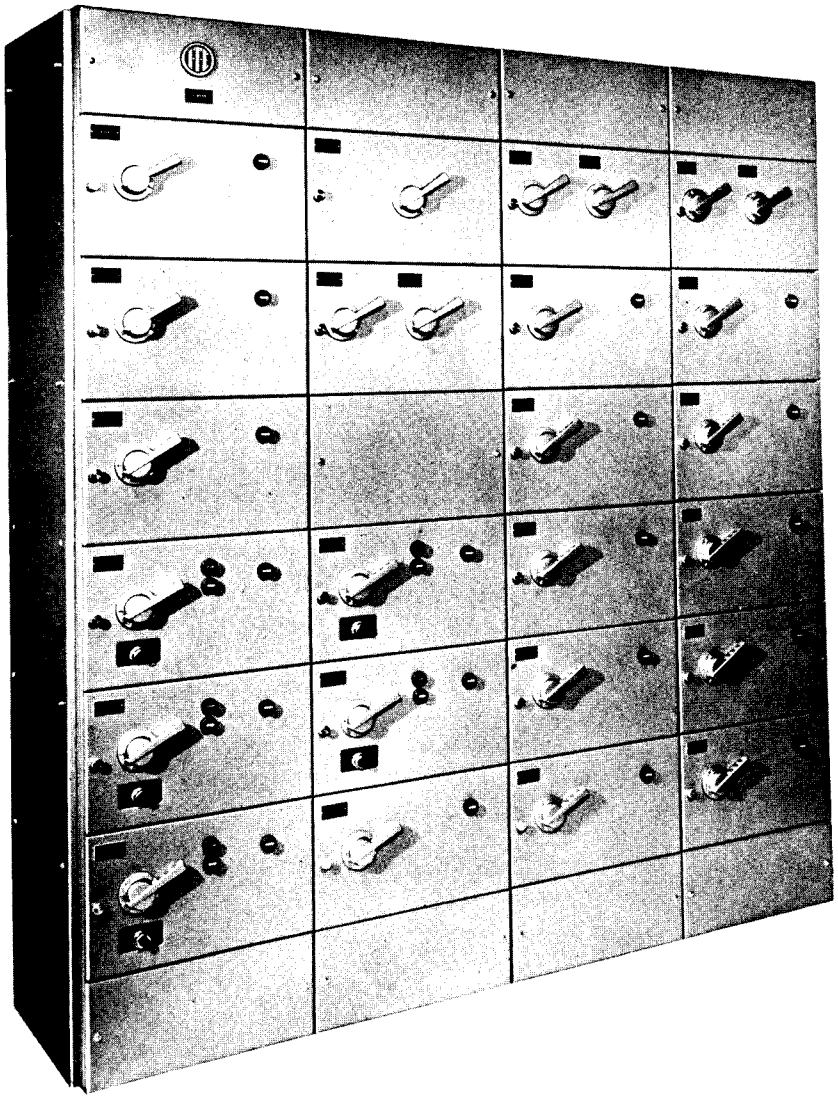
MOTOR CONTROL CENTERS

IB-6,10-1
ISSUE A

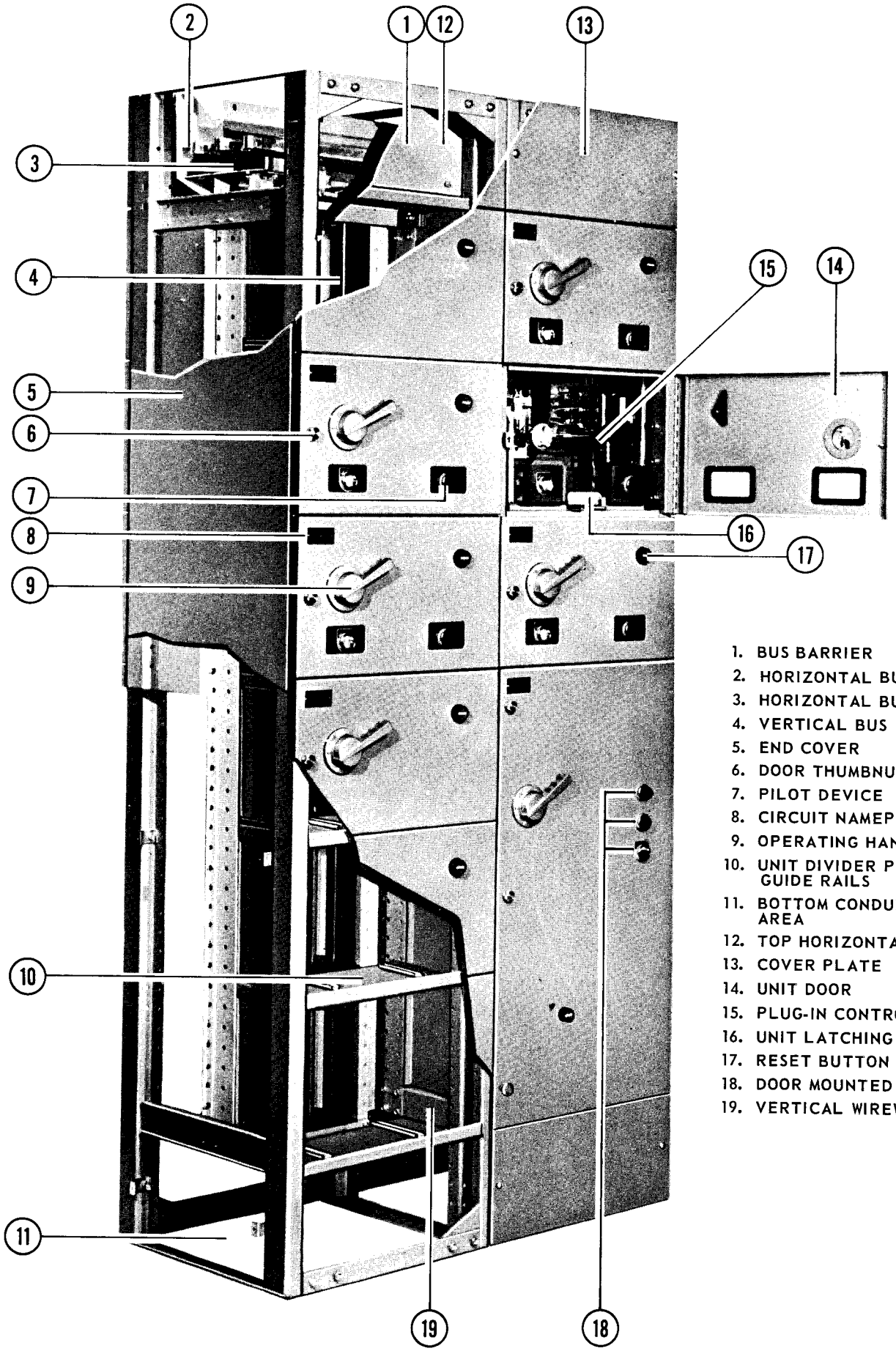
INSTRUCTIONS

INSTALLATION, OPERATION AND MAINTENANCE

SERIES 9600
MOTOR CONTROL CENTER



I-T-E CIRCUIT BREAKER COMPANY



1. BUS BARRIER
2. HORIZONTAL BUS
3. HORIZONTAL BUS INSULATORS
4. VERTICAL BUS
5. END COVER
6. DOOR THUMBNUT
7. PILOT DEVICE
8. CIRCUIT NAMEPLATE
9. OPERATING HANDLE
10. UNIT DIVIDER PLATE WITH UNIT GUIDE RAILS
11. BOTTOM CONDUIT AND WIREWAY AREA
12. TOP HORIZONTAL WIREWAY AREA
13. COVER PLATE
14. UNIT DOOR
15. PLUG-IN CONTROL UNIT
16. UNIT LATCHING MECHANISM
17. RESET BUTTON
18. DOOR MOUNTED PILOT DEVICES
19. VERTICAL WIREWAY AREA

INSTRUCTIONS FOR SERIES 9600 MOTOR CONTROL CENTER

INTRODUCTION

This instruction book is intended as a general guide for the installation, operation, and maintenance of the standard I-T-E Motor Control Center. Individual apparatus may vary as a result of special requirements.

Specific information on a particular order is usually furnished in the form of engineering drawings composed of schedule, elevation, plan view, and wiring diagrams. These are submitted to the purchaser shortly after an order is received.

These instructions should be read carefully and used as a guide during installation and initial operation. They should be filed in a readily accessible place, together with drawings and descriptive data pertaining to this equipment. Their use will facilitate proper maintenance of the equipment and prolong its life.

Experienced service engineers are available to assist you in the installation, check-out, and maintenance of this equipment, should it be required. This service is charged at published standard daily rates plus transportation costs.

DESCRIPTION OF APPARATUS

The I-T-E Motor Control Center is a group of combination starters and other control or protective devices mounted in free-standing cubicles. Vertical cubicles called "sections" are joined together and electrically connected to form a continuous assembly. A common horizontal power bus runs throughout the top of each section. In addition, each section has a separate vertical bus to which the control units and other apparatus are connected.

Individual "control units" are housed in separate metal enclosed compartments, each with its own door. The motor control units, include circuit-breaker or fusible combination starters. Feeder Units may include circuit breakers or fusible switches. Units of 21" or less in height are plug-in design. Larger units are bolted in, but they are front removable with simple hand tools. Other apparatus such as lighting panelboards, dry type transformers, instrumentation etc. may be mounted in the Motor Control Center.

The Motor Control Center section is nominally 90" high, 20" deep, and 20" wide. Doors and covers on the front, rear, and both ends of the assembly add a total of 1½" to overall length and depth of the complete assembly.

Individual control units vary in height, depending on size. Generally, they are standard depth, permitting front only or back-to-back arrangement of units in the 20" deep section. Each vertical section has 72" of control unit mounting space. This will accommodate up to six NEMA size 1 or 2 combination starter units. Where a complement of units does not fill the unit mounting area, remaining space is normally equipped for future units, provided it is in multiples of standard-unit height. Future units are enclosed with blank covers. Any unusable space is equipped with a filler cover.

Control-unit operator handles are furnished with an interlock requiring the handle to be in the OFF position before the door can be opened. A defeater arrangement, bypassing the interlock, is provided for live-circuit maintenance.

