Hp
115	1.5	115	1		
220	2	230	1.5	115	1
440	3	440	2	230	1

Continuous current - 15 amps

Tungsten lamp load - 8 amps

Ward Leonard Electric Company Inc.
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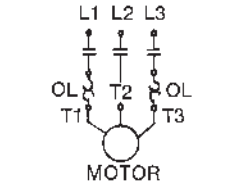
Manual Heaters

Type IC5900

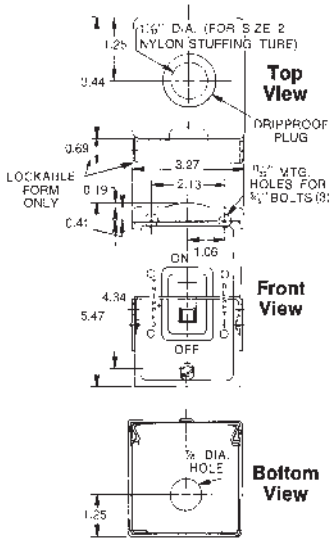
Catalog Number	Rating Amps	Continuous Motor Load Range -- Amp Minimum	Maximum
81D900	0.37	0.29	0.32
81D901	.42	.33	.36
81D902	.46	.37	.40
81D903	.52	.41	.45
81D904	.58	.46	.50
81D905	.63	.51	.55
81D906	.70	.56	.61
81D907	.78	.62	.68
81D908	.87	.69	.75
81D909	.96	.76	.83
81D910	1.05	.84	.91
81D911	1.15	.92	1.00
81D912	1.26	1.01	1.10
81D913	1.39	1.11	1.21
81D914	1.53	1.22	1.33
81D915	1.68	1.34	1.46
81D916	1.84	1.47	1.60
81D917	2.01	1.61	1.75
81D918	2.20	1.76	1.75
81D919	2.41	1.92	2.09
81D920	2.63	2.10	2.28
81D921	2.87	2.29	2.49
81D922	3.13	2.50	2.72
81D923	3.42	2.73	2.97
81D924	3.73	2.98	3.24
81D925	4.07	3.25	3.53
81D926	4.43	3.54	3.85
81D927	4.82	3.86	4.19
81D928	5.24	4.20	4.56
81D929	5.71	4.57	4.97
81D930	6.22	4.98	5.41
81D931	6.77	5.42	5.89

Catalog Number	Rating Amps	Continuous Motor Load Range – Amp Minimum	Maximum
81D932	7.38	5.90	6.42
81D933	8.03	6.43	6.99
81D934	8.75	7.00	7.61
81D935	9.53	7.62	8.29
81D936	10.4	8.30	9.03
81D937	11.3	9.04	9.83
81D938	12.2	9.84	10.6
81D939	13.4	10.7	11.6
81D940	14.5	11.7	12.6
81D941	15.8	12.7	13.7
81D942	17.3	13.8	15.0

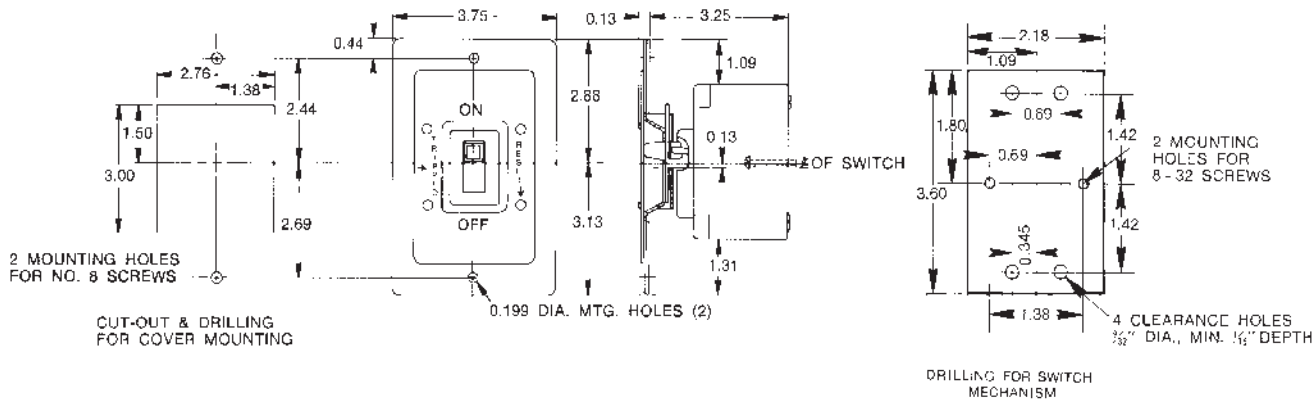


NOTE: *For single-phase and DC installation use L1 & L3*

Wiring Symbol



Surface-mounted Form



Flush-mounted Form

Ward Leonard Electric Company Inc.
401 Watertown Road
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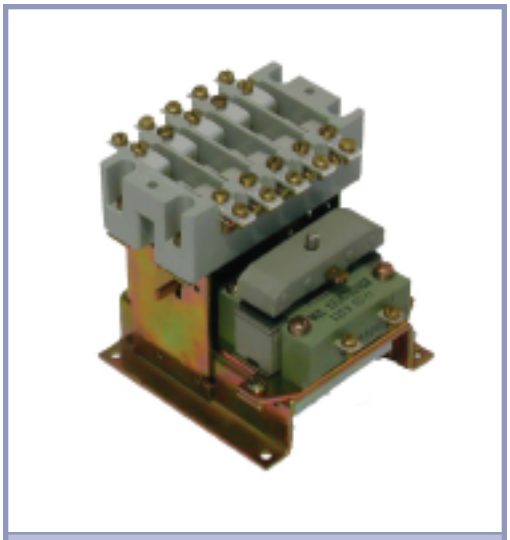
AC Contactors

Type IC5181

Specification	MIL-C-2212
Application	Motor control, heater and tungsten lamp switching.
Type	Select standard type (IC5181C) or quiet type (IC5181D) when control is to meet standard MIL-C-740. All quiet contactors undergo special testing at the factory.
Rated Ambient	50^{o} C
Duty	Continuous
Insulation	Class B (coils are Class A)



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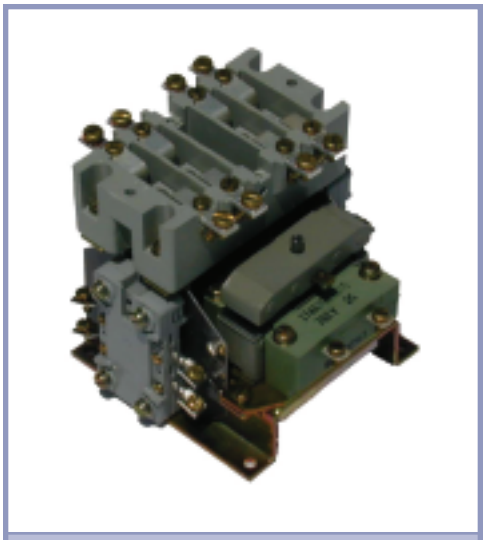

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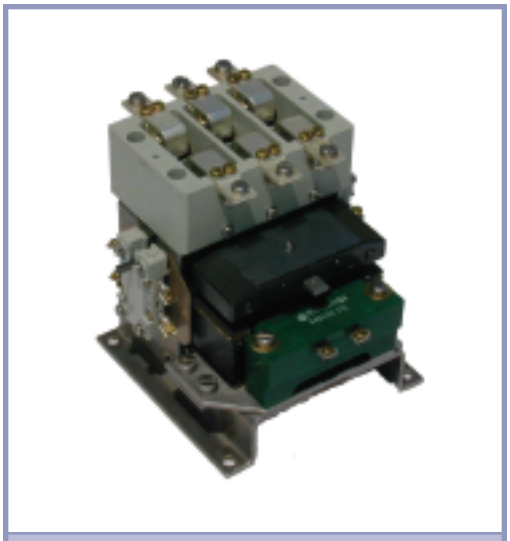

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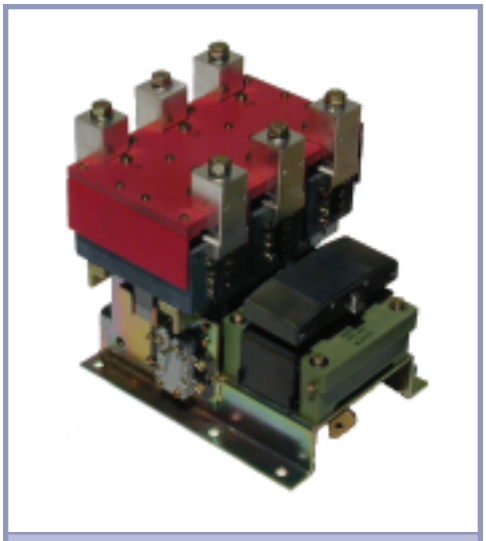

Size 6

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
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AC Contactors

Type IC5181

Size	Poles	Standard			Quiet		
		Basic Catalog Number IC5181			Basic Catalog Number IC5181		
		115 V Coil 60 Hz	440 V Coil 60 Hz	Number of Auxiliary Contacts	115 V Coil 60 Hz	440 V Coil 60 Hz	Number of Auxiliary Contacts
0	2	C100D3	C100D6	2	D100D3	D100D6	2
		C100D3	C100D6	4	D100D3	D100D6	4
	3	C100A3	C100A6	2	D100A3	D100A6	2
		C100A3	C100A6	4	D100A3	D100A6	4
	4	C100B3	C100B6	2	D100B3	D100B6	2
		C100B3	C100B6	4	D100B3	D100B6	4
	5	C100C3	C100C6	2	D100C3	D100C6	2
		C100C3	C100C6	4	D100C3	D100C6	4
1	3	C101A3	C101A6	2	D101A3	D101A6	2
		C101A3	C101A6	4	D101A3	D101A6	4
	4	C101B3	C101B6	2	D101B3	D101B6	2
		C101B3	C101B6	4	D101B3	D101B6	4
	5	C101C3	C101C6	2	D101C3	D101C6	2
		C101C3	C101C6	4	D101C3	D101C6	4
2	3	C102A3	C102A6	2	D102A3	D102A6	2
		C102A3	C102A6	4	D102A3	D102A6	4
	4	C102B3	C102B6	2	D102B3	D102B6	2
		C102B3	C102B6	4	D102B3	D102B6	4
	5	C102C3	C102C6	2	D102C3	D102C6	2
		C102C3	C102C6	4	D102C3	D102C6	4
3	3	C103A3	C103A6	2	D103A3	D103A6	2
		C103A3	C103A6	4	D103A3	D103A6	4
		C103A3	C103A6	6	D103A3	D103A6	6
		C103A3	C103A6	8	D103A3	D103A6	8
4	3	C104A3	C104A6	2	D104A3	D104A6	2
		C104A3	C104A6	4	D104A3	D104A6	4
		C104A3	C104A6	6	D104A3	D104A6	6
		C104A3	C104A6	8	D104A3	D104A6	8
5	3	C105A3	C105A6	2	D105A3	D105A6	2
		C105A3	C105A6	4	D105A3	D105A6	4
		C105A3	C105A6	6	D105A3	D105A6	6
		C105A3	C105A6	8	D105A3	D105A6	8
6	3	C106A3	C106A6	2	D106A3	D106A6	2
		C106A3	C106A6	4	D106A3	D106A6	4
		C106A3	C106A6	6	D106A3	D106A6	6
		C106A3	C106A6	8	D106A3	D106A6	8

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AC Contactors

Type IC5181

Auxiliary Contact Ratings

	Amperes			
			Break	
Volts	Carry	Make	One Contact	Two Contacts in Series
115 VAC	10	60	10	–
440 VAC	10	60	5	–
115 VDC				
Inductive	10	60	1	2
Noninductive	10	60	5	10
230 VDC				
Inductive	10	60	0.5	1
Noninductive	10	60	2	4

Control Power Requirements

	Amperes Holding		Amperes Inrush	
Size	115 V	440 V	115 V	440 V
0, 1	0.33	0.08	2.1	0.5
2	.63	.15	5.0	1.2
3, 4	.75	.18	10.9	2.6
5, 6	1.2	.40	32.0	10.0

Note: Pick-up voltage is approximately 74-79% of rated coil voltage. Drop-out voltage is approximately 40-45% of rated coil voltage.

Note: Auxiliary contacts can be changed from N.O. to N.C. and vice versa without addition of parts.

Application

	Motor Horsepower Non-plugging and Nonjogging Duty			Encl.	Tungsten		
	Single Phase	Three Phase		Rating	Lamp		
Size	115 V	115 V	440 V	Amp Cont	Load Amp	Make Amp	Break Amp
0	1	2	5	18	10	108	108
1	2	3	10	27	15	162	162
2	3	7.5	25	45	30	270	270
3	7.5	15	50	90	60	540	540
4	–	25	100	135	120	810	810
5	–	–	200	270	180	1620	1620
6	–	–	400	540	–	3240	3240

Note: Enclosed rating shown is 90% of open rating.

Auxiliary Contact Arrangements

Size 0 – 1 – 2 Contactors

No. of Auxiliary Contacts	Arrangements		Catalog No. Indicator
	N.O.	N.C.	
0	0	0	XX
2	2	0	BX
	1	1	AX
	0	2	CX
4	0	4*	CC
	1	3*	AC
	2	2	AA
	3	1	AB
	4	0	BB

Size 3 – 4 – 5 – 6 Contactors

No. of Auxiliary Contacts	Arrangements		Catalog No. Indicator
	N.O.	N.C.	
0	0	0	XX
2	2	0	XBXX
	1	1	XAXX
	0	2	XCXX
4	0	4	XCCX
	1	3	XACX
	2	2	XAAX
	3	1	XABX
	4	0	XBBX
6	6	0	BBBX
	5	1	ABBX
	4	2	ABAX
	3	3	AAAX
	2	4	ACAX
	1	5	ACCX
	0	6	CCCX
8	8	0	BBBB
	7	1	ABBB
	6	2	ABBA
	5	3	AABA
	4	4	AAAA
	3	5	AACA
	2	6	ACCA
	1	7	ACCC
	0	8	CCCC

*This auxiliary contact arrangement is not available on Size 0 and 1 contactors. Size 0 and 1 contactors are design limited to two N.C. auxiliary contacts.

Ward Leonard Electric Company Inc.
401 Watertown Road
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Tel: 860-283-5801

AC Contactors

Type IC5181

Ordering Information

Order by complete catalog number. Complete catalog number consists of the basic catalog number, plus an auxiliary contact indicator.

Example: A standard Size 2 contactor with 3 poles, 440 VAC, 60 Hz coil and 2 N.O. and 2 N.C. auxiliary contacts is:

IC5181C102A6AA

Basic Catalog Number — Auxiliary Contact Indicator

Mechanical Interlocks: For mechanical interlocking of two contactors for reversing or multispeed starters, refer to Company for quotation.

Unlisted Ratings: For other unlisted voltages or frequencies or for application on DC, refer to Company for quotation.

Typical Cat. No. Size 0, 1, and 2

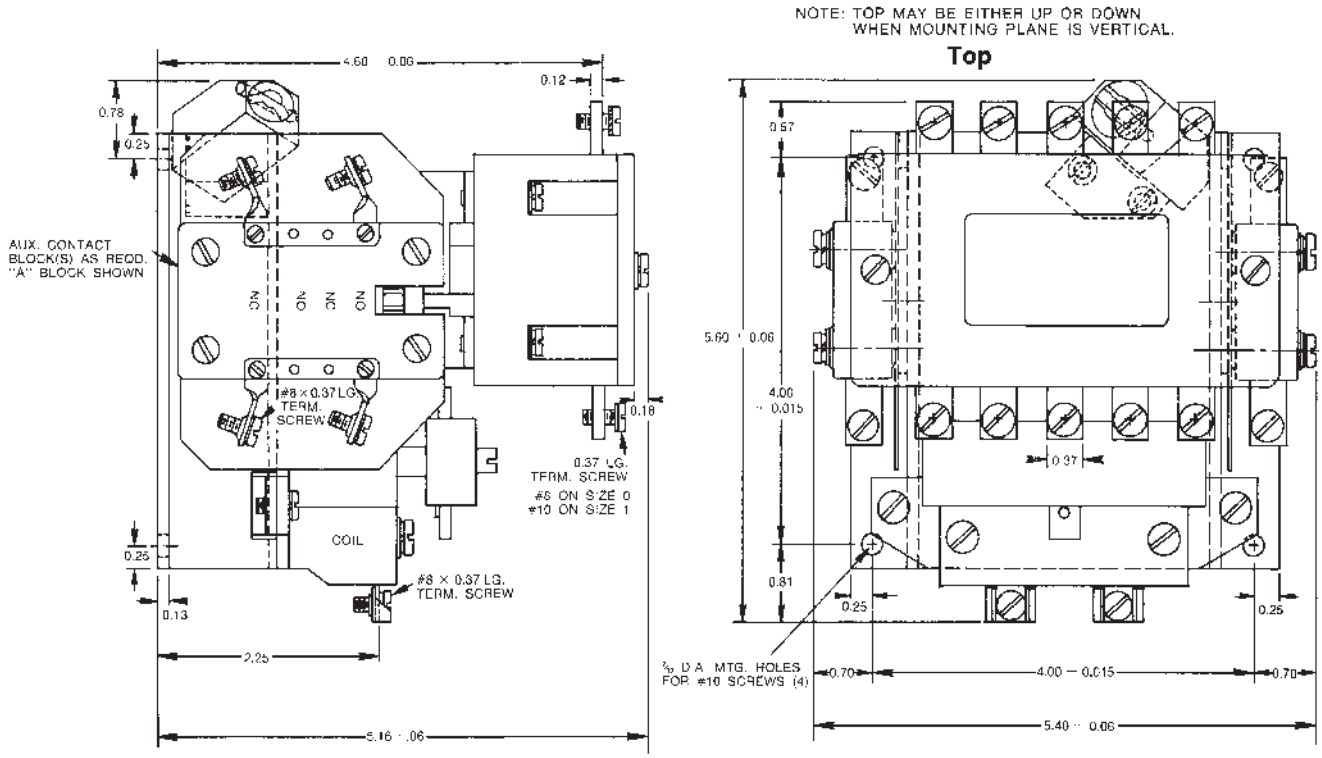
IC5181C100A6AA

- Basic No.
- Device Form
- Coil Group No.
- Right side Aux. Contact Block
- Left side Aux. Contact Block

Typical Cat. No. Size 3, 4, 5, and 6

IC5181C103A6XAAX

- Basic No.
- Device Form
- Coil Group No.
- Right side outer Aux. Contact Block
- Right side Aux. inner Contact Block
- Left side inner Aux. Contact Block
- Left side outer Aux. Contact Block

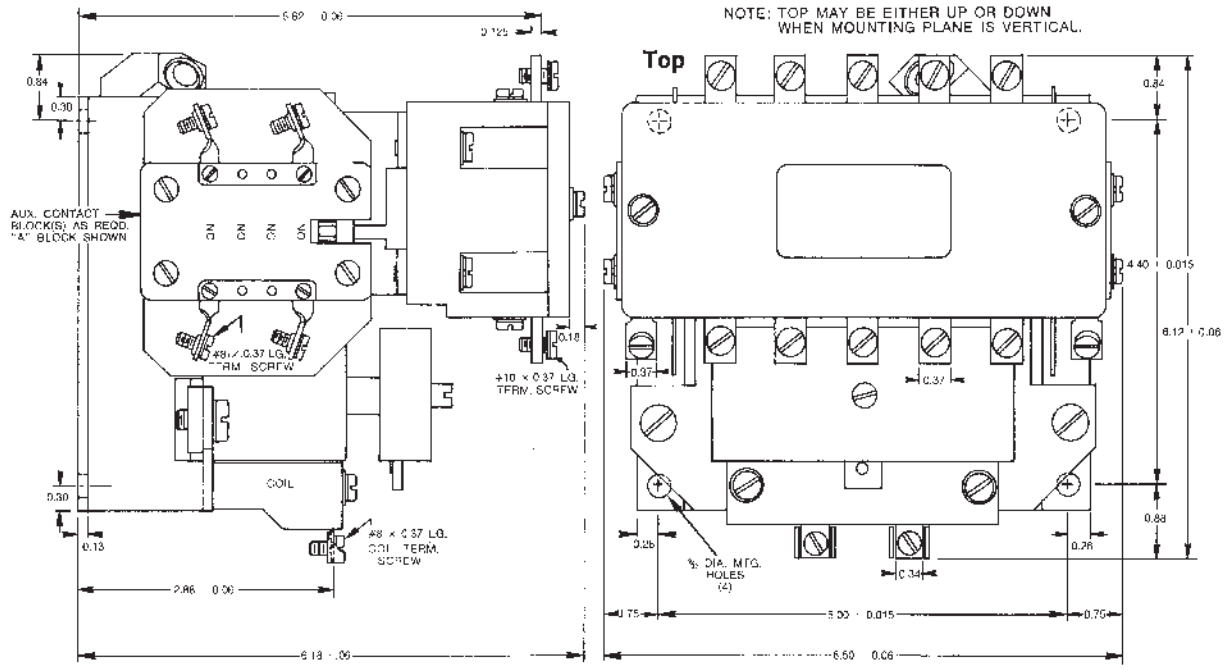


Outline and Mounting Dimensions (in Inches)

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

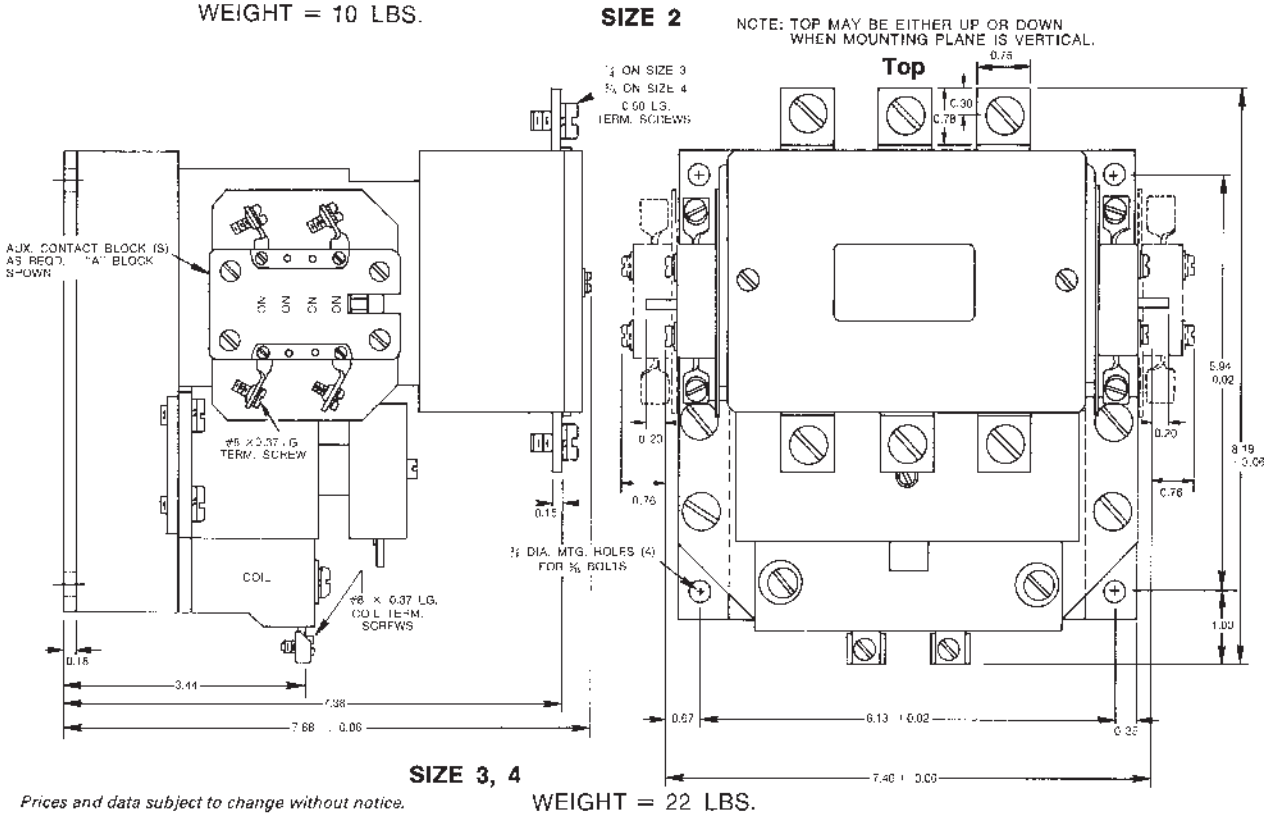
AC Contactors

Type IC5181



WEIGHT = 10 LBS.

