ASCO® 940

Automatic Transfer Switch

with Microprocessor Control Panel Group 6 or 7

OPERATOR'S MANUAL

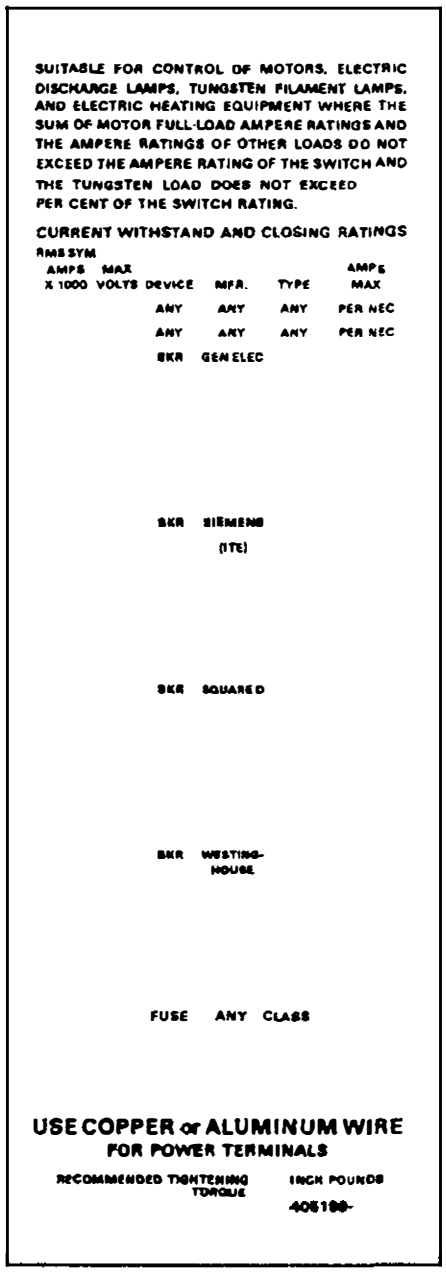
INCLUDES:

• Installation Testing • Service

• Optional Accessories • Diagrams

for switches rated 30 through 4000 amps

ASCO® Controls are designed and manufactured by Automatic Switch Co., Florham Park, New Jersey 07932. Telephone (201) 966-2070
381333-031
1D4980R6


SUITABLE FOR CONTROL OF MOTORS, ELECTRIC DISCHARGE LAMPS, TUNGSTEN FILAMENT LAMPS, AND ELECTRIC HEATING EQUIPMENT WHERE THE SUM OF MOTOR FULL-LOAD AMPERE RATINGS AND THE AMPERE RATINGS OF OTHER LOADS DO NOT EXCEED THE AMPERE RATING OF THE SWITCH AND THE TUNGSTEN LOAD DOES NOT EXCEED PER CENT OF THE SWITCH RATING.

CURRENT WITHSTAND AND CLOSING RATINGS RMS SYM

AMPS X 1000	MAX VOLTS	DEVICE	MFR.	TYPE	AMPS MAX
		ANY	ANY	ANY	PER NEC
		ANY	ANY	ANY	PER NEC
		BKR	GEN ELEC		
		BKR	SIEMENS (ITE)		
		BKR	SQUARE D		
		BKR	WESTING-HOUSE		
		FUSE	ANY	CLASS	

USE COPPER or ALUMINUM WIRE FOR POWER TERMINALS

RECOMMENDED TIGHTENING TORQUE INCH POUNDS 405199-

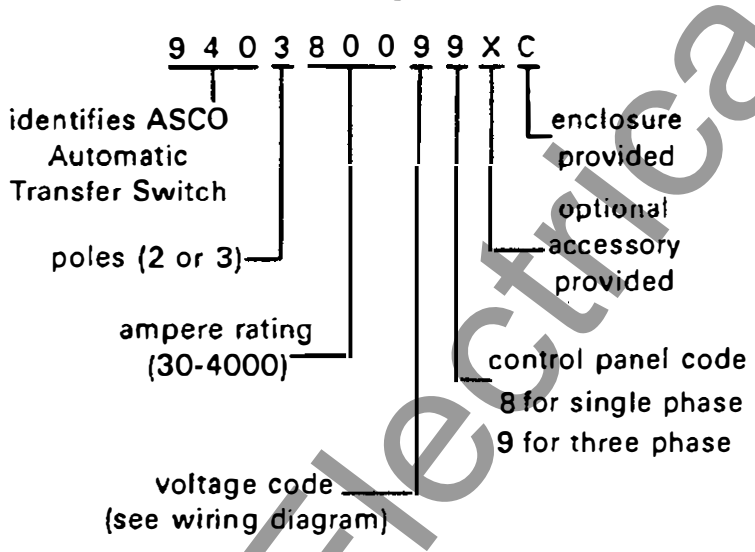
Typical Rating Label

Each Automatic Transfer Switch contains a rating label to define the loads and fault circuit withstand/ closing ratings. Refer to the label on the Transfer Switch for specific values.

WARNING: Do not exceed the values on the rating label. Exceeding the rating could cause serious damage or personal injury.

Nameplate

The nameplate (shown below) on the Transfer Switch includes data for each specific ASCO 940 switch. Use the switch only within the limits shown on this nameplate. A typical Catalog Number is shown below with its elements explained:




ASCO® PRODUCT NO. 940

AUTOMATIC TRANSFER SWITCH
FOR USE ON
EMERGENCY OR STANDBY SYSTEMS
CAT. NO. E940360099X
SER. NO. 123456
600 AMPS
480V 60HZ 3 PH 3 WIRE
READ MANUAL BEFORE INSTALLING
FOR SERVICE CALL (201)966-2070
Automatic Switch Co.
FLORHAM PARK, N.J. U.S.A.

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Only experienced licensed electricians should install the switch.

⚠ **DANGER:** is used in this manual to warn of high voltages capable of causing shock, burns, or death.

WARNING: is used in this manual to warn of possible personal injury.

CAUTION: is used in this manual to warn of possible equipment damage.

SECTION 1
INSTALLATION

ASCO automatic transfer switches are factory wired and tested. Field installation simply requires mounting and connection of service cables, engine start signal wires, and auxiliary control circuits (if required).

Mounting

Composite Outline and Mounting Diagrams are furnished at the back of this manual. The diagrams shows all mounting details and instructions.

> **WARNING:** Protect the switch from construction grit and metal chips to prevent malfunction or shortened life for the switch.

Mount the automatic transfer switch vertically to a rigid supporting structure. Level all mounting points by using flat washers behind the holes to avoid forced distortion of the switch.

Mount open–type 260–400 amp transfer switches on the supplied insulator backing piece. It must be installed behind the transfer switch. See Figure 1–1.

WARNING: Be sure to install the insulator piece behind 260–400 amp transfer switches.

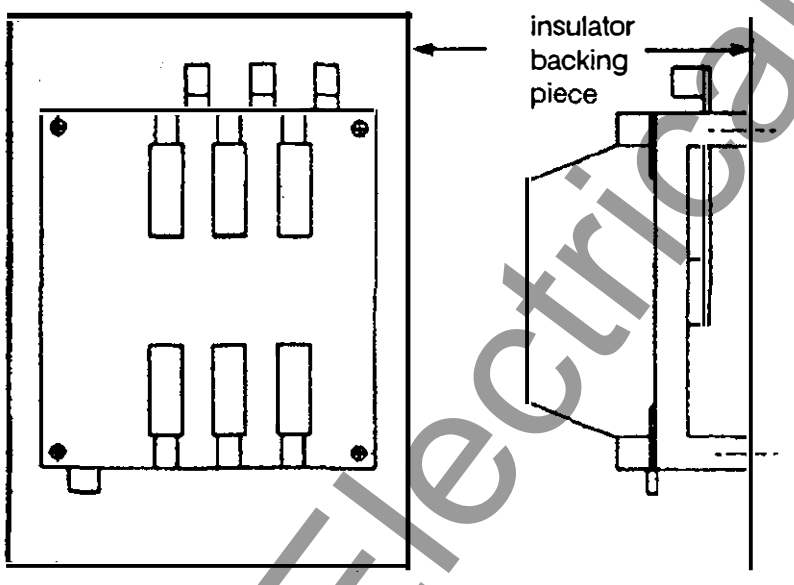


Figure 1–1. Insulator for 260–400 amp switches.

Enclosed switches have the control panel mounted on the cabinet door. For customer furnished enclosures (open–type switches), mount the control panel to the right of the transfer switch, preferably on the inside surface of the enclosure door. Do not exceed the length of the harness; provide stress relief where required.

An add–on panel may be provided for certain optional accessories. It is mounted below the control panel. For open–type switches only, the control panel and add–on panel are usually supplied on mounting rails. Refer to the *Composite Outline and Mounting Diagrams* for details.

Line Connections

Composite Elementary Wiring Diagrams are furnished at the back of this manual. All wiring must be made in accordance with the National Electrical Code and local codes.

> ⚠**DANGER:** De–energize the conductors before making any line or auxiliary circuitry connections. Be sure that Normal and Emergency line connections are in proper phase rotation. Also place the engine generator starting control in the off position. Make sure the engine generator is not in operation.

Three cable spacers are included with 150 ampere transfer switches. When installing power cables, run the cables through the cable spacers as shown in Figure 1–2. Position the cable spacers within 1 1/2 inches from the terminal lugs.

CAUTION: The cable spacers must be located as shown for 150 amp switches.

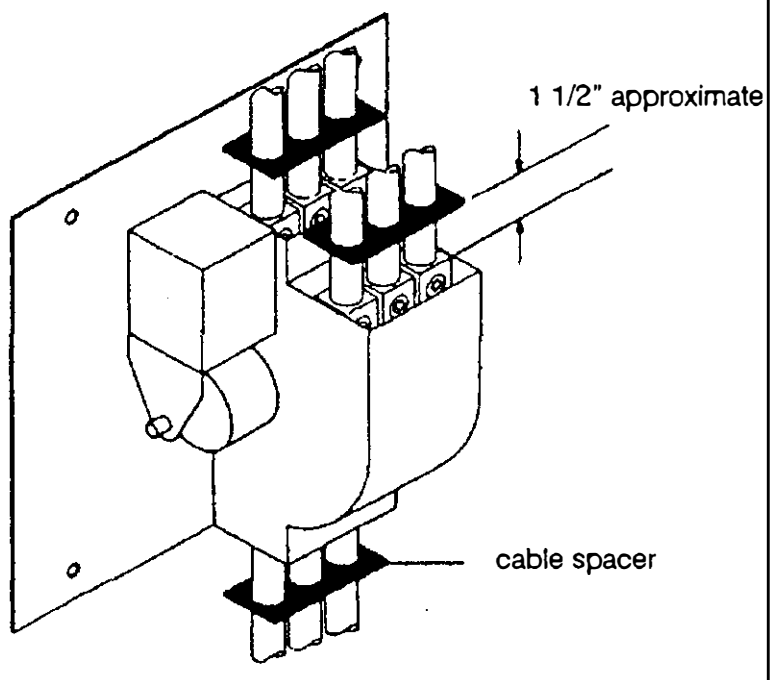


Figure 1–2. Cable spacer for 150 amp switch.

Do not run cables behind the switch. Cables can be bundled on the right side of the switch. Maintain proper electrical clearance between the live metal parts and grounded metal: 1/2" minimum for 30–400 amps, 1" minimum over 400 amps.

It is not necessary to remove the barriers from the transfer switch. If you do remove the them, however, reinstall them carefully.

INSTALLATION
(continued)

Connect source and load conductors to clearly marked switch terminal lugs. Be careful when stripping insulation from cables; avoid nicking or ringing the conductor. Remove surface oxides from cables by cleaning with a wire brush. Follow cable manufacturer's instructions when aluminum conductor is used. Apply joint compound to conductor, then carefully wipe away excess compound. Tighten the cable lugs to the torque specified on the rating label.

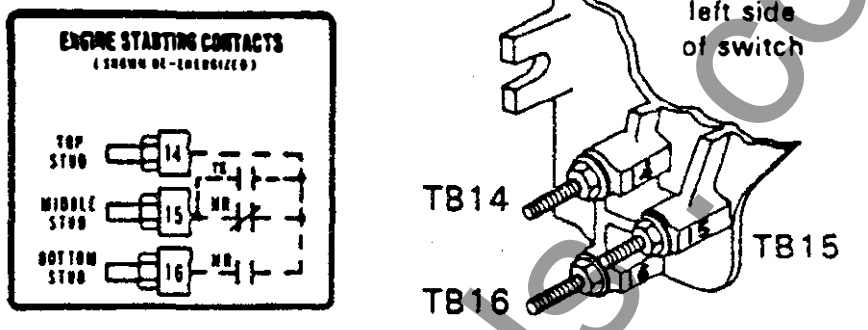


Figure 1-3. Engine starting contact label and location for 30 - 150 amp switches.

Auxiliary Circuits

Connect auxiliary circuit wires to appropriate terminals on the transfer switch. External circuits can include the toggle switch, auxiliary contacts on the transfer switch, and optional accessories. The toggle switch and optional accessories are already installed and wired on enclosed switches. For open-type switches the toggle switch is supplied loose. Be sure to connect the toggle switches correctly (so that a normally closed switch is not installed in a normally open circuit and vice versa). Refer to the Elementary Wiring Diagram.

Note any optional accessories that may be furnished on this switch. Make the necessary auxiliary connections by referring to **Section 5, Optional Accessories**. Also refer to any separate drawings and/or publications that may be packed with the switch.

Harnesses

All internal connections are made at the factory. The switch is connected to the control panel by a plug-in harness. Extension harnesses are available in standard lengths. The plug is already engaged on enclosed switches. For open-type switches, the plug must be engaged after installation is completed. Align the harness plug with the socket in the control panel and push them together until the latches click.

Engine Starting Contacts

The engine control contact connections are located on the transfer switch. Connect signal wires to appropriate terminals as specified in Table 1-1 and shown in Figures 1-3 and 1-4.

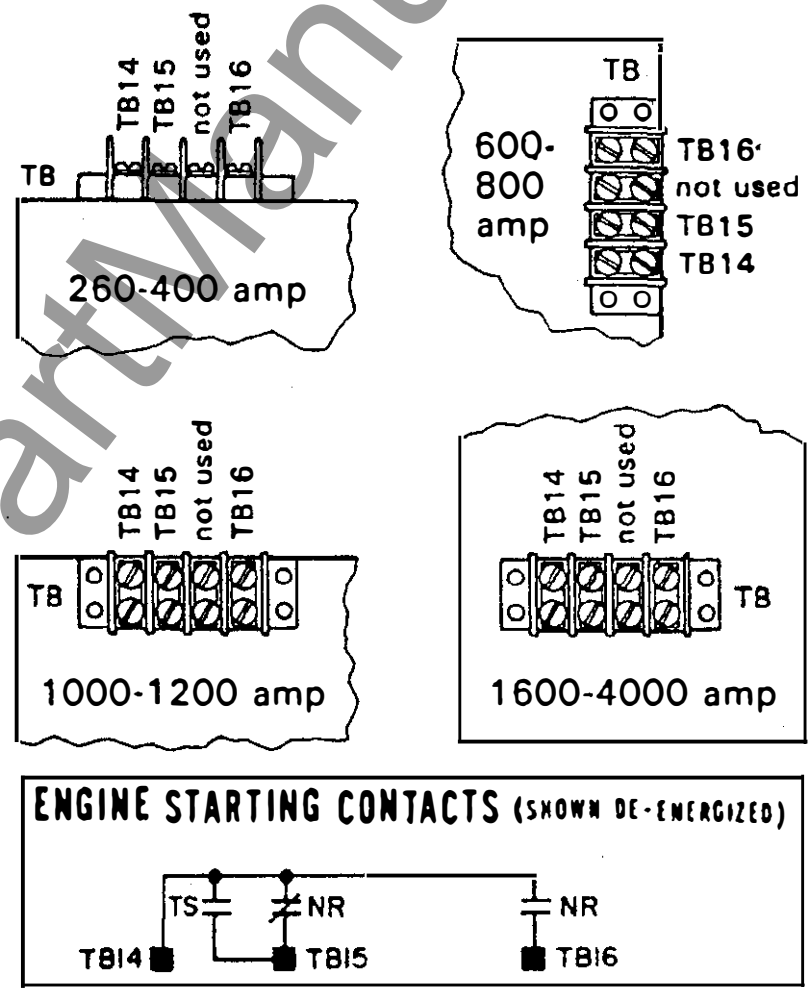


Figure 1-4. Engine starting contact label and locations for 260 - 4000 amp switches.

Table 1-1. Engine start connections.

Features	When normal source falls	Terminals on transfer switch
7	contact closes	TB14 and TB15
8	contact opens	TB14 and TB16

Functional Test

The Functional Test consists of three checks: manual operation, voltage checks, and electrical operation.

> *CAUTION: Do these checks in the order presented to avoid damaging the switch.*

Read and understand all instructions on the Composite Elementary Wiring Diagrams and on labels affixed to the automatic transfer switch. Note any optional accessories that are provided with this switch, and review their operation before proceeding.

Manual Operation

A manual operator handle (detachable on 260 through 4000 ampere sizes) is provided on the Transfer Switch for maintenance purposes only. Manual operation of the switch must be checked before it is operated electrically.

> **WARNING:** Do not manually operate the transfer switch until both power sources are disconnected: Open both circuit breakers.

1. Select the appropriate switch amperage size below and follow the directions for installing the handle:

   30 through 150 ampere

   Grasp the permanently attached manual handle (left side of the operator) and turn it with thumb and fingers. See Figure 1-5.

   260 and 400 ampere

   Insert the manual handle into the hole in the shaft, left side of the operator. See Figure 1-6.

   600 and 800 ampere

   Attach the manual handle onto the pivot shaft extension, left side of the operator. See Figure 1-7.

   1000 through 4000 ampere

   Insert the manual handle into the hole in the rotating weight. See Figure 1-8.

2. Move the handle as shown to manually operate the Transfer Switch. The switch should operate smoothly without binding. If it does not, check for shipping damage or construction debris.

3. Return the Transfer Switch to the *N* (normal) position. Remove manual operator handle (if detachable) and store it on the Transfer Switch in the place provided.

Continue the Functional Test on the next page.

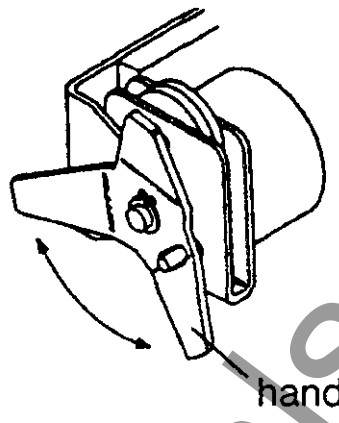


Figure 1-5. 30-150 amp switches.

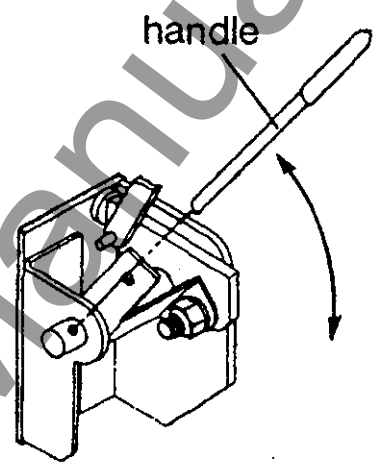


Figure 1-6. 260 and 400 amp switches.

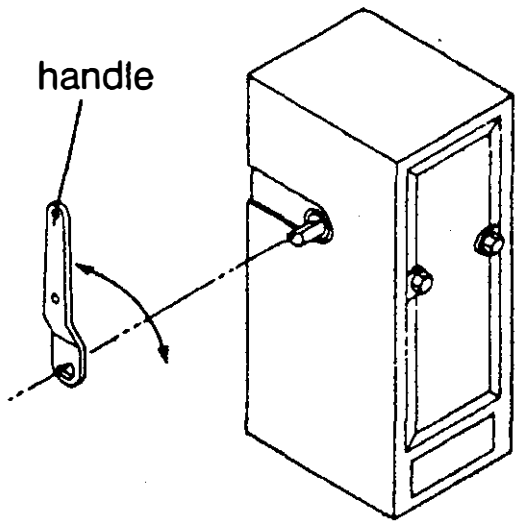


Figure 1-7. 600 and 800 amp switches.

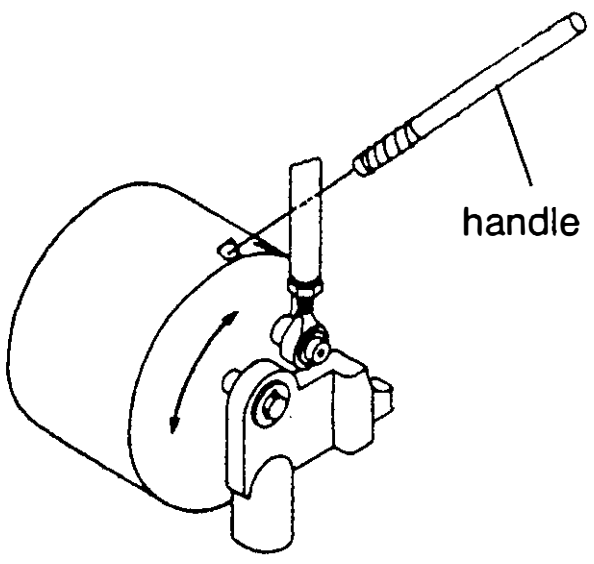


Figure 1-8. 1000 - 4000 amp switches.

Voltage Checks

First check nameplate on the transfer switch for rated voltage. It should be the same as the normal and emergency line voltages..

CAUTION: Verify that the feeders have been connected to the proper lugs.

⚠**DANGER:** Use extreme caution when using a meter to measure voltages in the following steps. Do not touch power terminals; shock, burns, or death could result.

1. Close the normal source circuit breaker. The *LOAD CONNECTED TO NORMAL* lamps should light.
2. Use an accurate voltmeter to check phase to phase and phase to neutral voltages present at the Transfer Switch normal source terminals.
3. Close the emergency source circuit breaker. (Start the generator, if necessary.) The *EMERGENCY AVAILABLE* lamp should light.
4. Use an accurate voltmeter to check phase to phase and phase to neutral voltages present at the Transfer Switch emergency source terminals.

If necessary, adjust the voltage regulator on the generator according to the manufacturer's recommendations. The Automatic Transfer Switch will respond only to the rated voltage specified on the nameplate.

5. Check phase rotation; it must be the same as the normal source.
6. Shut down the engine-driven generator. Then put the starting control selector switch (on the generator set) in the *automatic* position.
7. Close the cabinet door and tighten the screws.

Electrical Operation

This procedure will check the electrical operation of the Automatic Transfer Switch. Put engine starting control in *automatic* position.

WARNING: Close the cabinet door first.

Transfer Test

Both normal and emergency sources must be available.

1. Operate and hold the door-mounted Transfer Test switch until the engine starts and runs. This should happen within 15 seconds.
2. The transfer switch will operate to the Emergency position. If Feature 2B is used, the transfer will occur after a time delay (up to 8 minutes). The *LOAD CONNECTED TO EMERGENCY* light should come on; the *LOAD CONNECTED TO NORMAL* light should go off.
3. The transfer switch will operate back to the Normal position after Feature 3A time delay (up to 30 minutes). The *LOAD CONNECTED TO NORMAL* light should come on; the *LOAD CONNECTED TO EMERGENCY* light should go off.
4. Feature 2E allows the engine to run unloaded for a cool-down period (up to 30 minutes).

This completes the Functional Test of the ASCO 940. The engine-driven generator's starting control should be left in the *automatic* position.

SECTION 2
SEQUENCE OF OPERATION

*See the **Composite Elementary Wiring Diagram**. Note any Optional Accessories that may be furnished on this switch, and review their operation. Refer to any separate drawings and/or publications that may be packed with this switch.*

Transfer To Emergency

The sequence for load transfer to the emergency source begins automatically when the normal source voltage falls below the preset dropout point or when the **Transfer Test** switch (Feature 5) is operated. An under voltage condition on any phase of the normal source is detected by the sensor.

When the normal source voltage fails or the **Transfer Test** switch is operated, the SE relay de-energizes and relay NR begins its timing cycle (Feature 1). The NR relay is provided with a time delay on dropout to override momentary outages and prevent nuisance starting of the engine-driven generator. If the normal source voltage returns above the sensor dropout setting before the time delay expires, the NR relay timing cycle is reset to zero and relay SE energizes.