If circuit identification is furnished with the order, individual engraved nameplates are installed on the unit doors. Auxiliary contacts, pushbuttons, selector switches, and similar accessories are supplied as specified.

Overload heaters are furnished when motor horsepower information has been provided or specific sizes have been indicated for each circuit at the time of order entry. In general, power fuses are not included unless specifically ordered.

Units of similar type and NEMA size, having the same complement of pilot accessories, may be interchanged without structural modification. When interchanging units, be sure that heater coil sizes and other component ratings correspond to that required for the new positions.

RECEIVING

Before accepting shipment from the transportation company, a thorough inspection of the I-T-E Motor Control Center should be made to determine whether damage has occurred in transit. If so, the carrier should be immediately notified, and a damage claim filed. The I-T-E Circuit Breaker Company is not responsible for damage occurring after release of the equipment to the carrier. Upon request, the I-T-E Circuit Breaker Company will provide assistance in filing a claim with the carrier. The nearest I-T-E Circuit Breaker Company District Sales Office, as listed on the back of this publication, should be contacted. Complete information on the damage involved as well as pertinent information should be provided.

STORAGE

In the event installation cannot be made immediately, the I-T-E Motor Control Center should be stored in a clean, dry, ventilated location. Should it be subjected to either extremely low temperature or moisture, approximately 100 watts of heat should be introduced into each section. CAUTION: Indoor Motor Control Centers should not be stored outdoors even if completely covered with a tarpaulin or plastic sheet. When stored indoors, protection against contamination, such as moisture and dust, should be provided. It is suggested that the factory-installed plastic covering not be removed until equipment is ready for installation.

UNPACKING

Care must be used in unpacking and handling to avoid injury to the Motor Control Center. In cold weather, after removal to a warm place, do not uncover the equipment until it has reached room temperature. This procedure will minimize moisture condensation. Check equipment against the packing list and should any shortages occur, follow the procedure as outlined under "Receiving".

HANDLING

All Motor Control Centers should be handled with utmost care as they contain devices which might be damaged if subjected to shock. The plastic cover, shipping skids, and open crating should remain on each assembly as long as possible for convenient handling and protection. Equipment may be moved on an even surface by the use of rollers or short lengths of heavy-duty pipe under the skids. Any force to move the equipment should be applied only to

the skids by means of crowbar, block and tackle, or by pushing or pulling with motor vehicle, and not to the Motor Control Center itself.

CAUTION: When pushing or pulling equipment, stabilize front and rear faces of the assembly to prevent possible tipping. When handling with an overhead crane, the assembly should be supported by slings under the skids. Cable spreaders should be used in the slings above the Motor Control Center to prevent damage to the top edges. When handling the assembly with skids removed, lifting lugs should be placed under the outboard carriage bolts at the four top corners of the Motor Control Center. Lifting lugs are included with each shipment.