SIZE 2



SIZE 3, 4

WEIGHT = 22 LBS.

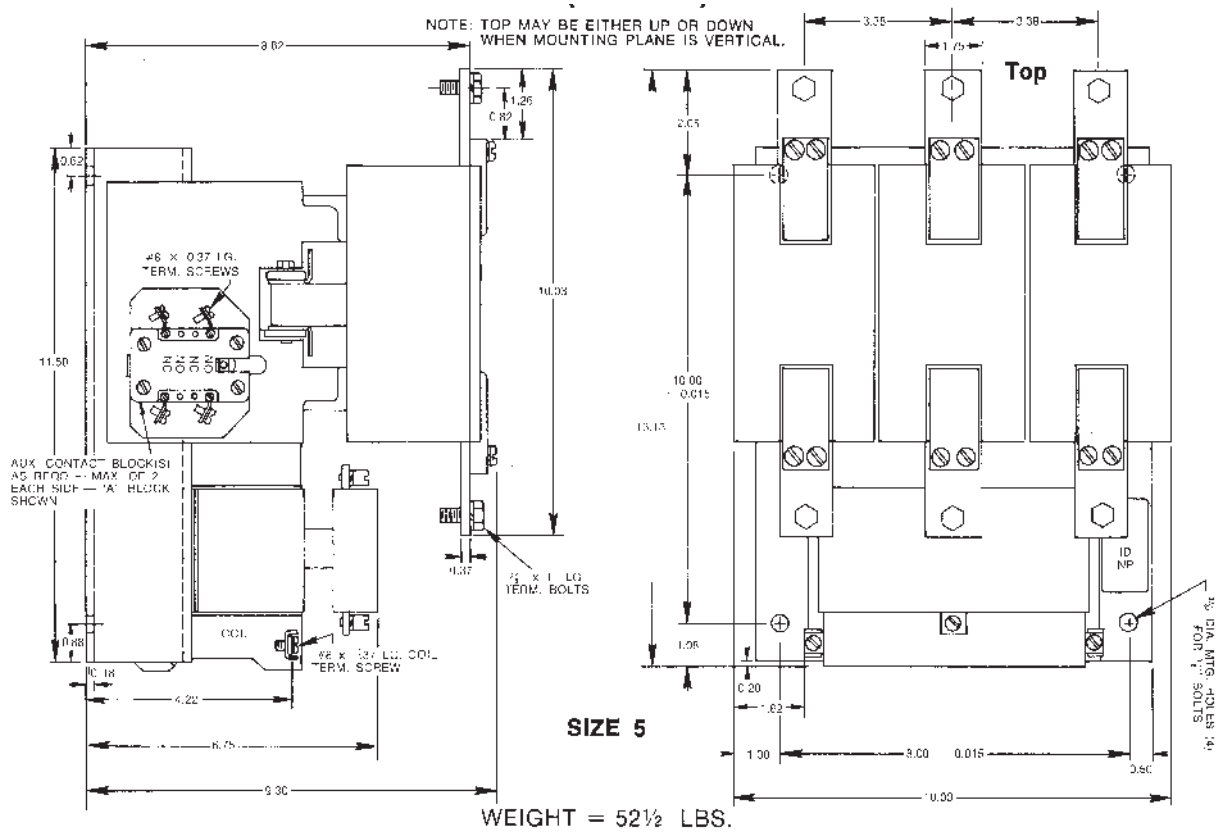
Prices and data subject to change without notice.

Outline and Mounting Dimensions (in Inches)

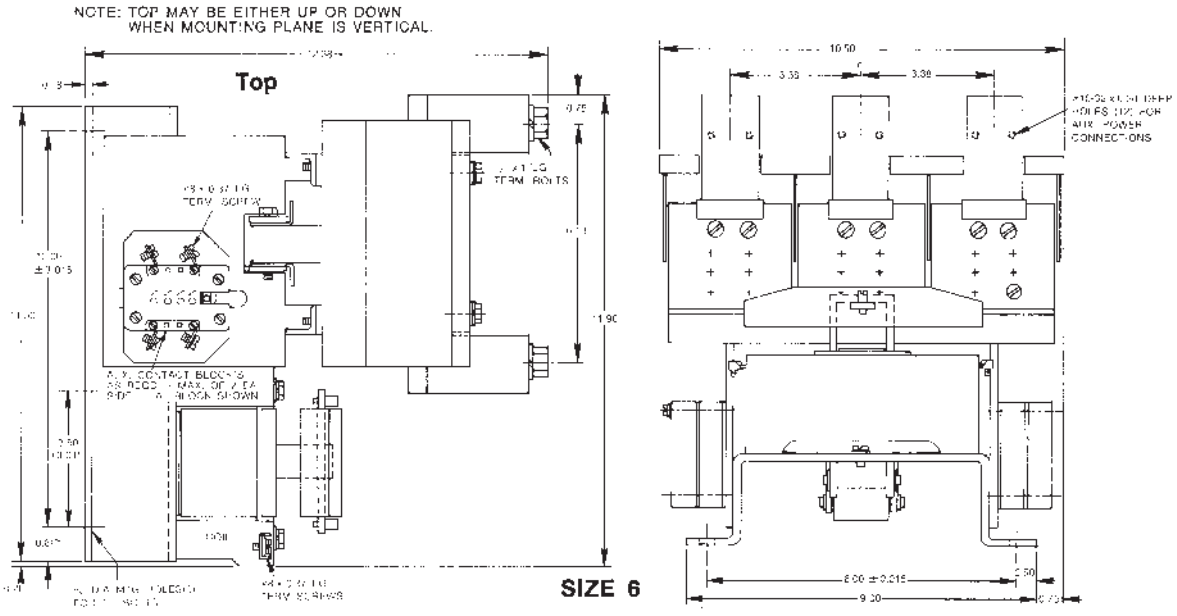
Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

AC Contactors

Type IC5181



WEIGHT = 52½ LBS.



WEIGHT = 70 LBS.

Outline and Mounting Dimensions (in Inches)

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

AC Magnetic Contactors

Series 4691

Series 4691 A.C. Magnetic Contactors, both standard and low noise types, are available in Sizes 0-6. Used for motor starting, lamp switching, and heater controls. The 4691 Series meets all applicable military specifications.

Contactors are solenoid operated featuring totally enclosed double break alloy contacts, accessible line, load, and coil terminals and continuous duty operating coils. Contactor parts are compactly arranged on a steel base plate.

Specification	MIL-C-2212 A.C. Control MIL-C-23742 Group Control MIL-C-901 Hi-Shock MIL-STD-167 Vibration MIL-STD-740 Acceptable Noise Criteria (quiet type)
Operation	Magnetic solenoid
Function	Line, accelerating or control contactors.
Type	Series 4691, Types N160 thru N176
Duty	Continuous
Ambient	50^{O} C
Insulation	Class B (coils are Class A)

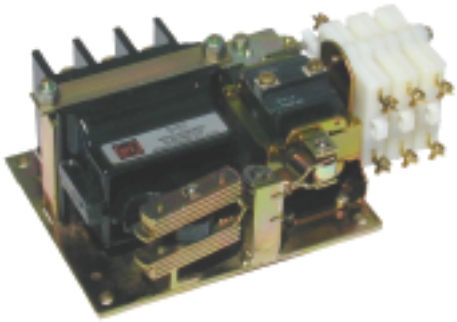
Auxiliary Contacts

Auxiliary contacts for electrical interlocking, maintaining and other control circuit applications are available in N.O. and N.C. types. Auxiliaries are rated at 5 amps., 440 volts, 60 Hz., (make or break). A maximum of 3 auxiliaries per contactor can be furnished.

Mechanical Interlocks

Mechanically interlocked contactors can be furnished for reversing and multispeed applications.

Size 0



Size 1

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

AC Magnetic Contactors

Series 4691

Application

Type No.	Size	Motor Horsepower Nonjogging Duty: Single Phase 115 V	Three Phase 115 V	Three Phase 440 V	Elec. Rating Amps. Cont.	Tungsten Lamp Load Amps	Make Amps	Break Amps
N160-1	0	1	2	5	18	10	108	108
N161	1	2	3	10	27	15	162	162
N162	2	3	7 1/2	25	45	30	270	270
N163	3	7 1/2	15	50	90	60	540	540
N164	4	–	25	100	135	120	810	810
N175-1	5	–	–	200	270	180	1620	1620
N176	6	–	–	400	540	–	3240	3240

Repair Parts

Repair parts normally furnished in accordance with applicable part allowance list include:

1 set of contacts
1 set of springs
1 shunt of coil of each size and type

Control Power Requirements

Size	Amperes Holding 115 V	220 V	440 V	Amperes Inrush 115 V	220 V	440 V
0, 1, 2	0.29	0.13	0.06	1.9	0.91	0.38
3, 4	1.2	.51	.27	12.3	5.6	2.8
5, 6	1.4	–	.32	4.3	–	0.94

Notes: The 356L1 coil and a 15 watt (actual load) 833 ohm resistor are connected in series across the output of a full wave bridge rectifier for 115 volts 60 hertz service voltage.

The 356L2 coil and a 58 watt (actual load) 3.2K ohm resistor are connected in series across the ouput of a full wave bridge rectifier for 440 volt 60 hertz service voltage.

Ordering Information

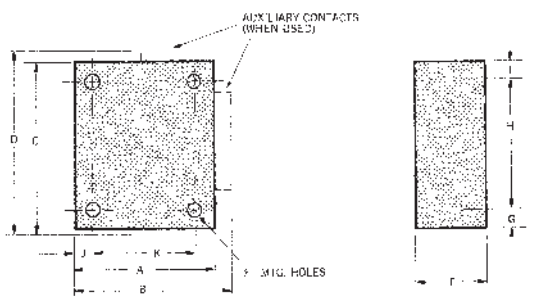
When ordering Series 4691 A.C. Contactors, specify:

1. Type No. or Contactor size
2. Coil voltage and frequency
3. No. of auxiliary contactors (N.O. or N.C.)
4. Open or enclosed
5. Repair parts (if required)
6. Special environmental requirements
7. Application

Dimensions in Inches (approx.)

Contactor Size	A	B Auxiliaries 1	2	3	C	D Aux. 1 or 2	E	F Dia.	G	H	I	J	K	Weight in Lbs. Approx.
0, 1, 2	6 1/8	7 1/16	7 1/16	8 1/16	5 1/16	–	3 9/16	(4) 17/64	5/16	4 1/4	5/16	5/16	5 1/2	5
3, 4	10 15/16	–	–	–	8 11/16	31/32	6 5/16	(4) 13/32	11/16	7 1/8	11/16	11/16	9 9/16	21
5, 6	16 3/4	–	–	–	16 3/4	–	15 3/8	(4) 9/16	7/8	14 1/2	7/8	13/16	15 1/8	85

Dimensions



Ward Leonard Electric Company Inc.
401 Watertown Road
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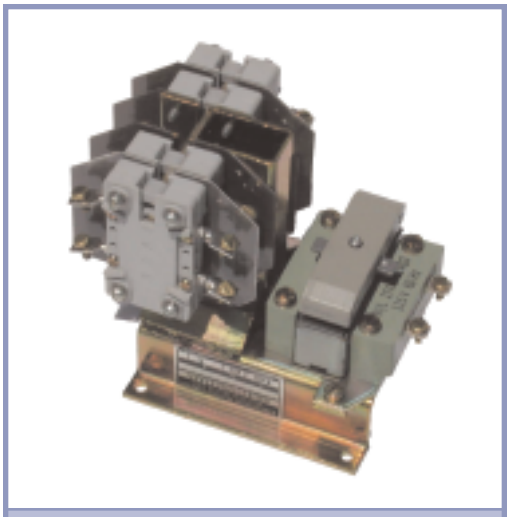
Tel: 860-283-5801

AC Relays

Type IC5182

Series N147 Overload Relays are of the magnetically operated self reset type, designed for use on A.C. or D.C. motor starters and controllers for Navy Service A applications.

Specification	MIL-C-2212
Application	Auxiliary relay, control relay, or undervoltage relay.
Forms	Select standard form (IC5182), or quiet form (IC5182D) when control is to meet standard MIL-STD-740. All quiet AC relays undergo special testing at the factory.
Contacts	Available in 2, 4, 6, and 8 contact versions.
Rated Ambient	50° C
Duty	Continuous
Insulation	Class B (coil is Class A)



Type IC5182 AC Relay

	Basic Catalog Number IC5182			
	Standard		Quiet	
Number of Contacts	115 V Coil	440 V Coil	115 V Coil	440 V Coil
2	C120A3	C120A6	D120A3	D120A6
4	C120A3	C120A6	D120A3	D120A6
6	C120A3	C120A6	D120A3	D120A6
8	C120A3	C120A6	D120A3	D120A6

Ordering Information

Order by complete catalog number. Complete catalog number consists of the basic catalog number, plus a contact arrangement indicator.

Example: A standard relay having a 440 VAC, 60 Hz coil and 6 N.O. and 2 N.C. contacts is: IC5182C120A6ABBA

Basic Catalog Number — Contact Arrangement Indicator

Unlisted Ratings: For other unlisted voltages or frequencies or for application on D.C., refer to Company.

Control Power Requirements

Volts	Amperes Holding	Amperes Inrush
115	0.33	2.1
440	.08	0.5

Contact Ratings (Amperes)

			Break	
Volts	Carry	Make	One Contact	2 Contacts in Series
115 VAC	10	60	10	-
440 VAC	10	60	5	-
115 VDC				
Inductive	10	60	1	2
Noninductive	10	60	5	10
230 VDC				
Inductive	10	60	0.5	1
Noninductive	10	60	2	4

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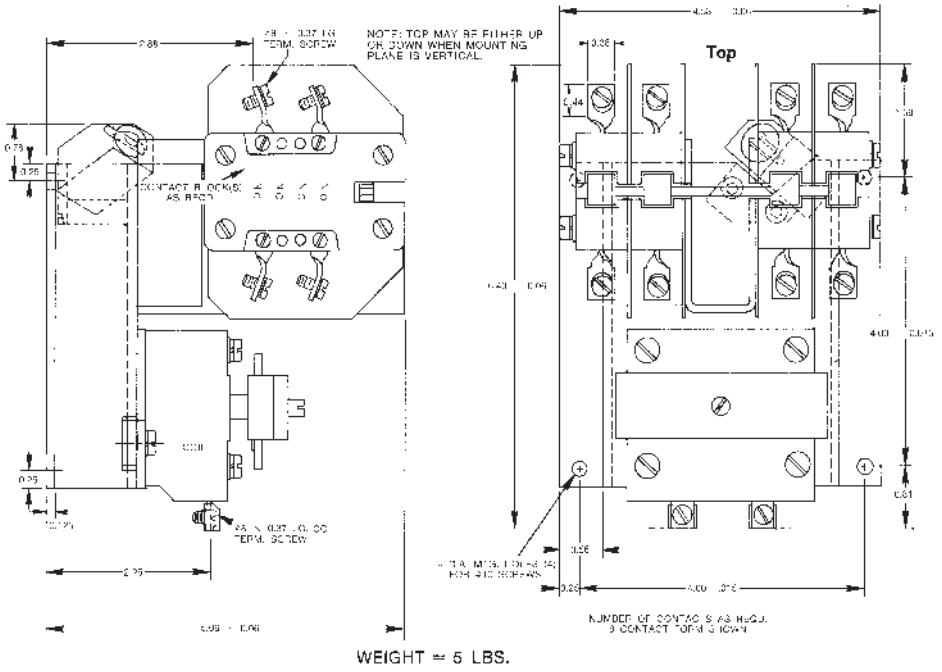
AC Relays

Type IC5182

Outline and Mounting Dimensions



WEIGHT ≈ 5 LBS.

Contact Arrangements

No. of Auxiliary Contacts	Arrangements N.O.	Arrangements N.C.	Contact Arrangement Indicator
2	2	0	XBXX
	1	1	XAXX
	0	2	XCXX
4	0	4	XCCX
	1	3	XACX
	2	2	XAAX
	3	1	XABX
	4	0	XBBX
6	6	0	BBBX
	5	1	ABBX
	4	2	ABAX
	3	3	AAAX
	2	4	ACAX
8	8	0	BBBB
	7	1	ABBB
	6	2	ABBA
	5	3	AABA
	4	4	AAAA

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Thermal Overload Relays

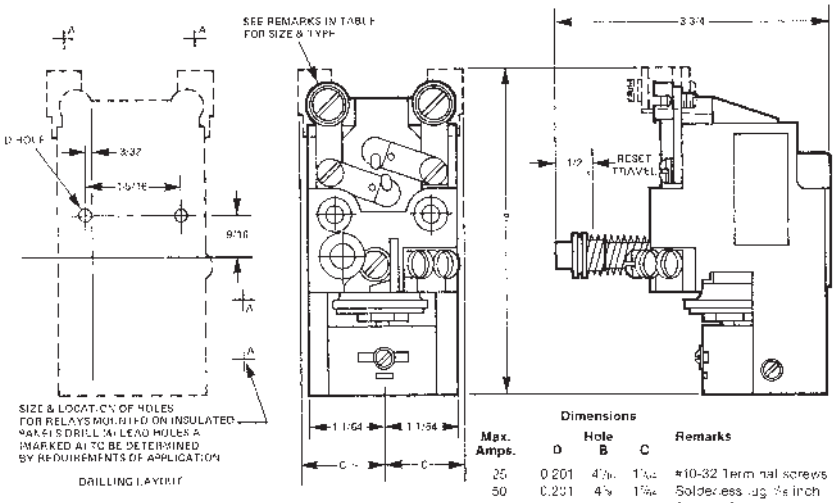
Series N154

Type N154 Relay is an ambient compensated single pole inverse time thermal overload relay suitable for A.C. or D.C. service. It is specifically designed for use with motor starters and controllers that are to be applied on Navy Service A applications.

Specification	MIL-C-2212
Function	Motor overload protection
Operation	Thermal inverse time delay type, manual reset
Type	Series N154
Heaters	Interchangeable, Heaters available with current trip range 0.36 to 275 amps.
Compensation	Ambient compensation within 0.3% per degree change in ambient temperature between 20 oC and 70 oC.
Insulation	Class A
Adjustment	Trip current adjustable +/- 10% of heater rating.
Voltage	A.C. 600 volts max., D.C. 250 volts max.
Contact Rating	Normally closed contact will carry and break 6 amps. max. A.C. and 200 V.A. with a max. of 2 amps. D.C.

Series N154 Thermal Overload Relay

Dimensions (Approximate)



Dimensions

Max. Amps.	Hole D	Hole B	Hole C	Remarks
25	0.201	4⅞	1¾₂	#10-32 Terminal screws
50	0.201	4⅞	1¾₄	Solderless lug ⅝ inch
100	0.201	4⅞	1⅜₂	Square Opening
150	0.201	5 1/16	1⅝₂	¼-20 Terminal screws
300	0.201	5⅝	1⅝₂	A- Clearance hole for terminal screw.

Use with Contactor Size	Ampere Rating Nominal	Catalog Number
0, 1	25	N154-1
2	50	N154-2
3	100	N154-3
4	150	N154-4
5	300	N154-5*

* Relays must be used with current transformer. Consult Factory for transformer selection.

Ordering Information

When ordering Series N154 Overload Relays, specify:

1. Catalog Number
2. Motor type, H.P. and nameplate amperes.

When ordering heaters, specify Heater Part Number and Motor Full Load Amperes. Heaters furnished separately.