If the normal source voltage does not return above the sensor dropout setting before the time delay expires, the NR relay de-energizes and signals the engine-driven generator to start. At the same time, a voltage and frequency sensor begins monitoring the emergency source. The sensor will accept the emergency source only when both voltage and frequency reach preset pickup points. Usually about ten seconds elapse from dropout of the NR relay to acceptance by the sensor. This time span occurs because the engine-driven generator must crank, start, and run up to nominal pickup points. For this reason, if the **Transfer Test** switch is used it must be held for 15 seconds. If the emergency source is available immediately, the sensor may accept it as soon as NR relay drops out.

When the emergency source is accepted by the sensor, relay ER begins its timing cycle (Feature 2B). ER relay is provided with a an adjustable (0 to 8 minutes) time delay on pickup to delay transfer of the load to the emergency source, if desired.

ER relay energizes, the TS coil is energized, the transfer switch operates, and all switch contacts (mains, controls, auxiliaries) reverse position. The transfer switch is now supplying the load from the emergency source.

The transfer switch will remain in the Emergency position until the normal source is restored. If the Transfer Test switch is used, the transfer switch will remain on emergency until Feature 3A times out.

Retransfer to Normal

The sequence for load retransfer to the normal source automatically begins when the voltage sensor detects restoration of the normal source. The voltage level must rise above the preset pickup point on all phases before the sensor will accept the normal source.

When the normal source is accepted by the sensor, relay SE begins its timing cycle (Feature 3A). SE relay is provided with a time delay on pickup to prevent immediate load retransfer to the normal source. The delay insures that the normal source has stabilized before reconnection of vital loads. If the normal source voltage falls below the present dropout point before the time delay expires, the timing cycle is reset to zero. If the emergency source fails during the timing cycle, ER relay drops out and the load is immediately retransferred to the normal source, if that source is acceptable.

SE relay energizes and ER relay is dropped out. The TS coil is energized, the transfer switch operates, and all switch contacts (mains, controls, auxiliaries) reverse position. The transfer switch is now supplying the load from the normal source again.

Upon retransfer to the normal source, NR relay begins its timing cycle (Feature 2E). NR relay is provided with a time delay on pickup to keep the engine running for a cool-down period.

NR relay energizes after the time delay and signals the engine-driven generator to shut down. All circuits are reset for any future normal source failure.

MANUAL LOAD TRANSFER

This procedure will manually transfer the load if the Control Panel is disconnected.

> **WARNING:** Do not manually operate the transfer switch until both power sources are disconnected.

1. Open normal and emergency source circuit breakers.
2. Use the manual handle to manually operate the transfer switch to the opposite source. Remove the handle, if detachable. See **Section 1**, *Manual Operation*.
3. If the transfer switch is in the Emergency position manually start the engine generator and then close the emergency source circuit breaker.

TROUBLE-SHOOTING

Note any optional accessories that may be furnished on the switch and review their operation. Refer to any separate drawings and/or instructions that may be packed with the switch. Also refer to **Section 5, Optional Accessories.**

WARNING: Proceed with care! The switch is energized.

Table 3-1. Trouble-Shooting Checks.

PROBLEM	CHECK IN NUMERICAL SEQUENCE			
	1 OPERATION	2 GEN-SET	3 VOLTAGE	4 CIRCUIT
Gen-Set does not start when *TRANSFER TEST* switch is operated or when normal source fails.	Hold *TRANSFER TEST* switch 15 seconds or the outage must be long enough to allow for Feature 1 time delay plus engine cranking and starting time.	Starting control must be in automatic position. Batteries must be charged and connected. Check wiring to engine starting contacts.	-----	Ohmmeter should indicate an open circuit between control panel terminals CP16 and CP17 after Feature 1 time delay.
Transfer switch does not transfer the load to emergency source after the gen-set starts.	Wait for Feature 2B time delay to time out.	Generator output circuit breaker must be closed. Generator frequency must be at least 95% of nominal (57 Hz for a 60 Hz system.) *	Voltmeter should read at least 90% of nominal phase to phase voltage between transfer switch terminals EA and EC (or EL1 and EL2 for 2 pole switches). *	-----
Transfer switch does not transfer the load to normal source when normal returns or when the TRANSFER TEST switch is released.	Wait for Feature 3A time delay to time out.	-----	Voltmeter should read at least 90% of nominal phase to phase voltage between transfer switch terminals NB and NC, NC and NA, and NA and NB (or NL1 and NL2 for 2 pole switches).	-----
Gen-Set does not stop after load retransfer to the normal source.	Wait for Feature 2E time delay to time out.	Starting control must be in automatic position.	-----	Ohmmeter should indicate a closed circuit between control panel terminals CP16 and CP17 after Feature 2E time delay.

* These are factory settings. Refer to **Section 4.**

If the problem is isolated to circuits on the control panel or the transfer switch, call your local ASCO Authorized Representative, District Office, or Service Center. Furnish the Serial No. and Catalog No. from the transfer switch nameplate.

SECTION 4
ADJUSTMENTS

Time Delay Adjustment

Features 1, 2B, 3A, and 2E time delays are factory set to the job specifications. Unless otherwise specified, the standard factory setting is used. If these time delays must be changed, carefully follow the procedures on the pages that follow.

Use Table 4–1 below as a guide to the time delays and their corresponding slide DIP switches. The adjustments are incremental. Two DIP switches are used; each has eight actuators. See Figures 4–2, 4–3, and 4–4 on page 4–2.

NOTE: While any one of the time delays is timing out, it can be bypassed or canceled by operating the slide switch located on the right end of the DIP switch circuit board. See Figure 4–4 on page 4–2.

Table 4–1. Time Delay Settings

FEATURE	TIME DELAY DESCRIPTION	FACTORY SETTING	ADJUSTMENT RANGE	DIP SWITCH	SWITCH ACTUATORS	CHART NO.	PAGE NO.
1	override momentary outages	1 second	0 to 6 seconds	S1	5678	2	4-3
2B	transfer to emergency	0 minutes	0 to 5 minutes	S2	1234	3	4-4
3A	retransfer to normal	30 minutes	0 to 30 minutes	S1	1234	1	4-3
2E	gen-set cool down	5 minutes	0 to 60 minutes	S2	5678	4	4-4

Sensor Adjustments

The voltage and frequency sensor pickup and dropout points are factory set to the job specifications. The standard factory setting is used unless otherwise specified. If a setting must be changed, carefully follow the procedures on the pages that follow.

Use Table 4–2 below as a guide to the voltage and frequency settings and their corresponding slide DIP switches. The adjustments are incremental. Three DIP switches are used; each has eight actuators. See Figures 4–3 and 4–4 on page 4–2.

CAUTION: Any indiscriminate change in these settings may affect the normal operation of the automatic transfer switch. This change could allow the load circuits to remain connected to a low voltage source.

Table 4–2. Voltage and Frequency Settings.

SENSOR DESCRIPTION	SETTING	% of nominal		DIP SWITCH	SWITCH ACTUATORS	CHART NO.	PAGE NO.
		FACTORY SETTING	ADJUSTMENT RANGE				
Normal Source Voltage	Pickup	90%	85 to 100%	S3	5678	6	4-5
	Dropout	85%	75 to 98% of pick-up setting	S4	12345	7	4-6
Emergency Source Voltage	Pickup	90%	85 to 100%	S3	1234	5	4-5
	Dropout	A fixed differential of approximately 15% below the pickup setting		---	---	---	---
Emergency Source Frequency	Pickup	95%	90 to 100%	S5	1234	8	4-8
	Dropout	A fixed differential of approximately 12% below the pickup setting		---	---	---	---

Note: Transformer adjust DIP switch S6 (actuator 3) lowers voltage sensing by 4.2% for special voltage applications. For example, a 460 Volt system requires this transformer adjust turned on (up = ON, down = OFF).

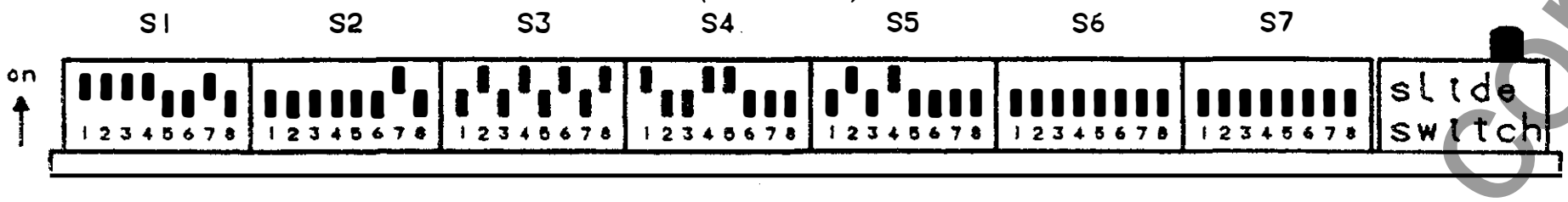


Figure 4-1. Standard factory settings.

The template in Figure 4-1 above shows the standard factory settings for the DIP switches on the upper circuit board (J3) of the control panel.

WARNING: Do not make any setting changes while the control panel is energized.

How to Change a Setting

1. Prevent the transfer switch from operating by disconnecting one source as follows:

   a. If the transfer switch is in the *Normal* position, open the emergency source circuit breaker. Turn the engine starting control to *off*.

   b. If the transfer switch is in the *Emergency* position, open the normal source circuit breaker. Turn the engine starting control to *test* or *run*.

2. Unplug the harness from the control panel by squeezing the latches. Do not pull on the wires.

3. Remove the cover from the control panel. Use your thumbs to release both latches. See Figure 4-2.

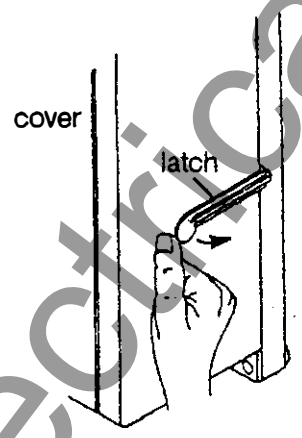


Figure 4-2. Control Panel cover latch.

4. Locate the appropriate DIP switch for the setting you want to change (refer to Tables 4-1 and 4-2 on the previous page and refer to Figure 4-4).

5. Find the specific chart for that setting then choose the new setting (left side of chart).

6. Use a ball-point pen to slide the switch actuators up or down so they match the illustration next to the setting (up = on, down = off). Recheck the setting. See Figure 4-3.

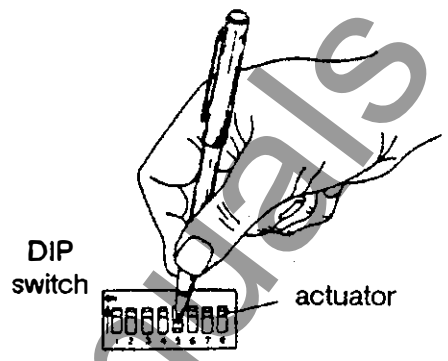


Figure 4-3. Setting DIP switch actuators.

7. Install the cover on the control panel. Align the cover and push it inward; be sure both cover latches engage the holes in the cover. See Figure 4-2.

8. Reconnect the harness to the control panel. Carefully align the plug then press it straight in until both latches click.

9. Restore the disconnected source as follows:

   a. If the transfer switch is in the *Normal* position close the emergency source circuit breaker.

   b. If the transfer switch is in the *Emergency* position, close the normal source circuit breaker. The load will be automatically retransferred to the normal source after Feature 3A time delay. For immediate retransfer, open and then reclose the emergency source circuit breaker.

10. Turn the engine starting control to *automatic*.

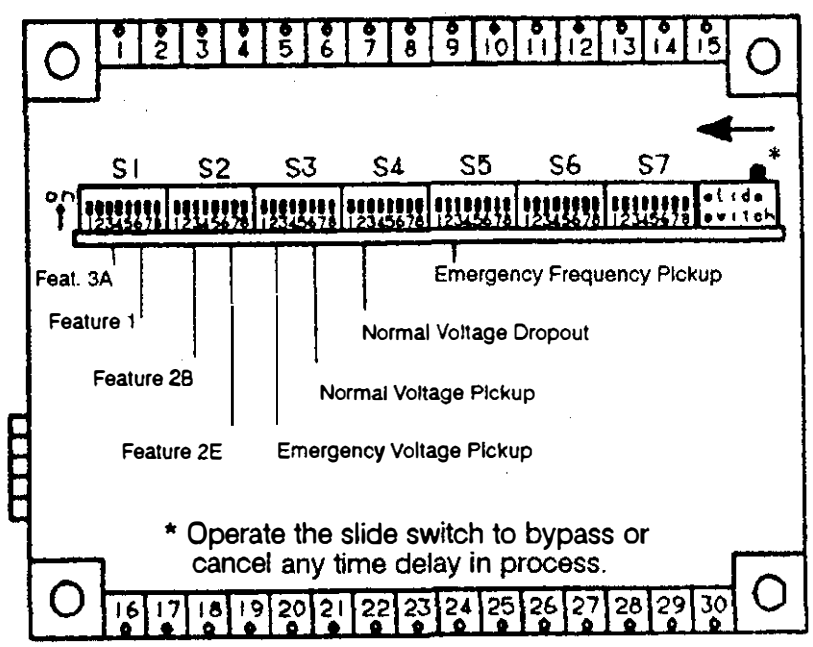


Figure 4-4. Location of DIP switches.

ADJUSTMENTS
(continued)

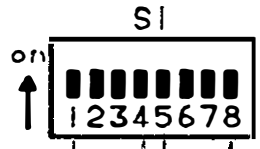


Chart 1

Retransfer to Normal Time Delay

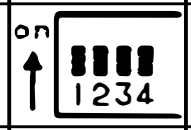
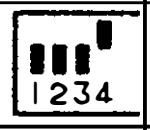
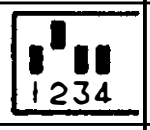
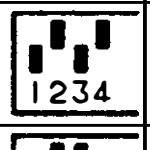
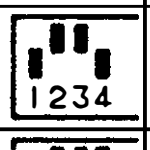
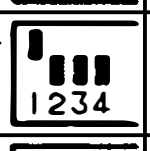
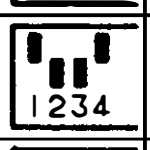
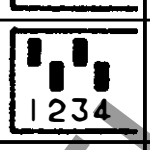
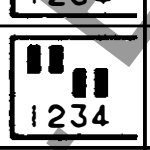
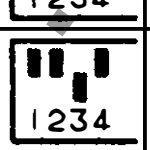
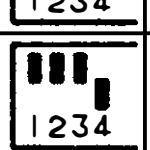
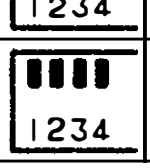
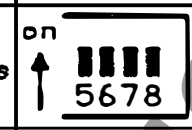
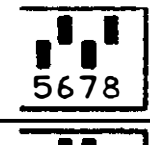
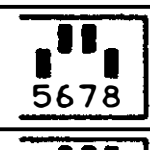
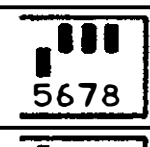
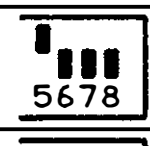
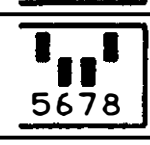
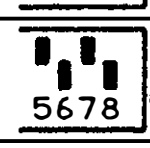
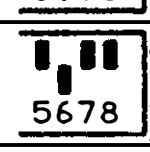
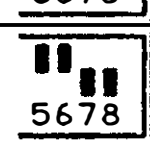
Feature 3A Time Delay Setting	S1 DIP Switch	Actuator Positions 1	2	3	4
0 seconds		off	off	off	off
15 seconds		off	off	off	on
30 seconds		off	off	on	off
1 minute		off	off	on	on
2 minutes		off	on	off	off
3 minutes		off	on	off	on
4 minutes		off	on	on	off
5 minutes		off	on	on	on
8 minutes		on	off	off	off
10 minutes		on	off	off	on
12 minutes		on	off	on	off
15 minutes		on	off	on	on
18 minutes		on	on	off	off
20 minutes		on	on	off	on
25 minutes		on	on	on	off
30 minutes		on	on	on	on

Chart 2

Override Momentary Outages Time Delay

Feature 1 Time Delay Setting	S1 DIP Switch	Actuator Positions 5	6	7	8
0 seconds		off	off	off	off
0.5 second		off	off	off	on
1.0 seconds		off	off	on	off
1.5 seconds		off	off	on	on
2.0 seconds		off	on	off	off
2.5 seconds		off	on	off	on
3.0 seconds		off	on	on	off
3.5 seconds		off	on	on	on
4.0 seconds		on	off	off	off
4.5 seconds		on	off	off	on
5.0 seconds		on	off	on	off
5.5 seconds		on	off	on	on
6.0 seconds		on	on	off	off

Do not use combinations other than above.

ADJUSTMENTS

(continued)

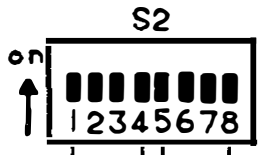


Chart 3

Transfer to Emergency Time Delay

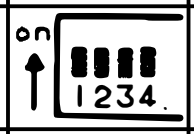
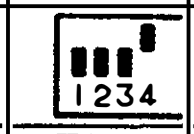
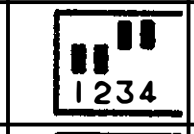
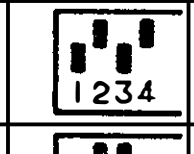
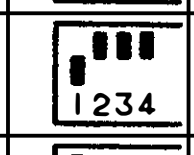
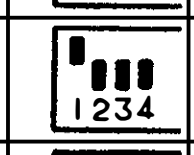
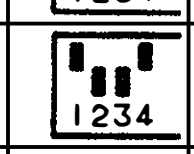
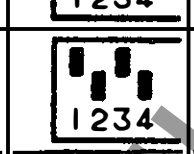
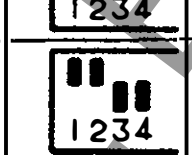
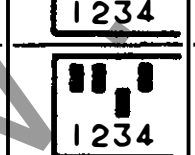
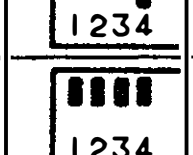
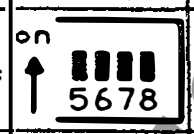
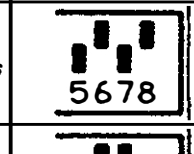
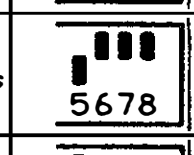
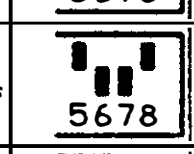
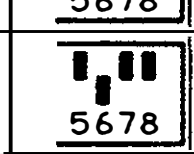
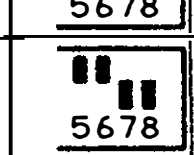
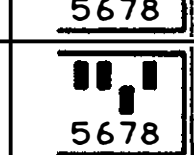
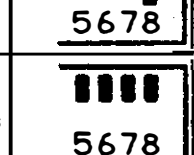
Feature 2B Time Delay Setting	S2 DIP Switch	Actuator Positions 1	2	3	4
0 seconds		off	off	off	off
1 second		off	off	off	on
2 seconds		off	off	on	off
3 seconds		off	off	on	on
4 seconds		off	on	off	off
5 seconds		off	on	off	on
8 seconds		off	on	on	off
10 seconds		off	on	on	on
20 seconds		on	off	off	off
30 seconds		on	off	off	on
45 seconds		on	off	on	off
1 minute		on	off	on	on
2 minutes		on	on	off	off
3 minutes		on	on	off	on
4 minutes		on	on	on	off
5 minutes		on	on	on	on

Chart 4

Gen-Set Cool Down Time Delay

Feature 2E Time Delay Setting	S2 DIP Switch	Actuator Positions 5	6	7	8
0 minutes		off	off	off	off
2 minutes		off	off	off	on
5 minutes		off	off	on	off
8 minutes		off	off	on	on
10 minutes		off	on	off	off
12 minutes		off	on	off	on
15 minutes		off	on	on	off
20 minutes		off	on	on	on
25 minutes		on	off	off	off
30 minutes		on	off	off	on
35 minutes		on	off	on	off
40 minute		on	off	on	on
45 minutes		on	on	off	off
50 minutes		on	on	off	on
55 minutes		on	on	on	off
60 minutes		on	on	on	on

ADJUSTMENTS

(continued)

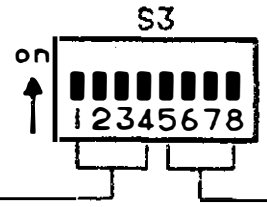


Chart 5

Emergency Source Voltage Pickup

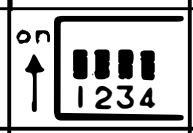
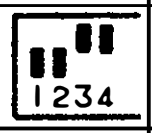
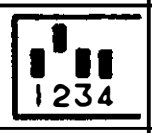
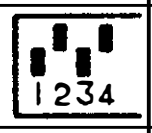
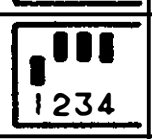
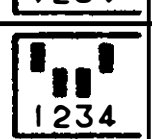
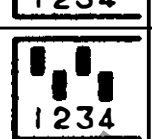
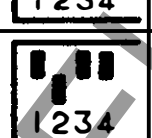
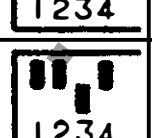
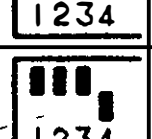
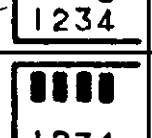
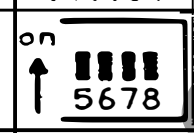
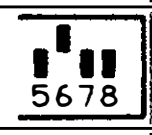
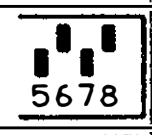
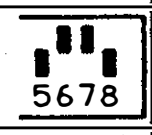
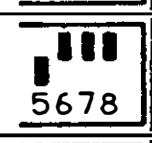
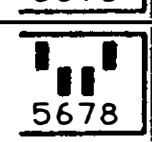
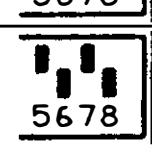
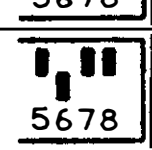
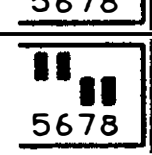
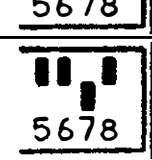
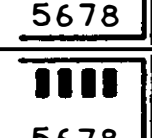
voltage pickup setting	S3 DIP Switch	Actuator Positions 1	2	3	4
85 percent		off	off	off	off
86 percent		off	off	off	on
87 percent		off	off	on	off
88 percent		off	off	on	on
89 percent		off	on	off	off
90 percent		off	on	off	on
91 percent		off	on	on	off
92 percent		off	on	on	on
93 percent		on	off	off	off
94 percent		on	off	off	on
95 percent		on	off	on	off
96 percent		on	off	on	on
97 percent		on	on	off	off
98 percent		on	on	off	on
99 percent		on	on	on	off
100 percent		on	on	on	on

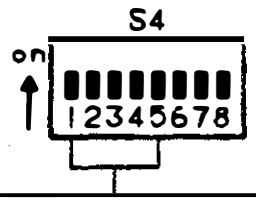
Chart 6

Normal Source Voltage Pickup

voltage pickup setting	S3 DIP Switch	Actuator Positions 5	6	7	8
85 percent		off	off	off	off
86 percent		off	off	off	on
87 percent		off	off	on	off
88 percent		off	off	on	on
89 percent		off	on	off	off
90 percent		off	on	off	on
91 percent		off	on	on	off
92 percent		off	on	on	on
93 percent		on	off	off	off
94 percent		on	off	off	on
95 percent		on	off	on	off
96 percent		on	off	on	on
97 percent		on	on	off	off
98 percent		on	on	off	on
99 percent		on	on	on	off
100 percent		on	on	on	on

ADJUSTMENTS
(continued)

Chart 7
(see page 4-7)



Normal Source Voltage Dropout (percent of pickup setting)

voltage dropout setting	S4 DIP Switch	Actuator Positions 1	2	3	4	5
A 75%	on 12345	off	off	off	off	off
B 76%	12345	off	off	off	off	on
C 77%	12345	off	off	off	on	off
D 78%	12345	off	off	off	on	on
E 79%	12345	off	off	on	off	off
F 80%	12345	off	off	on	off	on
G 81%	12345	off	off	on	on	off
H 82%	12345	off	off	on	on	on
I 83%	12345	off	on	off	off	off
J 84%	12345	off	on	off	off	on
K 85%	12345	off	on	off	on	off
L 86%	12345	off	on	off	on	on
M 87%	12345	off	on	on	off	off
N 88%	12345	off	on	on	off	on
O 89%	12345	off	on	on	on	off
P 90%	12345	off	on	on	on	on

Normal Source Voltage Dropout (continued) (percent of pickup setting)

voltage dropout setting	S4 DIP Switch	Actuator Positions 1	2	3	4	5
Q 91%	on 12345	on	off	off	off	off
R 92%	12345	on	off	off	off	on
S 93%	12345	on	off	off	on	off
T 94%	12345	on	off	off	on	on
U 95%	12345	on	off	on	off	off
V 96%	12345	on	off	on	off	on
W 97%	12345	on	off	on	on	off
X 98%	12345	on	off	on	on	on

Do not use combinations other than above.