POSITIONING

Before attempting installation, all information furnished by the I-T-E Circuit Breaker Company for the particular order should be reviewed. Normally, order information includes drawings showing plan view, front view, and designation of the incoming service entrance area. As much clearance as possible should be allowed from wall surfaces, columns, obstructions, etc., when locating the Motor Control Center. Front aisle space should be a minimum of 24" (42" is recommended when space is available). Clearance at the back should be a minimum of 1½" for front-only construction or a minimum of 24" aisle space for back-to-back construction.

FLOOR PREPARATION

The I-T-E Motor Control Center is a free-standing, self-supporting assembly; however, it is desirable that it be bolted down with anchor bolts. Reference should be made to the order drawings as supplied for bolt locations. Large rectangular washers(clips), shipped with each section, are normally used for anchoring (fig. 3). Optional base channels are furnished when ordered. The channels may be set on the floor or embedded in it (fig. 5). Closure caps are installed to make the assembly rodent-proof. Refer to order drawings for anchor-bolt locations.

Where required, conduit may be "roughed-in" in the floor slab before installation of the Motor Control Center. Available conduit entry space for each section is shown on the submittal drawings, the height of conduit stubs above the slab should be held to a minimum. Care should be exercised when the equipment is lifted into place to avoid damage to either equipment or conduit. Stabilizing ropes attached to the front and rear of the assembly will help prevent oscillation and subsequent misalignment during lowering of the equipment.

It is important that the assembly be straight and level throughout its length. To insure this condition, shims should be placed under the base, as required, before anchoring.

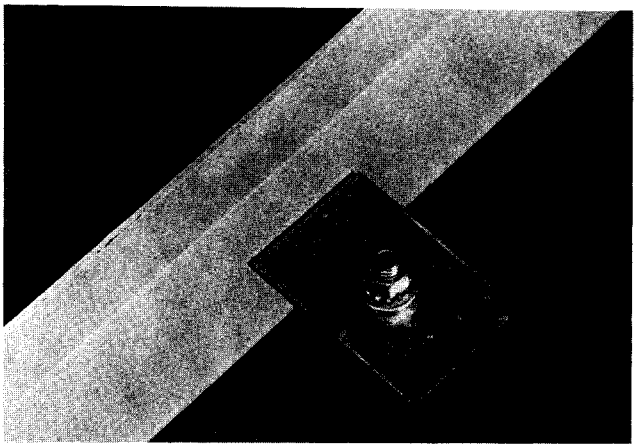


Fig. 3 Anchor Bolt Clip Mounting

JOINING OF SECTIONS

When the Motor Control Center is shipped in more than one assembly of sections or "shipping splits", it is necessary to join the individual assemblies by bolting together. Order drawings indicate "shipping splits". Each partial assembly is clearly marked showing its relative position. Necessary bus bolts are temporarily installed in position at the end of one horizontal bus section. The required bolts for holding the section frames together are placed in position at the end of one assembly. After removing these bolts, the two sections may be moved together and aligned in position before bolting. All bolts, particularly bus bolts, should be carefully tightened.

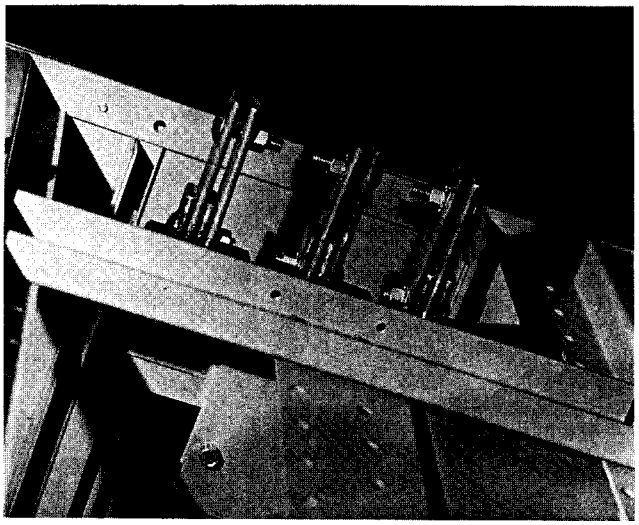


Fig. 4 Horizontal Bus Splice

ADDITION OF NEW SECTIONS

The following procedure should be followed when adding a section to an existing I-T-E Motor Control Center:

1. Remove the cover and its mounting hardware from the end of the Motor Control Center where the section is being added.
2. Align the horizontal busses and loosely bolt the bus assembly together using the two short pieces of copper bus provided for each phase.
3. Install and tighten the bolts between sections.
4. Tighten horizontal bus bolts.
5. Install the end cover and supporting hardware on the outboard end of the new section.
6. Check for loose connections or contamination of bus compartments before energizing.

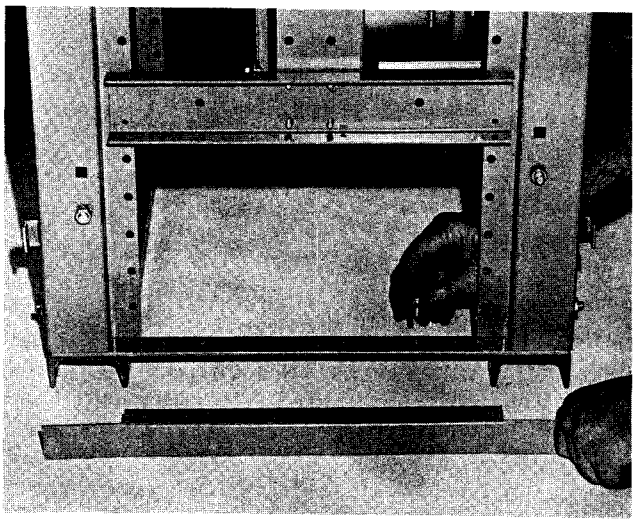


Fig. 5 Floor Channel Mounting

WIRING AND CHECKOUT

INCOMING SERVICE ENTRANCE

Before installation of the incoming service connections to the I-T-E Motor Control Center, consult the final job drawings for service entrance details. The top cover over the service-entrance is removable for ease of cutting conduit openings. The end cover of the service entrance section may also be removed for maximum accessibility to service connections. Solderless-type lugs of size requested with order are supplied for connection of the incoming service. Where sizes have not been indicated with the order, factory standard sizes to match bus capacity will be installed.

The service connection may enter from top or bottom as required for front-only, control unit arrangements; however, in a back-to-back arrangement, it is necessary to utilize one of the unit compartments or a top pull box for service connections.