Repair Parts

Repair parts are normally furnished in accordance with the applicable part allowance list include:

1 set of overload heaters (wt. 2 oz. each)

Ward Leonard

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Thermal Overload Relays

Series N154

Heaters

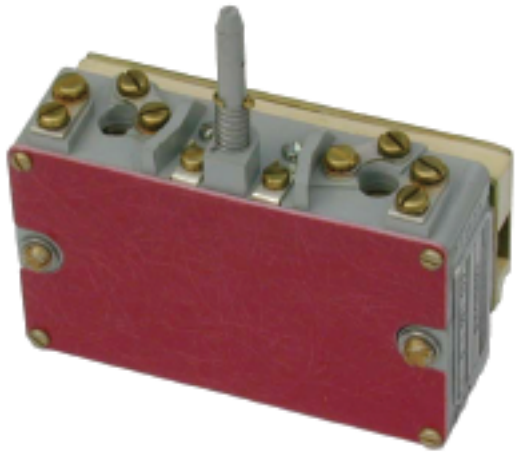
Full Load Motor Amperes	Heater Marking	Catalog Number	Full Load Motor Amperes	Heater Marking	Catalog Number
.28 - .30	.36	104.813.11	13.1 - 14.0	16.0	104.813.42
.31 - .34	.40	104.813.12	14.1 - 16.0	18.0	104.813.43
.35 - .39	.45	104.813.13	16.1 - 18.0	20.5	104.813.44
.40 - .44	.51	104.813.14	18.1 - 20.3	23.0	104.813.45
.45 - .50	.58	104.813.15	20.4 - 22.9	26.0	104.813.46
.51 - .56	.65	104.813.16	23.0 - 25.4	29.5	104.813.47
.57 - .64	.73	104.813.17	25.5 - 27.0	32.0	104.813.48
.65 - .73	.83	104.813.18	28 - 31	35.0	104.813.49
.74 - .30	.94	104.813.19	32 - 35	41.0	104.813.50
.82 - .92	1.06	104.813.20	36 - 38	44.0	104.813.51
.93 - 1.05	1.20	104.813.21	39 - 42	49.0	104.813.52
1.06 - 1.19	1.36	104.813.22	43 - 45	53.0	104.813.53
1.20 - 1.35	1.54	104.813.23	46 - 48	58.0	104.813.54
1.36 - 1.53	1.74	104.813.24	49 - 52	62.0	104.813.55
1.54 - 1.73	1.95	104.813.25	53 - 57	67.0	104.813.56
1.74 - 1.94	2.21	104.813.26	58 - 63	73.0	104.813.57
1.95 - 2.1	2.50	104.813.27	64 - 71	81.0	104.813.58
2.2 - 2.5	2.83	104.813.28	72 - 80	91.0	104.813.59
2.6 - 2.8	3.20	104.813.29	81 - 89	102.0	104.813.60
2.9 - 3.2	3.65	104.813.30	90 - 98	113.0	104.813.61
3.3 - .3.6	4.15	104.813.31	99 - .108	123.0	104.813.62
3.7 - 4.0	4.65	104.813.32	109 - 118	137.0	104.813.63
4.1 - 4.5	5.25	104.813.33	119 - 125	149.0	104.813.64
4.6 - 5.3	5.95	104.813.34	126 - 136	157.0	104.813.65
5.4 - 6.0	6.75	104.813.35	137 - 151	173.0	104.813.66
6.1 - 6.7	7.70	104.813.36	152 - 163	190.0	104.813.67
6.8 - 7.7	8.70	104.813.37	164 - 180	205.0	104.813.68
7.8 - 9.0	10.2	104.813.38	181 - 190	223.0	104.813.69
9.1 - 10.3	11.7	104.813.39	191 - 199	244.0	104.813.70
10.4 - 11.7	13.2	104.813.40	200 - 205	275.0	104.813.71
11.8 - 13.0	14.8	104.813.41			

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Thermal Overload Relays

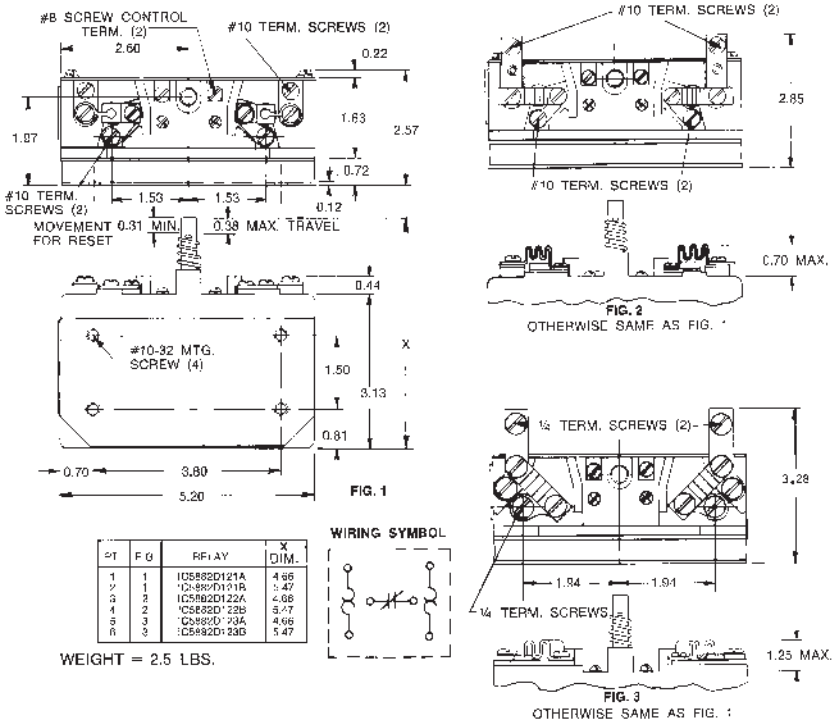
Type IC5882D

Specification	MIL-C-2212
Application	Use for motor overload protection.
Type	Heater type with interchangeable heater elements and adjustable trip setting. Trip current can be varied +/- 10% from factory setting.
Form	Dual element (two pole) with one N.C. contact. Use only one pole for single phase A.C. or D.C.
Voltage	600 volts maximum.



Type IC5882D Overload Relay

Outline and Mounting Dimensions (in inches)



Ordering Information

To order overload relay with heaters specify overload relay catalog number and heater catalog number.

Example: IC5882D122B with two Type 81D363 heaters.

Overload relay or heaters may be ordered as separate items (not assembled together) by specifying appropriate catalog number and quantity of each required.

Contact Ratings (Amperes)

Carry Continuous	Make Momentary	Break			
		115 VAC	440 VAC	115 VDC	230 VDC
10	30	15	5	0.35	0.17

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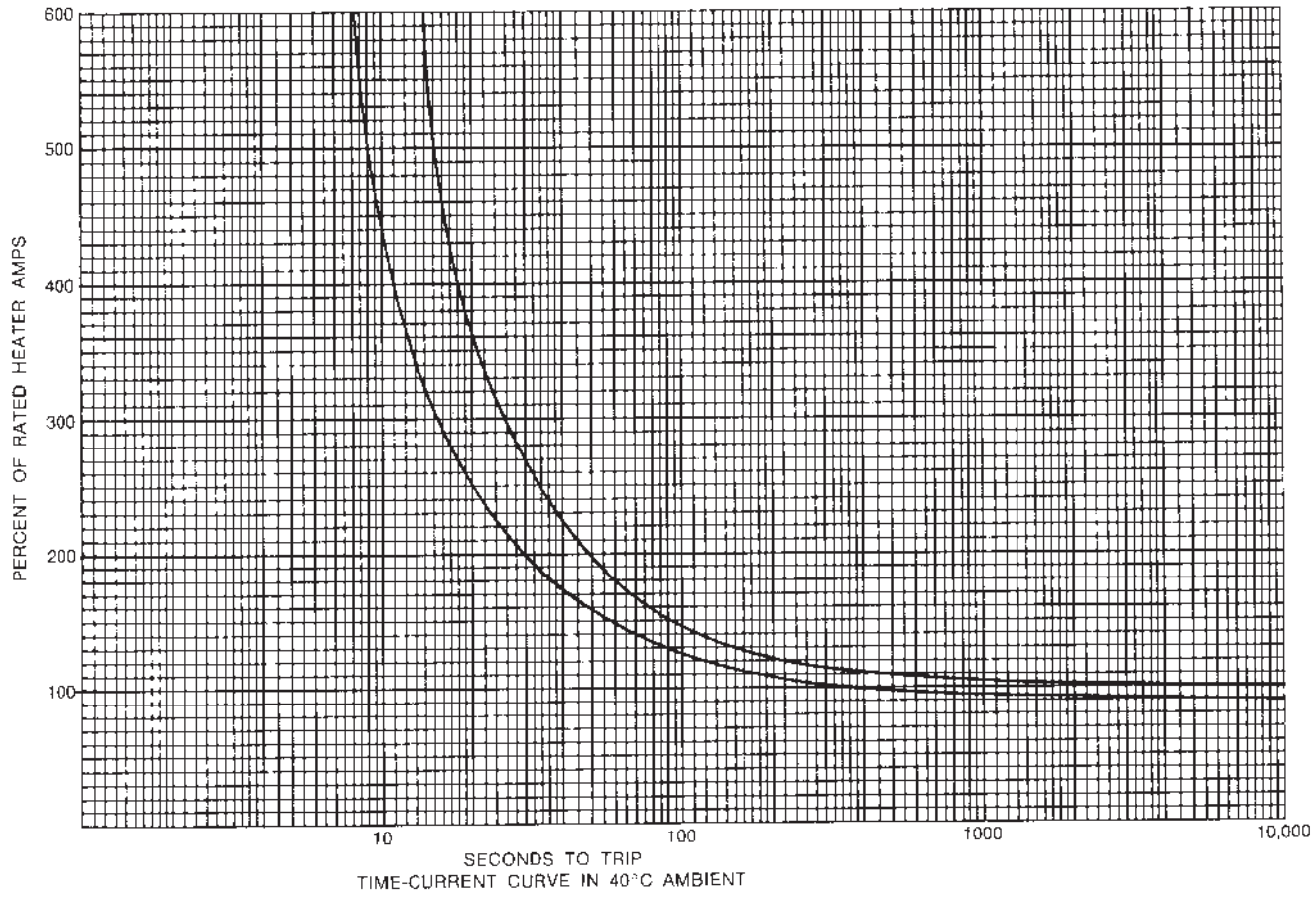
Thermal Overload Relays

Type IC5882D



Heaters

Use With Contactor Size	Reset Rod Length	Catalog Number
0, 1	Short Long	IC5882D121A IC5882D121B
2	Short Long	IC5882D122A IC5882D122B
3	Short Long	IC5882D123A IC5882D123B
4, 5, 6*	–	–

*Size 4: USE induction overload relay on page 26
Size 5 & 6:
USE overload relay Cat. No. IC5882D121 with two 200:5 current transformers.

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Thermal Overload Relays

Type IC5882D

Heaters

Max. Cont. Full Load Motor Amp for 40° C Rise Motors	Heater Rating Amps @ 40° C	Catalog Number
Size 0, 1, 2		
0.37 - 0.38	0.44	81D303
0.39 - 0.42	0.48	81D304
0.43 - 0.46	0.53	81D305
0.47 - 0.50	0.58	81D306
0.51 - 0.56	0.64	81D307
0.57 - 0.62	0.71	81D308
0.63 - 0.67	0.77	81D309
0.68 - 0.74	0.85	81D310
0.75 - 0.82	0.94	81D311
0.83 - 0.90	1.03	81D312
0.91 - 0.99	1.14	81D313
1.00 - 1.09	1.25	81D314
1.10 - 1.20	1.37	81D315
1.21 - 1.31	1.50	81D316
1.32 - 1.44	1.65	81D317
1.45 - 1.59	1.82	81D318
1.60 - 1.74	2.00	81D319
1.75 - 1.92	2.20	81D320
1.93 - 2.11	2.42	81D321
2.12 - 2.31	2.65	81D322
2.32 - 2.55	2.92	81D323
2.56 - 2.80	3.20	81D324
2.81 - 3.09	3.54	81D325
3.10 - 3.42	3.92	81D326
3.43 - 3.75	4.3	81D327
3.76 - 4.10	4.7	81D328
4.11 - 4.54	5.2	81D329
4.55 - 4.98	5.7	81D330
4.99 - 5.45	6.25	81D331
5.46 - 6.03	6.9	81D332
6.04 - 6.65	7.6	81D333
6.66 - 7.25	8.3	81D334
7.26 - 8.05	9.2	81D335
8.06 - 8.83	10.1	81D336
8.84 - 9.70	11.1	81D337
Size 0, 1, 2		
9.71 - 10.6	12.2	81D338
10.7 - 11.7	13.4	81D339
11.8 - 12.7	14.5	81D340
12.8 - 13.9	15.9	81D341
14.0 - 15.2	17.4	81D342
15.3 - 16.8	19.3	81D343
16.9 - 18.5	21.3	81D344
18.6 - 20.6	23.6	81D345
20.7 - 22.5	25.9	81D346
22.6 - 24.9	28.5	81D360
25.0 - 27.3	31.3	81D361
27.4 - 30.0	34.5	81D362
30.1 - 33.0	37.9	81D363
33.1 - 36.4	41.9	81D364
36.5 - 44.0	46.0	81D365
40.1 - 44.2	50.6	81D366
Size 3		
22.6 - 24.9	28.5	81D400
25.0 - 27.3	31.3	81D401
27.4 - 30.0	34.5	81D402
30.1 - 33.0	37.9	81D403
33.1 - 36.4	41.7	81D404
36.5 - 40.0	46.0	81D405
40.1 - 44.2	50.6	81D406
44.3 - 48.6	55.7	81D407
48.7 - 53.6	61.3	81D408
53.7 - 58.8	67.4	81D409
58.9 - 64.7	74.1	81D410
64.8 - 71.1	81.5	81D411
71.2 - 78.3	89.7	81D412
78.4 - 86.0	98.6	81D413
86.1 - 94.0	108	81D414
94.1 - 103.0	119	81D415

Note: Ultimate trip current will be 90%-100% of heater rating.

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Thermal Overload Relays

Induction Type IC5882-34

Specification	MIL-C-2212
Application	Use for overload protection of A.C. motors where highly accurate, ambient compensated overload relays are required. Choose medium-trip relay for most applications. Use slowtrip relay if it is necessary to have motor ride through long over load periods. Use fast-trip relay for motors that heat rapidly. See characteristic curves for comparative time-current characteristics.
Type	Induction type with interchangeable coils and adjustable trip setting. Trip current can be varied +/- 10% from factory setting. Compensation is such that trip current will not vary more than 3 percent for each 10^{o} C change in ambient temperature.
Form	Single element (one pole) with one N.C. contact. Use two relays in two lines of a three phase circuit.
Reset	Reset manually with one reset button or electrically with reset relay on page 32
Voltage	600 volts maximum.

Ordering Information

To order overload relay with heating coil, specify overload relay catalog number with heating coil suffix number.

Example: IC5882-34JJ200

To order overload relay only (less coil) specify overload relay catalog number only.

Example: IC5882-34JJ

To order heating coil only specify heating coil catalog number plus suffix number.

Example: 1D5G200

Contact Ratings

Amperes			
		Break	
Carry	Make	115 VAC	440 VAC
10	30	20	5

Type of Trip	Overload Relay Catalog Number
Slow	IC5882-34KK
Medium	IC5882-34JJ
Fast	IC5882-34MM

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Thermal Overload Relays

Induction Type IC5882-34

Heaters Coils (Sizes 0-4)

Max. Cont. Full Load Motor Amp for 40° C Rise Motors	Coil Rating in Amps	Coil Catalog Number is ID5G Plus Suffix Listed Below			Max. Cont. Full Load Motor Amp for 40° C Rise Motors	Coil Rating in Amps	Coil Catalog Number is ID5G Plus Suffix Listed Below		
		Medium-trip IC5882-34JJ	Slow-trip IC5882-34KK	Fast-trip IC5882-34MM			Medium-trip IC5882-34JJ	Slow-trip IC5882-34KK	Fast-trip IC5882-34MM
		Coil Suffix					Coil Suffix		
0.57 - 0.62	0.71	200	200	–	18.3 - 20.0	22.9	237	237	236
0.63 - 0.69	0.78	201	201	200	20.1 - 22.0	25	238	238	237
0.70 - 0.76	0.86	202	202	201	22.1 - 24.4	27.5	239	239	238
0.77 - 0.82	0.94	203	203	202	24.5 - 26.1	29.5	240	240	*
0.83 - 0.91	1.03	204	204	203	26.2 - 27.1	30.6	*	*	239
0.92 - 1.00	1.13	205	205	204	27.2 - 27.4	31.2	241	241	*
1.01 - 1.10	1.24	206	206	205	27.5 - 28.7	32.4	*	*	240
1.11 - 1.20	1.36	207	207	206	28.8 - 29.4	33.3	242	242	*
1.21 - 1.33	1.50	208	208	207	29.5 - 30.4	34.4	*	*	241
1.34 - 1.45	1.65	209	209	208	30.5 - 31.4	35.7	243	243	*
1.46 - 1.60	1.80	210	210	209	31.5 - 32.5	36.7	*	*	242
1.61 - 1.77	2.00	211	211	210	32.6 - 33.9	38.5	244	244	*
1.78 - 1.94	2.20	212	212	211	34.0 - 34.8	39.3	*	*	243
1.95 - 2.13	2.42	213	213	212	34.9 - 35.9	41.7	245	245	*
2.14 - 2.33	2.65	214	214	213	36.0 - 38.4	43.3	*	*	244
2.34 - 2.58	2.92	215	215	214	38.5 - 40.3	45.5	246	246	*
2.59 - 2.82	3.22	216	216	215	40.4 - 40.6	45.8	*	*	245
2.83 - 3.10	3.52	217	217	216	40.7 - 44.1	50	247	247	246
3.11 - 3.40	3.87	218	218	217	44.2 - 49.0	55	248	248	247
3.41 - 3.74	4.25	219	219	218	49.1 - 53.7	61	*	*	248
3.75 - 4.12	4.68	220	220	219	53.8 - 55.3	62.5	249	249	*
4.13 - 4.54	5.15	221	221	220	55.4 - 60.5	68.8	253	253	*
4.55 - 4.94	5.65	222	222	221	60.6 - 60.8	69	*	*	249
4.95 - 5.48	6.20	223	223	222	60.9 - 63.0	71.5	250	250	*
5.49 - 6.03	6.85	224	224	223	63.1 - 63.9	72.5	*	*	253
6.04 - 6.66	7.55	225	225	224	64.0 - 69.5	78.7	254	254	*
6.67 - 7.32	8.34	226	226	225	69.6 - 69.6	79	*	*	250
7.33 - 8.03	9.16	227	227	226	69.7 - 73.1	83	*	*	254
8.04 - 8.83	10.0	228	228	227	73.2 - 74.0	83.5	251	251	*
8.84 - 9.70	11.1	229	229	228	74.1 - 81.0	92	255	255	251
9.71 - 10.8	12.2	230	230	229	81.1 - 85.0	96.6	*	*	255
10.9 - 11.9	13.5	231	231	230	85.1 - 88.2	100	252	252	*
12.0 - 13.0	14.9	232	232	231	88.3 - 96.9	110	*	*	252
13.1 - 14.2	16.1	233	233	232	97 - 98	110	256	256	*
14.3 - 15.7	17.8	234	234	233	99 - 106.5	121	*	*	269
15.8 - 17.1	19.6	235	235	234	106.6 - 111	125	64	64	*
17.2 - 18.2	21.7	236	236	235	112 - 121	137	85	85	64
					122 - 127	144	*	*	85
					128 - 133	150	272	272	*

NOTE: Ultimate trip current will be 90-100% of coil rating.

* Use next higher rating

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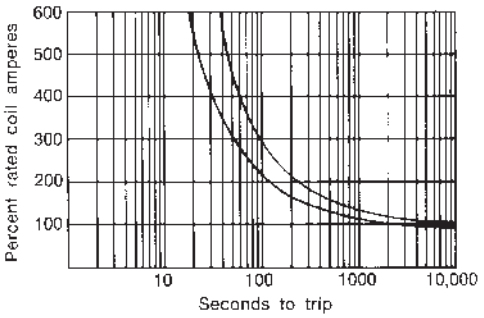
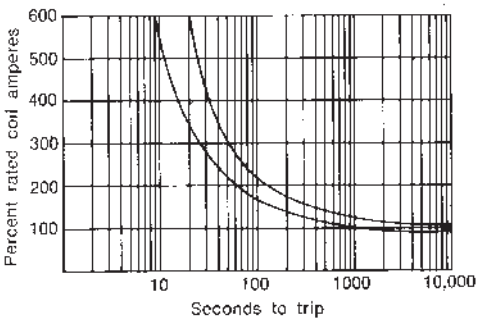
Thermal Overload Relays

Induction Type IC5882-34

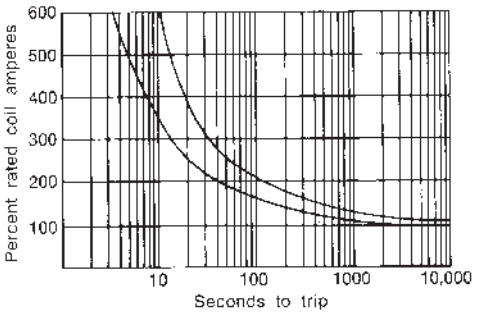
Characteristic Curves



Time-current curve, slow-trip form, 60 hertz, 40°C ambient temperature.

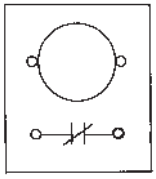


Time-current curve, medium-trip form, 60 hertz, 40°C ambient temperature.

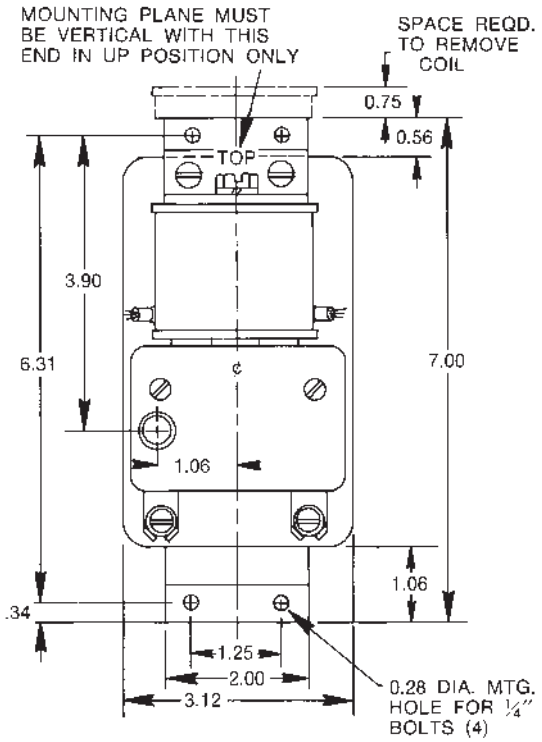


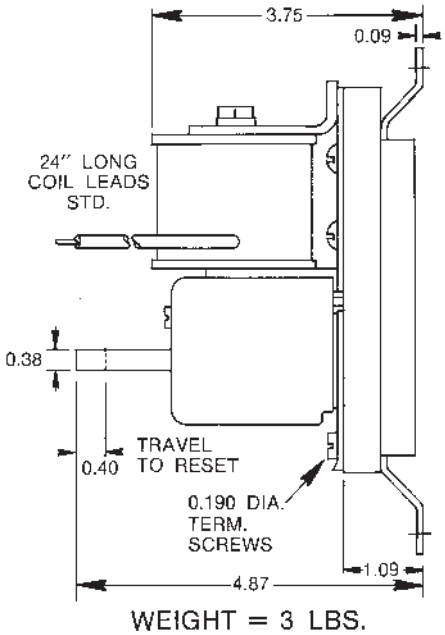
Time-current curve, fast-trip form, 60 hertz, 40°C ambient temperature.