Phase Selection

Normal Source Sensing	S4 DIP Switch	Switch Actuator 7
Three Phase	7	off
Single Phase	7	on

Frequency Selection

Source Frequency	S4 DIP Switch	Switch Actuator 8
60 Hz	8	off
50 Hz	8	on

How To Determine the Normal Source Voltage Dropout Setting (% Pickup)
(shown in Chart 7 on page 4–6, based on a percentage of Nominal)

1. Determine the Normal Source Voltage Pickup Setting as set on DIP Switch S3 (actuators 5–8) in Chart 6 on page 4–5.
2. Find this number at the top of Table 4–3.
3. Find the desired Normal Source Voltage Dropout Setting in the column below the number found in step 2.
4. Find the DIP switch setting on the left side in the same row as the number found in step 3.
5. Set DIP Switch S4 (actuators 1–5) in Chart 7 to the letter found in step 4.

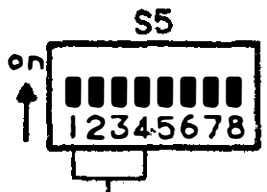
Table 4–3. Normal Source Voltage Pickup to Dropout Conversion

Set DIP Switch S4 (1–5) to this letter	**Steps 1 & 2** NORMAL VOLTAGE PICKUP (% Pickup) (as set on Dip Switch S3 (5–8) in Chart 6 on page 4–5)															
	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Step 4	**Step 3** Normal Voltage Dropout (% Nominal)															
A	64	65	65	66	67	68	68	69	70	71	71	72	73	74	74	75
B	65	65	66	67	68	68	69	70	71	71	72	73	74	74	75	76
C	65	66	67	68	69	69	70	71	72	72	73	74	75	75	76	77
D	66	67	68	69	69	70	71	72	73	73	74	75	76	76	77	78
E	67	68	69	70	70	71	72	73	73	74	75	76	77	77	78	79
F	68	69	70	70	71	72	73	74	74	75	76	77	78	78	79	80
G	69	70	70	71	72	73	74	75	75	76	77	78	79	79	80	81
H	70	71	71	72	73	74	75	75	76	77	78	79	80	80	81	82
I	71	71	72	73	74	75	76	76	77	78	79	80	81	81	82	83
J	71	72	73	74	75	76	76	77	78	79	80	81	81	82	83	84
K	72	73	74	75	76	77	77	78	79	80	81	82	82	83	84	85
L	73	74	75	76	77	77	78	79	80	81	82	83	83	84	85	86
M	74	75	76	77	77	78	79	80	81	81	83	84	84	85	86	87
N	75	76	77	77	78	79	80	81	82	83	84	84	85	86	87	88
O	76	77	77	78	79	80	81	82	83	84	85	85	86	87	88	89
P	77	77	78	79	80	81	82	83	84	85	86	86	87	88	89	90
Q	77	78	79	80	81	82	83	84	85	86	87	87	88	89	90	91
R	78	79	80	81	82	83	84	85	86	86	87	88	89	90	91	92
S	79	80	81	82	83	84	85	86	86	87	88	89	90	91	92	93
T	80	81	82	83	84	85	86	86	87	88	89	90	91	92	93	94
U	81	82	83	84	85	86	86	87	88	89	90	91	92	93	94	95
V	82	83	84	84	85	86	87	88	89	90	91	92	93	94	95	96
W	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
X	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98

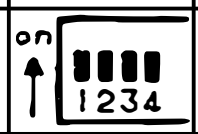
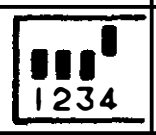
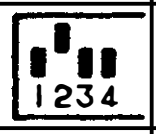
ADJUSTMENTS
(continued)

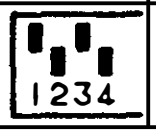
Chart 8

Emergency Source Frequency Pickup



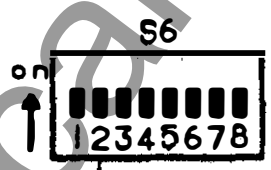
Emergency Source Frequency Pickup (continued)

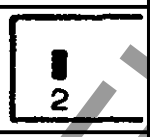
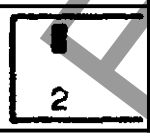
Frequency pickup setting	S5 DIP Switch	Actuator Positions 1	2	3	4
90 percent		off	off	off	off
91 percent		off	off	off	on
92 percent		off	off	on	off
93 percent		off	off	on	on
94 percent		off	on	off	off
95 percent		off	on	off	on

Frequency pickup setting	S5 DIP Switch	Actuator Positions 1	2	3	4
96 percent		off	on	on	off
97 percent		off	on	on	on
98 percent		on	off	off	off
99 percent		on	off	off	on
100 percent		on	off	on	off

Do not use combinations other than above.

Commit on Transfer Selection
(after engine start contact closes)



Commit On Transfer Setting	S6 DIP Switch	Switch Actuator 2
not used		off
used		on

Upon Normal Source failure (or Transfer Test) the Automatic Transfer Switch is committed to transfer to Emergency, even if the Normal Source is restored before transfer. This *Commit on Transfer* can be overridden by placing DIP Switch S6 actuator 2 to *off* (down).

SECTION 5
STANDARD FEATURES & OPTIONAL ACCESSORIES

REMOTE CONTROL

Feature 17. Terminal provisions for Area Protection remote contact which opens to signal automatic transfer switch to transfer to the emergency source.

Connect a contact (rated for low energy circuits) to control panel terminals **CP25** and **CP 26.** Remove existing jumper. See Figure 5-1.

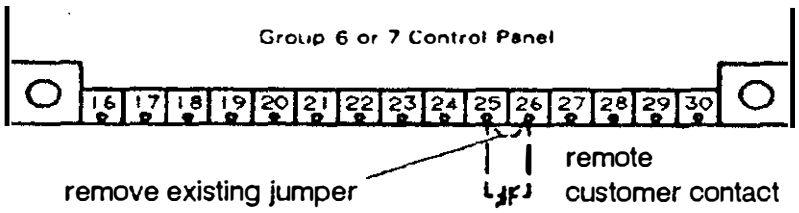


Figure 5-1. Feature 17

Feature 34A. Terminal provisions for a remote customer contact to inhibit transfer to the Normal source. Customer contact must close to allow transfer to Normal.

Connect a contact (rated for low energy circuits) to control panel terminals **CP28** and **CP29.** Remove existing jumper. See Figure 5-2.

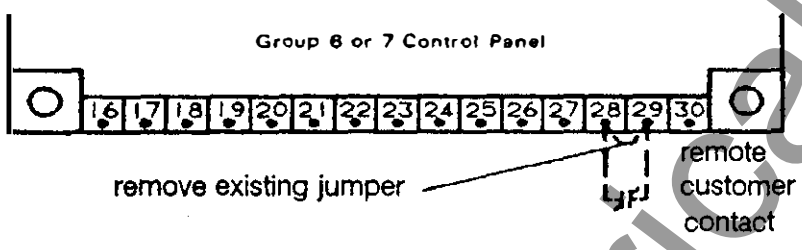


Figure 5-2. Feature 34A.

Feature 34B. Terminal provisions for a remote customer contact to inhibit transfer to the Emergency source. Customer contact must close to allow transfer to Emergency.

Connect a contact (rated for low energy circuits) to control panel terminals **CP29** and **CP30.** Remove existing jumper. See Figure 5-3.

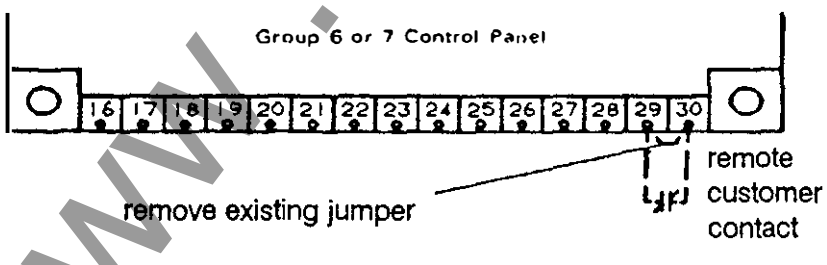


Figure 5-3. Feature 34B.

OPTIONAL MANUAL CONTROL

These manual controls, if furnished, are connected and installed on the enclosure door, or is shipped loose for open-type automatic transfer switches.

☐ **Acc. 6B.** Momentary override switch to manually bypass time delay on retransfer to the normal source. See Figure 5-4.

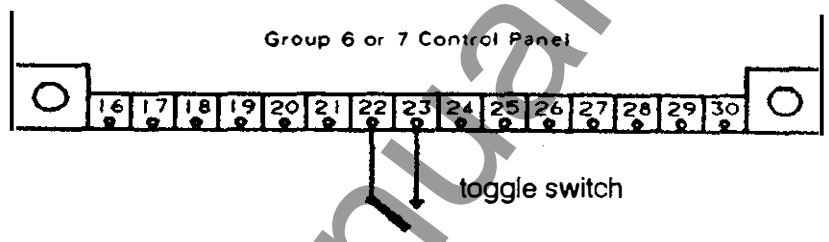


Figure 5-4. Optional Accessory 6B.

☐ **Acc. 6C.** Momentary reset switch for manual retransfer of the automatic transfer switch to the normal source only after time delay Feature 3A expires with automatic retransfer in event of emergency source failure. See Figure 5-5.

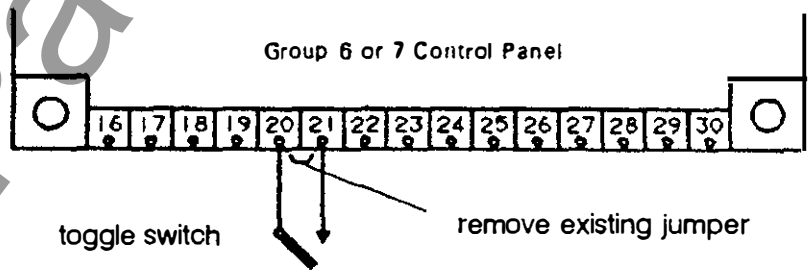


Figure 5-5. Optional Accessory 6C.

OPTIONAL PLANT EXERCISER

☐ **Acc. 11C** This timer, if furnished, is an additional plug-in circuit board in the control panel. The timer is used for periodic exercising of the emergency engine-generator plant. The timer can be set to exercise the gen-set for 0 to 7 days a week. The exercise time period may be from 1 minute to 24 hours (in 1 minute increments). The exerciser can be set to exercise with or without load transfer. The engine-generator should be exercised under load once a week for a minimum time period of 20 minutes, or follow the recommendations of the engine-generator set manufacturer. A built-in battery allows the exerciser to *keep time* for up to 2 weeks without external power. A built-in battery charger extends battery life to approximately 3 years. Battery is fully charged after 24 hours. See Figures 5-6 and 5-7.

The standard factory setting is for exercise without load.

Exercise Without Load

Timer exercises the engine generator without load for the set time period. The automatic transfer switch is not affected. This is the standard factory setting.

Exercise With Load

Timer simulates a normal source failure. The automatic transfer switch transfers the electrical load to the emergency generator during the exercise period.

Exerciser Selection

Exerciser Mode Setting	S6 DIP Switch	Switch Actuator 4
Exercise without load (factory setting)	4	off
Exercise with load	4	on

How to Set the Timer

1. **Set Present Time** Hold down the *TIME/DAY* button and press the *SET* button. Hold down the *SET* button for fast set; press and release the *SET* button for slow set (1 minute increments). A dot in the top left corner means PM. Release the *TIME/DAY* button when the correct time is displayed.

2. **Set Present Day** Press the *TIME/DAY* button once, release, then press again and hold it. Press and release the *SET* button to change the day (1 is Sunday). Release the *TIME/DAY* button when the correct day is displayed.

3. **Set Start Time** Decide what time you want to start the exercise period. Hold down the *ON TIME* button and press the *SET* button. Hold down the *SET* button for fast set; press and release the *SET* button for slow set (1 minute increments). Release the *ON TIME* button when the correct start time is displayed.

4. **Set Stop Time** Decide what time you want to stop the exercise period. Hold down the *OFF TIME* button and press the *SET* button. Hold down the *SET* button for fast set; press and release the *SET* button for slow set (1 minute increments). Release the *OFF TIME* button when the correct stop time is displayed.

(continued on next page)

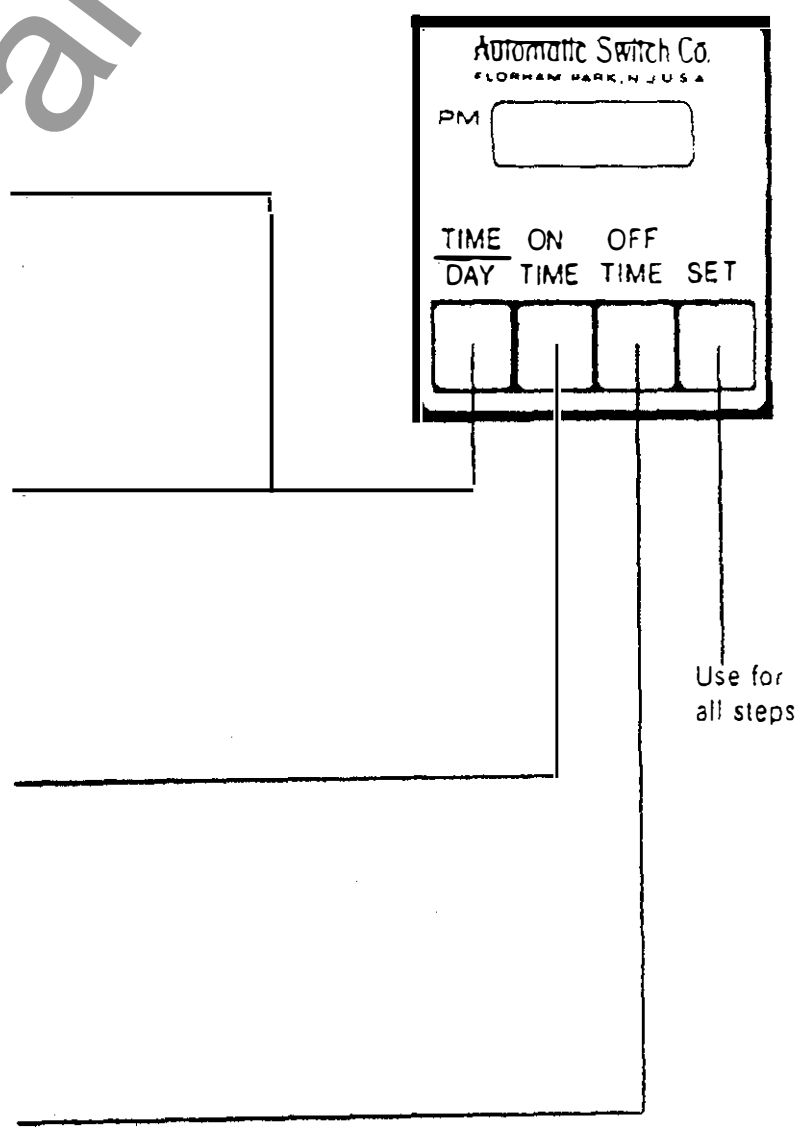


Figure 5-6. Setting and reading the timer.

5. Set Run Day(s) Decide what day(s) you want to exercise the engine-generator set. Read the following directions completely before setting run days.

   Hold down the *SET* button and press both the *TIME/DAY* and *ON TIME* buttons simultaneously; a 0 is displayed. (If no run days are desired, release all buttons.) Next the display will change to 1 (Sunday). If that day is desired, release the *SET* button and **wait for a dash to appear** before the 1 (-1). Once the dash appears that day is set. To set more run days in addition to this one, press the *SET* button while the dash is there (**you only have 1.5 seconds to do so**) and the next run day is displayed. If you do not want that day do not release the *SET* button. That day will be skipped. When all run days are entered release all the buttons; "**S:E**" is displayed which means the setting process is completed.

How To Read The Timer

Display Time*

Press the *TIME/DAY* button once. A dot in the top left corner means PM.

Display Day*

Press the *TIME/DAY* button twice. The day of the week is displayed as 1-7 (1 is Sunday).

Display Engine Start Time*

Press the *ON TIME* button.

Display Engine Stop Time*

Press the *OFF TIME* button.

Display Run Day(s)

Press the *TIME/DAY* and *ON/TIME* buttons simultaneously, then release them. The run days are displayed in sequence.

* The display stays on for 5 seconds or as long as the button is pressed.

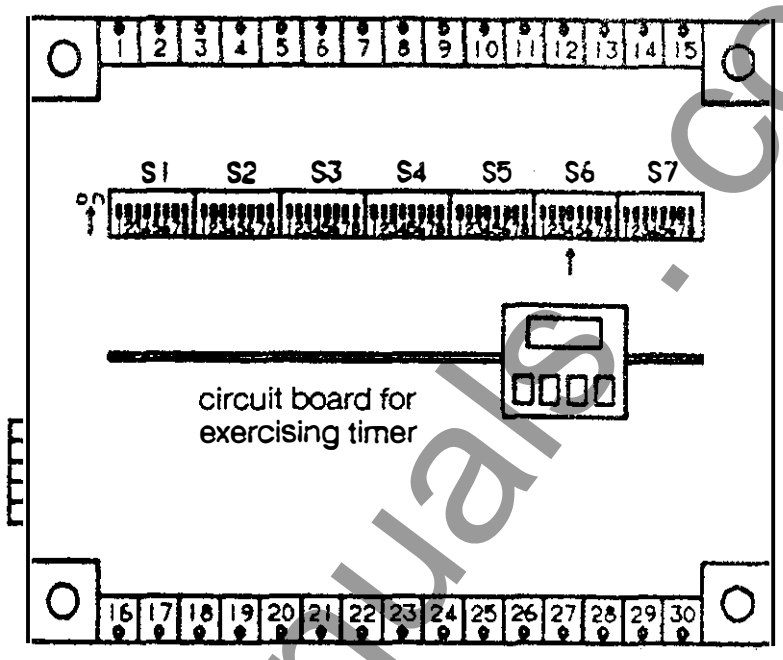


Figure 5-7. Optional Accessory 11C.

Trouble-Shooting

If the contact at CP16 and CP17 does not close during the set exercise period, the engine generator plant will not be signaled to run. If the contact remains closed beyond the set period, the plant will continue running. In either case, Acc. 11 timer is malfunctioning. **The built-in battery may need to be replaced after approximately 3 years.**

Note

In the exercise mode total engine running time consists of timer setting plus retransfer time setting (Feature 3A) plus cool-down time setting (Feature 2E). See page 4-1.

Timer Override

To override the timer so that the engine is not exercised, change the timer setting to day "0" (step 2 on page 5-2).

OPTIONAL ACCESSORIES
(continued)

STANDARD AND OPTIONAL ACCESSORY 14 INDICATORS

One set of auxiliary contacts (Feature 14A/14B) is provided standard on all automatic transfer switches.

✓ ☐ **Acc. 14A/14B** If furnished, are mounted on the transfer switch. Connect external circuits to the terminals indicated in Table 5-1. The location of the auxiliary contacts varies according to the amp size of the transfer switch. See Figures 5-8 through 5-12.

Feature/Acc. 14A Auxiliary contact closed when automatic transfer switch is connected to the normal source.

Feature/Acc. 14B Auxiliary contact closed when automatic transfer switch is connected to the emergency source.

Auxiliary Contact Rating: 10 amps 480 VAC

WARNING: Do not make any connections before de-energizing both the normal and emergency sources: Open both circuit breakers.

Table 5-1. Auxiliary Contact Terminals

Contact Sets	Closed On Normal 14A	Closed On Emergency 14B
standard	TS 12-13	TS10-11
1st optional	TS 31-32	TS29-30
2nd optional	TS 35-36	TS33-34
3rd optional	TS 39-40	TS37-38

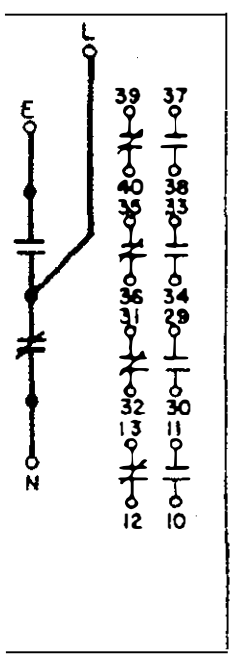


Figure 5-8.
30-150 amps

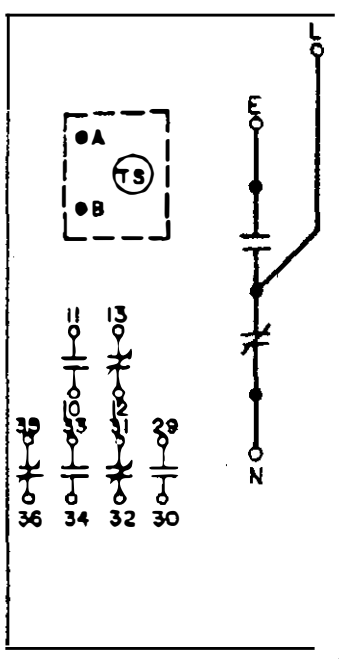


Figure 5-9.
260-400 amps

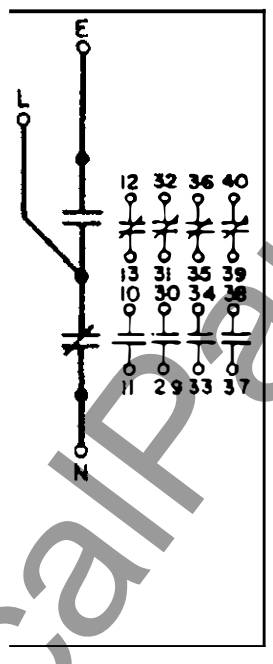


Figure 5-10.
600-800 amps

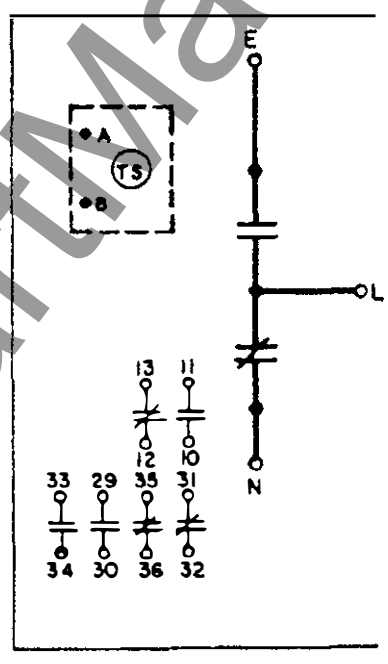


Figure 5-11.
1000-1200 amps

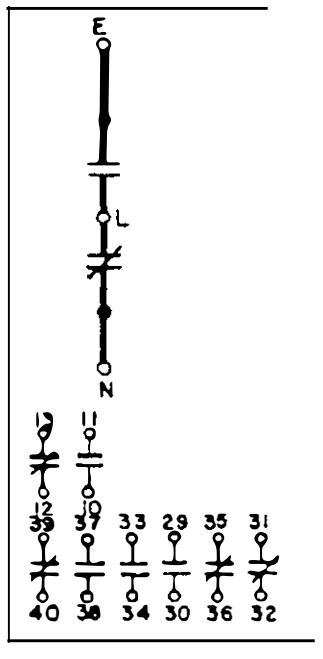


Figure 5-12.
1600-4000 amps

OPTIONAL SOURCE AVAILABLE SIGNAL LIGHTS

✓ ☐ **Acc. 9C and 9D**. These signal lights, if furnished, are connected and installed on the enclosure door, or are shipped loose for open-type automatic transfer switches. See Figure 5-13.