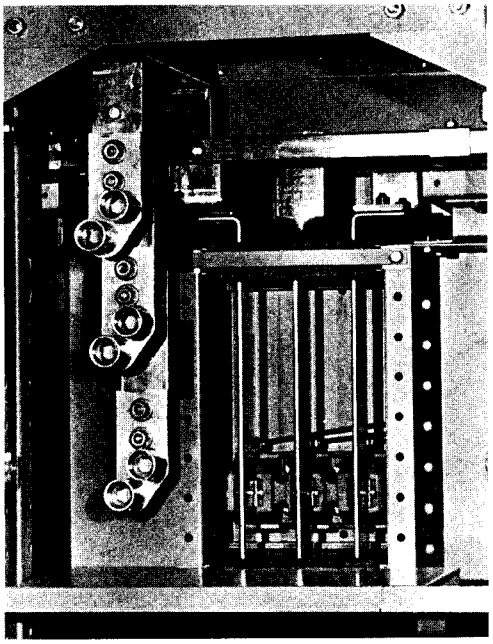


Fig. 6. Typical Incoming Service Entrance

CONTROL WIRING

Pulling of wires to individual units may be simplified during initial installation by removing all plug-in control units in a section. See page 10 for instructions on unit removal. Where wires are being pulled into the bottom wireway, the bottom unit support pan may be easily removed for maximum accessibility. Units that have been removed to facilitate wire pulling should be carefully tagged for identification. Refer to the wiring diagrams furnished with the order for individual unit connections. For simplicity, sections are numbered 1, 2, 3, etc., left to right of the section assembly. Units are lettered A, B, C, etc., top to bottom of each section. For example, unit 2A would be the top unit in section 2.

Where wiring bypasses an individual control unit, it is convenient to push the wires to the rear of vertical wireway behind the unit.

Insulated straps are mounted on the side of the vertical wireway for wiring support. Closure bands for the straps in each vertical wireway are shipped with the upper strap.

GROUND CONNECTION

The ground and/or neutral bus when included is located in the bottom of the horizontal wireway at the rear of the Motor Control Center. The lower horizontal wireway covers provide easy access to these busses.

EQUIPMENT CHECKOUT

Before energizing any part of the Motor Control Center the following steps should be taken:

1. Remove any blocking wedges that may have been inserted in relays, circuit breakers, motor starters, etc., to prevent movement during shipment.
2. Operate all circuit breakers, relays, and starters by hand to make sure there is no binding of moving parts.
3. Make a thorough inspection to determine that no foreign matter (tools, etc.) has been left in the Motor Control Center. Particular attention should be paid to the bus compartment.
4. The Motor Control Center should be thoroughly cleaned, particularly the insulators, by use of a vacuum cleaner or if not available, an air hose. During this cleaning process, bus insulators and unit plug-in blocks should be carefully inspected for breakage.
5. All circuit connections are tightened at the factory, however, it is possible that these may loosen during shipment. Particular attention should be paid to terminal-block connections. It is also desirable to check the various bolts and screws, and should a spot check reveal anything loose, a thorough inspection should be made.
6. Check all doors having circuit breaker or switch operating mechanisms to make sure that they operate freely. Operating handles on the unit doors should also be checked and should adjustment be required, the two handle retaining screws should be loosened, the door closed, reopened, and the screws retightened.
7. Shipping screw on the left side of each plug-in unit should be removed and discarded.

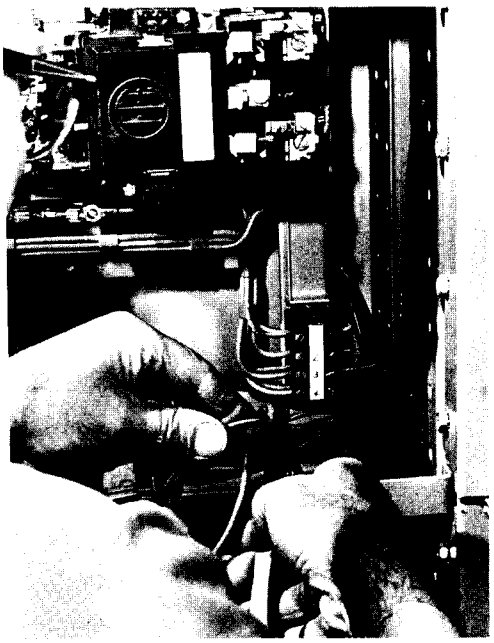


Fig. 7 Connection of Control Wiring

OVERLOAD HEATER APPLICATION DATA

Overload heaters are normally supplied with the Motor Control Center. Where motor full-load currents are specified with the order, specific heaters for the motor controlled are included. Where the horsepower only is specified, the table below is used for overload heater sizing.

NOTE: When installing the Motor Control Center, check the information on the order to be sure that the installed motors match those used for heater sizing.