Wiring Symbol



Outline and Mounting Dimensions (In Inches)





WEIGHT = 3 LBS.

Ward Leonard Electric Company Inc.
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Magnetic Overload Relays

Series N147

Series N147 Overload Relays are of the magnetically operated self reset type, designed for use on A.C. or D.C. motor starters and controllers for Navy Service A applications.

Specification	MIL-R-2033
Function	Motor overload protection.
Operation	Magnetic inverse time delay type, self reset.
Compensation	Ambient compensated between 20° C and 70° C
Adjustment	Trip current adjustable +/- 10% of nominal current rating.
Insulation	Class A
Voltage	Normally closed contact will carry and break 5 amps 440 volts max. A.C. and 1 amp D.C

N147 Magnetic Overload Relay

Ordering Information

When ordering N147 Magnetic Overload Relays, the following information is requested:

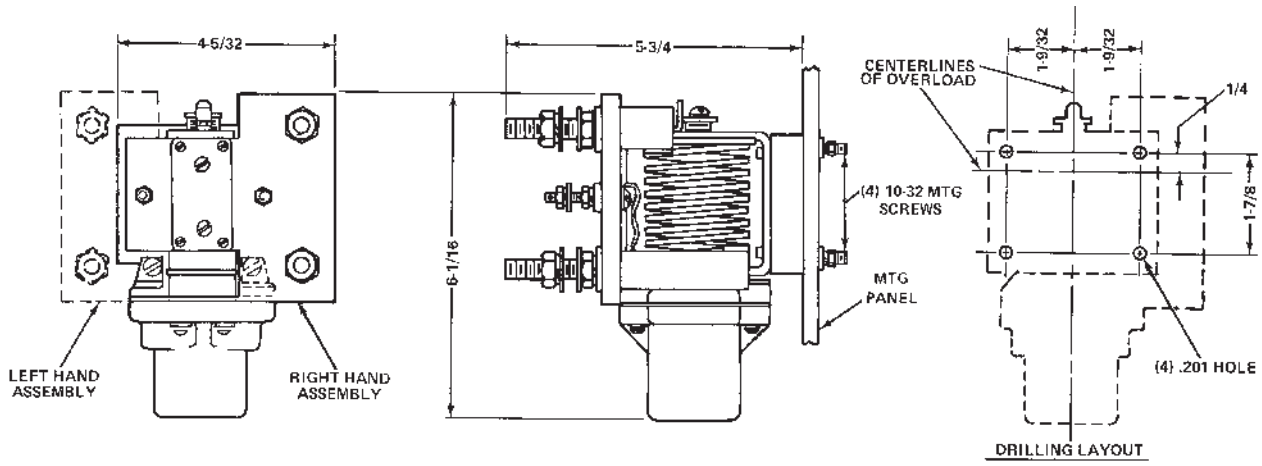
1. Series No. of relay
2. Motor type, H.P. and nameplate amperes
3. Location of coil terminal studs (left or right hand side of relay)

Repair Parts

Repair parts normally furnished in accordance with applicable part allowance list include:

1 Relay operating coil

Dimensions (Approximate)



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Magnetic Overload Relays

Series N147

Full Load Motor Current Amperes		Relay Tripping		Full Load Motor Current Amperes		Relay Tripping	
Min.	Max.	Amps.	Coil Nos.	Min.	Max.	Amps.	Coil Nos.
0.50	0.54	0.625	151L901	22.1	24.0	27.7	151L43
0.61	0.67	0.77	151L1	24.1	26.5	30.4	151L44
0.68	0.72	0.84	151L2	26.6	29.0	33.3	151L45
0.73	0.79	0.91	151L3	29.1	32.0	36.3	151L146*
0.80	0.86	0.99	151L4	32.1	35.0	39.7	151L147*
0.87	0.94	1.08	151L5	35.1	38.0	43.4	151L148*
0.95	0.03	1.18	151L6	38.1	41.0	48.3	151L149*
1.04	1.13	1.30	151L7	41.1	43.1	50.2	151L150*
1.14	1.24	1.43	151L8	43.1	46.0	52.8	151L151*
1.25	1.35	1.57	151L9	46.1	49.0	58.0	151L152*
1.36	1.47	1.68	151L10	49.1	52.0	61.0	151L153*
1.48	1.61	1.85	151L11	52.1	55.0	64.5	151L154*
1.62	1.75	2.03	151L12	55.1	59.0	68.3	151L155*
1.76	1.86	2.14	151L13	59.1	62.0	72.5	151L156*
1.87	1.96	2.26	151L14	62.1	67.0	77.3	151L157*
1.97	2.16	2.47	151L15	67.1	72.0	83.0	151L158*
2.17	2.37	2.72	151L16	72.1	77.0	89.3	151L159*
2.38	2.61	2.98	151L17	77.1	84.0	96.7	151L160*
2.62	2.80	3.27	151L18	84.1	91.9	105.5	151L161*
2.81	2.96	3.41	151L19	92.1	101	116	151L162*
2.97	3.23	3.70	151L20	102	114	129	151L163*
3.24	3.53	4.05	151L21	115	126	145	151L164*
3.54	3.87	4.43	151L22	127	131	150	151L172*
3.88	4.23	4.85	151L23	132	143	165	151L165*
4.24	4.61	5.30	151L24	144	153	174	151L173*
4.62	5.04	5.79	151L25	154	167	192	151L166*
5.05	5.50	6.33	151L26	168	183	210	151L174*
5.51	5.97	6.84	151L27	184	201	231	151L167*
5.98	6.52	7.47	151L28	202	209	254	151L175*
6.53	7.10	8.16	151L29	210	230	263	151L176*
7.11	7.52	8.60	151L30	231	252	289	151L168*
7.53	8.24	9.40	151L31	253	278	318	151L177*
8.25	8.95	10.3	151L32	279	306	350	151L178*
8.96	9.67	11.0	151L33	307	337	385	151L169*
9.68	10.6	12.1	151L34	338	369	424	151L179*
10.7	11.6	13.3	151L35	418	457	525	151L180*
11.7	12.6	14.6	151L36	462	501	578	151L170*
12.7	13.9	16.1	151L37	507	550	635	151L181*
14.0	15.1	17.4	151L38				
15.2	16.7	19.1	151L39				
16.8	18.2	21.0	151L40				
18.3	20.0	23.0	151L41				
20.1	22.0	25.3	151L42				

NOTE: Full load columns based on coil ratting of 115% to 125% of full load current.

* These coils used with overload relays employing terminal boards.

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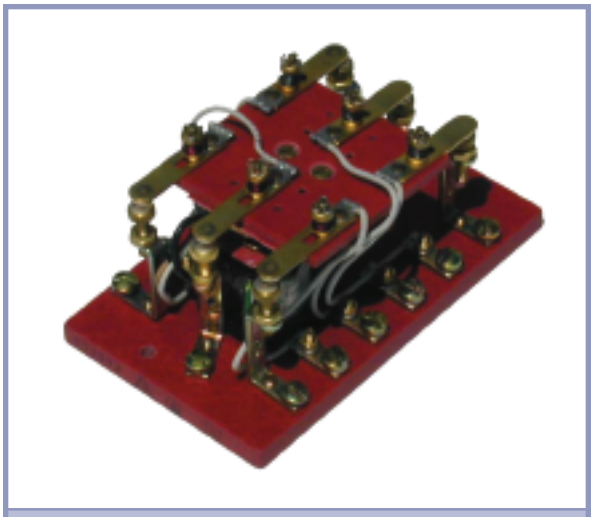
AC and DC Magnetic Relays

Series N130

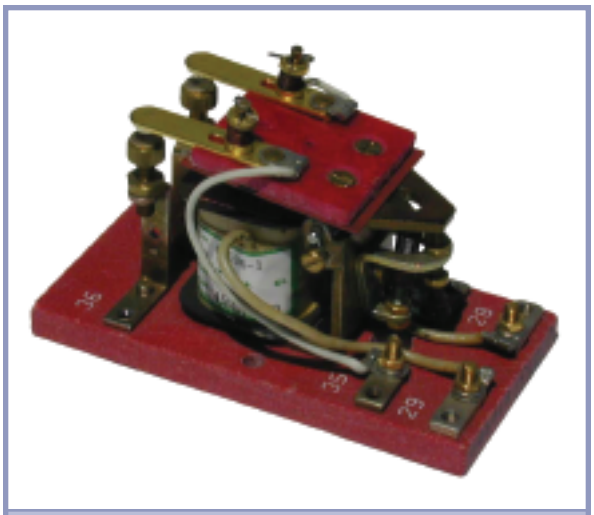
Series N130 Magnetic Relays are recommended for applications where the pilot or control circuit must be established and interrupted repeatedly. These auxiliary control relays in one, two, three and four pole combinations are available for operation on A.C. (480 volts max.) and D.C. (250 volts max.) circuits. All pole combinations can be obtained with or without magnetic blowouts. Optional Features Contact assemblies other than those listed are available with or without blowouts.

Specification	MIL-C-2212*
Operation	Magnetic
Function	Auxiliary Control Relay
Duty	Continuous
Ambient	50^{O} C
Insulation	Class B
Enclosure	For enclosed service
Vibration	MIL-STD-167 (ships) Type 1

*For use where opening and closing of contacts, in excess of 10 milliseconds, under shock, does not affect the operation of associated equipment.



N130 Relay: 3 pole N.O. and 3 pole N.C.



N130 Relay: 2 pole N.O.

Optional Features

Contact assemblies other than those listed are available with or without blowouts.
Special coil insulation other than Class “A” applied as standard, can be furnished.
In certain instances where ambient conditions or space limitations dictate, Class “H” coil insulation can be supplied at additional cost.

Similarly, Class “B” insulation can be furnished where required at additional cost.

Enclosure either dripproof or watertight are available on special order.

Special requirements such as destructive tests, relays for special applications, should be referred to the Home Office.

Contact Ratings*

Max. Volts	Amps A.C. (60 Hz)	Amps D.C.	
		without Blowouts	with Blowouts
125	25	3	30
250	25	1	30
480	15	-	-

* Ratings are non-inductive

Drawings

Dimension sketches for all contact combinations are availble without charge. Master plans and special drawings will be quoted on request.

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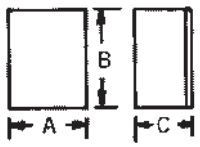
AC and DC Magnetic Relays

Series N130

No. of Poles	Type of Contacts	Dimensions (in Inches)					
		Without Blowouts			With Blowouts		
		A	B	C	A	B	C
1 - Single Break	SPNO or SPNC SPNO and SPNC	2 1/2 2 1/2	4 7/8 6	3 3/16 3 3/16	2 1/2 2 1/2	5 3/4 7 11/16	3 1/2 3 1/2
1 - Double Break	SPNO or SPNC	2 1/2	4 7/8	3 3/16	3 5/8	5 3/4	3 1/2
2 - Single Break	DPNO or DPNC DPNO and DPNC	2 1/2 2 1/2	4 7/8 6	3 3/16 3 3/16	3 5/8 3 5/8	5 3/4 7 11/16	3 1/2 3 1/2
3 - Single Break	3 PNO 3 PNC 3 PNC and 3 PNO	3 5/8 3 5/8 3 5/8	4 7/8 5 1/8 6 5/8	3 3/16 3 3/16 3 3/16	4 7/16 4 7/16 4 7/16	5 1/2 6 7 11/16	3 1/2 3 1/2 3 1/2
4 - Single Break	4 PNO 4 PNC 4 PNC and 4 PNO	4 3/4 4 3/4 4 3/4	4 7/8 5 1/8 6 7/8	3 3/16 3 3/16 3 3/16	5 7/8 5 7/8 5 7/8	6 3/4 7 1/4 8 3/8	3 1/2 3 1/2 3 1/2



1/32" insulator (furnished with relay) must be used for steel panel mounting.

Single Pole, Single Break

Coil Voltage	D.C.			A.C.		
	1 Pole N.O.	1 Pole N.C.	1 Pole N.O. 1 Pole N.C.	1 Pole N.O.	1 Pole N.C.	1 Pole N.O. 1 Pole N.C.
115	N130-6410	N130-6411	N130-6419	N130-6510	N130-6511	N130-6519
230	N130-7410	N130-7411	N130-7419	–	–	–
440	–	–	–	N130-8510	N130-8511	N130-8519

When ordering relays with blowouts, specify Cat. No. followed by the letter "B". Example: N130-6410B.

Ordering Information

When ordering catalog listed N130 Relays specify:

1. Catalog Number
2. Contact current, voltage, and frequency
3. Coil voltage and frequency
4. Application
5. Repair parts, if required0

For special assemblies furnish:

1. Number of poles and contact arrangement (include number and location of blowouts if required)

Repair Parts

Repair parts normally furnished in accordance with applicable part allowance list include:

1 set of contacts
1 set of spring
1 shunt of coil

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AC and DC Magnetic Relays

Series N130

Single Pole, Double Break

	D.C.		A.C.	
Coil Voltage	1 Pole N.O.	1 Pole N.C.	1 Pole N.O.	1 Pole N.C.
115	N130-6413	N130-6414	N130-6513	N130-6514
230	N130-7413	N130-7414	–	–
440	–	–	N130-8513	N130-8514

Double Pole, Single Break

	D.C.			A.C.		
Coil Voltage	2 Poles N.O.	2 Poles N.C.	2 Poles N.O. 2 Poles N.C.	2 Poles N.O.	2 Poles N.C.	2 Poles N.O. 2 Poles N.C.
115	N130-6420	N130-6421	N130-6429	N130-6520	N130-6521	N130-6529
230	N130-7420	N130-7421	N130-7429	–	–	–
440	–	–	–	N130-8520	N130-8521	N130-8529

Three Pole, Single Break

	D.C.			A.C.		
Coil Voltage	3 Poles N.O.	3 Poles N.C.	3 Poles N.O. 3 Poles N.C.	3 Poles N.O.	3 Poles N.C.	3 Poles N.O. 3 Poles N.C.
115	N130-6430	N130-6431	N130-6439	N130-6530	N130-6531	N130-6539
230	N130-7430	N130-7431	N130-7439	–	–	–
440	–	–	–	N130-8530	N130-8531	N130-8539

Four Pole, Single Break

	D.C.			A.C.		
Coil Voltage	4 Poles N.O.	4 Poles N.C.	4 Poles N.O. 4 Poles N.C.	4 Poles N.O.	4 Poles N.C.	4 Poles N.O. 4 Poles N.C.
115	N130-6440	N130-6441	N130-6449	N130-6540	N130-6541	N130-6549
230	N130-7440	N130-7441	N130-7449	–	–	–
440	–	–	–	N130-8540	N130-8541	N130-8549

When ordering relays with blowouts, specify Cat. No. followed by the letter “B”. Example: N130-6410B.

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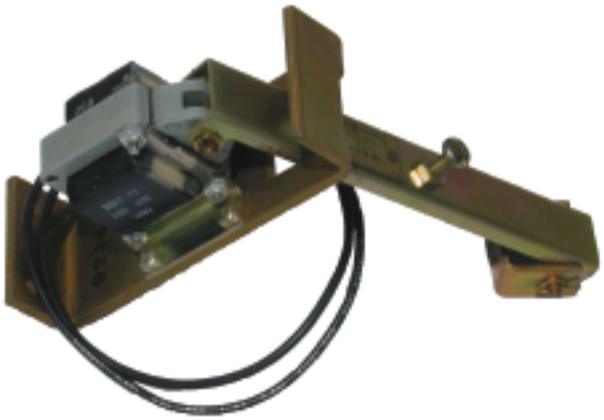
Reset Relays

Type IC5882A300 and IC5882A400

Specification	MIL-C-2212
Application	**Use for remote resetting of Types IC5882D and IC5882-34 overload relays.**
Duty	**Short time, 30 minutes, 200° C maximum temperature.**
Voltage	**600 volts maximum.**



For Use With Overload Relay	Reset Relay Catalog Number	
	115 VAC	440 VAC
IC5882D121A*	IC5882A400H12	UC5882A400H14
IC5882D122A*	IC5882A400H12	UC5882A400H14
IC5882D123A*	IC5882A400H12	UC5882A400H14
IIC5882-34KK**	IC5882A300B12	UC5882A300B14
IIC5882-34KK**	IC5882A300B12	UC5882A300B14
IIC5882-34KK**	IC5882A300B12	UC5882A300B14

* Resets only the short reset rod version of Type IC5882D overload relay.

** Resets two Type IC5882-34 overload relays.

Ordering Information

Order by catalog number. Overload relay is ordered separately.

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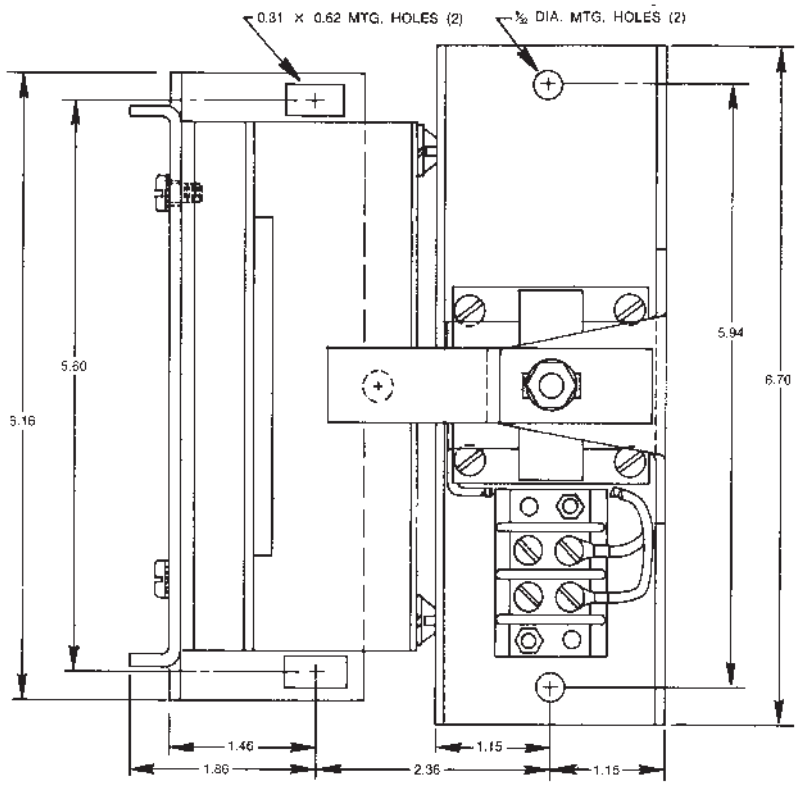
Reset Relays

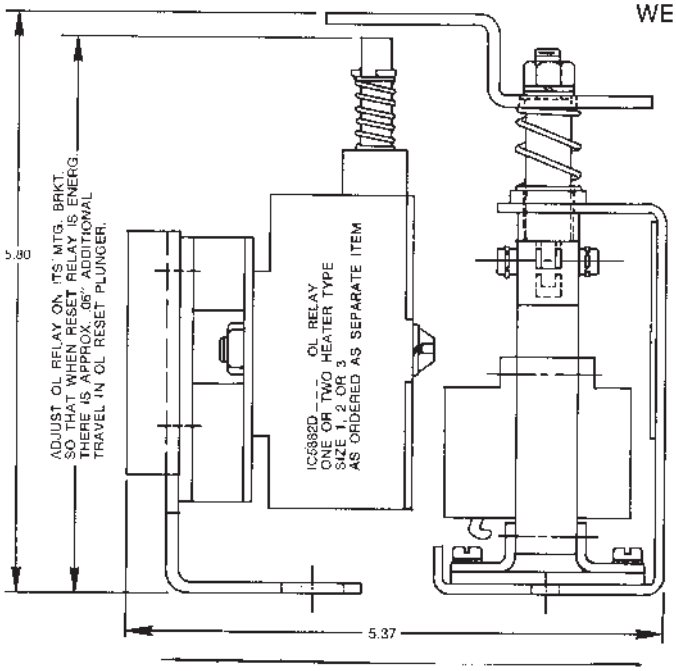
Type IC5882A300 and IC5882A400

Outline and Mounting Dimensions (In Inches)



Top

WEIGHT = 2 LBS.