Acc. 9C Signal light (green) indicates that the Normal source is available.

Acc. 9D Signal light (red) indicates that the Emergency source is available.

Replacement bulbs for standard application are:
ASCO number 343978-3 green LED (Acc. 9C)
ASCO number 343978-1 red LED (Acc. 9D)
For oil-tight, watertight, or weatherproof applications:
ASCO number 397400-2 green LED (Acc. 9C)
ASCO number 397400-1 red LED (Acc. 9D)
Do not substitute!

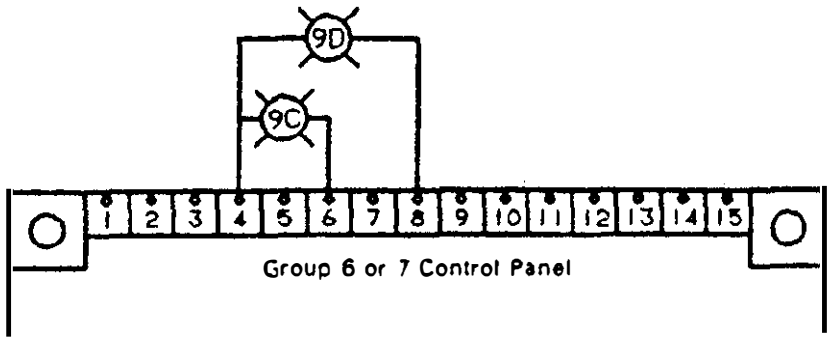
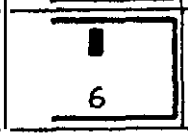


Figure 5-13. Optional Accessories 9C and 9D.

OPTIONAL ACCESSORY 27
MOTOR LOAD TRANSFER

☐ **Acc. 27**, if furnished, is an inphase monitor control for transfer and retransfer of motor loads, so that inrush currents do not exceed normal starting currents. This avoids nuisance tripping of circuit breakers and possible mechanical damage to motor couplings. Accessory 27 is built-in to the control panel and is activated at the factory when ordered by the customer. DIP switch S4 (actuator 6) activates this accessory. Up = ON, down = OFF.

Accessory 27 Setting	S4 DIP Switch	Switch Actuator 6
not used		off
activated		on

Sequence of Operation

Normal Source Restoration: SE relay energizes and ER relay is dropped out. After approximately 2 seconds the inphase monitor senses both sources of power, and its output relay energizes to initiate inphase transfer. The TS coil is energized and the standard Sequence of Operation is resumed.

When **Transfer Test** switch is used, the inphase monitor senses both sources of power approximately 2 seconds after the **ER** relay energizes. The **TS** coil is energized and the standard Sequence of Operation is resumed.

If either source of power is not available when the inphase monitor starts its sensing mode, the output relay picks up after 2 seconds and allows the **TS** coil to be energized.

Trouble-Shooting

1. Connect a voltmeter between terminals NA and EA on the transfer switch. Set the meter scale to at least twice the system phase to phase voltage.

2. Manually start the engine generator plant. After it has reached maximum output voltage, the meter needle should sweep back and forth at a regular rate between 0 volts and about twice the system voltage.

3. Depress and hold the **Transfer Test** switch. The load should transfer to the emergency source when the meter needle is near 0 volts. If transfer does not occur, Acc. 27 is malfunctioning.

4 Release the **Transfer Test** switch. The load should retransfer back to the normal source after Feature 3A time delay, if used. The retransfer should occur when the needle is near 0 volts. If retransfer does not occur after the time delay, Acc. 27 is malfunctioning.

5. Immediate retransfer may be accomplished by manually shutting down the engine. Make sure that full rated normal voltage is available before doing this.

6. Disconnect and remove the voltmeter.

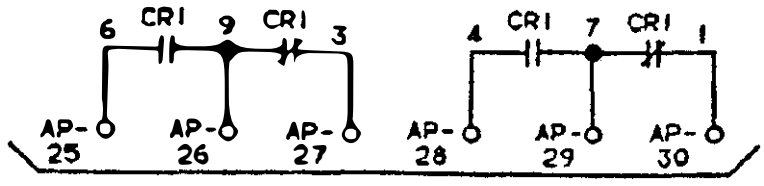
OPTIONAL SELECTIVE LOAD DISCONNECT CONTROL

These circuits, if furnished, are supplied on an add-on panel and connected to the control panel. Two sets of double-throw contacts are provided. Connect external circuits to the terminals indicated in Figure 5-14.

☐ **Acc. 31F** Contacts operate 1 second to 5 minutes (adjustable) before transfer of the Automatic Transfer Switch and reset immediately after transfer.

☐ **Acc. 31M** Contacts operate 1 second to 5 minutes (adjustable) before transfer of the Automatic Transfer Switch and reset 1 second to 5 minutes after transfer.

Note: CR1 is normally energized.



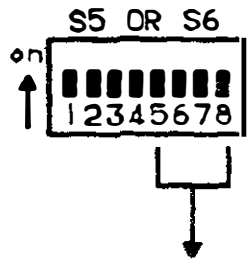
Selective Load Disconnect Control Contacts

3 amps @ 480 V ac
6 amps @ 240 V ac general use
10 amps @ 32 V dc resistive
1/3 hp @ 120 V ac
1/2 hp @ 240 V ac

Figure 5-14. Optional Accessory 31F & 31M terminal connections on add-on panel.

How to Change a Time Delay Setting

To change the time delay settings follow the procedure in **Section 4, Adjustments.** The time delays are shown in the chart at the right. DIP switch S5 (actuators 5,6,7,8) sets the time delay before transfer. DIP switch S6 (actuators 5,6,7,8) sets the time delay after transfer.

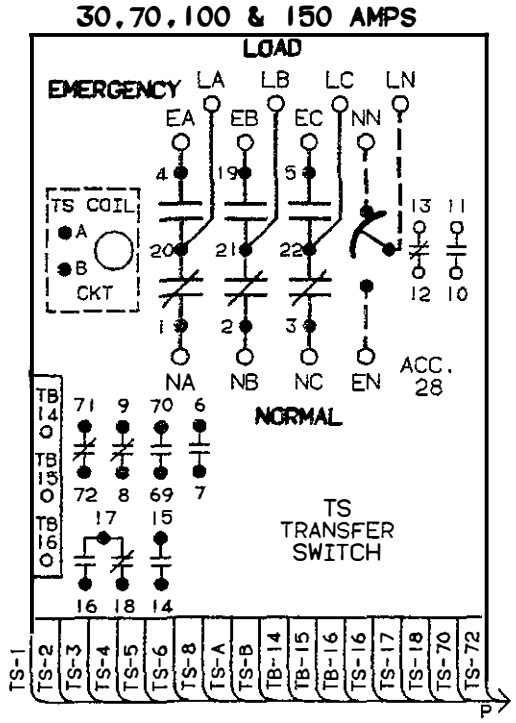


Load Shed Time Delay	DIP Switch	Actuator Positions 5	6	7	8
0 seconds	on 5678	off	off	off	off
1 second	5678	off	off	off	on
2 seconds	5678	off	off	on	off
3 seconds	5678	off	off	on	on
4 seconds	5678	off	on	off	off
5 seconds	5678	off	on	off	on
8 seconds	5678	off	on	on	off
10 seconds	5678	off	on	on	on
20 seconds	5678	on	off	off	off
30 seconds	5678	on	off	off	on
45 seconds	5678	on	off	on	off
1 minute	5678	on	off	on	on
2 minutes	5678	on	on	off	off
3 minutes	5678	on	on	off	on
4 minutes	5678	on	on	on	off
5 minutes	5678	on	on	on	on

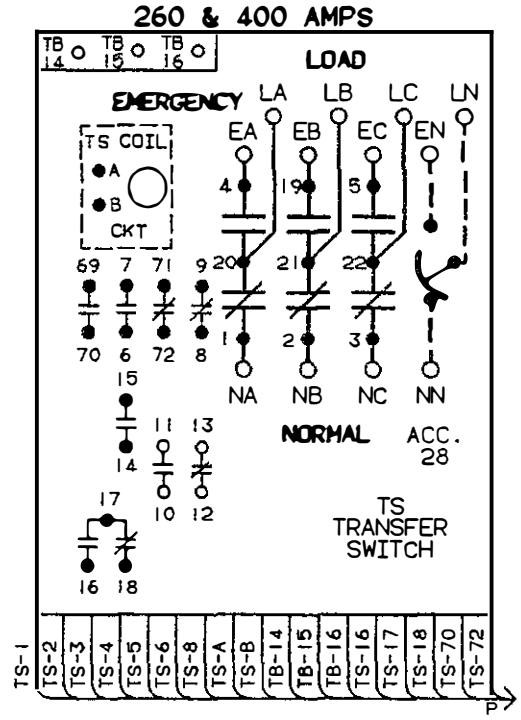
NOTES

PHYSICAL WIRING

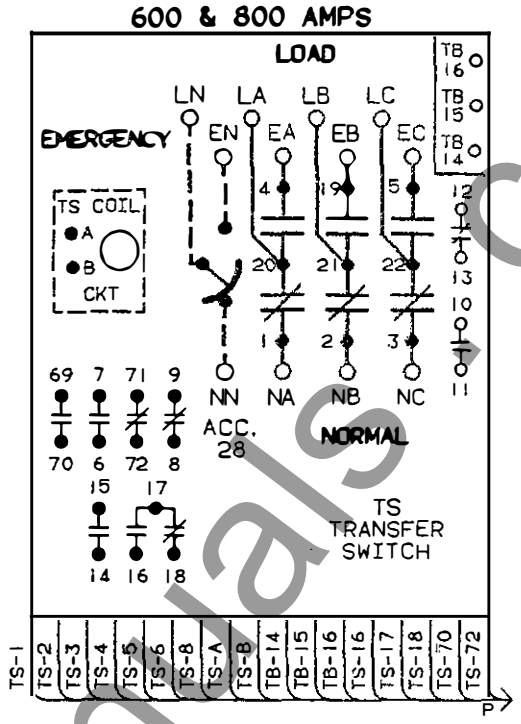
30, 70, 100 & 150 AMPS



260 & 400 AMPS



600 & 800 AMPS



STANDARD FEATURES

VOLTAGE AND FREQUENCY SENSING

A. CLOSE DIFFERENTIAL VOLTAGE SENSING ON ALL PHASES OF NORMAL SOURCE. PICKUP VOLTAGE IS ADJUSTABLE FROM 85% TO 100% OF NOMINAL AND THE DROPOUT IS ADJUSTABLE FROM 75% TO 98% OF THE PICKUP VALUE. FACTORY SET TO PICKUP AT 90% AND DROPOUT AT 85% OF NOMINAL UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 4B.**

B. SINGLE PHASE VOLTAGE SENSING OF EMERGENCY SOURCE. PICKUP ADJUSTABLE FROM 85% TO 100% OF NOMINAL. FACTORY SET TO PICKUP AT 90% UNLESS OTHERWISE SPECIFIED.

C. FREQUENCY SENSING OF EMERGENCY SOURCE. PICKUP ADJUSTABLE FROM 90% TO 100% OF NOMINAL. FACTORY SET TO PICKUP AT 95% UNLESS OTHERWISE SPECIFIED.

TIME DELAYS

D. TIME DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES TO DELAY ALL TRANSFER SWITCH AND ENGINE STARTING SIGNALS. ADJUSTABLE FROM 0 TO 6 SECONDS. FACTORY SET AT 1 SECOND UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 1.**

E. RETRANSFER TO NORMAL TIME DELAY. TIME DELAY IS AUTOMATICALLY BYPASSED IF EMERGENCY SOURCE FAILS AND NORMAL SOURCE IS AVAILABLE. ADJUSTABLE FROM 0 TO 30 MINUTES. FACTORY SET AT 30 MINUTES UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 3A.**

F. UNLOADED RUNNING TIME DELAY FOR EMERGENCY ENGINE GENERATOR COOLDOWN. ADJUSTABLE FROM 0 TO 60 MINUTES. FACTORY SET AT 5 MINUTES UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 2E.**

G. TRANSFER TO EMERGENCY TIME DELAY. ADJUSTABLE FROM 0 TO 5 MINUTES. FACTORY SET AT 0 MINUTES UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 2B.**

MANUAL CONTROLS

H. MOMENTARY TYPE TEST SWITCH (TGL) TO SIMULATE NORMAL SOURCE FAILURE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE. **STANDARD FEATURE 5.**

REMOTE AUTOMATIC TRANSFER SWITCH CIRCUITS

J. TERMINAL PROVISIONS FOR REMOTE CUSTOMER CONTACT WHICH OPENS TO SIGNAL A.T.S. TO TRANSFER TO EMERGENCY. REFER TO OPERATOR'S MANUAL TO ACTIVATE. **STANDARD FEATURE 17.** (SEE NOTE 9)

ENGINE CONTROL CONTACTS

K. ONE SET OF CONTACTS CONSISTING OF: ONE CONTACT THAT CLOSES WHEN NORMAL SOURCE FAILS AND ONE CONTACT THAT OPENS WHEN NORMAL SOURCE FAILS. CONTACTS ARE GOLD FLASHED FOR LOW VOLTAGE ENGINE START SIGNALS OR OTHER CUSTOMER USE. RATED 10 AMPS, 32 VOLTS DC. **STANDARD FEATURE 7/8.**

INDICATORS

L. ONE SET OF AUXILIARY CONTACTS CONSISTING OF: ONE CONTACT CLOSED WHEN A.T.S. IS CONNECTED TO NORMAL AND ONE CONTACT CLOSED WHEN A.T.S. IS CONNECTED TO EMERGENCY. (ADDITIONAL SETS OF AUXILIARY CONTACTS ARE AVAILABLE AS OPTIONS - SEE BELOW). **STANDARD FEATURE 14A/14B.**

M. ONE SET OF SIGNAL LIGHTS CONSISTING OF: ONE SIGNAL LIGHT (GREEN) TO INDICATE WHEN A.T.S. IS CONNECTED TO NORMAL SOURCE AND ONE SIGNAL LIGHT (RED) TO INDICATE WHEN A.T.S. IS CONNECTED TO EMERGENCY SOURCE. LIGHTS ARE INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE. **STANDARD FEATURE 9A/9B.**

TRANSFER INHIBIT

N. TERMINAL PROVISIONS FOR REMOTE CUSTOMER CONTACT(S) TO INHIBIT A.T.S. TRANSFER TO NORMAL AND/OR EMERGENCY SOURCE. CUSTOMER CONTACT OPENS TO INHIBIT TRANSFER. REFER TO OPERATOR'S MANUAL TO ACTIVATE. **STANDARD FEATURE 34A/34B.** (SEE NOTE 9)

COMMIT/NO COMMIT ON TRANSFER

P. UPON FEATURE 1 TIMING OUT (DUE TO A TEST OR NORMAL SOURCE FAILURE) THE A.T.S. IS COMMITTED TO TRANSFER TO EMERGENCY, EVEN IF THE NORMAL SOURCE IS RESTORED BEFORE THE TRANSFER TAKES PLACE. THIS "COMMIT ON TRANSFER" FEATURE CAN BE OVERRIDDEN BY OPERATING A SWITCH IN THE CONTROL PANEL. REFER TO OPERATOR'S MANUAL.

FREQUENCY SELECTION

R. OPERATING FREQUENCIES OF 50HZ. OR 60HZ. MAY BE SELECTED BY A SWITCH IN THE CONTROL PANEL. FACTORY SET AT SPECIFIED FREQUENCY. REFER TO OPERATORS'S MANUAL.

OPTIONAL ACCESSORIES

MANUAL CONTROLS

☐ **6B:** MOMENTARY OVERRIDE SWITCH TO MANUALLY BYPASS TIME DELAY ON RETRANSFER TO NORMAL. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

☐ **6C:** MOMENTARY RESET SWITCH FOR MANUAL RETRANSFER OF THE A.T.S TO THE NORMAL SOURCE ONLY AFTER TIME DELAY FEATURE 3A EXPIRES WITH INSTANTANEOUS AUTOMATIC RETRANSFER IN THE EVENT OF EMERGENCY SOURCE FAILURE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

INDICATORS

☐ **14A/14B:** ADDITIONAL AUXILIARY CONTACT SETS. ONE SET IS SUPPLIED AS STANDARD. SPECIFY TOTAL QUANTITY WHEN MORE THAN ONE SET IS REQUIRED. **TOTAL QUANTITY**_____

INDICATORS (CONT'D.)

☐ **9C/9D :** ONE SET OF SIGNAL LIGHTS CONSISTING OF: ONE SIGNAL LIGHT (GREEN) TO INDICATE NORMAL SOURCE AVAILABLE AND ONE SIGNAL LIGHT (RED) TO INDICATE EMERGENCY SOURCE AVAILABLE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

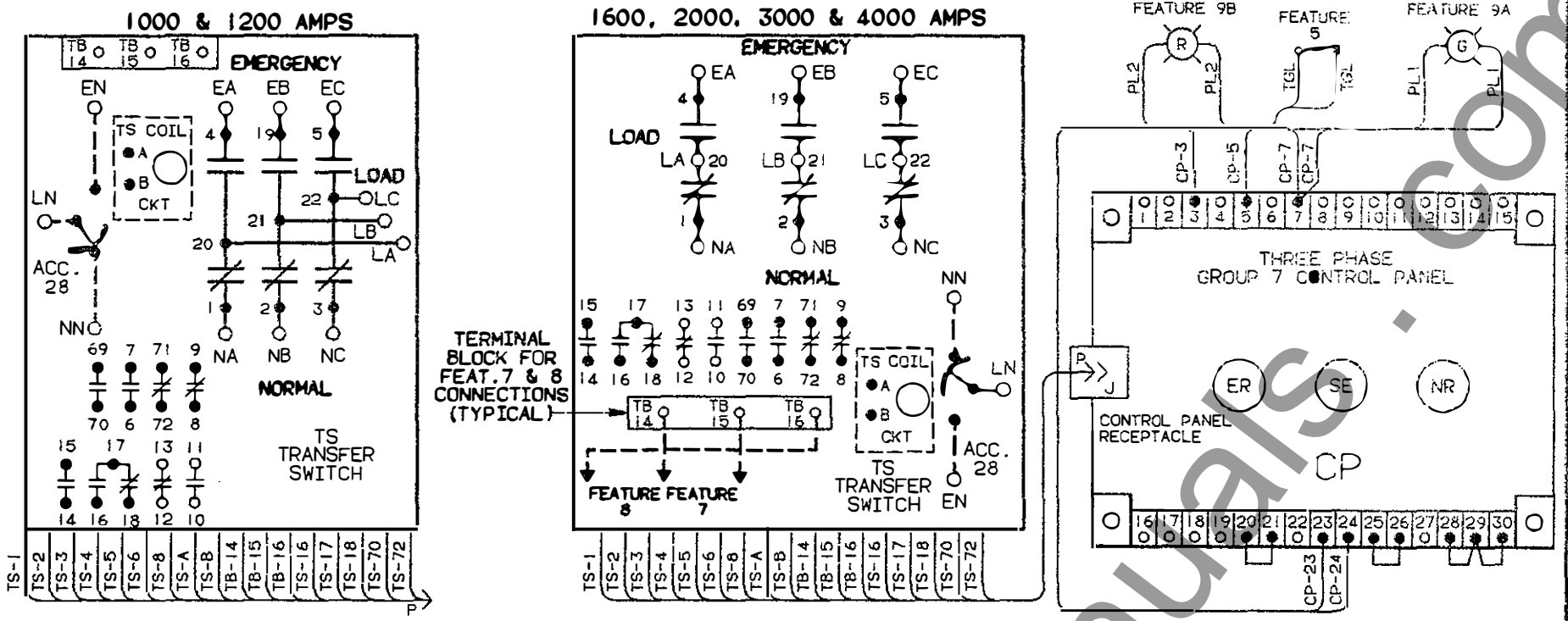
PLANT EXERCISER

☐ **11C:** ENGINE GENERATOR EXERCISING TIMER WITH "LOAD" OR "NO-LOAD" OPERATING MODES. ADJUSTABLE FROM 1 MINUTE TO 24 HOURS IN 1 MINUTE INCREMENTS. FACTORY SET FOR 20 MINUTES MINIMUM EACH WEEK UNLESS OTHERWISE SPECIFIED. REFER TO OPERATOR'S MANUAL FOR MODE SELECTION.

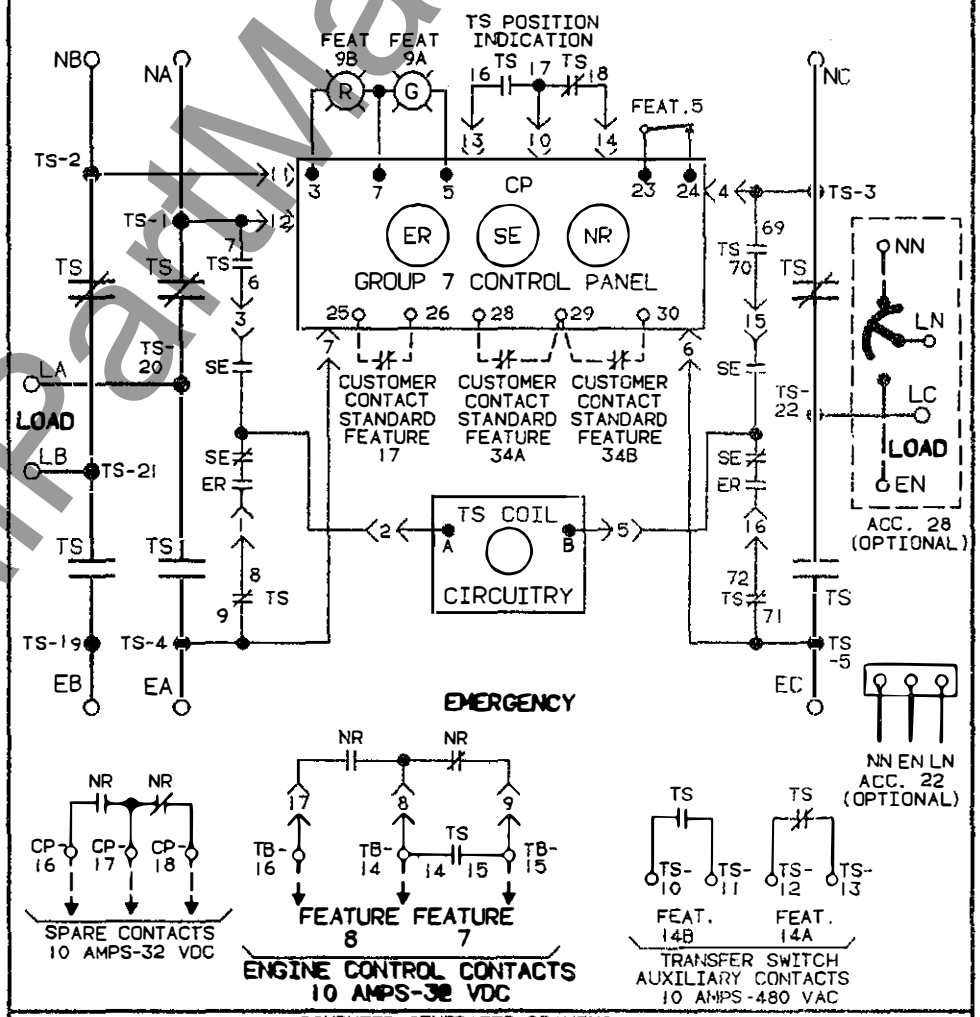
MOTOR LOAD TRANSFER

☐ **27:** INPHASE MONITOR CONTROL FOR TRANSFER AND RETRANSFER OF MOTOR LOADS, SO THAT INRUSH CURRENTS DO NOT EXCEED NORMAL STARTING CURRENTS, TO AVOID NUISANCE TRIPPING OF CIRCUIT BREAKERS AND POSSIBLE MECHANICAL DAMAGE TO MOTOR COUPLINGS.