CURRENT RATING OF THREE PHASE, 60 CYCLE, A-C INDUCTION MOTORS

H. P.	Syn. Speed RPM	Current in Amperes			
		110 Volts	220 Volts	440 Volts	550 Volts
¼	1800	1.92	0.96	0.48	0.38
	1200	2.32	1.16	0.58	0.46
	900	2.90	1.45	0.73	0.58
⅓	1800	2.32	1.16	0.58	0.47
	1200	2.86	1.43	0.72	0.58
	900	3.50	1.75	0.88	0.71
½	1200	4.14	2.07	1.04	.83
	900	5.80	2.90	1.45	1.16
¾	1800	4.66	2.33	1.17	.93
	1200	5.70	2.85	1.43	1.14
	900	6.90	3.45	1.73	1.38
1	3600	5.50	2.75	1.38	1.10
	1800	6.10	3.05	1.53	1.22
	1200	7.08	3.54	1.77	1.42
	900	7.48	3.74	1.87	1.50
1½	3600	8.34	4.17	2.09	1.67
	1800	8.56	4.28	2.14	1.71
	1200	9.70	4.85	2.43	1.94
	900	11.60	5.81	2.91	2.32
2	3600	11.1	5.56	2.78	2.22
	1800	11.5	5.76	2.88	2.30
	1200	12.7	6.35	3.18	2.54
	900	14.4	7.21	3.61	2.88
3	3600	15.7	7.87	3.94	3.14
	1800	16.6	8.29	4.14	3.32
	1200	17.8	8.92	4.46	3.56
	900	20.4	10.20	5.09	4.08
5	3600	25.4	12.7	6.34	5.08
	1800	26.4	13.2	6.60	5.28
	1200	28.2	14.1	7.05	5.64
	900	31.2	15.6	7.80	6.24
7½	3600	38.4	19.2	9.6	7.68
	1800	38.6	19.3	9.7	7.72
	1200	40.6	20.3	10.2	8.12
	900	47.6	23.8	11.9	9.51
10	3600	49.0	24.5	12.3	9.8
	1800	50.4	25.2	12.6	10.1
	1200	53.2	26.6	13.3	10.6
	900	57.8	28.9	14.5	11.6
	600	67.6	33.8	16.9	13.5
15	3600	73.4	36.7	18.4	14.7
	1800	76.2	38.1	19.1	15.2
	1200	79.8	39.9	20.0	16.0
	900	83.8	41.9	21.0	16.8
	600	96.6	48.3	24.2	19.3
20	3600	98	49.0	24.5	19.6
	1800	101	50.5	25.3	20.2
	1200	103	51.7	25.9	20.6
	900	109	54.6	27.3	21.8
	600	123	61.5	30.8	24.6
25	3600	118	59.2	29.6	23.6
	1800	125	62.7	31.3	25.0
	1200	129	64.7	32.3	25.8
	900	135	67.4	33.7	27.0
	600	144	71.9	35.9	28.8
30	1800	146	72.8	36.4	29.2
	1200	154	77.1	38.6	30.8
	900	159	79.4	39.7	31.8
	600	176	87.9	43.9	35.2
40	1800	196	98	49.0	39.2
	1200	198	99	49.5	39.6
	900	208	104	52.0	41.6
	600	226	113	56.5	45.2
50	1800	242	121	60.5	48.4
	1200	244	122	61.0	48.8
	900	254	127	63.5	50.8
	600	276	138	69.0	55.2
60	1800	—	143	71.5	57.2
	1200	—	148	74.0	59.2
	900	—	151	75.5	60.4
	600	—	162	81.0	64.8
75	1800	—	178	89.0	71.2
	1200	—	181	90.5	72.4
	900	—	187	93.5	74.8
	600	—	199	99.5	79.6
100	1800	—	233	116	93.2
	1200	—	239	120	95.6
	900	—	245	123	98.0
	600	—	257	128	103
	450	—	290	145	116
125	1800	—	289	144	115
	1200	—	298	149	119
	900	—	305	153	122
	720	—	314	157	126
	600	—	320	160	128
	450	—	351	175	140
150	1800	—	346	173	138
	1200	—	350	175	140
	900	—	363	182	145
	720	—	376	188	150
	600	—	378	189	151
	450	—	418	209	166
200	1800	—	460	230	184
	1200	—	466	233	186
	900	—	490	245	196
	720	—	494	247	197
	600	—	498	249	199
	450	—	528	264	211
250	1800	—	572	286	229
	1200	—	580	290	232
	900	—	604	302	242
	720	—	625	312	250
	600	—	630	315	252
	450	—	630	315	252
	360	—	676	338	270
300	1800	—	685	342	274
	1200	—	696	348	278
	900	—	722	361	289
	600	—	722	361	289
	450	—	760	380	304
	360	—	830	415	332
400	1800	—	910	455	364
	1200	—	933	466	373
	600	—	955	477	382
	450	—	1000	500	400
	360	—	1050	523	418
500	1800	—	1160	578	462
	1200	—	1120	560	448
	600	—	1180	590	472
	450	—	1200	602	482
	360	—	1320	658	526

CLASS G 30 HEATER SELECTION TABLES

Class A20 FVNR, Class A22 Two-Speed, Class A21 Reversing

HEATER REQUIREMENTS BY OPERATING CONDITIONS			
Motor Continuous Rating °C Rise	Ambient Same At Starter And Motor	Ambient Higher At Starter Than At Motor	Ambient Higher At Starter Than At Motor
40	As specified from tables	One size larger than specified for each 15°C difference.	One size smaller than specified for each 15°C difference.
50-55	One size smaller than 40°C. above	One size smaller than 40°C above	One size smaller than 40°C above

The current at which heaters will trip the overload relay with the knob at 100% mark in an ambient of 40°C. is 1.25 times the minimum full load motor current in the table. Heaters so selected give 125% protection.

NEMA SIZE 0-1 STARTERS

HEATER CAT NO.	FULL LOAD MOTOR CURRENT			
	2 OL RELAYS		3 OL RELAYS	
	MIN.	MAX.	MIN.	MAX.
G30T6	.32	.34	.29	.31
G30T7	.35	.38	.32	.34
G30T8	.39	.42	.35	.37
G30T9	.43	.45	.38	.41
G30T10	.46	.49	.42	.45
G30T11	.50	.56	.46	.50
G30T12	.57	.61	.51	.56
G30T13	.62	.70	.57	.63
G30T14	.71	.77	.64	.70
G30T15	.78	.86	.71	.78
G30T16	.87	.96	.79	.87
G30T17	.97	1.06	.88	.96
G30T18	1.07	1.14	.97	1.04
G30T19	1.15	1.25	1.05	1.11
G30T20	1.26	1.39	1.12	1.24
G30T21	1.40	1.52	1.25	1.35
G30T22	1.53	1.64	1.36	1.46
G30T23	1.65	1.81	1.47	1.62
G30T24	1.82	2.04	1.63	1.83
G30T25	2.05	2.26	1.84	2.02
G30T26	2.27	2.47	2.03	2.20
G30T27	2.48	2.73	2.21	2.44
G30T28	2.74	3.07	2.45	2.74
G30T29	3.08	3.41	2.75	3.05

NEMA SIZE 0-1 STARTERS

HEATER CAT NO.	FULL LOAD MOTOR CURRENT			
	2 OL RELAYS		3 OL RELAYS	
	MIN.	MAX.	MIN.	MAX.
G30T30	3.42	3.84	3.06	3.47
G30T31	3.85	4.31	3.48	3.89
G30T32	4.32	4.80	3.90	4.33
G30T33	4.81	5.05	4.34	4.62
G30T34	5.06	5.55	4.63	5.03
G30T35	5.56	6.06	5.04	5.54
G30T36	6.07	6.89	5.55	6.29
G30T37	6.90	7.79	6.30	7.04
G30T38	7.80	8.71	7.05	7.85
G30T39	8.72	9.74	7.86	8.81
G30T40	9.75	10.8	8.82	9.84
G30T41	10.9	12.1	9.85	10.9
G30T42	12.2	12.7	11.0	11.6
G30T43	12.8	14.2	11.7	12.3
G30T44	14.3	15.1	12.4	13.6
G30T45	15.2	16.6	13.7	14.7
G30T46	16.7	18.7	14.8	16.7
G30T47	18.8	20.1	16.8	18.0
G30T48	20.2	22.2	18.1	19.4
G30T49	22.3	25.4	19.5	21.6
G30T50	25.5	28.2	21.7	24.3
G30T51	28.3	30.0	24.4	27.7
G30T52	-	-	27.8	30.0