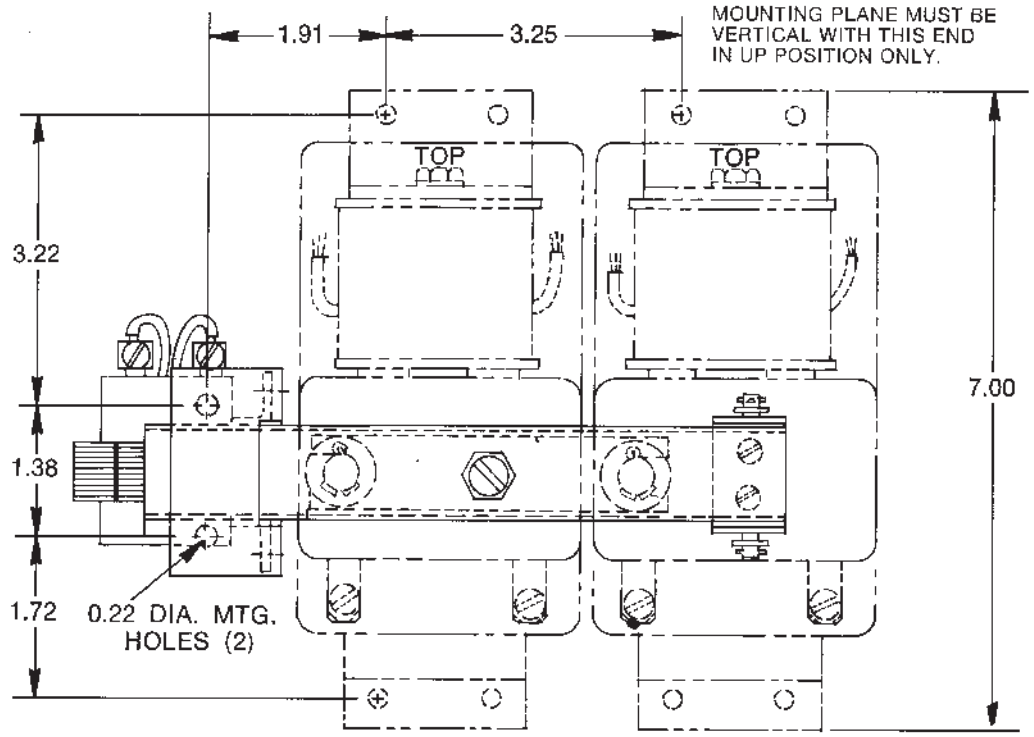
TYPE IC5882A400H RESET RELAY

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

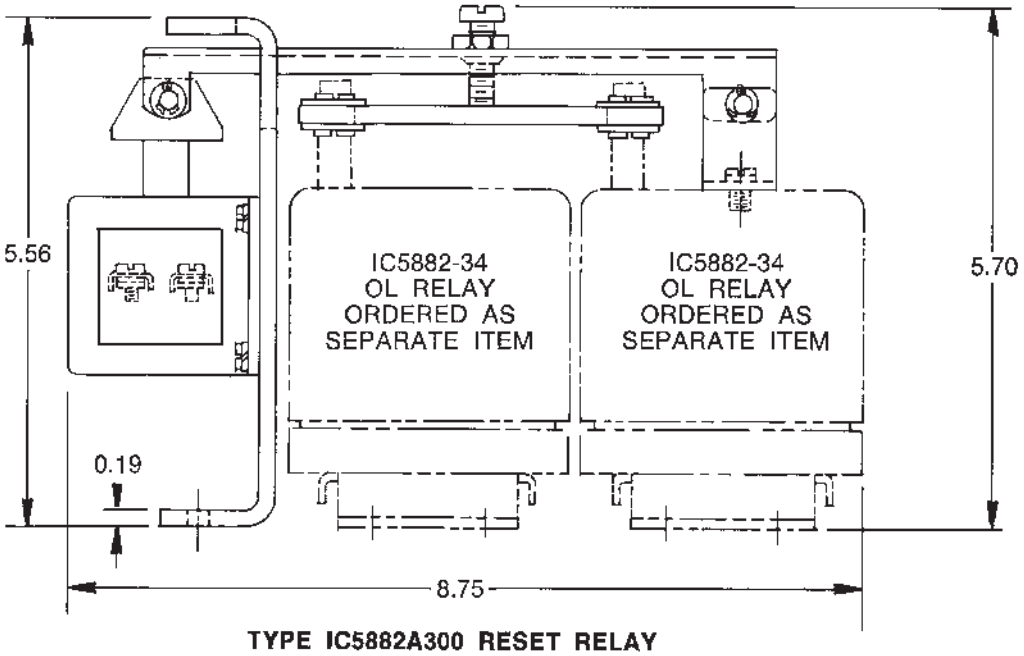
Reset Relays

Type IC5882A300 and IC5882A400

Outline and Mounting Dimensions (In Inches)



WEIGHT = 2 LBS.



TYPE IC5882A300 RESET RELAY

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
Tel: 860-283-5801

Master Switches

Type IC5847

Specification	MIL-C-2212
Application	Remote control of magnetic starters. Surface mounting.
Enclosure	Watertight.
Types	C - 4 positions max., 8 circuits max.
	D - 4 positions max., 20 circuits max.
Rating	C and D - 10 amps carry.
Duty	Continuous
Ambient	50° C
Contacts	Both spring return and maintaining contacts available.

Type IC5847 Master Switch

Ordering Information

When ordering Type IC5847 Master Switches specify:
1. IC Type (e.g. IC5847C)
2. Number of circuits
3. Number of positions
4. Circuit configuration
5. Nameplate marking (position identification)

Type IC5847	Ampere Rating	Number of Circuits (Max)
A	No Longer Available	
B	No Longer Available	
C	10	8
D	10	12 20

Electrical Ratings (Amperes)

	Amperes (Inductive Circuit)				
	AC, 60 Hz			DC	
Rating	115 V	230 V	440 V	115 V	230 V
Types IC5847C and IC5847D					
Make	10	8	5	8	5
Break	10	5	3	5	2
Carry	10	10	10	10	10
Types IC5847A and IC5847B					
Make	24	24	24	24	24
Break	24	12	5	2	0.7
Carry	20	20	20	20	20

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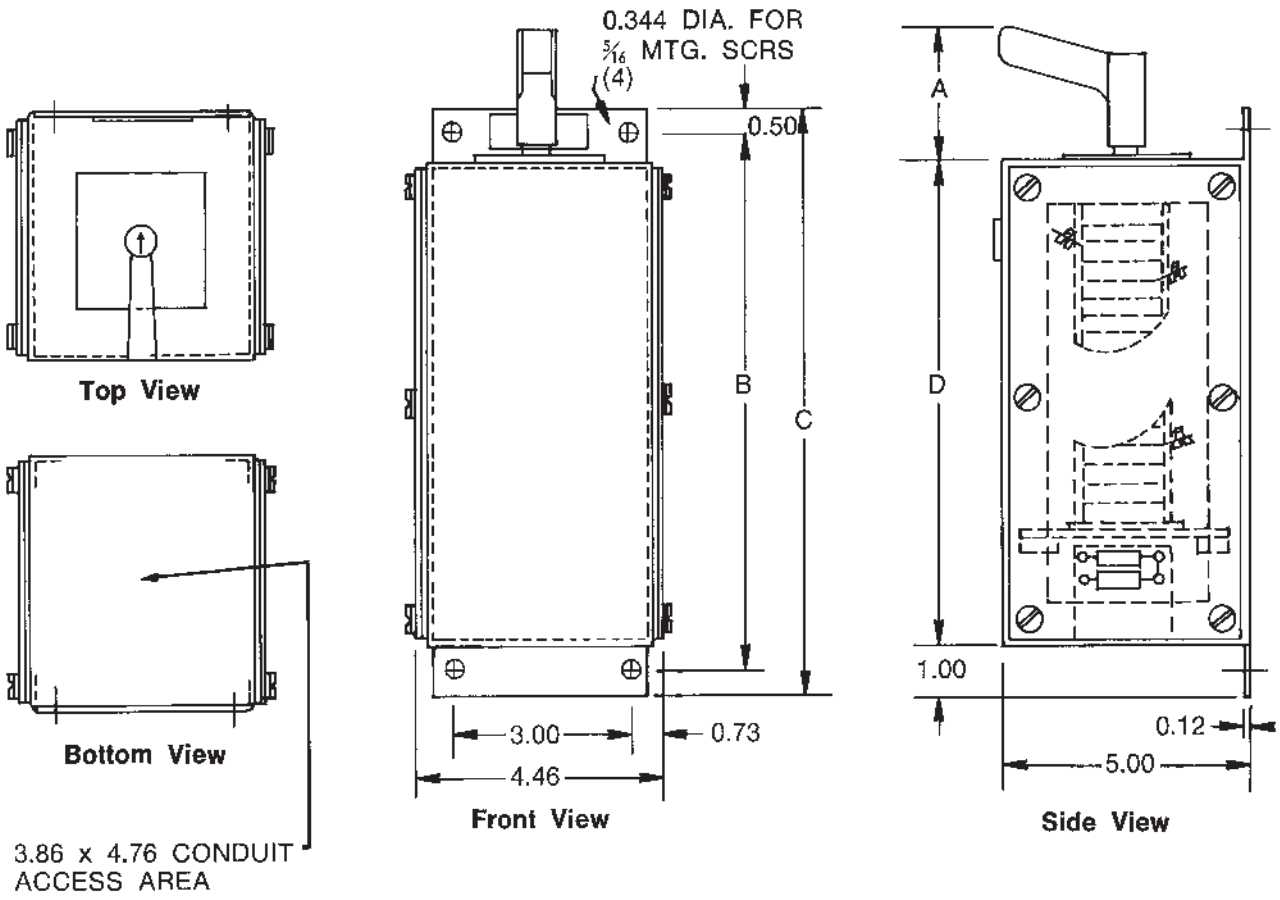
Master Switches

Type IC5847

Outline and Mounting Dimensions (In Inches)



Type IC5847	Dimensions in Inches				Wgt. in Lbs.
	A	B	C	D	
C	2.75	7.00	8.00	6.00	9.5
D	3.50	10.80	11.80	9.80	13.5

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Limit Switches

Type IC5896

Specification	MIL-C-2212
Application	For general shipboard use with deck machinery, material-handling equipment, machine tools, and elevators.
Enclosures	Submersible (15 ft., 30 min.) or explosion-proof (Class 1, Group D). Enclosure is of ductile iron. Molded parts are Navy-approved fire-resistant material. Gasket and "O" ring are of oil resistant compound.
Mounting	Brackets provide for either left-hand side or back mounting.
Shaft Extension	Right-hand standard or left-hand if specified.
Lever Operation	Spring return. Lever travels in either direction.
Insulation	Class A or Class B
Weight	Approximately 14 lbs.

Contacts	Features	Type of Lever	Submersible Limit Switch IC5896 - Form	Explosion-proof Limit Switch IC5896 - Form
1 N.O. and 1 N.C.	Standard Form	None Roller Straight	A1A1 A1A2 A1A3	A1D1 A1D2 A1D3
	Overlapping Contacts	None Roller Straight	A1T1 A1T2 A1T3	– – –
2 N.O.	Standard Form	None Roller Straight	A1B1 A1B2 A1B3	A1E1 A1E2 A1E3
	Contacts operate on CW rotation only	None Roller Straight	A1U1 A1U2 A1U3	– – –
2 N.C.	Standard Form	None Roller Straight	A1C1 A1C2 A1C3	A1F1 A1F2 A1F3

NOTE: Form numbers listed are for right-hand shaft extensions (see "Mounting Dimensions"). For left-hand shaft extensions add suffix "L" to form number (example: IC5895-A1A1L).

Contact Ratings

Ratings	Amps
Carry Continuous	10
Break, inductive	
115 VAC	30
230 VAC	20
440 VAC	5
125 VDC	0.4
250 VDC	0.2

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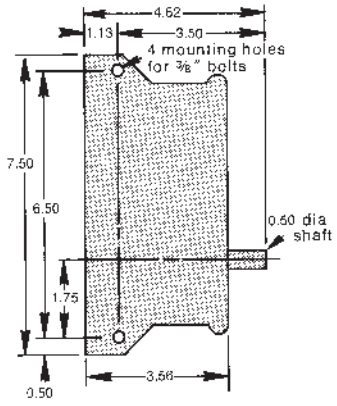
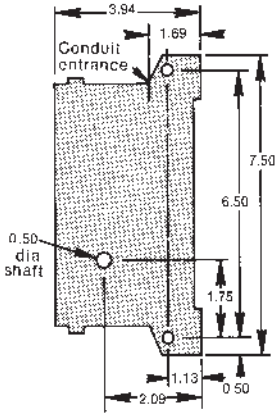
Limit Switches

Type IC5896

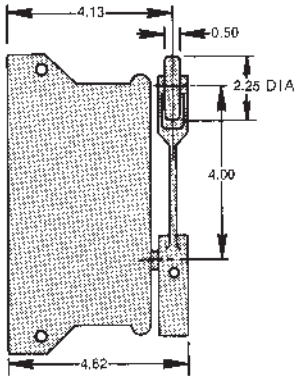
Outline and Mounting Dimensions (In Inches)



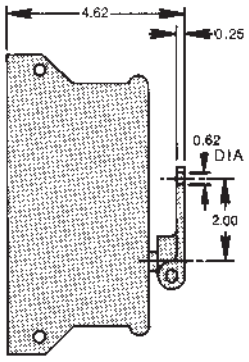
No lever
Front view



No lever
Side view

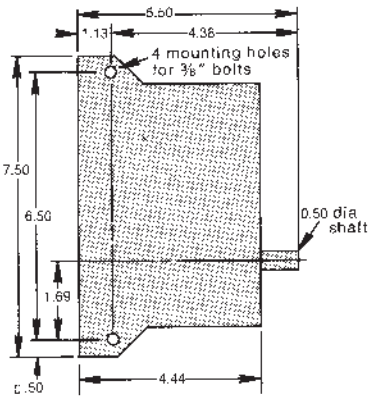


Lever with roller
Front view

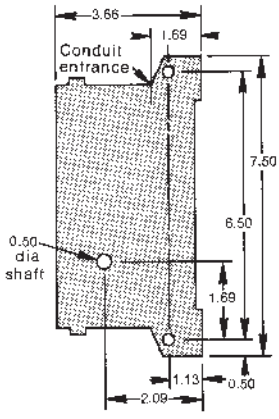


Straight lever
Front view

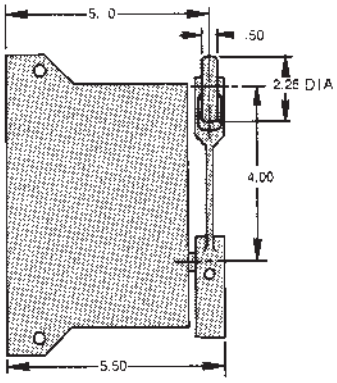
Submersible Switch



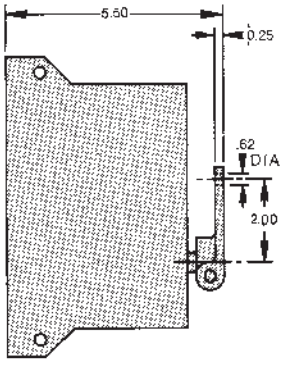
No lever
Front view



No lever
Side view



Lever with roller
Front view



Straight lever
Front view

Explosion-proof Switch

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Limit Switches

Series 4976

Series 4976 Limit Switches are for application on hoists, elevators, steering gear, and other shipboard equipment requiring an electrical limit switch for automatic control operation. Type N47A or B has a steel enclosure; Type N94A a brass enclosure. A wide selection of lever arms, cam arrangements, (overtravel) and contact combinations are offered on both types.

Specification	MIL-C-2212**
Operation	**Automatic**
Enclosure	**Watertight or submersible 15 ft. - without space heater*.**
Duty	**Continuous**
Ambient	**50° C**
Insulation	**Class B**
Ratings	**5 amps, 500 volts, A.C. 60 Hz**
	10 amps, 220 volts, A.C. 60 Hz.
	2 amps., 115 volts, D.C.

***Space heater can be provided.**

****For use where opening of contacts, in excess of 10 milliseconds, under shock, does not affect the operation of associated equipment.**

N47 Limit Switch Assemblies Without Lever Arms

	Contacts		Watertight	Submersible (15 Foot)
Steel Box	A	B	Type Number	
Left Hand	–	N.O.	N47A-60	N47B-60
Left Hand	N.C.	–	N47A-61	N47B-61
Left Hand	N.C.	N.O.	N47A-62	N47B-62
Left Hand	–	N.O.	N47A-63	N47B-63
Left Hand	N.C.	–	N47A-64	N47B-64
Left Hand	N.C.	N.O.	N47A-65	N47B-65
Left Hand	N.O.	N.O.	N47A-66	N47B-66
Right Hand	–	N.O.	N47A-70	N47B-70
Right Hand	N.C.	–	N47A-71	N47B-71
Right Hand	N.C.	N.O.	N47A-72	N47B-72
Right Hand	–	N.O.	N47A-73	N47B-73
Right Hand	N.C.	–	N47A-74	N47B-74
Right Hand	N.C.	N.O.	N47A-75	N47B-75
Right Hand	N.O.	N.O.	N47A-76	N47B-76

NOTE: Lever arms available with or without roller.

Ordering Information

When ordering Series 4976 Limit Switches, spedify:

1. Type No. (e.g. Type N47A-60)
2. Type contacts (e.g. N.O. contacts)
3. Operating shaft location (e.g. left or right hand)
4. Cam configuration (e.g. Cam Fig. 1)
5. Type lever arm (e.g. Type A)
6. Type enclosure (e.g. watertight or submersible)
7. Space heater, if required

Repair Parts

Repair parts normally furnished in accordance with applicable part allowance list include:

1 set of contacts
1 set of springs

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Limit Switches

Series 4976

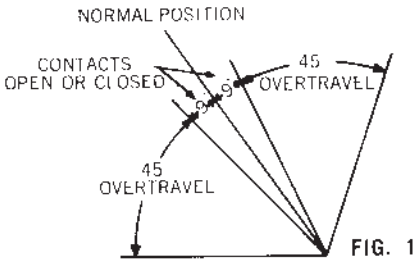

FIG. 1

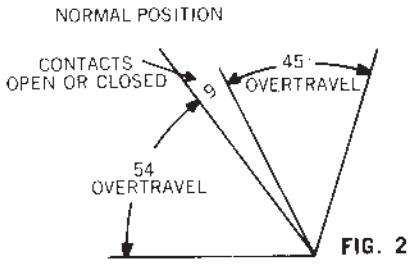

FIG. 2

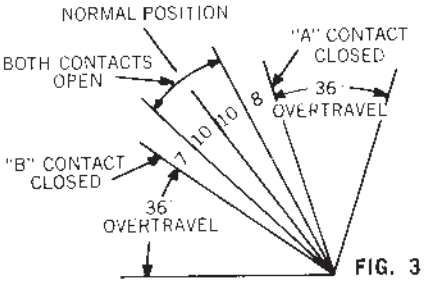

FIG. 3

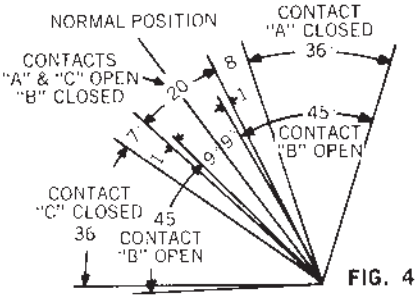

FIG. 4

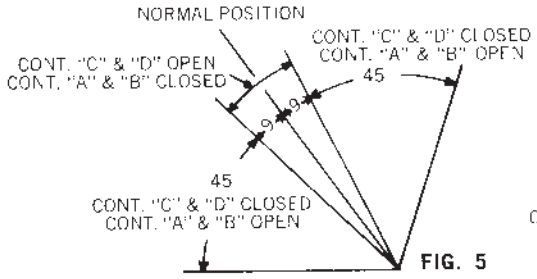

FIG. 5

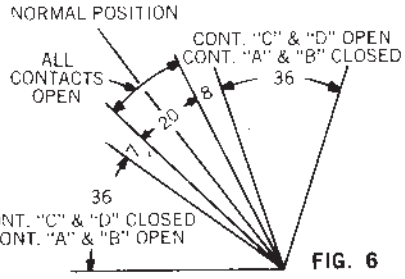

FIG. 6

Cam Selection

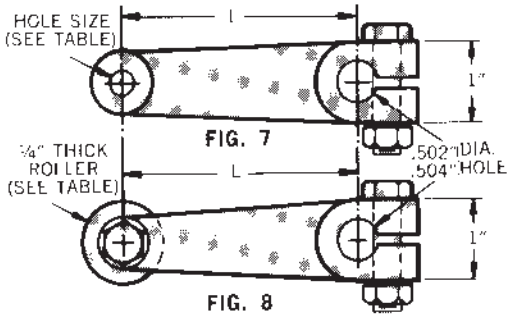

Fig. No.	Lever Arm Type	Length of Arm (L)	Hole Size	Roller Diameter
7	A	1 5/8	1/16	—
7	B	2	21/64	—
7	C	2 7/16	21/64	—
7	D	4 11/32	1/4	—
8	E	2 3/4	—	1"
8	F	4	—	1"
8	G	6	—	1"
8	H	5	—	2"

Lever Arms

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Limit Switches

Series 4976

N94A Limit Switch Assemblies without Levers (Dimensions)

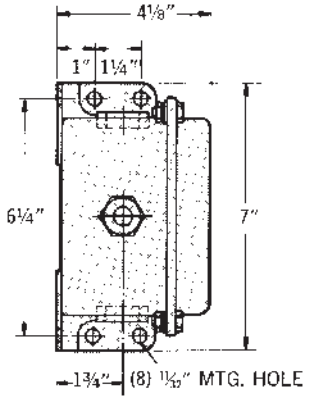
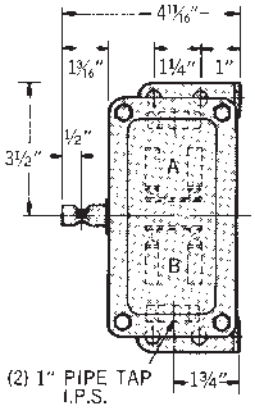


FIG. 9. Type N47
Lefthand assembly.



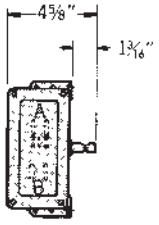


FIG. 10. Type N47
Righthand assembly.

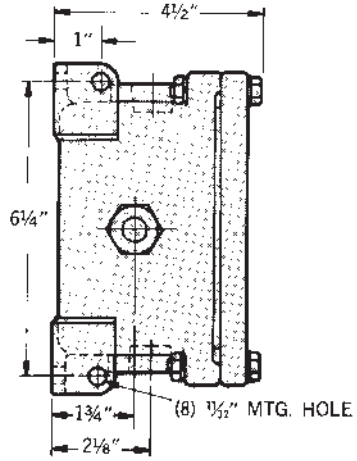
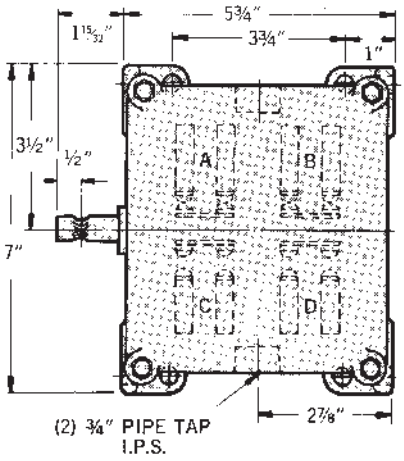


FIG. 11.
Type N94A assembly.



Brass Box	Contact A	Contact C	Contact B	Contact D	Type Number*
Left or Right Hand Left or Right Hand	N.C. –	– –	– N.C.	– –	N94A-2
Left or Right Hand Left or Right Hand	N.O. –	N.O. –	– N.O.	– N.O.	N94A-3
Left or Right Hand Left or Right Hand	N.C. –	N.O. –	– N.C.	– N.O.	N94A-4
Left or Right Hand Left or Right Hand	N.C. –	N.O. –	– N.C.	– –	N94A-5
Left or Right Hand Left or Right Hand	N.O. –	N.O. –	– N.C.	– –	N94A-6

* Same type numbers apply to Watertight or Submersible Enclosed.