DIAGRAM



ELEMENTARY WIRING DIAGRAM



THREE PHASE/SINGLE PHASE SELECTION

S. THREE PHASE CONTROL MAY BE OPERATED ON SINGLE PHASE SOURCES BY OPERATING A SWITCH IN THE CONTROL PANEL. THE SINGLE PHASE SOURCES MUST BE CONNECTED TO POWER TERMINALS NA/NC AND EA/EC. REFER TO OPERATORS' MANUAL.

GENERAL NOTES

1. SWITCH SHOWN DE-ENERGIZED AND CONNECTED TO NORMAL SOURCE.
2. DEVICE SYMBOLS AND DESIGNATIONS ARE IN ACCORDANCE WITH NEMA PUB.ICS 1-1983. PART 1-101A.
3. WIRES: #20 AWG ON 30-150 AMPS AND #16 AWG ON 260-4000 AMPS, STRANDED COPPER.
4. O INDICATES CUSTOMER CONNECTION POINTS.
5. ● INDICATES FACTORY CONNECTION POINTS.
6. CONNECTION POINTS THAT HAVE BOTH CUSTOMER CONNECTIONS AND FACTORY CONNECTIONS ARE SHOWN OPEN AS CUSTOMER CONNECTION POINTS.
7. ON ENCLOSED TYPE SWITCHES THE TRANSFER UNIT IS MOUNTED ON THE BACK INSIDE SURFACE AND THE CONTROL PANEL ON THE INSIDE DOOR SURFACE. WHEN AN ADDITIONAL ACCESSORY MOUNTING PANEL IS REQUIRED TO MOUNT OPTIONAL ACCESSORIES, IT IS LOCATED DIRECTLY BELOW THE CONTROL PANEL.
8. ALL FEATURES AND OPTIONS SHOWN ARE UL RECOGNIZED.
9. CUSTOMER REMOTE CONTACTS THAT ARE CONNECTED TO A.T.S. CONTROLS SHOULD BE SUITABLE FOR LOW ENERGY CIRCUITS.
10. REFER TO OPERATOR'S MANUAL FOR WIRING OF OPTIONAL ACCESSORIES SHOWN BELOW.
11. ADJUSTMENTS FOR PICKUP AND DROPOUT SETTINGS ARE IN INCREMENTS OF 1%. TIME DELAY ADJUSTMENTS ARE IN DISCRETE INCREMENTS.
12. **AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH**

TRANSFER SWITCH OPTIONS

☐ **22**: SOLID NEUTRAL, WITH FULL RATED TERMINALS. **AL-CU, UL** LISTED. SHIPPED LOOSE FOR OPEN TYPE.

☐ **28**: OVERLAPPING NEUTRAL TRANSFER CONTACTS. ASSURES PROPER GROUND FAULT SENSING AND AVOIDS POSSIBLE PHASE OVERVOLTAGES DURING TRANSFER OF NEUTRAL BETWEEN NORMAL AND EMERGENCY. **NOTE: NORMAL AND EMERGENCY CONTACTS, ON ACC. 28 POLE ARE REVERSED ON 30-150 AMP AND 1600-4000 AMP SWITCHES.** (SEE ABOVE DIAGRAMS).

☐ **SEE ATTACHED SHEET FOR ADDITIONAL ACCESSORIES.**

COMPUTER GENERATED DRAWING

BASIC CATALOG NUMBERS ASCO	POLES	AMPS	VOLT CODE	STD. ACC. CODE	OPT. ACC. CODE	ENCLOSURE CODE
940	3	30		7		C: TYPE 1, TYPE 2, TYPE 3R, TYPE 4, TYPE 7, TYPE 12
		70	4			
		100				
		150	6			
		260				
		400	9			
		600				
		800	G			
		1000				
		1200	X			
		1600				
		2000				
		3000				
		4000				OPEN TYPE NO SUFFIX REQ'D.

VOLTAGE CODE	DESCRIPTION OPERATING FREQ. 50-60 HZ
4	208Y/120V, 190 TO 208V
6	240/120V TAPPED DELTA
	220 TO 240V
9	480Y/277V, 460Y/265V
	440 TO 480V
G	600Y/347V
	550 TO 600V
X	OTHER VOLTAGES

CATALOG NUMBER _____
CERTIFIED
TO ASCO® S.O. _____
DATE _____ BY _____

COMPOSITE 3 PHASE WIRING DIAGRAM FOR ASCO® 940 AUTOMATIC TRANSFER SWITCHES WITH MICROPROCESSOR GROUP 7 CONTROLS

	BY	DATE
DRAWN	TEK	5/86
CHECKED		
DFTG APL	FM	6/86
ENG APL	PDG	6/86

Automatic Switch Co.© FLORHAM PARK, N.J., 07932. PRINTED IN U.S.A.

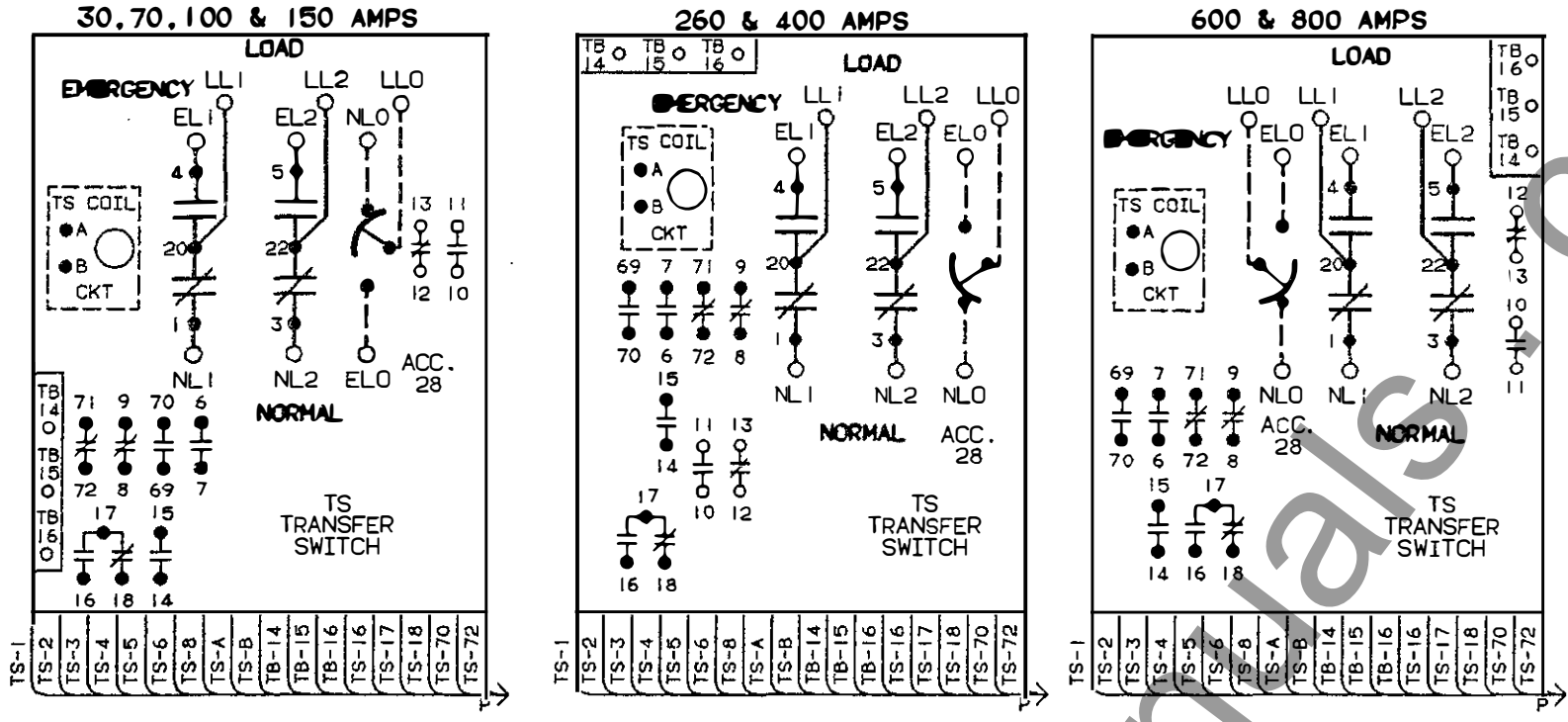
AL ☒ AP ☒ CE ☒ AS ☒ AN ☒ AD ☒

E.R. NO.	ITEM CHGD	CHG	DATE	APVD.
108391	MANUAL NO.	E	4/89	FM
101400	RMV'D 6A	D	7/87	FM
100366	FEAT 9A	C	5/87	FM
100126	SEE E.C.N.	B	5/87	PDG
110356	SEE E.C.N.	G	10/89	EOB
109279	400A ACC. 28	F	6/89	PDG

JS 381303

CHG LTR: G

PHYSICAL WIRING



STANDARD FEATURES

VOLTAGE AND FREQUENCY SENSING

A. SINGLE PHASE CLOSE DIFFERENTIAL VOLTAGE SENSING OF NORMAL SOURCE. PICKUP VOLTAGE IS ADJUSTABLE FROM 85% TO 100% OF NOMINAL AND THE DROPOUT IS ADJUSTABLE FROM 75% TO 98% OF THE PICKUP VALUE. FACTORY SET TO PICKUP AT 90% AND DROPOUT AT 85% OF NOMINAL UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 4A.**

B. SINGLE PHASE VOLTAGE SENSING OF EMERGENCY SOURCE. PICKUP ADJUSTABLE FROM 85% TO 100% OF NOMINAL. FACTORY SET TO PICKUP AT 90% UNLESS OTHERWISE SPECIFIED.

C. FREQUENCY SENSING OF EMERGENCY SOURCE. PICKUP ADJUSTABLE FROM 90% TO 100% OF NOMINAL. FACTORY SET TO PICKUP AT 95% UNLESS OTHERWISE SPECIFIED.

TIME DELAYS

D. TIME DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES TO DELAY ALL TRANSFER SWITCH AND ENGINE STARTING SIGNALS. ADJUSTABLE FROM 0 TO 6 SECONDS. FACTORY SET AT 1 SECOND UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 1.**

E. RETRANSFER TO NORMAL TIME DELAY. TIME DELAY IS AUTOMATICALLY BYPASSED IF EMERGENCY SOURCE FAILS AND NORMAL SOURCE IS AVAILABLE. ADJUSTABLE FROM 0 TO 30 MINUTES. FACTORY SET AT 30 MINUTES UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 3A.**

F. UNLOADED RUNNING TIME DELAY FOR EMERGENCY ENGINE GENERATOR COOLDOWN. ADJUSTABLE FROM 0 TO 60 MINUTES. FACTORY SET AT 5 MINUTES UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 2E.**

G. TRANSFER TO EMERGENCY TIME DELAY. ADJUSTABLE FROM 0 TO 5 MINUTES. FACTORY SET AT 0 MINUTES UNLESS OTHERWISE SPECIFIED. **STANDARD FEATURE 2B.**

MANUAL CONTROLS

H. MOMENTARY TYPE TEST SWITCH (TGL) TO SIMULATE NORMAL SOURCE FAILURE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE. **STANDARD FEATURE 5.**

REMOTE AUTOMATIC TRANSFER SWITCH CIRCUITS

J. TERMINAL PROVISIONS FOR REMOTE CUSTOMER CONTACT WHICH OPENS TO SIGNAL A.T.S. TO TRANSFER TO EMERGENCY. REFER TO OPERATOR'S MANUAL TO ACTIVATE. **STANDARD FEATURE 17.** (SEE NOTE 9)

ENGINE CONTROL CONTACTS

K. ONE SET OF CONTACTS CONSISTING OF: ONE CONTACT THAT CLOSES WHEN NORMAL SOURCE FAILS AND ONE CONTACT THAT OPENS WHEN NORMAL SOURCE FAILS. CONTACTS ARE GOLD FLASHED FOR LOW VOLTAGE ENGINE START SIGNALS OR OTHER CUSTOMER USE. RATED 10 AMPS, 32 VOLTS DC. **STANDARD FEATURE 7/8.**

INDICATORS

L. ONE SET OF AUXILIARY CONTACTS CONSISTING OF: ONE CONTACT CLOSED WHEN A.T.S. IS CONNECTED TO NORMAL AND ONE CONTACT CLOSED WHEN A.T.S. IS CONNECTED TO EMERGENCY. (ADDITIONAL SETS OF AUXILIARY CONTACTS ARE AVAILABLE AS OPTIONS - SEE BELOW). **STANDARD FEATURE 14A/14B.**

M. ONE SET OF SIGNAL LIGHTS CONSISTING OF: ONE SIGNAL LIGHT (GREEN) TO INDICATE WHEN A.T.S. IS CONNECTED TO NORMAL SOURCE AND ONE SIGNAL LIGHT (RED) TO INDICATE WHEN A.T.S. IS CONNECTED TO EMERGENCY SOURCE. LIGHTS ARE INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE. **STANDARD FEATURE 9A/9B.**

TRANSFER INHIBIT

N. TERMINAL PROVISIONS FOR REMOTE CUSTOMER CONTACT(S) TO INHIBIT A.T.S. TRANSFER TO NORMAL AND/OR EMERGENCY SOURCE. CUSTOMER CONTACT OPENS TO INHIBIT TRANSFER. REFER TO OPERATOR'S MANUAL TO ACTIVATE. **STANDARD FEATURE 34A/34B.** (SEE NOTE 9)

COMMIT/NO COMMIT ON TRANSFER

P. UPON FEATURE 1 TIMING OUT (DUE TO A TEST OR NORMAL SOURCE FAILURE) THE A.T.S. IS COMMITTED TO TRANSFER TO EMERGENCY, EVEN IF THE NORMAL SOURCE IS RESTORED BEFORE THE TRANSFER TAKES PLACE. THIS "COMMIT ON TRANSFER" FEATURE CAN BE OVERRIDDEN BY OPERATING A SWITCH IN THE CONTROL PANEL. REFER TO OPERATOR'S MANUAL.

FREQUENCY SELECTION

R. OPERATING FREQUENCIES OF 50HZ. OR 60HZ. MAY BE SELECTED BY A SWITCH IN THE CONTROL PANEL. FACTORY SET AT SPECIFIED FREQUENCY. REFER TO OPERATOR'S MANUAL.

OPTIONAL ACCESSORIES

MANUAL CONTROLS

☐ **6B:** MOMENTARY OVERRIDE SWITCH TO MANUALLY BYPASS TIME DELAY ON RETRANSFER TO NORMAL. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

☐ **6C:** MOMENTARY RESET SWITCH FOR MANUAL RETRANSFER OF THE A.T.S TO THE NORMAL SOURCE ONLY AFTER TIME DELAY FEATURE 3A EXPIRES WITH INSTANTANEOUS AUTOMATIC RETRANSFER IN THE EVENT OF EMERGENCY SOURCE FAILURE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

INDICATORS

☐ **14A/14B:** ADDITIONAL AUXILIARY CONTACT SETS. ONE SET IS SUPPLIED AS STANDARD. SPECIFY TOTAL QUANTITY WHEN MORE THAN ONE SET IS REQUIRED.
TOTAL QUANTITY_____

INDICATORS (CONT'D.)

☐ **9C/9D :** ONE SET OF SIGNAL LIGHTS CONSISTING OF: ONE SIGNAL LIGHT (GREEN) TO INDICATE NORMAL SOURCE AVAILABLE AND ONE SIGNAL LIGHT (RED) TO INDICATE EMERGENCY SOURCE AVAILABLE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

PLANT EXERCISER

☐ **11C:** ENGINE GENERATOR EXERCISING TIMER WITH "LOAD" OR "NO-LOAD" OPERATING MODES. ADJUSTABLE FROM 1 MINUTE TO 24 HOURS IN 1 MINUTE INCREMENTS. FACTORY SET FOR 20 MINUTES MINIMUM EACH WEEK UNLESS OTHERWISE SPECIFIED. REFER TO OPERATOR'S MANUAL FOR MODE SELECTION.

MOTOR LOAD TRANSFER

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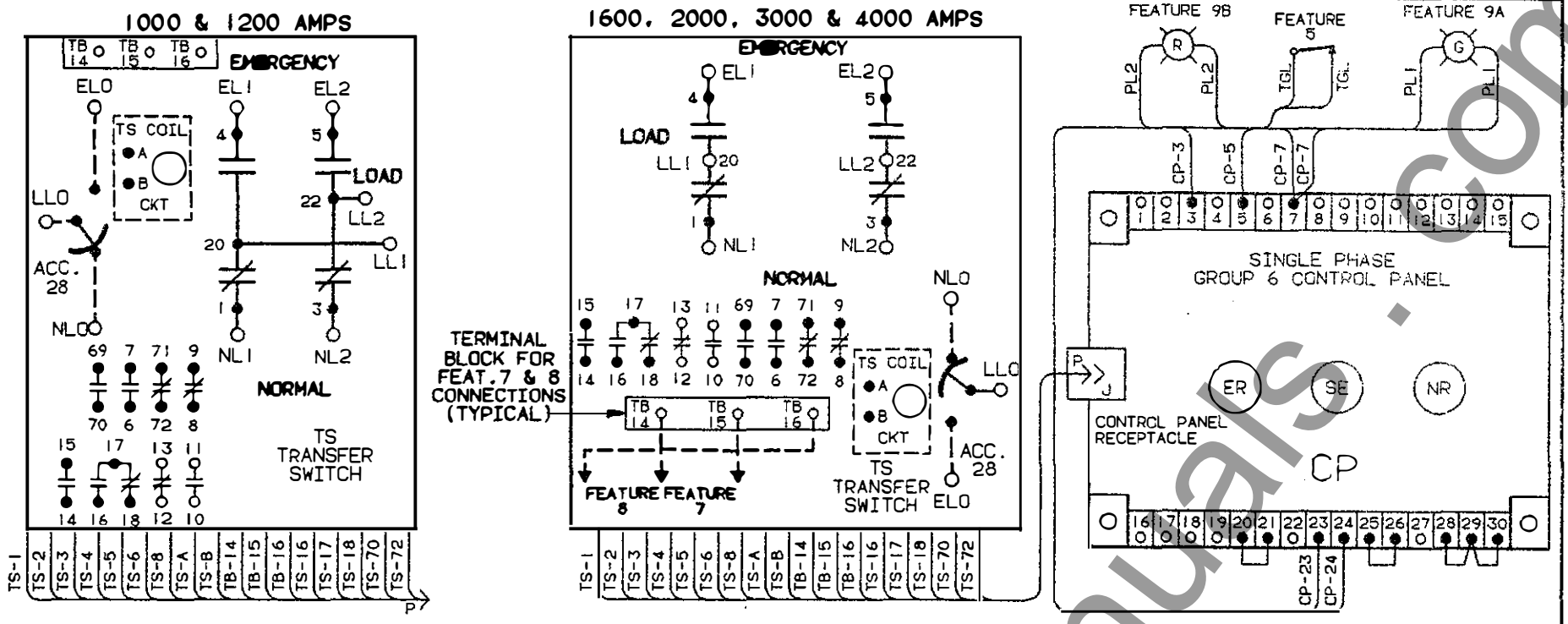
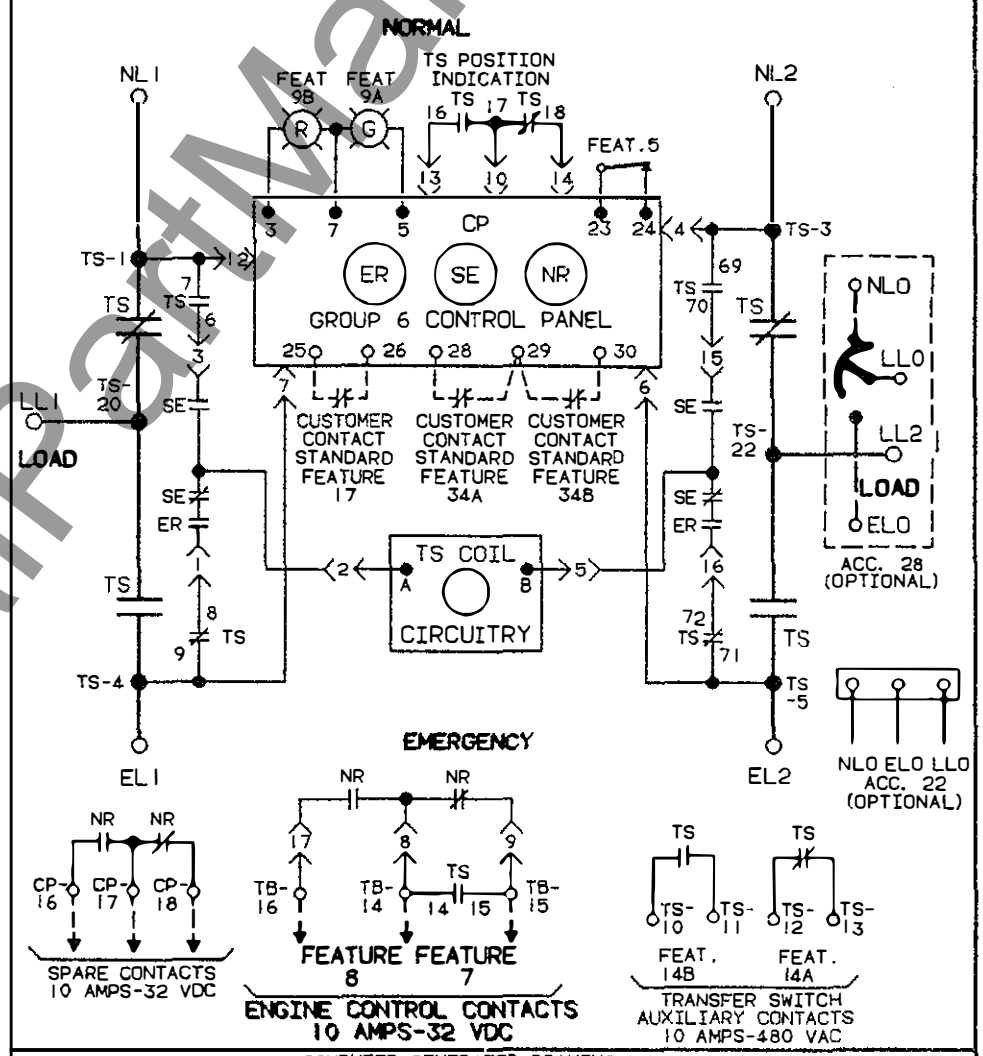
DIAGRAM



ELEMENTARY WIRING DIAGRAM



GENERAL NOTES

1. SWITCH SHOWN DE-ENERGIZED AND CONNECTED TO NORMAL SOURCE.
2. DEVICE SYMBOLS AND DESIGNATIONS ARE IN ACCORDANCE WITH NEMA PUB. ICS 1-1983. PART 1-101A.
3. WIRES: #20 AWG ON 30-150 AMPS AND #16 AWG ON 260-4000 AMPS, STRANDED COPPER.
4. O INDICATES CUSTOMER CONNECTION POINTS.
5. ● INDICATES FACTORY CONNECTION POINTS.
6. CONNECTION POINTS THAT HAVE BOTH CUSTOMER CONNECTIONS AND FACTORY CONNECTIONS ARE SHOWN OPEN AS CUSTOMER CONNECTION POINTS.
7. ON ENCLOSED TYPE SWITCHES THE TRANSFER UNIT IS MOUNTED ON THE BACK INSIDE SURFACE ANO THE CONTROL PANEL ON THE INSIDE DOOR SURFACE. WHEN AN ADDITIONAL ACCESSORY MOUNTING PANEL IS REQUIRED TO MOUNT OPTIONAL ACCESSORIES, IT IS LOCATED DIRECTLY BELOW THE CONTROL PANEL.
8. ALL FEATURES AND OPTIONS SHOWN ARE UL RECOGNIZED.
9. CUSTOMER REMOTE CONTACTS THAT ARE CONNECIED TO A.T.S. CONTROLS SHOULD BE SUITABLE FOR LOW ENERGY CIRCUITS.
10. REFER TO OPERATOR'S MANUAL FOR WIRING OF OPTIONAL ACCESSORIES SHOWN BELOW.
11. ADJUSTMENTS FOR PICKUP AND DROPOUT SETTINGS ARE IN INCREMENTS OF 1%. TIME DELAY ADJUSTMENTS ARE IN DISCRETE INCREMENTS.
12. **AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH**

TRANSFER SWITCH OPTIONS

☐ **22**: SOLID NEUTRAL, WITH FULL RATED TERMINALS. **AL-CU, UL** LISTED. SHIPPED LOOSE FOR OPEN TYPE.