CLASS G30 HEATER SELECTION TABLES

NEMA SIZE 2

HEATER CAT NO.	FULL LOAD MOTOR CURRENT			
	2 OL RELAYS		3 OL RELAYS	
	MIN.	MAX.	MIN.	MAX.
G30T36	6.42	7.22	6.16	6.94
G30T37	7.23	7.86	6.95	7.56
G30T38	7.87	8.92	7.57	8.55
G30T39	8.93	10.0	8.56	9.71
G30T40	10.1	11.5	9.72	10.6
G30T41	11.6	12.7	10.7	11.9
G30T42	12.8	13.5	12.0	13.0
G30T43	13.6	14.6	13.1	14.0
G30T44	14.7	15.2	14.1	14.7
G30T45	15.3	16.6	14.8	16.0
G30T46	16.7	18.3	16.1	17.7

NEMA SIZE 2

HEATER CAT NO.	FULL LOAD MOTOR CURRENT			
	2 OL RELAYS		3 OL RELAYS	
	MIN.	MAX.	MIN.	MAX.
G30T47	18.4	19.2	17.8	18.4
G30T48	19.3	22.2	18.5	21.3
G30T49	22.3	25.2	21.4	24.2
G30T50	25.3	28.2	24.3	27.1
G30T51	28.3	30.3	27.2	29.1
G30T52	30.4	34.1	29.2	32.4
G30T53	34.2	37.6	32.5	36.2
G30T54	37.7	41.0	36.3	39.4
G30T55	41.1	47.0	39.5	45.1
G30T56	47.1	53.5	45.2	50.3

NEMA SIZE 3

HEATER CAT NO.	FULL LOAD MOTOR CURRENT			
	2 OL RELAYS		3 OL RELAYS	
	MIN.	MAX.	MIN.	MAX.
G30T46	20.8	23.9	19.2	21.5
G30T47	24.0	26.3	21.6	24.7
G30T48	26.4	27.9	24.8	25.3
G30T49	28.0	32.7	25.4	30.3
G30T50	32.8	35.1	30.4	32.7
G30T51	35.2	39.9	32.8	37.6
G30T52	40.0	45.5	37.7	40.7
G30T53	45.6	50.3	40.8	46.4
G30T54	50.4	52.7	46.5	49.6
G30T55	52.8	61.5	49.7	57.4
G30T56	61.6	68.7	57.5	63.9
G30T57	68.8	75.1	64.0	70.4
G30T58	75.2	83.3	70.5	78.4
G30T59	83.4	89.9	78.5	85.5
G30T60	90.0	100.0	85.6	95.1
G30T61	-	-	95.2	100.0

NEMA SIZE 4

HEATER CAT NO.	FULL LOAD MOTOR CURRENT			
	2 OL RELAYS		3 OL RELAYS	
	MIN.	MAX.	MIN.	MAX.
G30T51	35.2	39.9	32.8	37.6
G30T52	40.0	45.5	37.7	40.7
G30T53	45.6	50.3	40.8	46.4
G30T54	50.4	52.6	46.5	49.6
G30T55	52.7	61.5	49.7	57.4
G30T56	61.6	68.7	57.5	64.7
G30T57	68.8	75.1	64.8	71.1
G30T58	75.2	83.3	71.2	79.9
G30T59	83.4	89.9	80.0	85.5
G30T60	90.0	101.0	85.6	95.2
G30T61	102.0	113.0	95.3	103.0
G30T62	114.0	124.0	104.0	114.0
G30T63	125.0	132.0	115.0	129.0
G30T64	133.0	150.0	130.0	133.0
G30T65	-	-	133.0	150.0

NEMA SIZE 5

HEATER CAT NO.	HEATER CODE MARKING	HEATER RATING 2 or 3 OL	MOTOR CURRENT	
			MIN.	MAX.
1597771	CA	93	74.4	83.9
1597772	CB	105	84.0	93.4
1597773	CC	117	93.5	104
1597774	CD	133	105	120
1597775	CE	152	121	136
1597776	CF	172	137	152
1597777	CG	192	153	168
1597778	CH	212	169	185
1597779	CI	233	186	199
1597780	CJ	250	200	211
1745083	CG - CG	265	212	239
1745084	CH - CH	300	240	259

PLACING THE MOTOR CONTROL CENTER INTO SERVICE

OPERATOR HANDLE

The door-mounted operator handle is interlocked with unit circuit breaker or fusible switch so that the handle must be in the OFF position before the door can be opened. The handle has provision for locking with up to three padlocks. Additionally, should it be required to lock the handle in the ON position, a pre-indented section of the handle may be punched out.

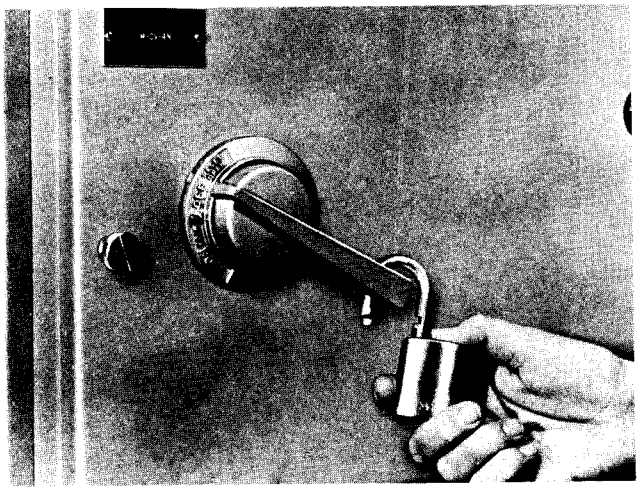


Fig. 8 Padlocking of Operator Handle

INTERLOCK DEFEATER ARRANGEMENT

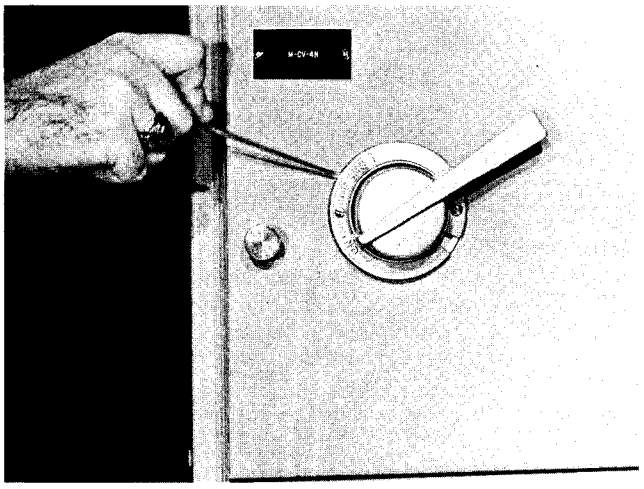


Fig. 9 A "defeater" arrangement is provided on the handle to void the interlock, thus permitting authorized personnel to open the door with the power circuit energized.