Ward Leonard Electric Company Inc.
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Pushbuttons, Indicating Light, and Rotary Switch Stations — Series 4975

Series 4975 Pushbutton Stations are designed for shipboard control applications requiring heavy duty watertight master switches. Stations are available with one, two or three elements equipped with maintained or momentary contacs and with indicating lights. For panel or switchboard mounting individual N.O., N.C. or D.T. elements can be supplied.

Specification	MIL-C-2122
Operation	Manual
Enclosure	Watertight (without space heater*)
Duty	Continuous
Ambient	50^{o} C
Insulation	Class B
Ratings	1 Amp., 250 volts D.C.
	5 amps., 500 volts A.C.

*Space heater can be furnished.

Pushbutton element for panel or switchboard mounting

Ordering Information

1. Specify Type Number, i.e. NS101-1

2. For special assemblies specify-
   A- Number of elements and location
   B- Type of elements and legend plate marking
   C- Indicator lens color, if required and circuit voltage

Indicating Lights

Indicating lights for 115 or 440 volt A.C. or 115 or 230 volt D.C. service can be included in one, two, or three button stations. Lights for 440 volt A.C. service are of the transformer type. Clear, red, blue, amber or green lenses are available.

Ward Leonard Electric Company Inc.
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Pushbuttons Stations

Series 4975

Control Station (Two Elements)

Type of Element		Legend Plate Marking***		
Top	Bottom	Top	Bottom	Type Nos.
N.O.	N.O.	Open	Close	NS201-1
D.T.	D.T.	Positive	Negative	NS203-1
D.T.	D.T.	Start	Open	NS203-2
D.T.	D.T.	Open	Close	NS203-3
Blue Lens**	Amber Lens**	(specify)	(specify)	NS204T3
Red Lens**	White Lens**	(specify)	(specify)	NS204T4
D.T.	D.T.	Man.-Auto.	Slow-Fast	NS205-1
N.O.	N.C.	Start	Stop	NS207-1
N.O.	N.C.	Start Emer.	Stop	NS207-2
N.O.	N.O.	Emer. Run	Stop-Start	NS213-1
Red Lens*	N.O.	(specify)	Stop-Start	NS216-1
D.T.	N.O.	Man.-Auto.	Stop-Start	NS221-1
D.T.	N.O.	Slow-Fast	Stop-Start	NS221-2
N.O.	N.C.	Start	Stop	NS230-1

Control Station (One Element)

Type of Element	Legend Plate Marking***	Type Nos.
N.O.	Start	NS101-1
N.O.	Reset	NS101-2
N.O.	Start Emergency	NS101-3
N.O.	Emergency Run	NS101-4
N.C.	Stop	NS102-1
N.C.	Test	NS102-2
N.C.	Emergency Stop	NS102-3
D.T.	Emergency Stop	NS103-1
Red Lens*	(specify)	NS104-1
Green Lens*	(specify)	NS104-2
Red Lens*	(specify)	NS104-T3
Green lens*	(specify)	NS104-T4
N.O.	Off - On	NS105-1
N.O.	Stop - Start	NS105-2
N.O.	Stop - Run	NS105-3
D.T.	Man. - Auto	NS106-1
D.T.	Slow - Fast	NS106-2

Control Station (Three Elements)

Type of Element			Legend Plate Marking***			
Top	Center	Bottom	Top	Center	Bottom	Type Nos.
D.T.	D.T.	N.C.	Fast	Slow	Stop	NS309-1
D.T.	D.T.	N.C.	Fast Emer.	Slow Emer.	Stop	NS309-2
D.T.	D.T.	N.C.	Forward	Reverse	Stop	NS309-3
Green Lens*	D.T.	D.T.	Motor Running	Off-On	Run-Auto	NS320-1
D.T.	D.T.	N.O.	Man.-Auto	Slow-Fast	Stop-Start	NS321-1
N.O.	N.O.	N.C.	Emer. Run	Start	Stop	NS322-1
Red Lens*	N.O.	N.C.	(specify)	Start	Stop	NS338-1
Red Lens*	N.O.	N.C.	Motor Running	Start	Stop	NS338-2
Green Lens**	N.O.	N.C.	Power On	Start	Stop	NS338T4
Red Lens**	N.O.	N.C.	Motor Running	Start	Stop	NS338T5
D.T.	N.O.	N.C.	Slow-Fast	Start	Stop	NS340-1
D.T.	N.O.	N.C.	Man-Auto	Start	Stop	NS340-2
D.T.	N.O.	N.C.	Slow-Fast	Start Emer.	Stop	NS340-3
Red Lens*	N.O.	N.O.	Power On	Start	Off-On	NS347-1
Red Lens**	N.O.	N.O.	Power On	Start	Off-On	NS347T2
Red Lens*	N.O.	D.T.	(specify)	Emer. Run	Man-Auto	NS360-1

* For 115 volt circuits

** For 440 volt circuits

*** Legend plate markings other than the markings listed available. The maximum number of characters per legend plate is 14.

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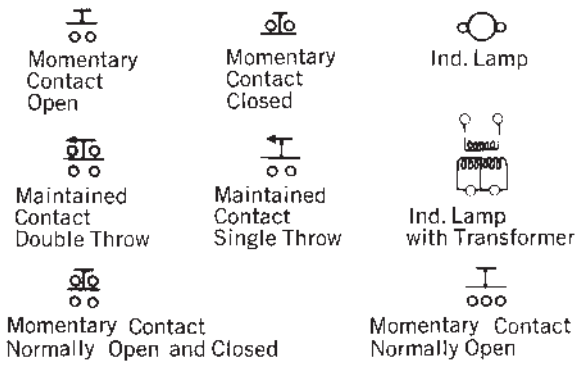
Pushbuttons Stations

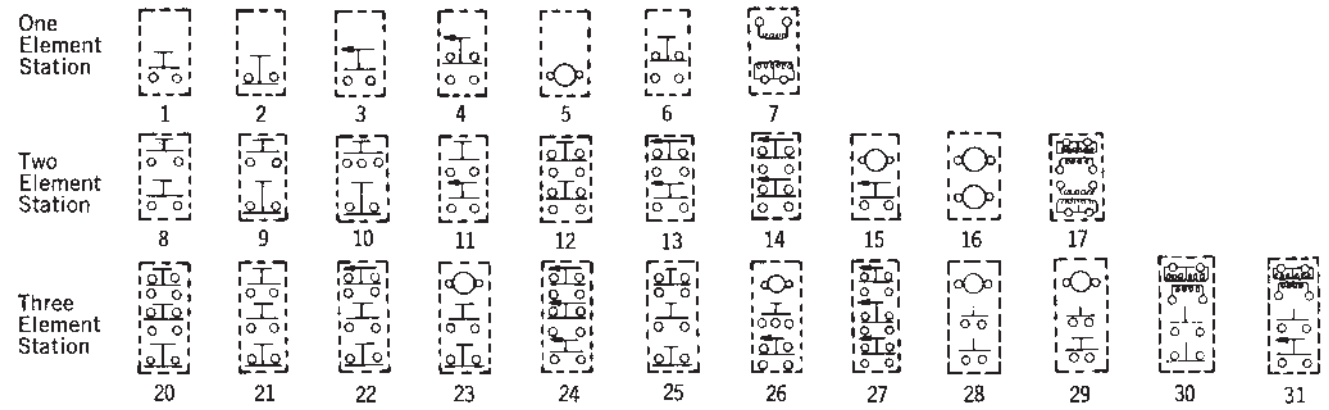
Series 4975

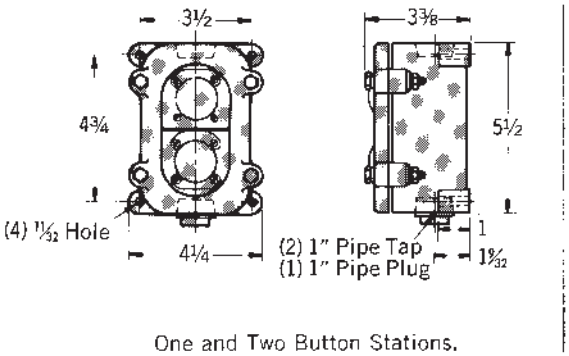


Key to Symbols

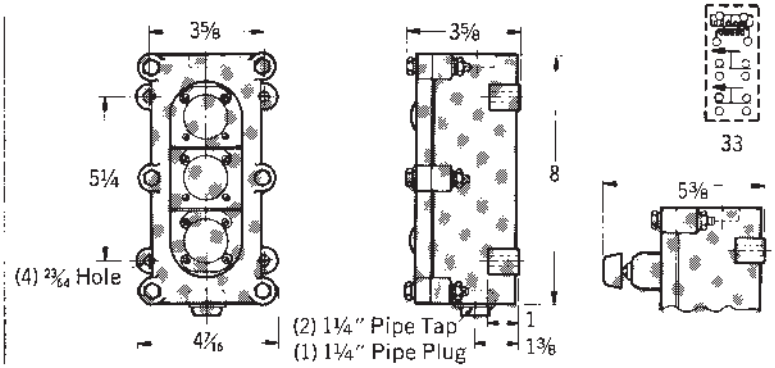
Special Assemblies

Type	Marking	Description
2-Button	(specify)	(2) Indicator Lights - 115 V
2-Button	(specify)	(2) Indicator Lights - 440/6 V
3-Button	(specify)	(3) Indicator Lights - 115 V
3-Button	(specify)	(3) Indicator Lights - 440/6 V





One and Two Button Stations.



Three Button Station.

Diagram Symbols

Switchboard Mounted Units (Dropproof or Watertight)

Standard Contact Arrangement

N.O., N.C., or D.T. Pushbutton – momentary
D.T., 2-position Rotary Switch – maintained
3-point N.O. Pushbutton – momentary

Ward Leonard Electric Company Inc.
401 Watertown Road
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Tel: 860-283-5801

Pushbutton, Indicating Light, and Rotary Switch Stations — Type IC5844

Specification	MIL-C-2212
Application	Control of magnetic starters from remote locations. Surface mounted.
Enclosure	Watertight. Conduit entrance, top or bottom.
Pushbuttons	Momentary contact type.
Selector Switches	Both spring return and maintaining contacts available.
Indicating Lights	Dual-lamp type. Uses T-1 $^{3}/_{4}$ midget screw lamps.
Duty.	Continuous
Ambient	50^{o} C

Ordering Information

1. Order by complete catalog number. The most frequently ordered standard stations are listed on page 48. Order these stations by the complete catalog number listed whenever possible.

2. Order by complete description, including
   IC number
   Quantity and type of each element desired
   Nameplate marking (lens cap marking if indicating element)

Example: IC5844L containing one indicating light element
1G marked “motor running” and one rotary switch element 3 marked “stop” (pos c) and “run” (pos D)

Basic Station	Maximum Number of Elements
IC5844K	2
IC5844L	3
IC5844M	5

Electrical Ratings

Rating	Amperes (Inductive circuit)				
	A.C., 60 Hz			D.C.	
	115 V	230 V	440 V	115 V	230 V
Push Button					
Make	60	60	60	60	60
Break	6	3	1.5	2.2	1.1
Carry	10	10	10	10	10
Selector Switch					
Make	10	8	5	8	5
Break	10	5	3	5	2
Carry	10	10	10	10	10

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Tel: 860-283-5801

Pushbuttons, Indicating Light, and Rotary Switch Stations Type IC5844

Electrical Arrangements

Element Arrangement		Order Station Type
One pushbutton		IC5844K
Two pushbuttons		IC5844K
Three pushbuttons		IC5844L
Four pushbuttons		IC5844M
Five pushbuttons		IC5844M
One indicating light		IC5844K
Two indicating lights		IC5844K
Three indicating lights		IC5844L
Four indicating lights		IC5844M
Five indicating lights		IC5844M
One rotary switch		IC5844K
Two rotary switches		IC5844L
Three rotary switches		IC5844M
One P.B. with	One indicating light	IC5844K
	Two indicating lights	IC5844L
	One rotary switch	IC5844L
	One ind. light and one rotary sw.	IC5844L
Two P.B. with	One indicating light	IC5844L
	Two indicating lights	IC5844M
	Three indicating lights	IC5844M
	One rotary switch	IC5844L
	Two rotary switches	IC5844M
Three P.B. with	One indicating light	IC5844M
	Two indicating lights	IC5844M
	One rotary switch	IC5844M
	Two rotary switches	IC5844M
One I.L. with	One rotary switch	IC5844L
Two I.L. with	One rotary switch	IC5844L

Refer to Company for arrangements not listed.

Ward Leonard Electric Company Inc.
401 Watertown Road
Thomaston, CT 06787 USA
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Pushbuttons, Indicating Light, and Rotary Switch Stations — Type IC5844

PUSHBUTTON ELEMENTS

ELEMENT 1P	ELEMENT 2P	ELEMENT 3P	ELEMENT 4P	ELEMENT 5P
1 NO MOMENTARY CONTACT	1 NC MOMENTARY CONTACT	1 NO AND 1 NC MOMENTARY CONTACT	2 NO MOMENTARY CONTACTS	2 NC MOMENTARY CONTACTS

INDICATING LIGHT ELEMENTS (SEE NOTE 1)

ELEMENT	LENS COLOR	ELEMENT	LENS COLOR	ELEMENT	LENS COLOR	ELEMENT	LENS COLOR	ELEMENT	LENS COLOR
1A	AMBER	2A	AMBER	3A	AMBER	4A	AMBER	5A	AMBER
1B	BLUE	2B	BLUE	3B	BLUE	4B	BLUE	5B	BLUE
1C	CLEAR	2C	CLEAR	3C	CLEAR	4C	CLEAR	5C	CLEAR
1G	GREEN	2G	GREEN	3G	GREEN	4G	GREEN	5G	GREEN
1R	RED	2R	RED	3R	RED	4R	RED	5R	RED
1W	WHITE	2W	WHITE	3W	WHITE	4W	WHITE	5W	WHITE
440 VAC 60 Hz		115 VAC 60 Hz		230 ○ 230 VDC VDC		115 VDC	115 VDC	28 VAC/ VDC	28 VAC/ VDC
TYPE TS-159 LAMPS		TYPE TS-159 LAMPS		SEE NOTE 1 TYPE TS-175 LAMPS		SEE NOTE 1 TYPE TS-175 LAMPS		TYPE TS-158 LAMPS	

Note 1: *Series resistors R1 and R2 must be remote mounted and are not included.*

Resistor	Ohms	Amps	Actual Watts
R1	2950	0.04	4.7
R2	1380	.04	2.2

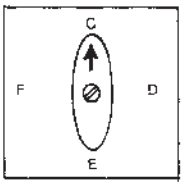
ROTARY SWITCH ELEMENTS (SEE NOTES 2 AND 3)

ELEMENT 1S (F C D)	ELEMENT 2S (F C D)	ELEMENT 3S (C D)	ELEMENT 4S (C D)	ELEMENT 5S (C D E)
MAINTAIN CONTACT × = CLOSED	MAINTAIN CONTACT × = CLOSED	MAINTAIN CONTACT × = CLOSED	MAINTAIN CONTACT × = CLOSED	← SPRING RETURN × = CLOSED MAKE BEFORE BREAK

ELEMENT 6S (F C D)	ELEMENT 7S (F C D)	ELEMENT 8S (F C D)	ELEMENT 9S (C D E)	ELEMENT 1T (F C D)
MAINTAIN CONTACT × = CLOSED	MAINTAIN CONTACT × = CLOSED	← SPRING RETURN × = CLOSED	MAINTAIN CONTACT × = CLOSED	SPRING→ RETURN × = CLOSED

ELEMENT 2T (F C D)	ELEMENT 3T (C D)	ELEMENT 4T (C D)	ELEMENT 5T (F C D)	ELEMENT 6T (F C D)	ELEMENT 7T (C D)
SPRING→ RETURN ← SPRING RETURN × = CLOSED	MAINTAIN CONTACT × = CLOSED	MAINTAIN CONTACT × = CLOSED	SPRING→ RETURN ← SPRING RETURN × = CLOSED	SPRING→ RETURN × = CLOSED	← SPRING RETURN × = CLOSED

Note 2: *Location of rotary switch positions.*



FRONT VIEW

NOTE 3: *Contacts break before make, unless otherwise specified.*

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Pushbuttons, Indicating Light, and Rotary Switch Stations Type IC5844

Standard Pushbutton Stations

Element(s) and Nameplate Markings			
Position 1	Position 2	Position 3	Complete Catalog Number
1P Start	–	–	IC5844K1PXXXX04AA
2P Stop (red)	–	–	IC5844K2PXXXX04AE
1P Emer. Run	–	–	IC5844K1PXXXX04AB
2P Emer Stop (red)	–	–	IC5844K2PXXXX04AC
1P Reset	–	–	IC5844K1PXXXX04AD
1P Test	–	–	IC5844K1PXXXX04AG
1P Bypass	–	–	IC5844K1PXXXX04AH
1P Start	2P Stop (red)	–	IC5844K1P2PXX01AA
1P On	2P Off	–	IC5844K1P2PXX01AF
3P Hoist	3P Lower	–	IC5844K3P3PXX01AB
3P Forward	3P Reverse	–	IC5844K3P3PXX01AE
3P High Speed	3P Low Speed	–	IC5844K3P3PXX01AN
3P Fast	3P Slow	2P Stop (red)	IC5844L3P3P2P07AA
3P Forward	3P Reverse	2P Stop (red)	IC5844L3P3P2P07AJ
3P Hoist	3P Lower	2P Stop (red)	IC5844L3P3P2P07AH
1P Start	2P Stop (red)	1P Emer. Run	IC5844L1P2P1P07AD
3P High Speed	3P Low Speed	2P Stop (red)	IC5844L3P3P2P07AG

Standard Combination Stations

Element(s) and Nameplate Markings			
Position 1	Position 2	Position 3	Complete Catalog Number
1G Motor Running	1P Start	2P Stop (red)	IC5844L1G1P2P10AA

Standard Indicating Light Stations

Element(s) and Nameplate Markings		
Position 1	Position 2	Complete Catalog Number
1G Motor Running	–	IC5844K1GXXXX06AA
1W Power Available	–	IC5844K1WXXXX06AB
1G Fast	1G Slow	IC5844K1G1GXX02AA
1G High Speed	1G Low Speed	IC5844K1G1GXX02AB
1G Up	1G Down	IC5844K1G1GXX02AC

Standard Rotary Switch Stations

Element(s) and Nameplate Markings (All Stations Are Single Element)	Complete Catalog Number
3S Stop (red) – Start	IC5844K3SXXXX03AA
3S Off – On	IC5844K3SXXXX03AB
4S Local – Remote	IC5844K4SXXXX03AC
4S Manual – Auto	IC5844K4SXXXX03AP
1S Manual – Off – Auto	IC5844K1SXXXX03MA
1S Slow – Stop (red) – Fast	IC5844K1SXXXX03MN
1S Raise – Stop (red) – Lower	IC5844K1SXXXX03MH

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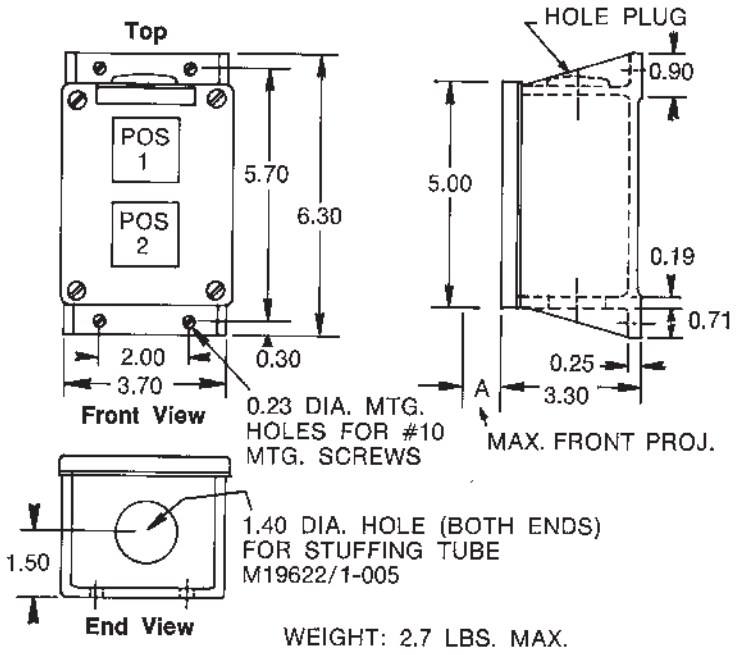
Pushbuttons, Indicating Light, and Rotary Switch Stations — Type IC5844

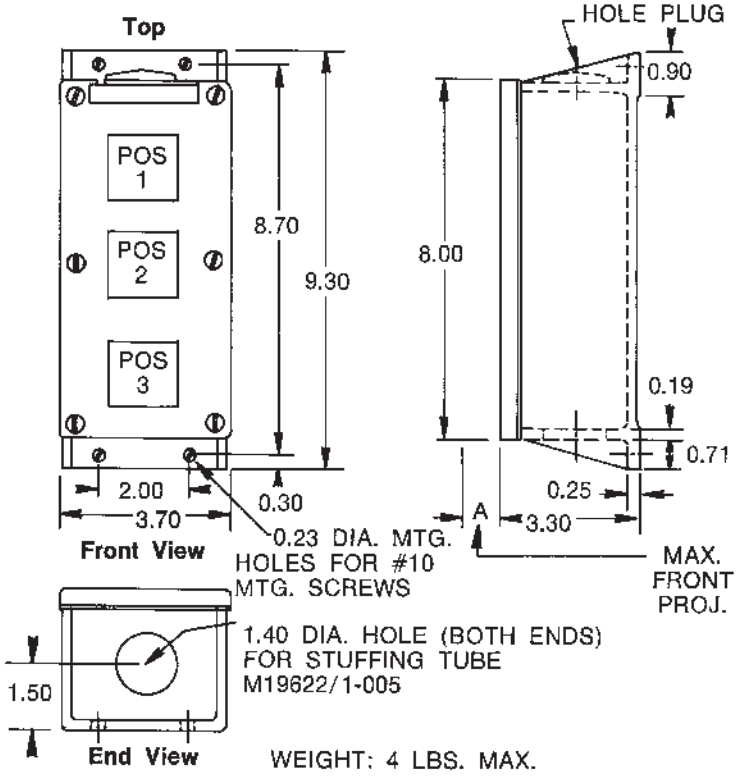
Outline and Mounting Dimensions (In Inches)



ELEMENT	A DIM.
PB	0.30
IL	0.30
ROT. SW	1.15

WEIGHT: 2.7 LBS. MAX.