☐ **28**: OVERLAPPING NEUTRAL TRANSFER CONTACTS. ASSURES PROPER GROUND FAULT SENSING AND AVOIDS POSSIBLE PHASE OVERVOLTAGES DURING TRANSFER OF NEUTRAL BETWEEN NORMAL AND EMERGENCY. **NOTE: NORMAL AND EMERGENCY CONTACTS, ON ACC. 28 POLE ARE REVERSED ON 30-150 AMP AND 1600-4000 AMP SWITCHES.** (SEE ABOVE DIAGRAM)

☐ **SEE ATTACHED SHEET FOR ADDITIONAL ACCESSORIES.**

COMPUTER GENERATED DRAWING

BASIC CATALOG NUMBERS ASCO	POLES	AMPS	VOLT CODE	STD. ACC. CODE	OPT. ACC. CODE	ENCLOSURE CODE
940	2	30				
		70	3			
		100				
		150	6			
		260				
		400	9	6		C
		600				
		800	G			
		1000				
		1200	X			
		1600				
		2000				
		3000				
		4000				

ENCLOSURE CODE: TYPE 1, TYPE 2, TYPE 3R, TYPE 4, TYPE 7, TYPE 12

OPEN TYPE NO SUFFIX REQ'D.

VOLTAGE CODE DESCRIPTION OPERATING FREQ. 50-60 HZ

3	110 TO 120V
6	120/240V 115/230V
	190 TO 208V
	220 TO 240V
9	440 TO 480V
G	347/600V
	550 TO 600V
X	OTHER VOLTAGES

CATALOG NUMBER _____
CERTIFIED
TO ASCO® S.O. _____

COMPOSITE SINGLE PHASE WIRING DIAGRAM FOR ASCO® 940 AUTOMATIC TRANSFER SWITCHES WITH MICROPROCESSOR GROUP 6 CONTROLS

	BY	DATE
DRAWN	TEK	5/86
CHECKED		
DFTG APL	FM	6/86
ENG APL	PDG	6/86

Automatic Switch Co. ©
FLORHAM PARK, N.J., 07932. PRINTED IN U.S.A.
AL ☒ AP ☒ CE ☒ AS ☒ AN ☒ AD ☒

E.R. NO.	ITEM CHGD	CHG	DATE	APVD.
106345	SEE ECN	E	12/88	FM
101400	RMV'D 6A	D	7/87	FM
100366	FEAT 9A	C	5/87	PDG
110356	SEE E.C.N.	H	10/89	EOB
109279	400A ACC.28	G	6/87	PDG
108391	MANUAL NO.	F	4/89	FM

JS 381535

CHG LTR: H

30 THRU 150 AMPS

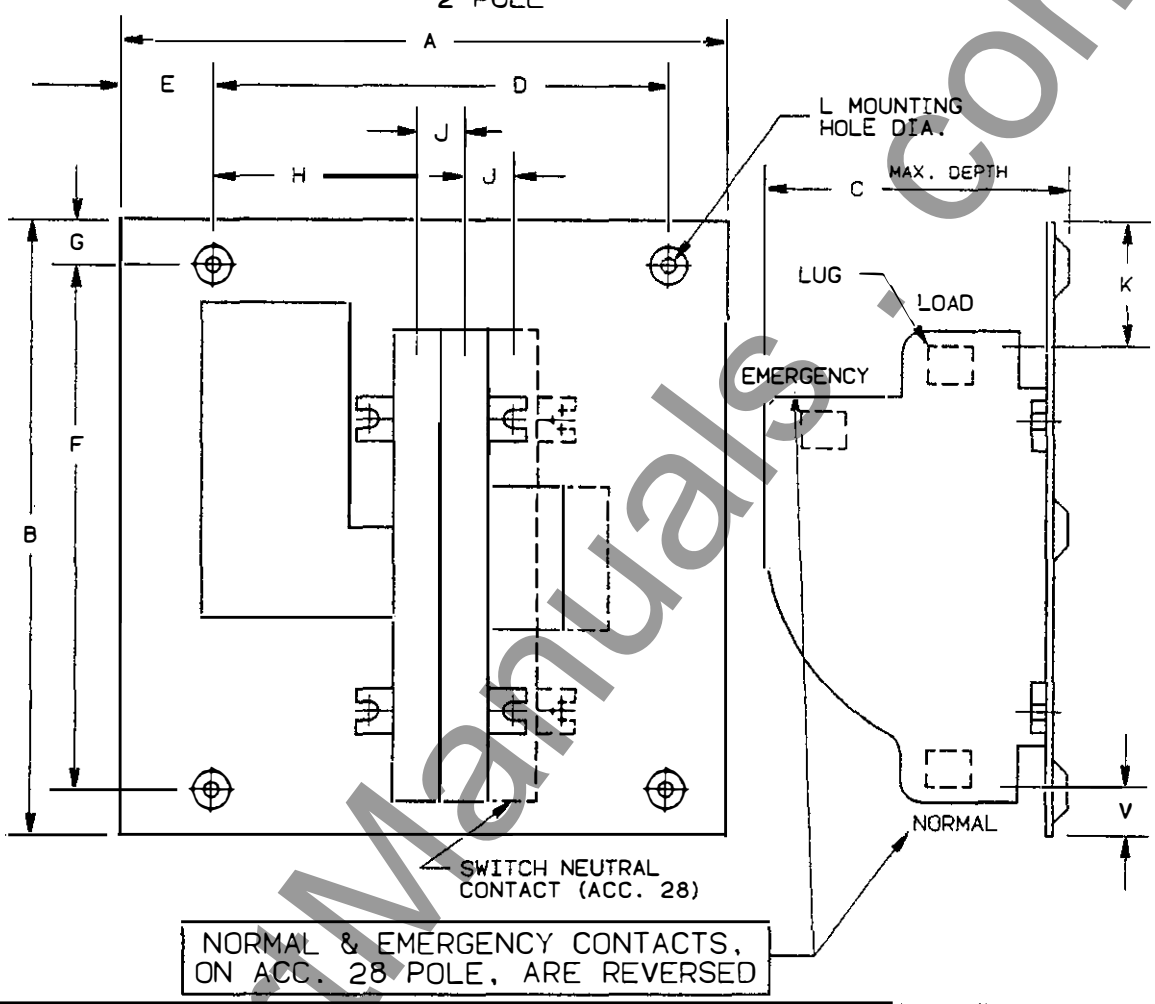
AMP SIZE	DIMENSIONS						
	A	B	C	D	E	F	G
30TO 100	10.25 260.4	10.25 260.4	5.50 139.7	7.75 196.9	1.62 41.1	8.75 222.3	0.75 19.1
150	10.25 260.4	10.25 260.4	5.37 136.4	7.75 196.9	1.62 41.1	8.75 222.3	0.75 19.1
	H	J	K	L	V		
30TO 100	3.48 88.4	0.73 18.5	2.09 53.1	0.31 ø7.9	0.79 20.1		
150	4.46 113.3	0.96 24.4	0.90 22.9	0.31 ø7.9	0.46 11.7		

APPROXIMATE SHIPPING WEIGHT, LBS (KG)
(WEIGHT INCLUDES STANDARD TRANSFER SWITCH & CONTROLS)

AMP SIZE	POLES	WEIGHT
30, 70 & 100	2	15 (7)
	3	18 (8)
	3 W/ACC.28	21 (10)
150	2	17 (8)
	3	20 (9)
	3 W/ACC.28	23 (11)
260 & 400	2	37 (17)
	3	45 (21)
	3 W/ACC.28	53 (24)

SUGGESTED BOLT SIZE FOR MOUNTING A.T.S.:
1/4-20 X 1 INCH LONG MINIMUM QUANTITY (4)

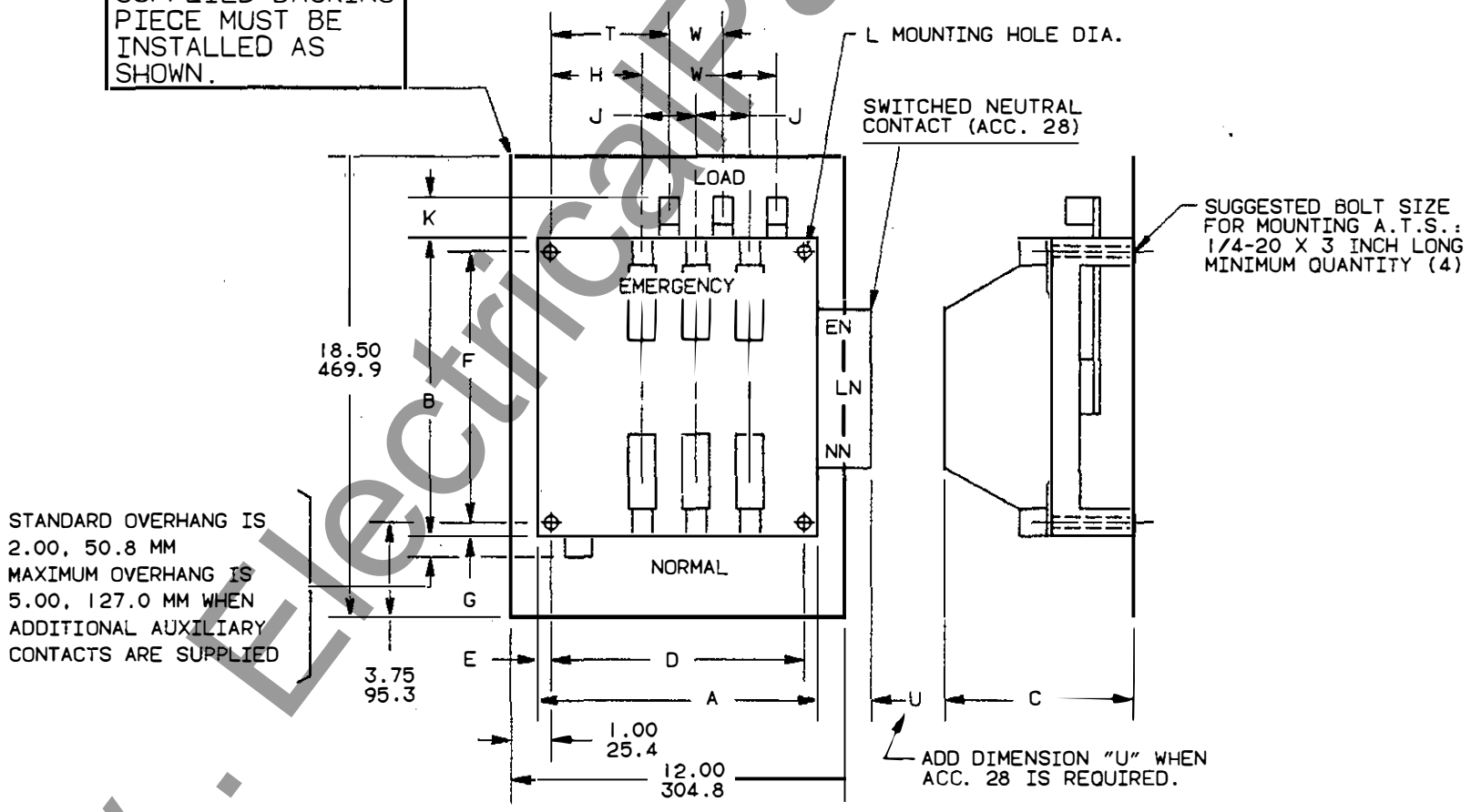
2 POLE



NORMAL & EMERGENCY CONTACTS, ON ACC. 28 POLE, ARE REVERSED

260 THRU 400 AMP.

WARNING
SUPPLIED BACKING PIECE MUST BE INSTALLED AS SHOWN.

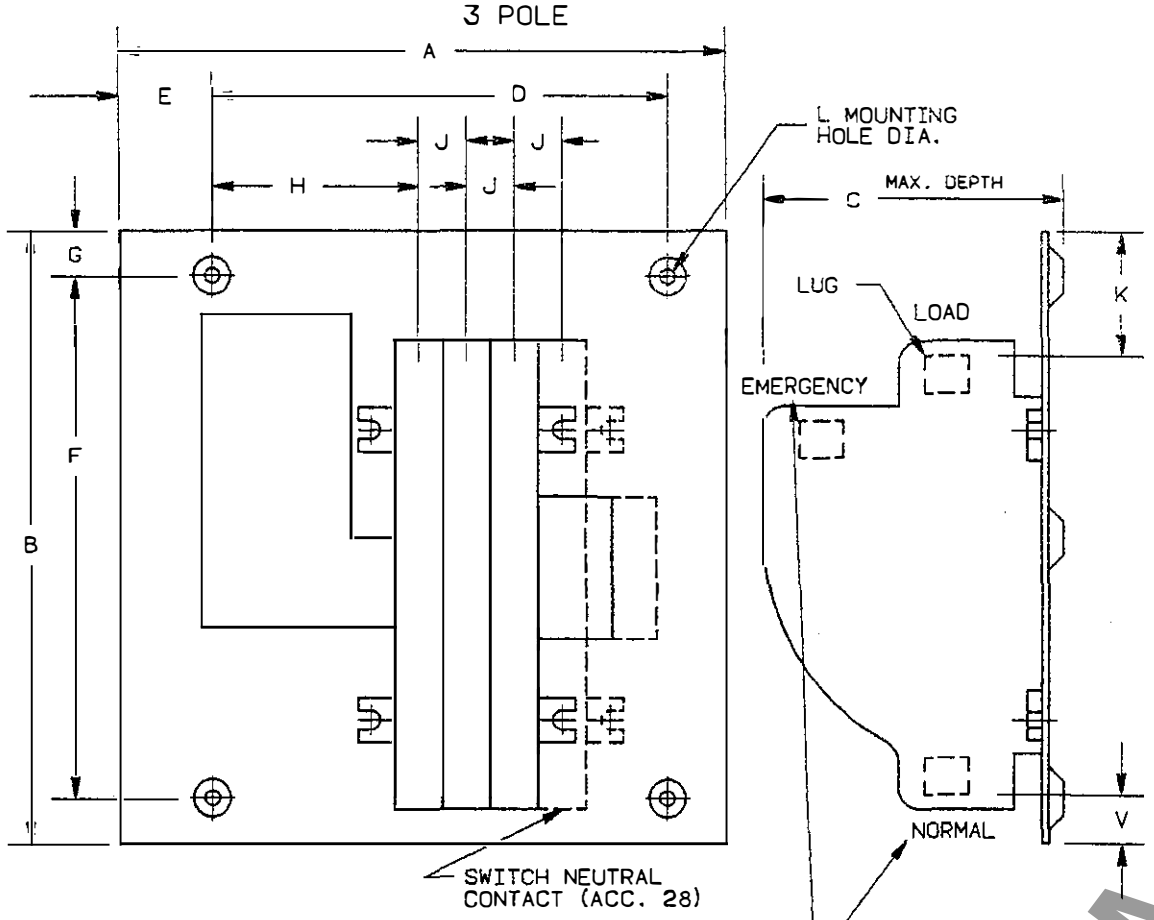


2 AND 3 POLE WITH AND WITHOUT ACC. 28

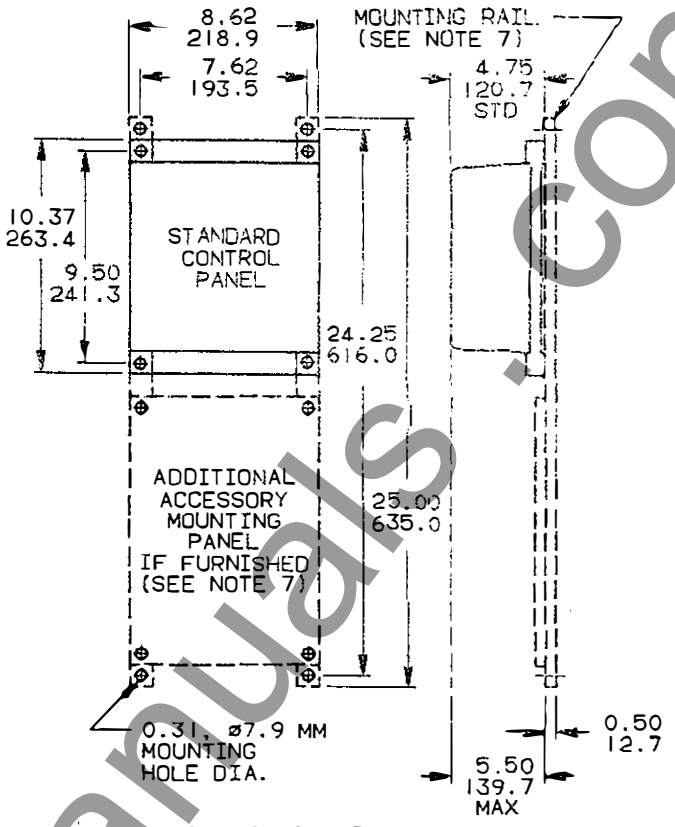
DIMENSIONS													
A	B	C	D	E	F	G	H	J	K	L	T	U	W
11.00 279.4	12.00 304.8	6.87 174.5	10.00 254.0	0.50 12.7	11.00 279.4	0.50 12.7	3.87 98.3	2.12 53.8	2.12 53.8	0.31 ø7.9	4.93 125.2	3.00 76.2	2.12 53.8

30 THRU 150 AMPS

3 POLE



NORMAL & EMERGENCY CONTACTS, ON ACC. 28 POLE, ARE REVERSED



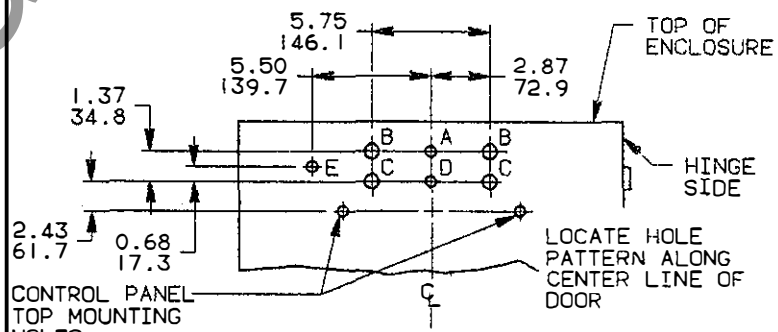
STANDARD CONTROL PANEL
WITH ADDITIONAL ACCESSORY MOUNTING PANEL AND CHANNELS USED WITH ANY SIZE TRANSFER SWITCH UNIT

SUGGESTED BOLT SIZE FOR MOUNTING CONTROLS: 1/4-20 X 1 1/2 INCH SELF CLINCHING CAPTIVE STUDS AS REQUIRED.

GENERAL NOTES

1. FOR 260 AND 400 AMP TWO POLE SWITCHES, OMIT CENTER POLE.
2. WHEN INSTALLING, CONNECT NORMAL, EMERGENCY, AND LOAD CONDUCTORS TO SIMILARLY MARKED TERMINALS.
3. ALL INTERNAL CONNECTIONS ARE MADE AT THE FACTORY
4. MAINTAIN ELECTRICAL CLEARANCE OF 0.50, 12.7 MM. MINIMUM BETWEEN LIVE METAL PARTS AND GROUNDED METAL.
5. WHEN OPEN TYPE ATS'S ARE INTENDED FOR ENCLOSURE TYPE MOUNTING BY OTHERS, MOUNT THE TRANSFER SWITCH UNIT ON THE INSIDE BACK SURFACE AND THE CONTROL PANEL(S) ON THE INSIDE DOOR SURFACE.
6. THE CONTROL PANEL IS CONNECTED TO THE TRANSFER SWITCH PANEL BY A WIRE HARNESS WITH A QUICK DISCONNECT PLUG. HARNESS LENGTH IS - 36.00, 914.4 MM. FOR 30-150 AMP. SWITCHES AND 45.00, 1143.0 MM. FOR 260-400 AMP. SWITCHES. CONSULT FACTORY FOR AVAILABLE EXTENSION HARNESSES.
7. OPTIONAL ACCESSORY MOUNTING PANEL AND RAILS ARE SUPPLIED ON OPEN TYPE SWITCHES FOR MOUNTING OPTIONAL TIME DELAYS, RELAYS, AND MONITORS.
8. **AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.**

DRILL PATTERN BELOW WILL ACCOMMODATE MOST DOOR MOUNTED ACCESSORIES. REFER TO ASCO SUPPLIED ACCESSORY NAMEPLATE DRAWING FOR ACTUAL DOOR DRILLING REQUIREMENTS.



HOLE A-FEAT 5-0.50 DIA, ø12.7 MM
HOLE B-FEAT 9A & 9B-0.71 DIA, ø18.0 MM
HOLE C-ACC 9C & 9D-0.71 DIA, ø18.0 MM
HOLE D-ACC 6A, 6B, OR 6C-0.50 DIA, ø12.7 MM
HOLE E-ACC 12 OR 16-0.50 DIA, ø12.7 MM

SIZES OF UL LISTED SOLDERLESS SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTIONS

SWITCH RATING (AMPS)	RANGE OF AL-CU WIRE SIZE
30	ONE #14 TO #6 AWG
70	ONE #14 TO 1/0 AWG
100	ONE #14 TO 2/0 AWG
150	ONE #8 TO 3/0 AWG
* 260-400	TWO #1/0 AWG TO 250 MCM OR ONE #4 AWG TO 600 MCM

* CONTACT FACTORY FOR BUS CONNECTION DRAWINGS

INCHES
MM

THIRD ANGLE PROJECTION

CATALOG NO. _____
CERTIFIED
TO ASCO ® S. O. _____
DATE _____ BY _____

COMPUTER GENERATED DRAWING

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FLORHAM PARK, NEW JERSEY, 07932
PRINTED IN U.S.A.