PROCEDURE

The following procedure is recommended when energizing the Motor Control Center for the first time:

1. The circuit breaker or fusible switch feeding the Motor Control Center should be checked for correct interrupting capacity.
2. Be sure all protective barriers and covers are in place and securely bolted.
3. Be certain that applicable codes and sound wiring practices have been followed.
4. Energize the main bus and note proper operation of instruments or meters that may be included.
5. After application of voltage to the Motor Control Center, test all combination starters by operating any pilot switches or pushbuttons that are incorporated in their circuits. If no pilot devices are provided in the Motor Control Center, simulate external control devices and operate starters.

MASTER TERMINAL BLOCKS
(Optional)

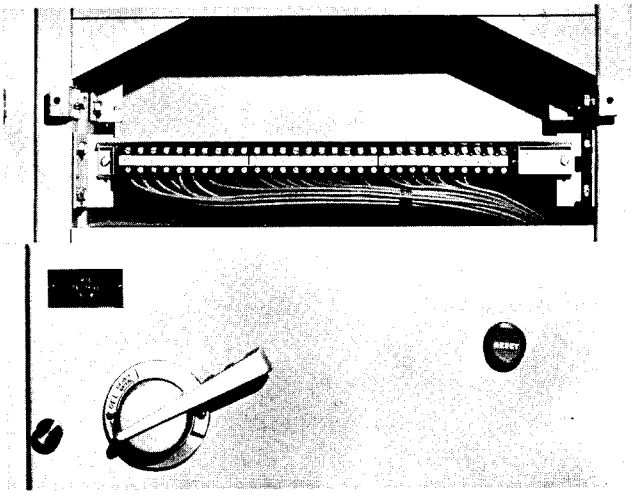


Fig. 10 Terminal blocks when supplied for type "C" wiring may be placed in the upper or lower horizontal wireways. A typical block in the upper wireway is shown.

CONTROL UNIT REMOVAL

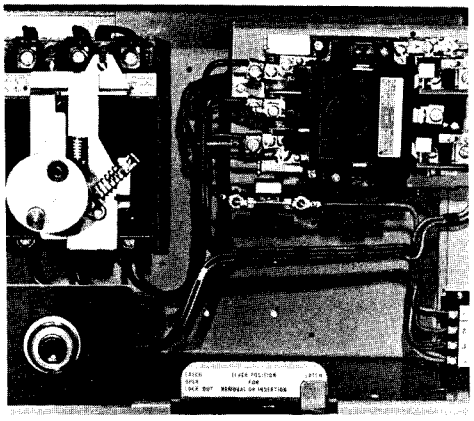


Fig. 11. Control Unit in Operating Position

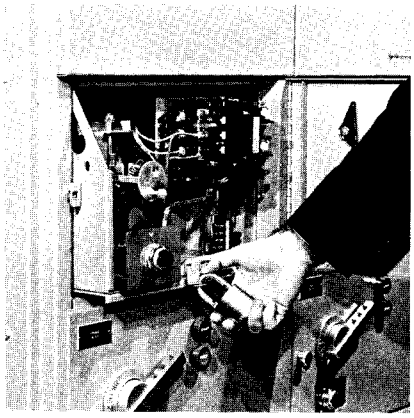


Fig. 12 Control Unit in Lockout Position

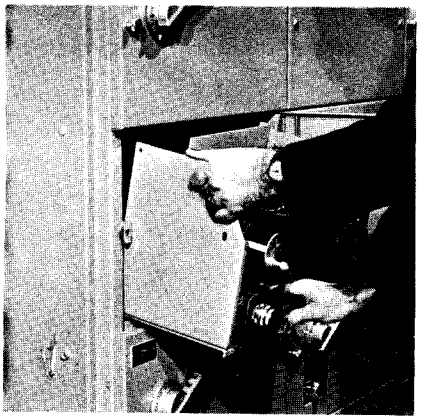


Fig. 13 Control Unit Withdrawal

CONTROL UNIT REMOVAL (PLUG-IN)

Plug-in units, may be removed without contacting live parts and disturbing other circuits in the Motor Control Center. The shipping screw holding the plug-in unit in place for shipment should be removed and discarded. The unit can then be withdrawn in the following manner:

1. Push the lower release lever to the right with the thumb of the right hand. This should be immediately followed by a push with the right forefinger on the latch lever toward the "latch open" position. Spring action will snap the latch lever to the "lockout position". Grasp the handle and pull the unit partially out until it locks in the lockout position. The bus stabs are then disconnected and power is removed from the unit. (Refer to Fig. 11)

CAUTION: INTERLOCKING CONTROL CIRCUITS FROM OTHER UNITS MAY STILL BE ENERGIZED.

2. External unit wiring must be disconnected to completely remove the unit. Wires should be tagged for reconnection.

3. To completely remove the unit from the structure, proceed as in step 1 above. When the unit latches in the "lockout position", hold the upper latch lever in the "unit removal" position and withdraw the unit from the structure. (Refer to Fig. 12)

4. When removing more than one unit at the same time, care should be taken to reinstall each unit in its proper location. To reinstall the unit, align the guide slot on the bottom rear edge of the unit with the rails in the structure. Hold the unit level and square with the Motor Control Center to avoid binding the telescoping rails. Insert the unit until it latches in the "lockout position". Reconnect all unit connections and then hold the upper latch lever to the "unit insertion" position and push the unit in as far as possible. Then push the latch lever to the "latch closed" position. The spring-loaded latching mechanism will then automatically lock the unit in position. The stabs are now connected to the bus and the unit is ready for operation.

CONTROL UNIT PADLOCKING IN THE LOCK-OUT POSITION

The control unit may be padlocked in the lock-out position as described by the unit removal section, part 1. In this position a padlock may be inserted as shown. When the unit is in the lockout position, it should be remembered that the control circuit may be energized from an external source. Take necessary precautions.

UNIT REMOVAL (BOLT-IN)

Units larger than 21" in height are bolted into place. The following procedure should be utilized to remove these units:

1. CAUTION: Be sure that the circuit is de-energized before proceeding with removal of bolt-in units.

2. Withdraw plug-in block or unit, disconnecting stab from the bus.
NOTE: Control units having protective devices larger than 225 amperes are connected to the bus by means of set-screw pressure type connections.