Type IC5844K



ELEMENT	A DIM.
PB	0.30
IL	0.30
ROT. SW	1.15

WEIGHT: 4 LBS. MAX.

Type IC5844L

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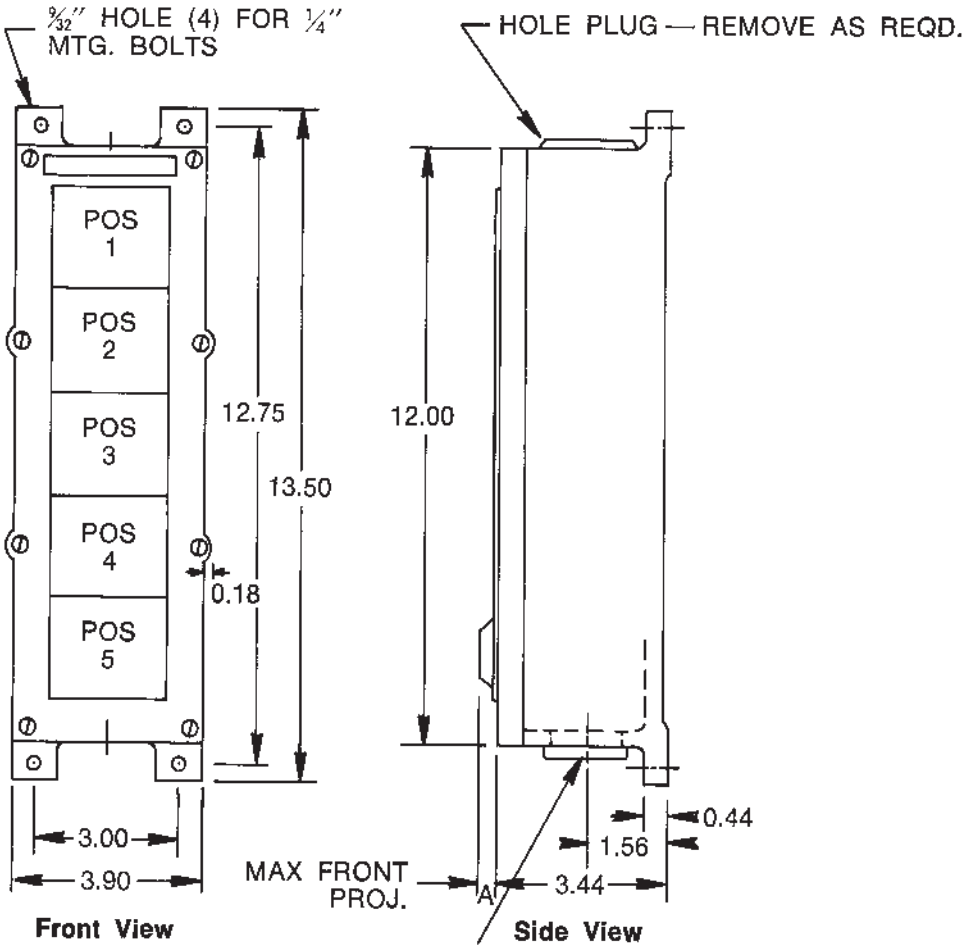
Tel: 860-283-5801

Pushbuttons, Indicating Light, and Rotary Switch Stations — Type IC5844

Outline and Mounting Dimensions (In Inches)



ELEMENT	A DIM.
PB	0.30
IL	0.30
ROT. SW	1.15

WEIGHT: 8 LBS. MAX.

Type IC5844M

Ward Leonard Electric Company Inc.
401 Watertown Road
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Tel: 860-283-5801

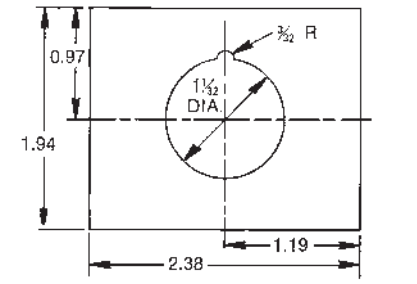
Panel-mounted Selector Switches

Type IC5846

Specification	MIL-C-2212
Application	Where ever maintained contact switching of control circuits is required.
Positions	Two or three position switches are available.

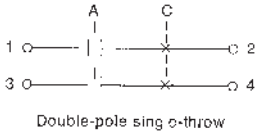
Selector Switch

Outline and Mounting Dimensions (In Inches)

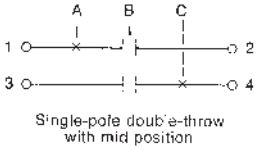


FRONT OF BASE 1.06
TOTAL DEPTH 3.53
MAX MOUNTING PANEL THICKNESS = 0.19
WEIGHT 12 OZS.

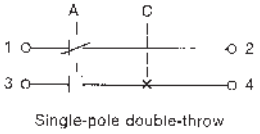
WIRING SYMBOLS



Double-pole single-throw

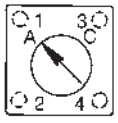


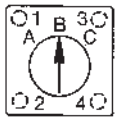
Single-pole double-throw with mid position

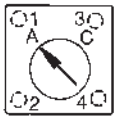


Single-pole double-throw

Position Location Front View







All contacts are maintained

Contact Ratings (Amperes)

Volts	Carry Continuous	Interrupt
115 VAC	10	3.0
440 VAC	10	0.5
115 VDC	10	1.0
230 VDC	10	0.3

Contact Arrangement	Catalog Number
Double-pole single-throw	5729122G1
Single-pole double-throw with mid position	5729122G2
Single-pole double throw	5729122G3

Ordering Information

Order selector by catalog number. Nameplate, if required, must be ordered separately. Order standard nameplate by catalog number. Specify marking for special nameplate.

Ward Leonard Electric Company Inc.
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Tel: 860-283-5801

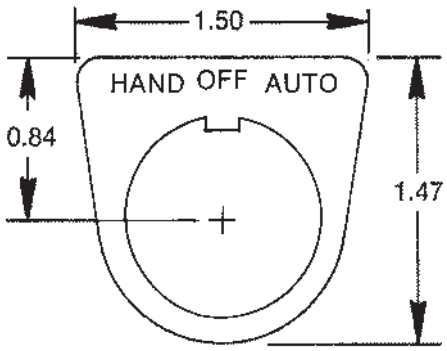
Panel-mounted Selector Switches

Type IC5846

Standard Selector-switch Nameplates

Nameplate Marking	Catalog Number
Stop – Start	NP93396C
Off – On	NP93396A
Stop – Run	NP94647B
Auto – Hand	NP94647D
Manual – Auto	NP97168A
Local – Remote	NP97168B
Off – Auto	NP97261C
Low – High	NP99265B
Man – Off – Auto	NP145872B
Hand – Off – Auto	NP97261D
Low – Off – Auto	NP97261B
Run – Off – Auto	NP145872A
On – Off – Remote	NP110849A
Blank	NP161895A
Special Nameplate Marking	–

Outline and Mounting Dimensions (In Inches)



Nameplate

Rotary and Momentary Selector Switches

Styles JF and JFM

Silver to Silver Contacts
- Silver overlay on bronze
- Low contact resistance
- Self-wiping actions
- Non-shorting - break before make
- Solder connections

Watertight Mounting
- "O" ring construction on shaft and mounting bushing
- Non-turn device included
- Single hole mounting for 3/8 - 32 thread

Kel-F Sections
- Unitized construction
- Available in one to five sections

Positive Index Mechanism (Style JF)
- Twelve positions
- Thirty (30) degree increments
- Conveniently located adjustable stops

Spring Return Index (Style JFM)
- Return positioning from both left and right

Qualified Product Listed (QPL) tested and approved per MIL-S-21604 for both styles:
- Circuit configuration
- Temperature rise
- Contact resistance
- Endurance
- Torque
- Seal
- Dielectric withstanding voltage
- Insulation
- Shock and Vibration
- Terminal strength
- Strength of mounting bushing
- Visual and mechanical

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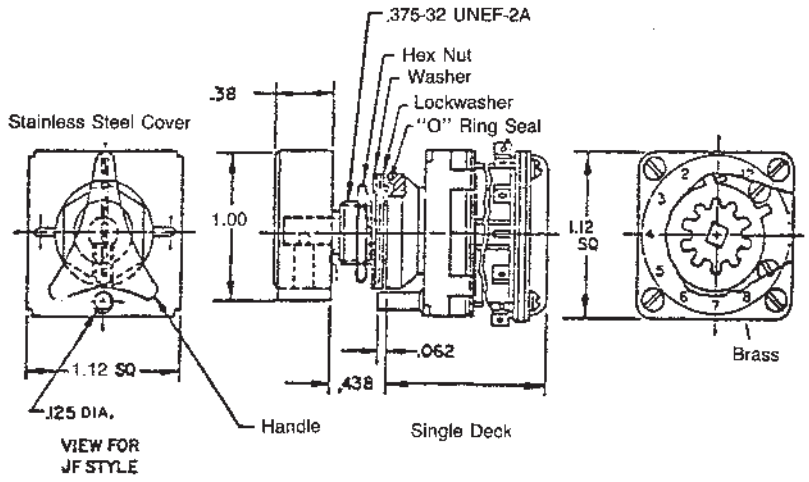
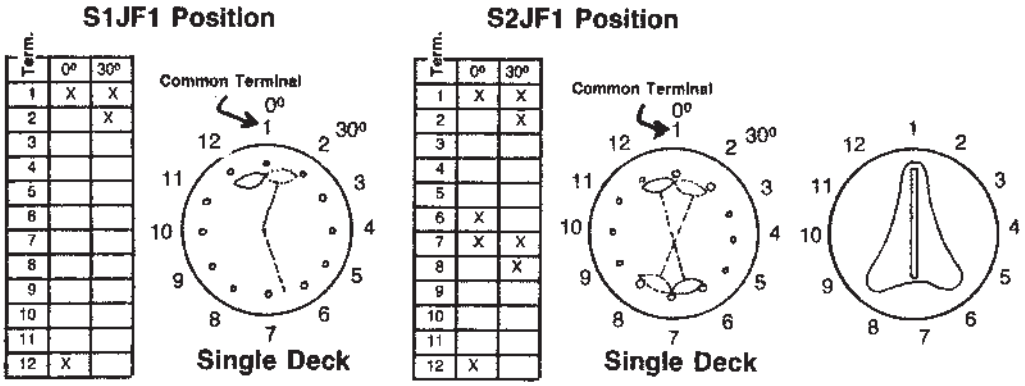
Panel-mounted Selector Switches

Type IC5846

Switch arrangement is basically a 4 pole, 2 position break before make (non-shorting) switch deck. Choose from 1 to 5 decks. As many as 20 circuits, if 5 decks used, can be transferred at one time.



Rotor Contact Configuration



Nickel plated brass handle will be furnished unless otherwise specified. Use of small soldering iron to attach wires to terminals is highly recommended to prevent damage due to excessive wear and tension to the Kel-F sections. Rosin core solder is best to use when soldering the terminal leads.

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Panel-mounted Pushbuttons

Type IC5845

Specification	MIL-C-2212
Application	Momentary operation in control circuits of magnetic starters.
Forms	Standard, oiltight, and watertight forms are available.
Contacts	Select from three contact arrangements listed below.

Ordering Information

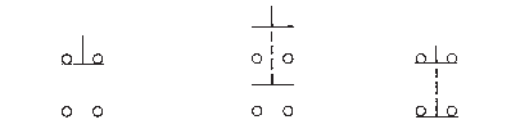
Order pushbutton by catalog number. Nameplate, if required, must be ordered separately. Order standard nameplate by catalog number. Specify marking for special nameplate.)

Contact Arrangement	Catalog Number			
			Watertight	
	Standard	Oiltight	W/ Black Rubber Cap	W/ Red Rubber Cap
1 N.O., 1 N.C.	5729215G1	5729215G18	205A234G5B	205A234G5R
2 N.O.	5729215G23	5729215G19	205A234G6B	205A234G6R
2 N.C.	5729215G22	5729215G20	205A234G8B	205A234G8R

Contact Ratings (Amperes)

Volts	Carry Continuous	Interrupt
115 VAC	10	3.0
440 VAC	10	.75
115 VDC	10	1.1
230 VDC	10	.55

Wiring Symbols



Watertight

Oiltight

Standard

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Panel-mounted Pushbuttons

Type IC5845

Standard Nameplates

Nameplate Marking	Catalog Number		
	Standard	Oiltight	Watertight**
Stop*	NP161882D	NP93003A	245A6295P004
Start	NP161882B	NP93003B	245A6295P005
Off	NP161882N	NP93286C	245A6295P028
On	NP161882P	NP93286D	245A6295P029
Forward	NP161882G	NP99360C	245A6295P035
Reverse	NP161882H	NP99360D	245A6295P036
Hoist	NP161882R	NP93286E	245A6295P037
Lower	NP161882S	NP93286F	245A6295P038
High Speed	NP161882C	NP94562C	245A6295P039
Low Speed	NP161882E	NP94562D	245A6295P040
Fast	NP161882J	NP93286G	245A6295P002
Slow	NP161882K	NP93286H	245A6295P003
Emergency Run	NP161882L	NP93286A	245A6295P030
Emergency Stop*	NP161882T	NP93286J	245A6295P021
Emergency Start	NP156339A	NP93286K	245A6295P041
Test Switch	NP161882M	NP93286L	245A6295P042
Run	NP161882F	NP93286M	245A6295P043
Jog	NP161882U	NP93286N	245A6295P044
Reset	NP100505D	NP93286P	245A6295P032
–	NP161882A	NP93286B	245A6295P001

* Red letters

** Navy approved adhesive backed “stick-on” type.

Pushbutton	Contact Arrangement	Dimensions in Inches			Weight in Ounces
		Front of Panel	Back of Panel	Maximum Panel Thickness	
Standard	1 N.O., 1 N.C.	0.38	1.47	0.13	4
	2 N.O.	0.38	2.00	0.13	4
	2 N.C.	0.38	2.13	0.13	4
Oiltight	1 N.O., 1 N.C.	0.31	1.82	0.25	5
	2 N.O.	0.31	2.35	0.25	5
	2 N.C.	0.31	2.48	0.25	5
Watertight	1 N.O., 1 N.C.	0.50	1.82	0.19	6
	2 N.O.	0.50	2.35	0.19	6
	2 N.C.	0.50	2.48	0.19	6

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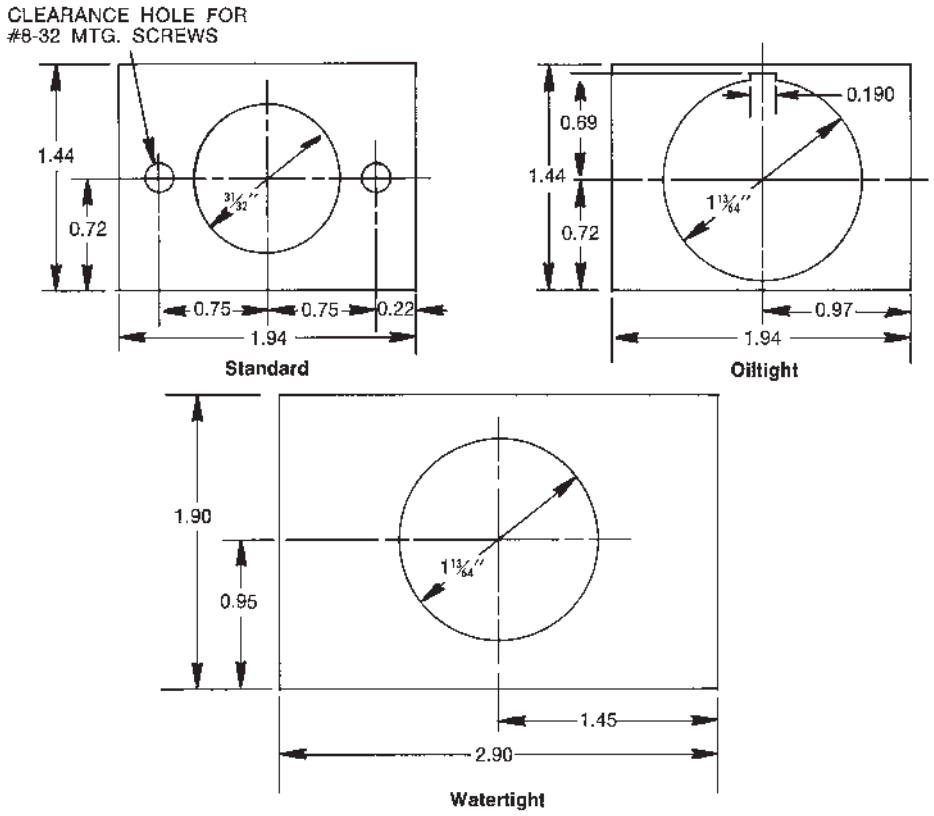
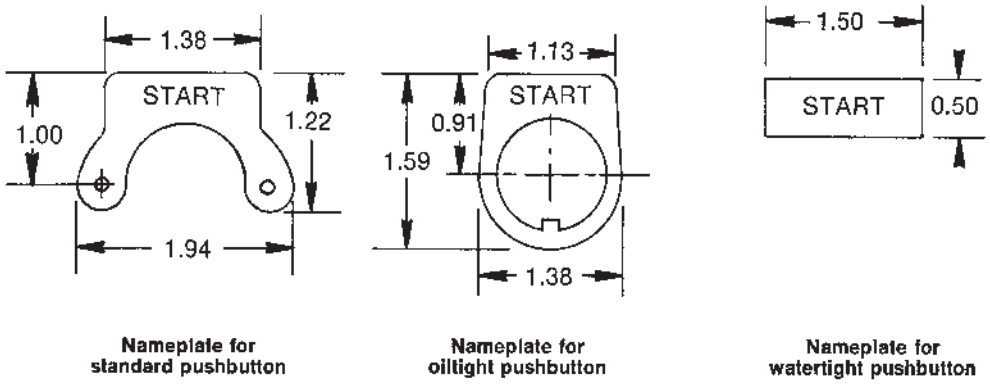
Panel-mounted Pushbuttons

Type IC5845

Outline and Mounting Dimensions (In Inches)





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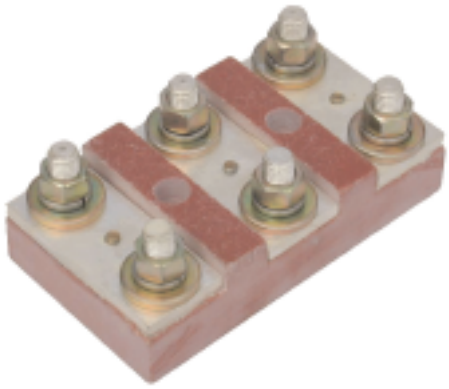
Power Terminal Boards

Type IC5885

Specification MIL-C-2212 and MIL-E-917

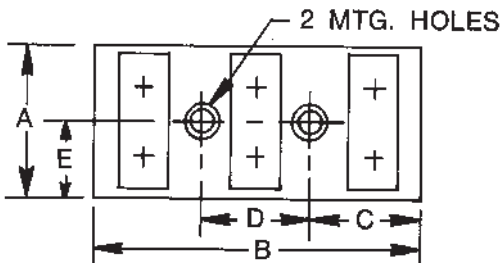
Application These one-piece terminal boards are for use in power circuits up to the amp rating listed.

Rating. 50 through 600 amps, 600 volts (max.), number of points - three.



Type IC5885 three-point power terminal board

Outline and Mounting Dimensions (In Inches)



Rating Amp	Dimenstions in Inches								Weight in Lbs.
	A	B	C	D	E	Front of Base	Mtg. Hole Diam.	Term. Screw Size	
50	1.38	2.94	0.89	1.16	0.69	1.50	0.22	0.19	0.38
100	2.00	3.66	1.13	1.41	1.00	1.56	0.22	0.25	0.69
150	2.00	3.66	1.13	1.41	1.00	1.56	0.22	0.31	0.81
400	2.50	4.82	1.47	1.88	1.25	2.38	0.31	0.50	2.00
600	3.50	6.32	1.97	2.38	1.75	2.38	0.31	0.50	3.25

Ordering Information

Order by catalog number.

Rating Amp	Number of Points	Catalog Number
50	3	8690261G1
100	3	8690262G1
150	3	8690262G2
400	3	147A3155G1
600	3	144A2191G1

Ward Leonard Electric Company Inc.
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Automatic Bus Transfers

Series 4685

Series 4685 Automatic Bus Transfers provide for the automatic or manual transfer of three phase A.C. loads from the ship's service supply to the emergency supply in case of low voltage or voltage failure. When normal conditions are restored, the load will be transferred automatically to the ship's service supply.

Specification	MIL-S-17773 (Ships)
Enclosure	Dripproof or Watertight*
Operation	Automatic
Switching Mechanism	Contactors, motor driven
Duty	Continuous
Ambient	50° C
Insulation	Class A
Mounting	Bulkhead
Transfer Position	Two way
Ratings	Amperes: 25, 50, 100, 150, 300, and 600 Voltage: 120 or 450 3 ph., A.C., 60 Hz. or 400 Hz.

*Can be furnished less enclosure for switchboard mounting.

Types

Amp Rating	Type ABT-A1 Part No. 60 Hz*	Type ABT-A2 Part No. 60 Hz*	Type ABT-A3 Part No. 60 Hz*
25	N296	N286	N276
50	N297	N287	N277
100	N294	N284	N274
150	N298	N288	N278
300	N299	N289	N279
600	N293	N283	N273

* For 400 Hz. Add "-41" to Part No.

A.C. Automatic Bus Transfer, dripproof enclosure

Types

ABT-A1-Automatic, for A.C. service, instantaneous without phase failure operation.

ABT-A2-Automatic, for A.C. service, instantaneous with phase failure operation.

ABT-A3-Automatic, for A.C. service, time delay without phase failure operation.