	BY	DATE
DRAWN	FDN	11/88
CHECKED	NS	11/88
DFTG APVL	NS	11/88
ENGR APVL	FM	11/88

☒ AL	☒ AP	☒ CE	☒ AS	☒ AN
☒ AD	☐ AA	☐	☐	☐

COMPOSITE OUTLINE AND MOUNTING DIMENSIONS FOR OPEN TYPE 30 THROUGH 400 AMPERE ASCO® 940 AUTOMATIC TRANSFER SWITCHES 2 & 3 POLE WITH OR WITHOUT ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

ER NO	ITEM CHGD	CHG	DATE	APVL
110272	SEE ECN	B	9/89	FM
109279	ACC. 28	A	6/89	POG
107077	ISSUED	-	11/88	FM

JS 401950

CHG LTR: B

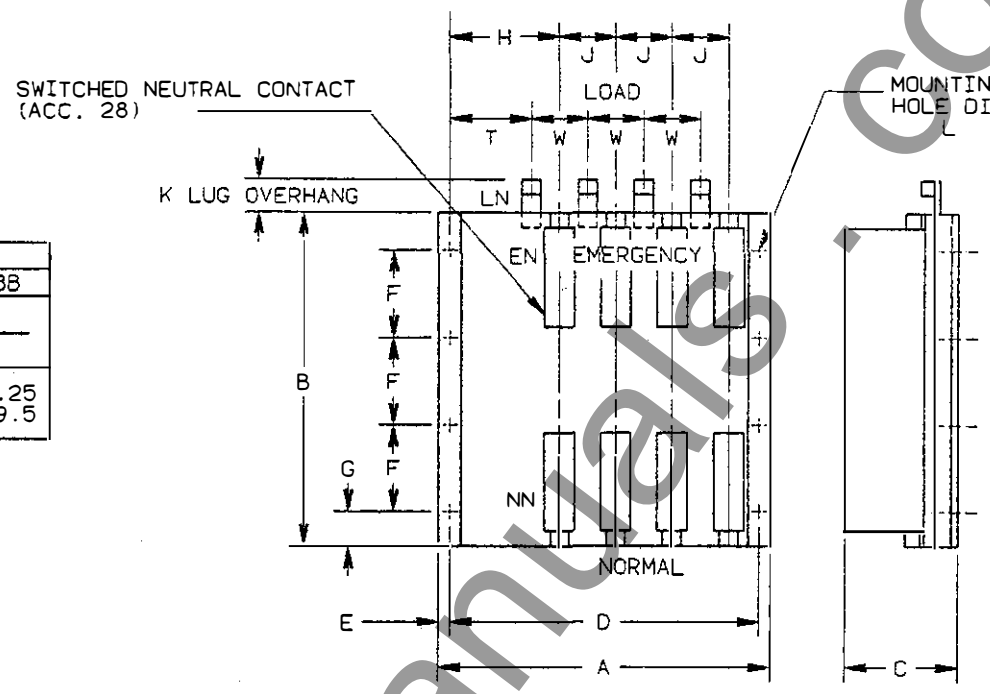
AMP SIZE	DIMENSIONS							
	A	B	C	D	E	F	G	H
600 & 800	22.75 577.8	25.00 635.0	11.00 279.4	21.87 555.5	0.43 10.9	7.50 190.5	1.25 31.8	6.87 174.5
1000 & 1200	25.00 635.0	30.00 762.0	13.00 330.2	24.25 616.0	0.37 9.4	31.25 793.8	0.62 15.7	3.06 77.7

AMP SIZE	DIMENSIONS							
	J	K	L	M	N	P	R	S
600 & 800	3.50 88.9	1.75 44.5	0.50 Ø12.7	—	—	—	—	—
1000 & 1200	4.28 108.7	5.06 128.5	0.43 Ø10.9	11.93 303.0	32.50 825.5	2.34 59.5	3.19 81.0	12.59 319.8

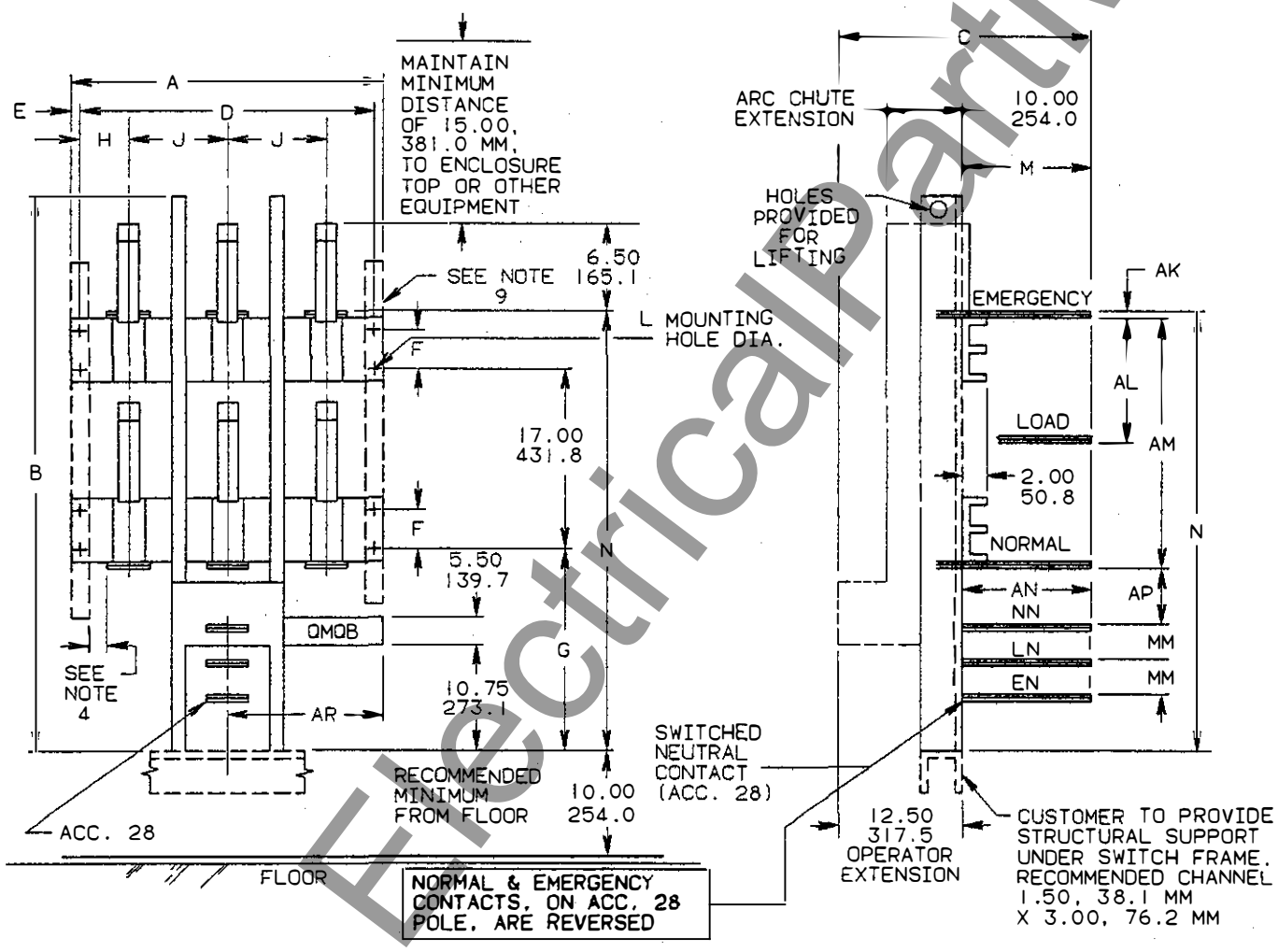
AMP SIZE	DIMENSIONS								
	T	U	V	W	X	Y	Z	AA	BB
600 & 800	5.12 130.0	—	—	3.50 88.9	—	—	—	—	—
1000 & 1200	—	2.62 66.5	2.25 57.2	3.68 93.5	7.12 180.8	2.62 66.5	1.37 34.8	11.31 287.3	8.25 209.5

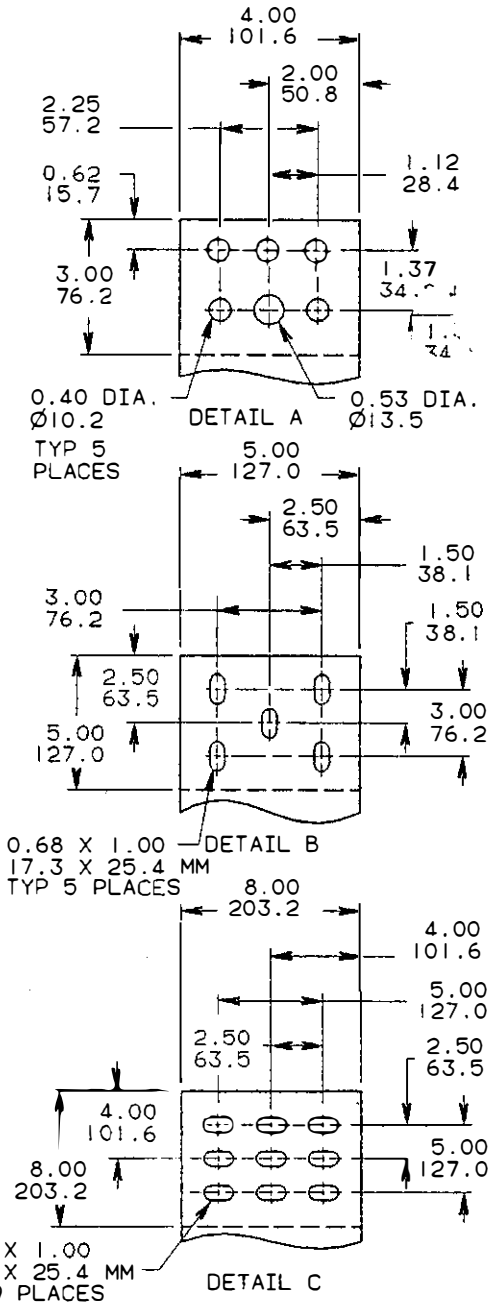
APPROXIMATE SHIPPING WEIGHT, LBS (KG) (WEIGHT INCLUDES STANDARD TRANSFER SWITCH & CONTROLS)				
AMPERES	POLES	WEIGHT	POLES	WEIGHT
600 800	2	145 (66)	3	155 (71)
1000-1200	2	320 (145)	3	340 (155)
1600-2000	2	385 (175)	3	410 (186)
3000	2	850 (386)	3	1000 (454)
4000	2	1000 (454)	3	1300 (590)

600 THRU 800 AMP



1600 THRU 4000 AMP



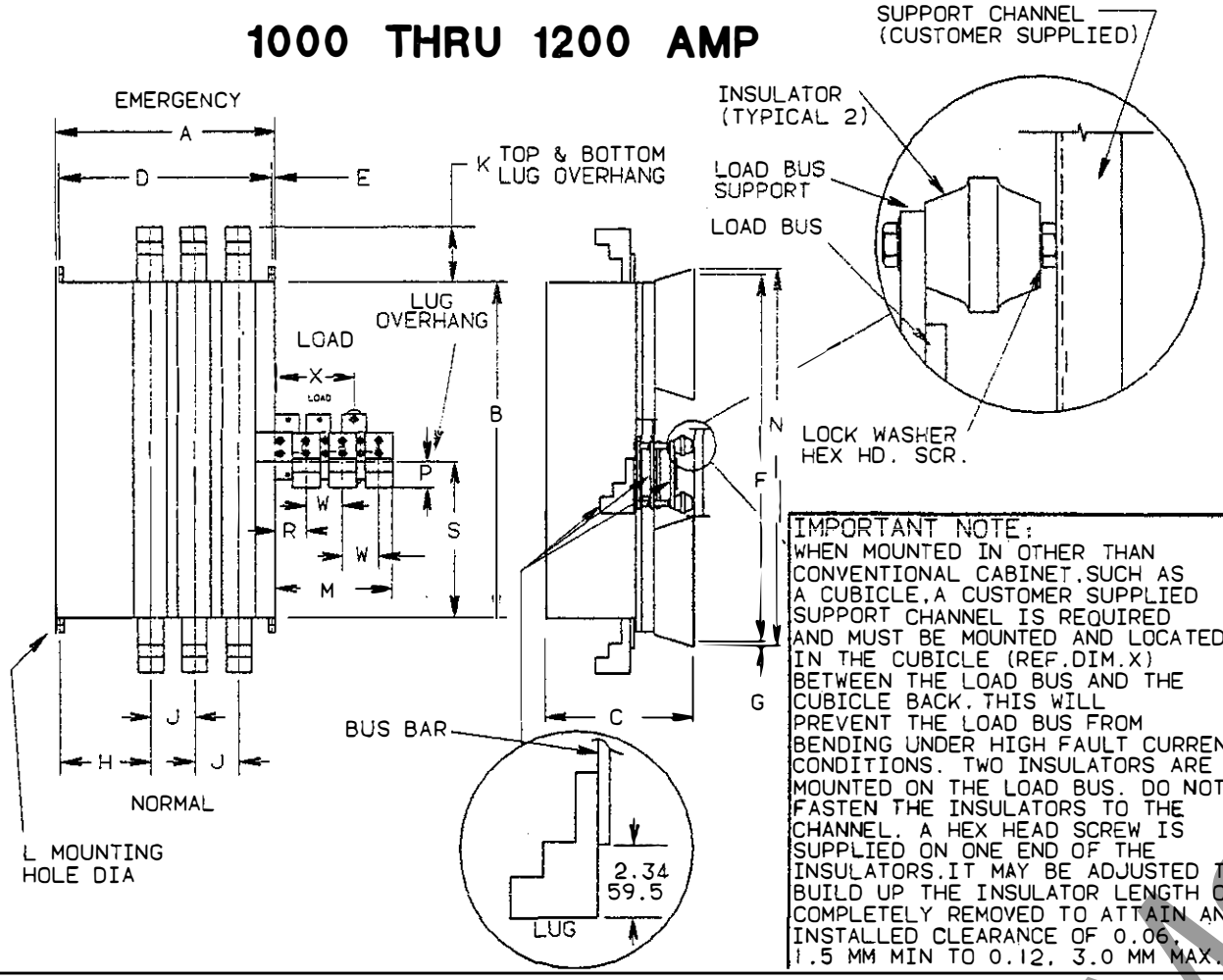


AMP SIZE	DIMENSIONS									
	A	B	C	D	E	F	G	H	J
1600 & 2000	28.50 723.9	52.00 1320.8	18.50 469.9	27.00 685.8	0.75 19.1	4.37 111.0	20.65 524.5	4.50 114.3	9.00 228.6
3000	31.50 800.1	52.00 1320.8	22.50 571.5	30.00 762.0	0.75 19.1	4.37 111.0	20.65 524.5	5.00 127.0	10.00 254.0
4000	41.00 1041.4	52.00 1320.8	25.50 647.7	39.00 990.6	1.00 25.4	4.37 111.0	20.65 524.5	6.50 165.1	13.00 330.2

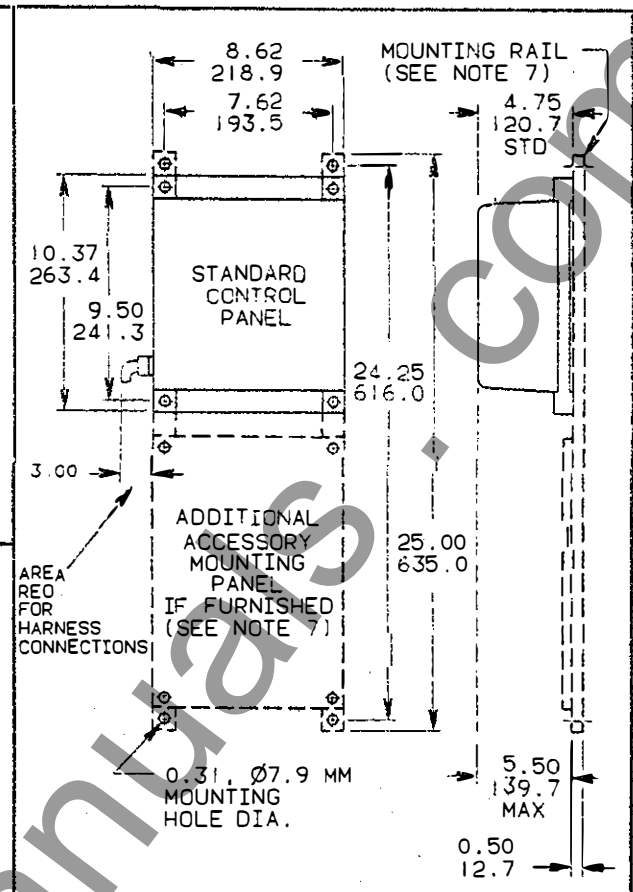
AMP SIZE	DIMENSIONS									
	L	M	N	AK	AL	AM	AN	AP	AR	MM
1600 & 2000	0.40 Ø10.2	6.00 152.4	43.46 1103.9	0.50 12.7	11.62 295.1	23.75 603.3	6.00 152.4	7.65 194.3	—	4.12 104.6
3000	0.40 Ø10.2	10.00 254.0	43.71 1110.4	0.75 19.1	11.75 298.5	24.00 609.6	10.00 254.0	7.15 181.6	20.50 520.7	4.25 107.9
4000	0.40 Ø10.2	13.00 330.2	43.71 1110.4	0.75 19.1	11.75 298.5	24.00 609.6	13.00 330.2	7.15 181.6	19.50 495.3	4.25 107.9

AMP SIZE	BUS BAR PER PHASE BOLTING SURFACE
1600 & 2000	TWO 0.25 X 4.00, 6.4 X 101.6 MM SEE DETAIL "A"
3000	TWO 0.37 X 5.00, 9.4 X 127.0 MM SEE DETAIL "B"
4000	TWO 0.37 X 8.00, 9.4 X 203.2 MM SEE DETAIL "C"

1000 THRU 1200 AMP



IMPORTANT NOTE:
WHEN MOUNTED IN OTHER THAN CONVENTIONAL CABINET, SUCH AS A CUBICLE, A CUSTOMER SUPPLIED SUPPORT CHANNEL IS REQUIRED AND MUST BE MOUNTED AND LOCATED IN THE CUBICLE (REF. DIM. X) BETWEEN THE LOAD BUS AND THE CUBICLE BACK. THIS WILL PREVENT THE LOAD BUS FROM BENDING UNDER HIGH FAULT CURRENT CONDITIONS. TWO INSULATORS ARE MOUNTED ON THE LOAD BUS. DO NOT FASTEN THE INSULATORS TO THE CHANNEL. A HEX HEAD SCREW IS SUPPLIED ON ONE END OF THE INSULATORS. IT MAY BE ADJUSTED TO BUILD UP THE INSULATOR LENGTH OR COMPLETELY REMOVED TO ATTAIN AN INSTALLED CLEARANCE OF 0.06, 1.5 MM MIN TO 0.12, 3.0 MM MAX.



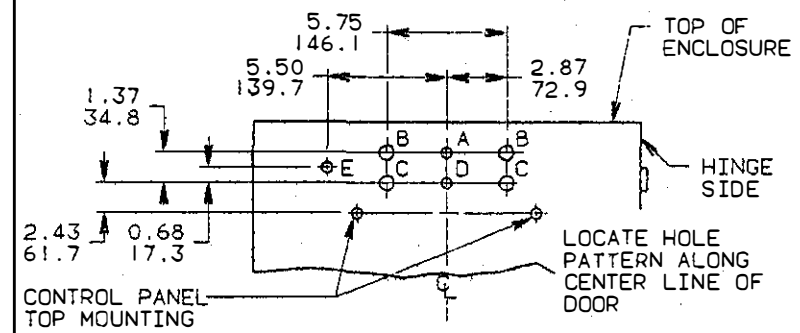
STANDARD CONTROL PANEL
WITH ADDITIONAL
ACCESSORY MOUNTING PANEL
AND CHANNELS USED WITH ANY SIZE
TRANSFER SWITCH UNIT

SUGGESTED BOLT SIZE FOR MOUNTING CONTROLS: 1/4-20 X 1 1/2 INCH SELF CLINCHING CAPTIVE STUDS AS REQUIRED.

GENERAL NOTES

1. FOR TWO POLE SWITCHES, OMIT CENTER POLE.
2. WHEN INSTALLING, CONNECT NORMAL , EMERGENCCY , AND LOAD CONDUCTORS TO SIMILARLY MARKED TERMINALS.
3. ALL INTERNAL CONNECTIONS ARE MADE AT THE FACTORY.
4. MAINTAIN ELECTRICAL CLEARANCE OF 1.00, 25.4 MM. MINIMUM BETWEEN LIVE METAL PARTS AND GROUNDED METAL.
5. WHEN OPEN TYPE ATS'S ARE INTENDED FOR ENCLOSURE TYPE MOUNTING BY OTHERS, MOUNT THE TRANSFER SWITCH UNIT ON THE INSIDE BACK SURFACE AND THE CONTROL PANEL(S) ON THE INSIDE DOOR SURFACE.
6. THE CONTROL PANEL IS CONNECTED TO THE TRANSFER SWITCH PANEL BY A WIRE HARNESS WITH A QUICK DISCONNECT PLUG. HARNESS LENGTH IS - 50.00, 1270.0 MM FOR 600-800 AMPS, 60.00, 1524.0 MM FOR 1000-1200 AMPS, AND 96.00, 2438.4 MM FOR 1600-4000 AMPS. CONSULT FACTORY FOR AVAILABLE EXTENSION HARNESSES.
7. OPTIONAL ACCESSORY MOUNTING PANEL AND RAILS ARE SUPPLIED ON OPEN TYPE SWITCHES FOR MOUNTING OPTIONAL TIME DELAYS, RELAYS, AND MONITORS.
8. REQUIRED TOP AND BOTTOM ENCLOSURE VENTILATION OPENINGS FOR 1600 THRU 4000 AMP SWITCHES IS 140 SQ. INCHES 903 SQ. CM TOTAL.
9. CUSTOMER SUPPLIED VERTICAL MOUNTING CHANNELS (FOR 1600-4000 AMP) (2) REQUIRED (MINIMUM GAUGE #10)
10. AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.

DRILL PATTERN BELOW WILL ACCOMMODATE MOST DOOR MOUNTED ACCESSORIES. REFER TO ASCO SUPPLIED ACCESSORY NAMEPLATE DRAWING FOR ACTUAL DOOR DRILLING REQUIREMENTS.



HOLE A-FEAT 5-0.50 DIA. Ø12.7 MM
HOLE B-FEAT 9A & 9B-0.71 DIA, Ø18.0 MM
HOLE C-ACC 9C & 9D-0.71 DIA, Ø18.0 MM
HOLE D-ACC 6A, 6B, OR 6C-0.50 DIA, Ø12.7 MM
HOLE E-ACC 12 OR 16-0.50 DIA, Ø12.7 MM

SIZES OF UL LISTED SOLDERLESS SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTIONS

SWITCH RATING (AMPS)	RANGE OF, AL-CU WIRE SIZES
*600-800	THREE #2 AWG TO 600 MCM
* 1000-1200	FOUR #2 AWG TO 600 MCM
1600-4000	SUITABLE FOR BUS BAR

CONTACT FACTORY FOR *BUS CONNECTION DRAWINGS

AMP SIZE	SUGGESTED BOLT SIZE FOR MOUNTING ATS
600 & 800	3/8-16 X 1 1/2 INCH LG MINIMUM QTY. (8)
1000 & 1200	3/8-16 X 1 1/4 INCH LG MINIMUM QTY. (4)
1600 TO 4000	3/8-16 X 3 INCH LG MINIMUM QTY. (8)
COMPUTER GENERATED DRAWING	

INCHES MM

THIRD ANGLE PROJECTION

CATALOG NO. _____
CERTIFIED
TO ASCO ® S. O. _____
DATE _____ BY _____

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FLORHAM PARK, NEW JERSEY, 07932
PRINTED IN U.S.A.