3. Disconnect stab block or unit wiring to the bolt-in unit.

4. Disconnect control wiring. Note the terminal locations so that wiring can be replaced correctly.

5. Remove the mounting bolts at the edge and back of the mounting panel. The unit may then be lifted out. Test weight of the heavier units before lifting. Lifting equipment should be used on heavier units.

SERVICING AND INSPECTION

PERIODIC INSPECTION

All Motor Control Center installations should be given a general inspection at frequent intervals. Perform a visual inspection, front and rear, to see that there is no evidence of loose parts, warping or undue vibration. Take immediate steps to remedy any deficiencies of this nature that may appear. The assembly should be kept dry at all times. If leaks from overhead pipes and dripping from condensation or other sources cannot be eliminated, prevent moisture from falling on the gear.

The equipment should be kept clean at all times. Any accumulation of dust or dirt should be removed by use of a vacuum cleaner or air hose.

SEMI-ANNUAL INSPECTION

At least twice yearly, a thorough inspection of the Motor Control Center should be performed. Prior to this inspection, disconnect the power source to the Motor Control Center and de-energize all interlock circuits. The following checks in particular are emphasized:

1. All devices should be hand or electrically operated to determine their operating conditions.
2. Badly-worn starter contacts should be replaced. The I-T-E Starter contacts can be easily inspected by removing the contact cover of the starter and lifting the moving contact, twisting slightly, and pulling out.
3. Do not lubricate contactor or starter bearings.
4. Do not file starter contacts.
5. A check should be made of the instantaneous trip on breakers to verify that the settings agree with I-T-E recommendations.
6. Inspect all bolted connections, nuts and screws for tightness.
7. Inspect all cable connections for proper tightness.
8. Inspect all wiring for signs of damage.
9. Examine the insulation system for evidence of heating.
10. Open all hinged panels and remove all bolted panels for a thorough inspection of all internal devices.

CARE OF THE FINISH

All painted parts of the I-T-E Motor Control Centers are given a thorough chemical cleaning; followed by a rust resisting phosphate treatment; and finally, a baked enamel finish.

The standard indoor color is ASA-61 light gray. The outdoor units are normally finished with ASA-24 dark gray on the outside and ASA-61 on the inside.

Should the finish become slightly soiled, wiping with a clean dry cloth will suffice. To remove oil and grease marks, use warm water and mild soap, wiping dry with a soft cloth.

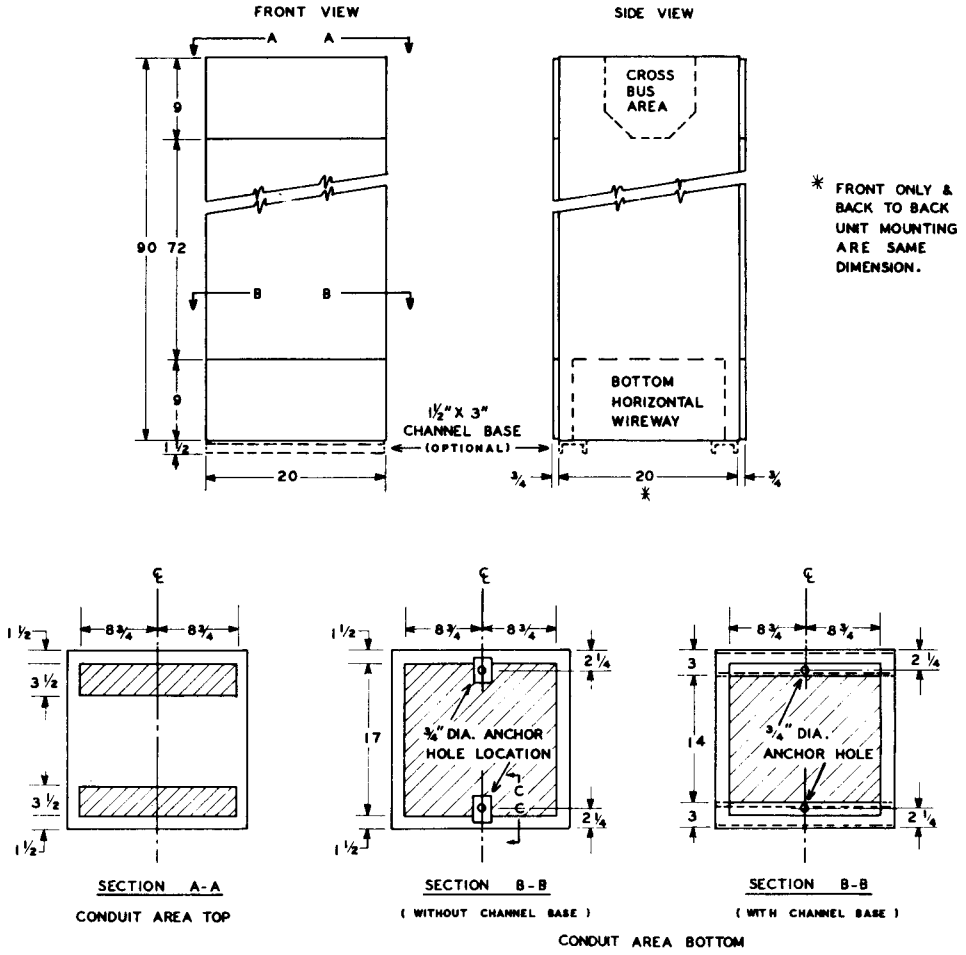
INFORMATION NEEDED FOR ORDERING ADDITIONAL CONTROL UNITS AND PARTS

When ordering a control unit for installation in an existing I-T-E Motor Control Center, the following information must be supplied:

1. Original purchase order number and date; also, the original I-T-E order number from the name plate.
2. Desired location of the new unit with an alternate location if feasible. Unit numbering is shown on the order drawings. In general, sections are numbered 1, 2, 3, etc., from left to right with units lettered A, B, C, etc. from top to bottom.
3. Nameplate engraving information for the new unit.
4. Combination starter information to include the following:
   a. Horsepower (rpm and full load current, if available).
   b. Type of starter and modifications required.
   c. Coil voltage and source of control voltage.
   d. Control wiring information.
5. If feeder circuit breakers of fusible switches are required, supply the following:
   a. Frame and trip size of circuit breaker.
   b. Switch size plus the class and/or type of fuse to be applied. Indicate if fuses are to be included.

When ordering renewal parts, furnish the I-T-E order number from the Motor Control Center nameplate. A full description of the required part should be included.

TYPICAL INDOOR ENCLOSURE DIMENSIONS
DO NOT USE FOR CONSTRUCTION



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