Ordering Information

When ordering A.C. Automatic Bus Transfers, the following information is requested:

1. Type (i.e. Type ABT-A1)
2. A.C. voltage
3. Current in amperes
4. Type of enclosure

Repair Parts

Repair parts normally furnished in accordance with applicable part allowance list include:

1 set of contacts
1 set of springs

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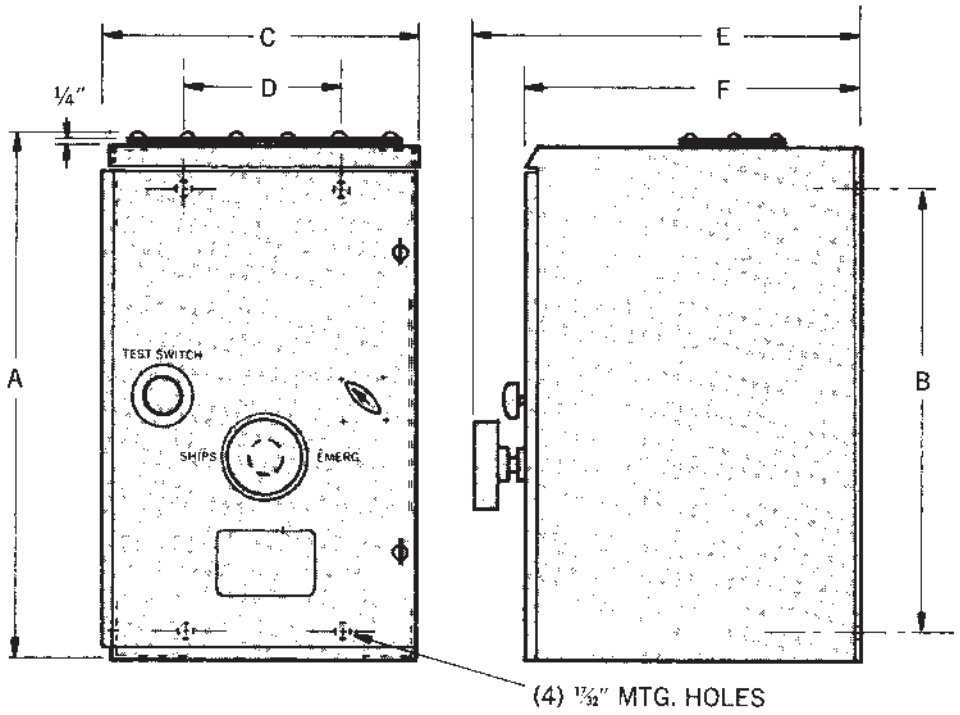
Automatic Bus Transfers

Series 4685



Dripproof Enclosure Dimensions*

Amp Rating Size	Approximate Dimensions (inches)					
	A	B	C	D	E	F
25, 50, 100	19 1/2	16 1/2	12	6 1/16	13 3/4	11 3/8
150	28	24 1/2	18	13 1/2	18	14 3/4
300	30	26 1/2	18	13 1/2	23	19 1/2
600	36	32 1/2	22	13 1/2	23	19 1/2

*Watertight enclosure dimensions available on request.

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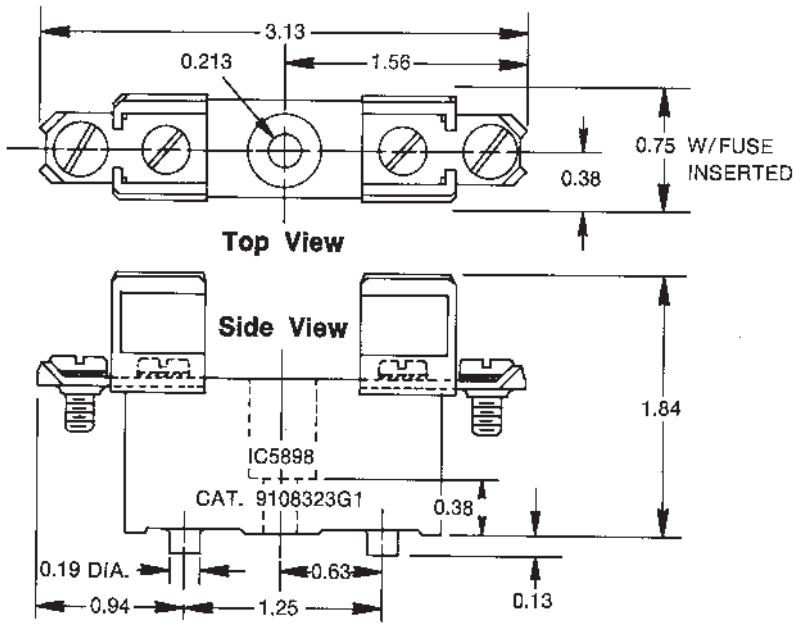
Fuse Blocks

Type IC5898

Specification	Fuse block meets MIL-E-917 and MIL-S-901 (for shock). Fuse clips meet MIL-F-21346.
Application	Use fuse blocks for holding cartridge-type fuses through 30 amps. Designed for use with style F61 fuses (9/16 " dia. x 2" long) of Specification MIL-F-15160.
Construction	Molded plastic block. Copper-clad steel fuse clips.
Rating	30 amps, 600 volts (max.)
Form	Single pole
Catalog Number	9108323G1

Type IC5898 Fuse Block

Outline and Mounting Dimensions (In Inches)



Ordering Information

Order by catalog number.

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Control Circuit Transformers

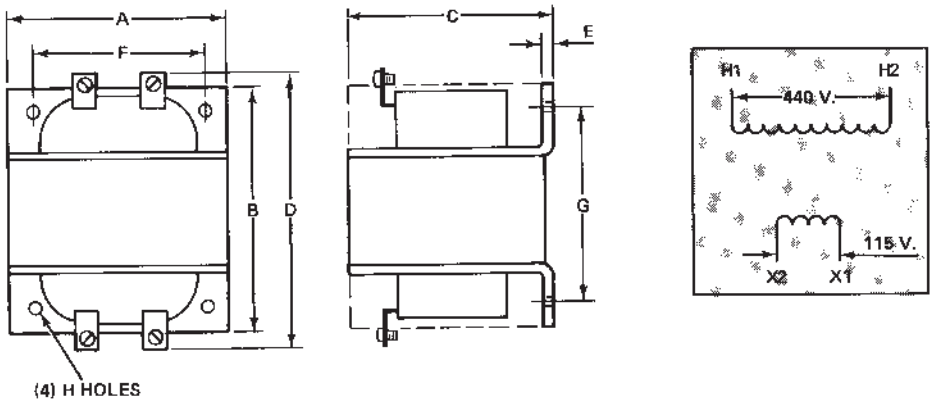
Series 106.531

Series 106.531 Transformers reduce supply voltage to 115 volts A.C. in control cricuits of motor starters, controllers and other equipment.

Specification	MIL-C-2212, MIL-T-16315 where applicable, MIL-E-917
Type	Series 106.531, Control Circuit
Application	Voltage step down.
Duty	Continuous
Ambient	50° C
Insulation	Class B

Typical Control Circuit Transformer

Dimensions (Approx.)



Catalog Number	V.A. Rating	Volts, 60 Hz		Dimensions - Approx. (in inches)							
		Primary	Secondary	A	B	C	D	E	F	G	H
106.531-1	500	440	115	5 1/4	4 3/8	4 3/8	5 3/8	1/8	3 3/4	3 1/2	5/16
106.531-2	1000	440	115	7 1/8	3 7/8	5 3/4	5 1/8	.134	5	3	5/16
106.531-3	2000	440	115	9	4 3/4	7 1/2	6 3/8	3/16	6	3 3/4	5/16
106.531-5	3000	440	115	9	5 3/8	7 1/2	7 3/8	3/16	6	4 3/8	5/16
106.531-6	1500	440	115	7 1/8	4 13/16	5 3/4	6 1/8	.134	5	3 15/16	5/16
106.531-7	250	440	115	4 1/2	3 7/8	3 3/4	4 3/8	1/8	1/4	3	5/16

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Indicator Lights

Two Lamps vs. One Lamp

The Dualamp Indicator Light revolutionizes the single lamp concept. When there is only one lamp and it is out, it may mean a real signal indication or just a burnt out lamp. This element of doubt is eliminated with the Dualamp since no two lamps burn out simultaneously. When both lamps are out it means a real signal indication.

The Dualamp Indicator Light uses 2.5 volts alternating current (VAC) lamps in parallel which are independently supplied by a 1.8 VAC closely regulated transformer for a long lamp life. Depending on the indicator light selected, it can be used on voltages such as 117 or 450 VAC. Dualamp Indicator Lights are also available for direct current voltages (VDC). Inquiries on other line voltages that may not be listed are invited. Hardware (Oring, hex nut, cup washer) are included. Midget screw base lamps and lenses are purchased separately.

Various Lengths Available

Lamp	Rated Volts	Design Amps.	Candlepower (Approx.)	Filament Designation	Life Avg. (Hrs.)	Primary Service
W-L-00111/56 (#1769:MS15612-3)	2.5	0.20	0.20	C-2R	500	A.C.
W-L-00111/46 (#342:MS15612-5)	6	0.04	0.04	C-2V	1000	D.C.
W-L-00111/45 (#335:MS15612-2)	28	0.04	0.34	C-2F	1000	A.C.

Lamp Accomodation

Dualamp Indicator Lights use incandescent midget screw base lamp in accordance with federal specification W-L-00111 and industry numbers. Two per unit. Clear finish.

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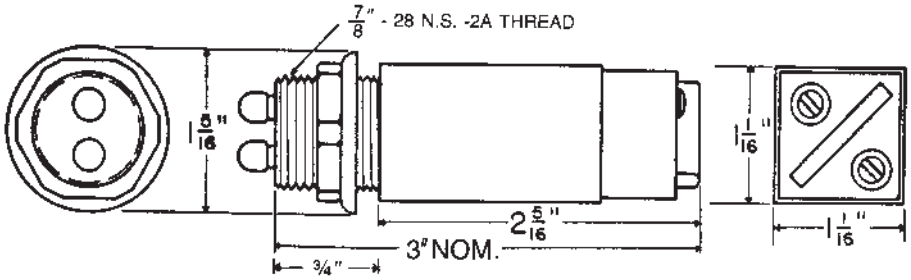
Indicator Light

LH 98

The Dualamp Indicator Light has been tested and approved for dielectric withstanding voltage, moisture resistance, voltage regualtion, temperature rise, shock, vibration, visual and dimensional. Application with 50, 60, or 400 Hz A.C. systems.

JHSLC P/N	Primary VAC	Secondary VAC	Lamp Accomodation	Lenses Available
LH 81/1	12	1.8		
LH 98/2	26	1.8		
LH 98/3	117	1.8		
LH 98/4	450	1.8	W-L-00111/56	LC 38 thru 45
JHS 1410	400 (3000) Spike	1.8	(#1769:ms15612-3)	
JHS 1510	220	1.8		
JHS 1610	440 (3000) Spike	1.8		

Dimensions



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Indicator Light

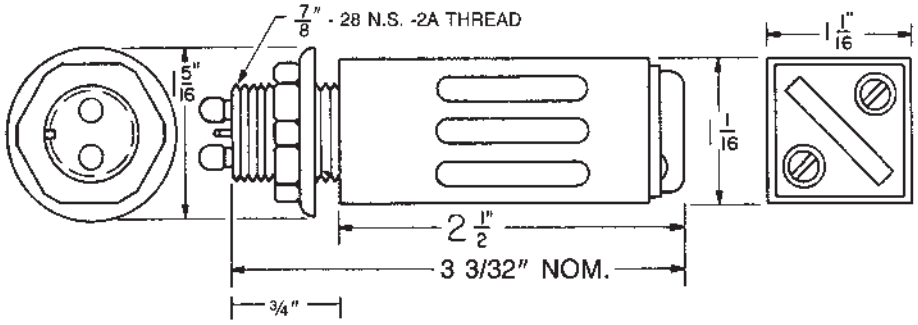
LH 96

The Dualamp Indicator Light lampholder is used for direct current applications and where personnel safety must be obtained without putting a ground on the system. The lamp sockets are recessed into an insulated core and the circuit is automatically disconnected when the lens is removed to replace the lamps. The two lamps are connected to a resistor contained within the unit.

JHSLC P/N	Primary VAC	Secondary VAC	Resistor Rating	Lamp Accomodation	Lenses Available
LH 96/1	6	6	none		
LH 96/2	12	6	300 ohm 5 W		
LH 96/3	24	6	600 ohm 5 W	W-L-00111/46	LC 38
LH 96/4	48	6	1200 ohm 5 W	(#342:MS15612-5	thru 45
LH 96/5	120	6	2800 ohm 5 W		
LH 96/6*	240	6	6300 ohm 5 W		

*The resistor for this unit must be mounted externally due to length.

Dimensions (Approx.)



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Indicator Light

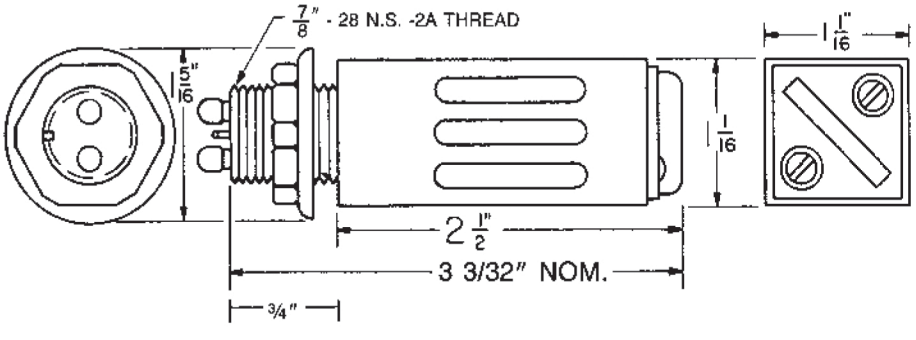
LH 96

The Dualamp Indicator Light lampholder is used for direct current applications and where personnel safety must be obtained without putting a ground on the system. The lamp sockets are recessed into an insulated core and the circuit is automatically disconnected when the lens is removed to replace the lamps. The two lamps are connected to a resistor contained within the unit.

JHSLC P/N	Primary VDC	Secondary VDC	Resistor Rating	Lamp (Bulb) Accomodation	Lenses Available
LH 96/1	6	6	none		
LH 96/2	12	6	300 ohm 5 W		
LH 96/3	24	6	600 ohm 5 W	W-L-00111/46	LC 38
LH 96/4	48	6	1200 ohm 5 W	(#342:MS15612-5	thru 45
LH 96/5	120	6	2800 ohm 5 W		
LH 96/6*	240	6	6300 ohm 5 W		

*The resistor for this unit must be mounted externally due to length.

Dimensions (Approx.)



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Indicator Light

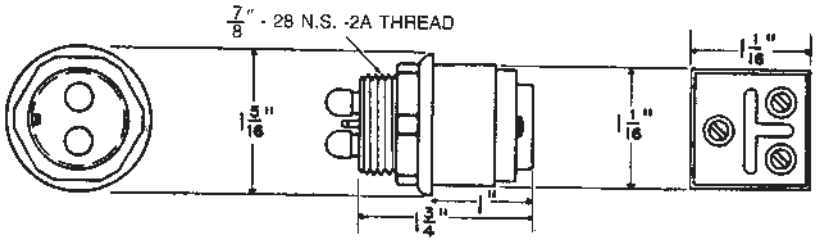
LH 95

The Dualamp Indicator Light lampholder is used for direct current applications and where personnel safety must be obtained without putting a ground on the system. The lamp sockets are recessed into an insulated core and the circuit is automatically disconnected when the lens is removed to replace the lamps. The two lamps are connected to separated resistors thereby featuring the same Dualamp advantages.

Lamp Accomodation: W-L-00111/46 (Industry #342; MS15612-5)

Lenses Available: LC 38 thru 45 (see page 67)

Dimensions (Approx.)



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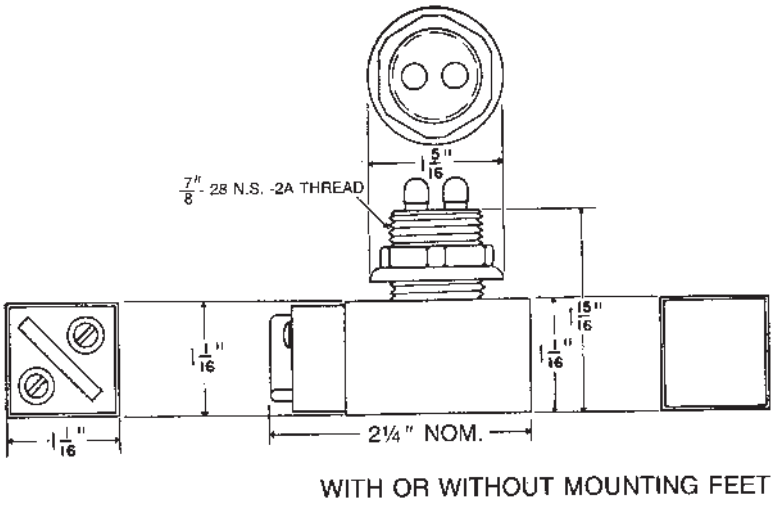
Indicator Light

LH 94

The Dualamp Indicator Light has been tested and approved for dielectric withstanding voltage, moisture resistance, voltage regualtion, temperature rise, shock, vibration, visual and dimensional. Application with 50, 60, or 400 Hz A.C. systems.

JHSLC P/N	Primary VAC	Secondary VAC	Lamp Accomodation	Lenses Available
LH 94/1	12	1.8		
LH 94/2	26	1.8	W-L-00111/56	LC 32 thru 45
LH 94/3	117	1.8	(#1769:MS15612-3)	
LH 94/4	450	1.8		

Dimensions (Approx.)



WITH OR WITHOUT MOUNTING FEET

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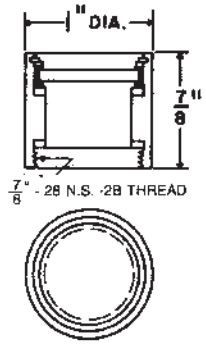
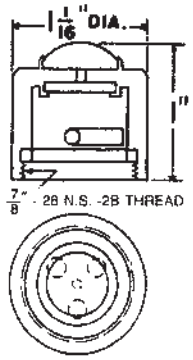
Lenses

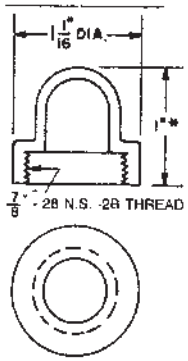
LC 38 thru 45



LC 38 MIL-L-3661/52



LC 39 MIL-L-3661/53

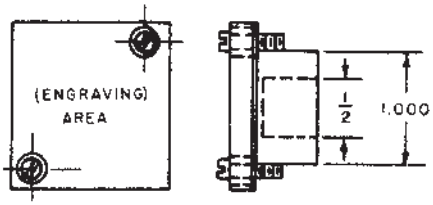


LC 40 MIL-L-3661/54

LC 38 MIL-L-3661/52		LC 39 MIL-L-3661/53		LC 40 MIL-L-3661/54	
Color	P/N	Color	P/N	Color	P/N
Colorless	LC 38 CN1	Colorless	LC 39 CN1	Colorless	LC 40 CN3
Red	LC 38 RN1	Red	LC 39 ED1	Red	LC 40 EN3
White	LC 38 WT1	Blue	LC 39 BD1	White	LC 40 WT3
Blue	LC 38 BN1	Green	LC 39 GD1	Blue	LC 40 BN3
Green	LC 38 GN1	Yellow	LC 39 YD1	Green	LC 40 GN3
Yellow	LC 38 YN1			Yellow	LC 40 YN3
				Unfrosted Colorless	LC 40 TN3
Material: Plexiglass		Material Glass		Material: Plastic	

LC 41 thru 45

These panel mounted lenses are in accordance with MIL-L-3661/55 thru 59. Any engraving must be specified along with color since these lenses are specially engraved to your order.



MS 17140

Flush type indicator light lenses are available in various colors. Engraving must be specified.

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Indicator Light Holder

LH 97

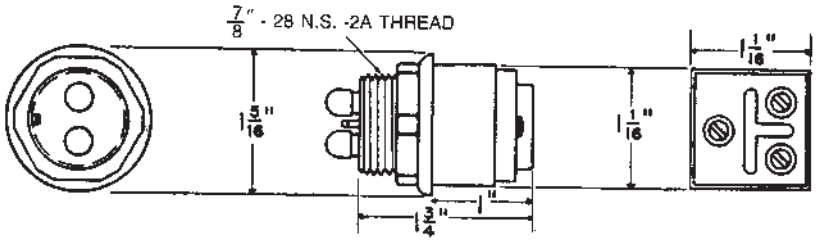
This light is to be used on alternating current where space behind the panel is limited and where a light with the built-in transformers which can be mounted elsewhere on the panel and can be connected to the LH 97 to obtain the required voltages. The lamp screw shells are grounded to the case so that when the lamps are removed, there is no shock hazard to personnel.

Application with 50, 60, or 400 Hz A.C. systems.

Lamp Accomodation - W-L-00111/56 (#1769; MS15612-3)

Lenses Available - LC38 thru 45 (see page 67)

Dimensions (Approx.)



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Indicator Light Transformer

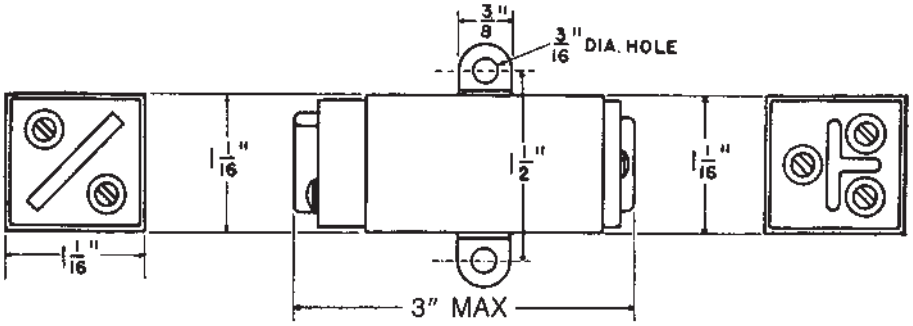
LH 93

Without lamp or lens accomodation, this self-contained transformer indicator light can be used in conjunction with the LH97 lampholder. The LH93 power transformer unit has been tested and approved for dielectric withstanding voltage, moisture resistance, voltage regulation, temperature rise, shock, vibration, visual and dimensional.

Application with 50, 60, or 400 Hz A.C. systems.

This unit is available in different primary voltage ranges from 12 VAC (LH93/1); 26 VAC (LH93/2); 117 VAC (LH93/3); 450 VAC (LH93/4) with secondary voltage at 1.8 VAC.

Dimensions (Approx.)



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Switch Boxes (for Sound Powered Telephone) Types A-17A and A-19A

This telephone system elminates need to have a power source from the outside or with a battery. Power is supplied by the person's voice thus communications are not disrupted due to power outage.

- Shock per MIL-S-901
- Vibration MIL-STD-167
- Watertight MIL-STD-108E
- Dielectric Test
- Insulation resistance
- Electrical continuity
- Non-magnetic (less than 2.0 mu)

Symbol 2861.1 Type A-19A

Includes 20 Rotary Selector Switches

Symbol 2860.1 Type A-17A