	BY	DATE
DRAWN	FDN	11/88
CHECKED	NS	11/88
DFTG APVL	NS	11/88
ENGR APVL	FM	11/88

☒ AL	☒ AP	☒ CE	☒ AS	☒ AN
☒ AD	☐ AA	☐	☐	☐

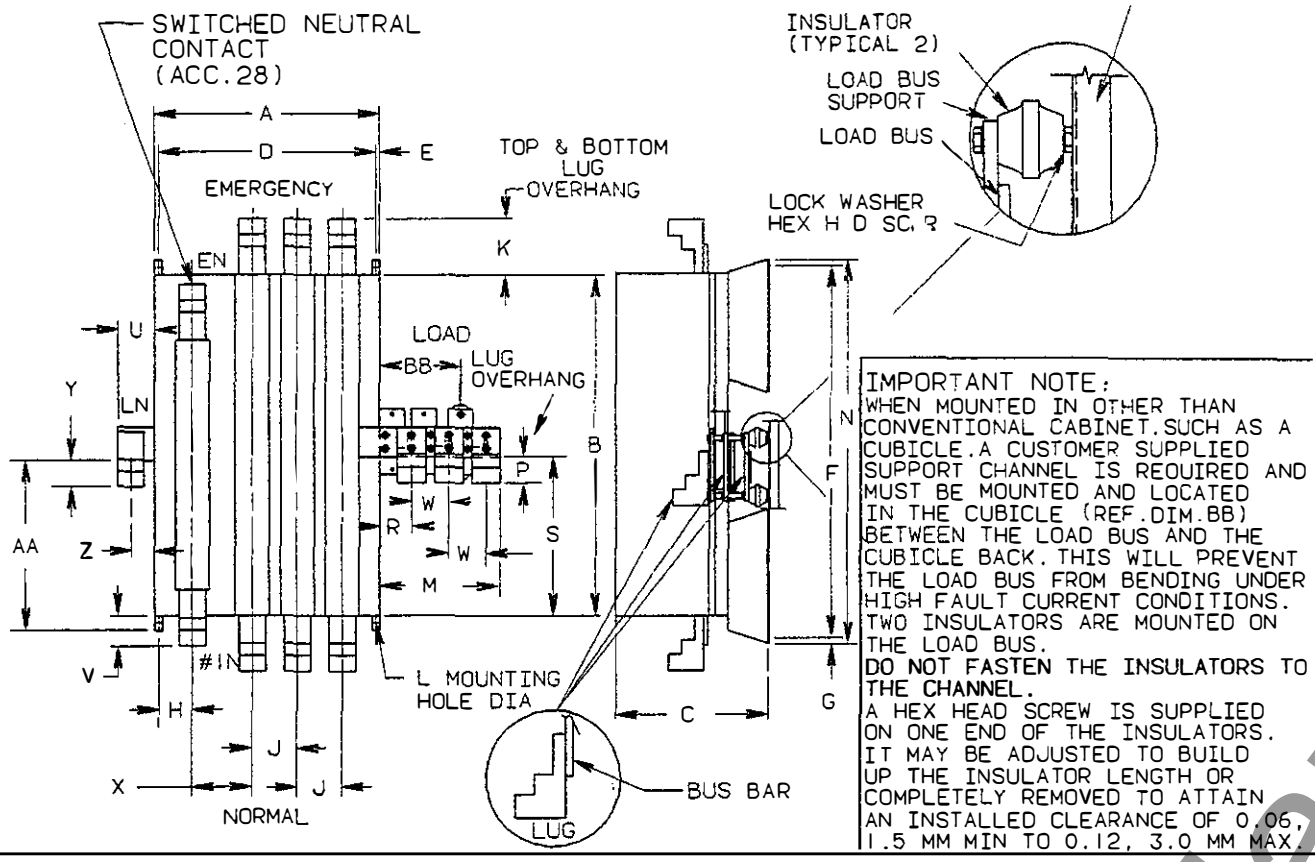
COMPOSITE OUTLINE AND MOUNTING DIMENSIONS FOR OPEN TYPE 600 THROUGH 4000 AMPERE ASCO ® 940 AUTOMATIC TRANSFER SWITCHES 2 & 3 POLE WITHOUT ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

ER NO	ITEM CHGD	CHG	DATE	APVL
111214	UPDATED		5/91	PB
107077	ISSUED	-	11/88	FM

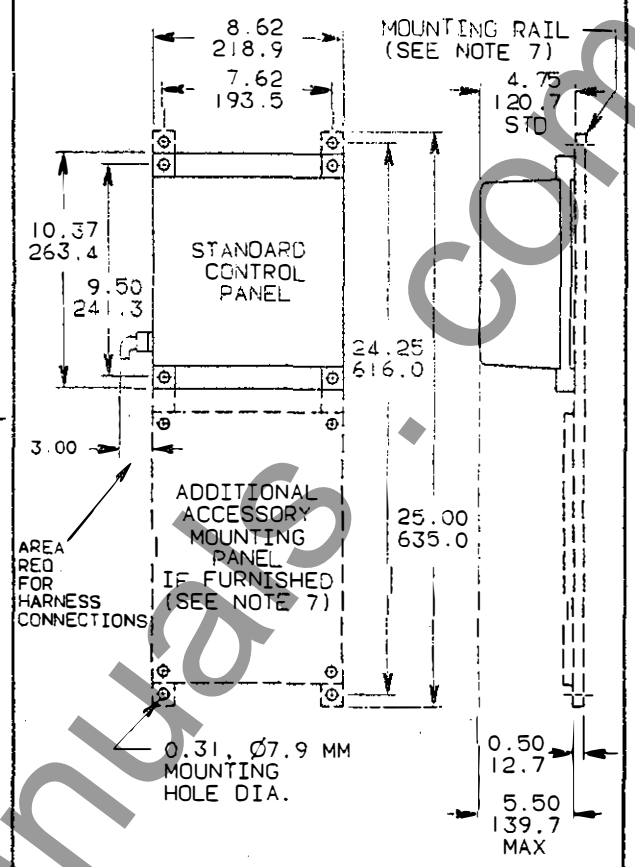
JS 401951

CHG LTR: A

1000 THRU 1200 AMP



IMPORTANT NOTE:
WHEN MOUNTED IN OTHER THAN CONVENTIONAL CABINET. SUCH AS A CUBICLE. A CUSTOMER SUPPLIED SUPPORT CHANNEL IS REQUIRED AND MUST BE MOUNTED AND LOCATED IN THE CUBICLE (REF. DIM. BB) BETWEEN THE LOAD BUS AND THE CUBICLE BACK. THIS WILL PREVENT THE LOAD BUS FROM BENDING UNDER HIGH FAULT CURRENT CONDITIONS. TWO INSULATORS ARE MOUNTED ON THE LOAD BUS.
DO NOT FASTEN THE INSULATORS TO THE CHANNEL.
A HEX HEAD SCREW IS SUPPLIED ON ONE END OF THE INSULATORS. IT MAY BE ADJUSTED TO BUILD UP THE INSULATOR LENGTH OR COMPLETELY REMOVED TO ATTAIN AN INSTALLED CLEARANCE OF 0.06, 1.5 MM MIN TO 0.12, 3.0 MM MAX.



STANDARD CONTROL PANEL

WITH ADDITIONAL ACCESSORY MOUNTING PANEL AND CHANNELS USED WITH ANY SIZE TRANSFER SWITCH UNIT

SUGGESTED BOLT SIZE FOR MOUNTING CONTROLS: 1/4-20 X 1 1/2 INCH SELF CLINCHING CAPTIVE STUDS AS REQUIRED.

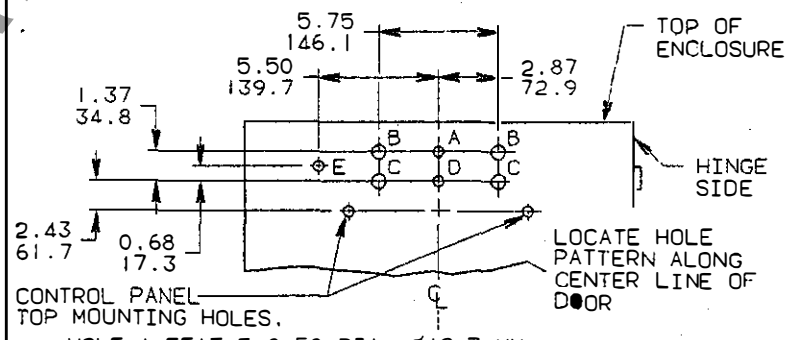
GENERAL NOTES

1. FOR TWO POLE SWITCHES, OMIT CENTER POLE.
2. WHEN INSTALLING, CONNECT NORMAL , EMERGENCCY , AND LOAD CONDUCTORS TO SIMILARLY MARKED TERMINALS.
3. ALL INTERNAL CONNECTIONS ARE MADE AT THE FACTORY.
4. MAINTAIN ELECTRICAL CLEARANCE OF 1.00, 25.4 MM. MINIMUM BETWEEN LIVE METAL PARTS AND GROUNDED METAL.
5. WHEN OPEN TYPE ATS'S ARE INTENDED FOR ENCLOSURE TYPE MOUNTING BY OTHERS, MOUNT THE TRANSFER SWITCH UNIT ON THE INSIDE BACK SURFACE AND THE CONTROL PANEL(S) ON THE INSIDE DOOR SURFACE.
6. THE CONTROL PANEL IS CONNECTED TO THE TRANSFER SWITCH PANEL BY A WIRE HARNESS WITH A QUICK DISCONNECT PLUG. HARNESS LENGTH IS - 50.00, 1270.0 MM FOR 600-800 AMPS, 60.00, 1524.0 MM FOR 1000-1200 AMPS, AND 96.00, 2438.4 MM FOR 1600-4000 AMPS.
CONSULT FACTORY FOR AVAILABLE EXTENSION HARNESSES.
7. OPTIONAL ACCESSORY MOUNTING PANEL AND RAILS ARE SUPPLIED ON OPEN TYPE SWITCHES FOR MOUNTING OPTIONAL TIME DELAYS, RELAYS, AND MONITORS.
8. REQUIRED TOP AND BOTTOM ENCLOSURE VENTILATION OPENINGS FOR 1600 THRU 4000 AMP SWITCHES IS 140 SQ. INCHES 903 SQ. CM TOTAL.
9. CUSTOMER SUPPLIED VERTICAL MOUNTING CHANNELS (FOR 1600-4000 AMP) (2) REQUIRED (MINIMUM GAUGE #10)
10. **AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.**

AMP SIZE	SUGGESTED BOLT SIZE FOR MOUNTING ATS
600 & 800	3/8-16 X 1 1/2 INCH LG MINIMUM QTY. (8)
1000 & 1200	3/8-16 X 1 1/4 INCH LG MINIMUM QTY. (4)
1600 TO 4000	3/8-16 X 3 INCH LG MINIMUM QTY. (8)

COMPUTER GENERATED DRAWING

DRILL PATTERN BELOW WILL ACCOMODATE MOST DOOR MOUNTED ACCESSORIES. REFER TO ASCO SUPPLIED ACCESSORY NAMEPLATE DRAWING FOR ACTUAL DOOR DRILLING REQUIREMENTS.



HOLE A-FEAT 5-0.50 DIA, Ø12.7 MM
HOLE B-FEAT 9A & 9B-0.71 DIA, Ø18.0 MM
HOLE C-ACC 9C & 9D-0.71 DIA, Ø18.0 MM
HOLE D-ACC 6A, 6B, OR 6C-0.50 DIA, Ø12.7 MM
HOLE E-ACC 12 OR 16-0.50 DIA, Ø12.7 MM

SIZES OF UL LISTED SOLDERLESS SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTIONS

SWITCH RATING (AMPS)	RANGE OF, AL-CU WIRE SIZES
* 600-800	THREE #2 AWG TO 600 MCM
* 1000-1200	FOUR #2 AWG TO 600 MCM
1600-4000	SUITABLE FOR BUS BAR

* CONTACT FACTORY FOR BUS CONNECTION DRAWINGS

INCHES — MM

THIRD ANGLE PROJECTION

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	BY	DATE
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DFTG APVL	BM	8/90
ENGR APVL	FM	8/90

☒ AL	☒ AP	☒ CE	☒ AS	☒ AN
☒ AD	☐ AA	☐	☐	☐

COMPOSITE OUTLINE AND MOUNTING DIMENSIONS FOR OPEN TYPE 600 THROUGH 4000 AMPERE ASCO ® 940 AUTOMATIC TRANSFER SWITCHES 2 & 3 POLE WITH ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

ER NO	ITEM CHGD	CHG	DATE	APVL
111214	UPDATED	D	5/91	PB
110272	SEE ECN	C	9/89	FM
109279	1600ACC28	B	6/89	PDG
109119	HOLE C	A	6/89	FM
107077	ISSUED	-	11/88	FM

JS 401952

CHG LTR: D

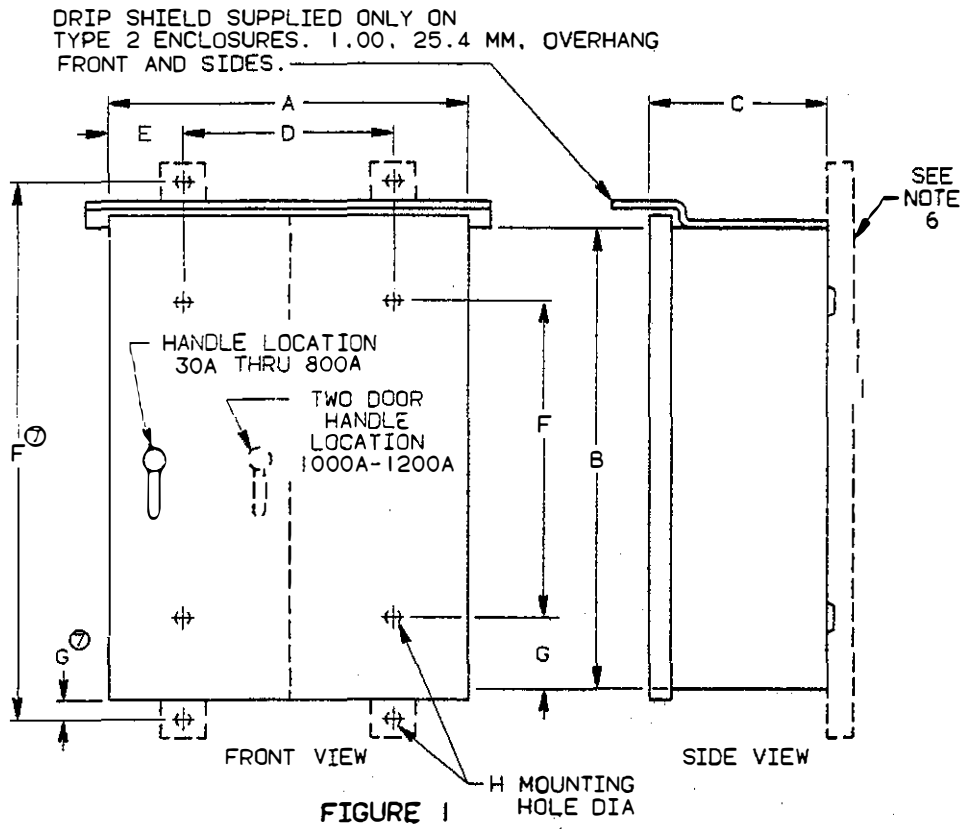

FIGURE 1

NOTES

NOTES - ① ② ③ ④ ⑤ ⑥ TYPE 1

NOTES - ① ② ③ ④ TYPE 2

1. REMOVABLE DOORS, KEY LOCKING HANDLE. SINGLE DOOR HINGED ON RIGHT SIDE WITH SINGLE CENTER LATCH AND CAPTIVE SCREWS ON TOP AND BOTTOM FOR 30 THRU 800 AMPS. TWO DOOR WITH 3 POINT LATCH ON 1000 THRU 1200 AMPS.
2. FULL WIRING GUTTERS AND 0.75-0.50 DIA, ø19.1-ø12.7 MM, COMBINATION PILOT KNOCKOUTS PROVIDED TOP AND BOTTOM ONLY.
3. TYPE 1 CAN BE SUPPLIED WITH GASKETING TO PROVIDE A DUST SEAL.
4. FLUSH MOUNTED TYPES HAVE REMOVABLE FLUSH DOOR AND TRIM. TRIM OVERLAPS 1.00, 25.4 MM, ON ALL SIDES.
5. ADD 3.00, 76.2 MM, FOR FLUSH MOUNTED ENCLOSURES.
6. EXTERNAL MOUNTING CHANNELS WITH MOUNTING HOLES FOR 1000-1200 AMPS ONLY. (SHOWN DASHED)
7. TYPE 2 ENCLOSURES ARE PROVIDED WITH A TOP MOUNTED DRIP SHIELD THAT EXTENDS BEYOND THE FRONT AND SIDES OF THE ENCLOSURE. PILOT KNOCKOUT PROVIDED IN BOTTOM ONLY.

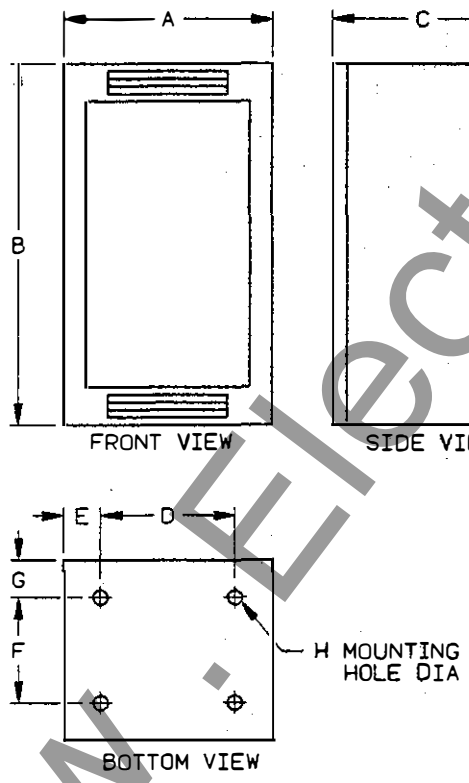

FIGURE 2

NOTES

TYPE 1-GENERAL PURPOSE. INDOOR. FLOOR SUPPORTED

1. FREE STANDING, FRAME CONSTRUCTION.
2. REMOVABLE DOORS, KEY LOCKING HANDLE. SINGLE DOOR HINGED ON RIGHT WITH SINGLE CENTER LATCH AND CAPTIVE SCREWS ON TOP AND BOTTOM FOR 1600-2000 AMPS. TWO DOOR WITH 3 POINT LATCH ON 3000-4000 AMPS.
3. SIDES, TOP, AND BACK REMOVABLE, OPEN BOTTOM.
4. VENTILATED FRONT, ON TOP AND BOTTOM.
5. PROVISIONS FOR LIFTING.

TYPE 1 AND 2 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITHOUT OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	1	17.50 ⑤ 444.5	31.00 ⑤ 787.4	11.62 295.1	14.50 368.3	1.50 38.1	28. 71.
260 & 400	1	18.00 ⑤ 457.2	48.00 ⑤ 1219.2	13.00 330.2	15.00 381.0	1.50 38.1	45.0 1143.0
600 & 800	1	24.00 609.6	63.00 1600.2	17.50 444.5	21.00 533.4	1.50 38.1	60.00 1524.0
1000 & 1200	1	36.00 914.4	79.00 2006.6	19.50 495.3	32.25 818.2	1.87 47.5	82.00 ⑥ 2082.8
1600 & 2000	2	38.00 965.2	90.00 2286.0	48.00 1219.2	33.50 850.9	2.25 57.2	41.75 1060.5
3000 & 4000	2	46.00 1168.4	90.00 2286.0	48.00 1219.2	41.50 1054.1	2.25 57.2	41.75 1060.5

		G	H
30,70 100,150	1	1.50 38.1	0.37 ø9.4
260 & 400	1	1.50 38.1	0.37 ø9.4
600 & 800	1	1.50 38.1	0.37 ø9.4
1000 & 1200	1	1.50 ⑥ 38.1	0.68 ø17.3
1600 & 2000	2	3.12 79.2	0.50 ø12.7
3000 & 4000	2	3.12 79.2	0.50 ø12.7

TYPE 1 AND 2 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITH OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	1	17.50 ⑤ 444.5	31.00 ⑤ 787.4	11.62 295.1	14.50 368.3	1.50 38.1	28.00 711.2
260 & 400	1	18.00 ⑤ 457.2	48.00 ⑤ 1219.2	13.00 330.2	15.00 381.0	1.50 38.1	45.00 1143.0
600 & 800	1	30.00 762.0	63.00 1600.2	17.50 444.5	27.00 685.8	1.50 38.1	60.00 1524.0
1000 & 1200	1	44.00 1117.6	79.00 2006.6	19.50 495.3	33.75 857.3	5.12 130.0	82.00 ⑥ 2082.8
1600 & 2000	2	38.00 965.2	90.00 2286.0	48.00 1219.2	33.50 850.9	2.25 57.2	41.75 1060
3000 & 4000	2	46.00 1168.4	90.00 2286.0	48.00 1219.2	41.50 1054.1	2.25 57.2	41 1060.

		G	H
30,70, 100,150	1	1.50 38.1	0.37 ø9.4
260 & 400	1	1.50 38.1	0.37 ø9.4
600 & 800	1	1.50 38.1	0.37 ø9.4
1000 & 1200	1	1.50 ⑥ 38.1	0.68 ø17.3
1600 & 2000	2	3.12 79.2	0.50 ø12.7
3000 & 4000	2	3.12 79.2	0.50 ø12.7

APPROXIMATE SHIPPING WEIGHT, LBS (KG)
(WEIGHT INCLUDES STANDARD TRANSFER SWITCH & CONTROLS)

AMP SIZE	POLES	WEIGHT TYPES 1 & 2	TYPES 3R, 4 & 12
30, 70 & 100	2	67 (31)	82 (37)
	3	70 (32)	85 (38)
	3 W/ACC.28	73 (33)	88 (40)
150	2	69 (32)	84 (38)
	3	72 (33)	87 (39)
	3 W/ACC.28	75 (34)	90 (41)
260 & 400	2	117 (53)	132 (60)
	3	125 (57)	140 (63)
	3 W/ACC.28	133 (61)	148 (67)
600 & 800	2	250 (114)	250 (114)
	3	260 (118)	260 (118)
	3 W/ACC.28	320 (145)	320 (145)
1000 & 1200	2	630 (286)	630 (286)
	3	650 (295)	650 (295)
	3 W/ACC.28	740 (336)	740 (336)
1600 & 2000	2	1040 (472)	CONSULT FACTORY
	3	1060 (481)	CONSULT FACTORY
	3 W/ACC.28	1085 (492)	CONSULT FACTORY
3000	2	1970 (894)	CONSULT FACTORY
	3	2120 (962)	CONSULT FACTORY
	3 W/ACC.28	2200 (998)	CONSULT FACTORY
4000	2	2300 (1044)	CONSULT FACTORY
	3	2520 (1144)	CONSULT FACTORY
	3 W/ACC.28	2620 (1189)	CONSULT FACTORY

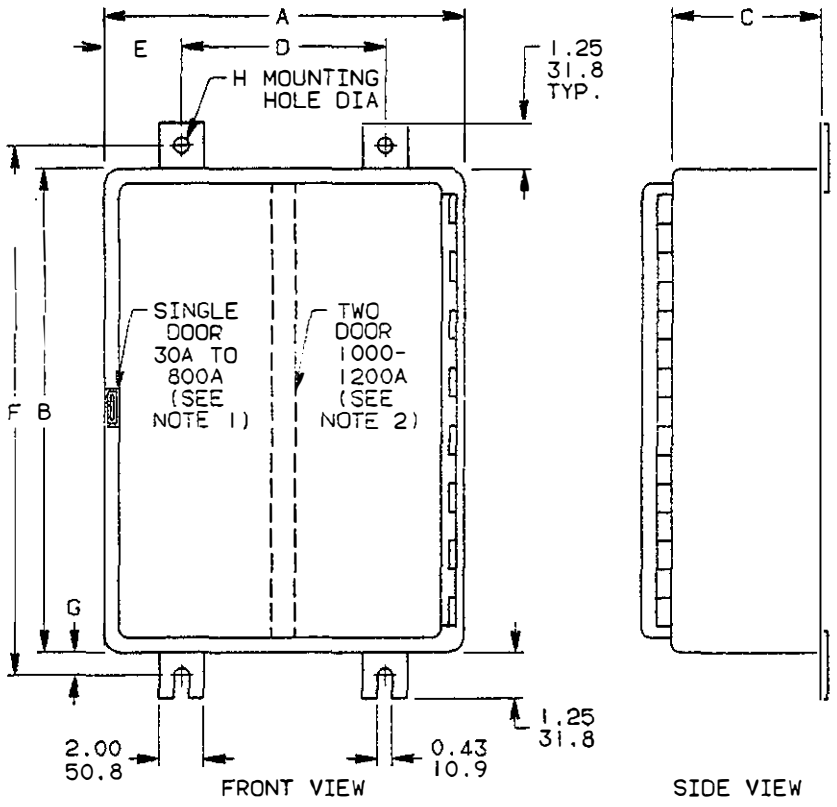

FIGURE 3
NOTES

TYPE 3R TYPE 4 TYPE 12

1. SINGLE DOOR HINGED ON RIGHT SIDE WITH PADLOCK HASP. PLATED DOOR CLAMPS ON THREE (3) SIDES FOR TYPE 4, AND ONE (1) SIDE FOR TYPE 3R & 12. (30A TO 800A)
2. TWO DOOR TYPE 4 ENCLOSURES HAVE REMOVABLE CENTER POST INSTALLED BETWEEN DOORS WITH DOOR CLAMPS ON THREE SIDES OF EACH DOOR. TWO DOOR TYPE 3R & 12 ENCLOSURES HAVE 3-POINT LATCHING WITH KEYLOCKING HANDLE. (1000-1200 A)
3. FULL WIRING GUTTERS PROVIDED TOP AND BOTTOM.
4. NO KNOCKOUTS PROVIDED

TYPE 3R, 4, AND 12 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITHOUT OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	3	17.50 444.5	32.50 825.5	11.62 295.1	11.50 292.1	3.00 76.2	33.75 857.3
260 & 400		18.00 457.2	48.00 1219.2	13.00 330.2	12.00 304.8	3.00 76.2	49.25 1251.0
600 & 800		24.00 609.6	63.00 1600.2	17.50 444.5	18.00 457.2	3.00 76.2	64.25 1632.0
1000 & 1200		36.00 914.4	79.00 2006.6	19.50 459.3	30.00 762.0	3.00 76.2	80.25 2038.4
1600 & 2000		CONSULT FACTORY					
3000 & 4000							

	FIG NO	G	H
30,70, 100,150	3	0.62 15.7	0.43 ø10.9
260 & 400		0.62 15.7	0.43 ø10.9
600 & 800		0.62 15.7	0.43 ø10.9
1000 & 1200		0.62 15.7	0.43 ø10.9
1600 & 2000		CONSULT FACTORY	
3000 & 4000			

TYPE 3R, 4, AND 12 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITH OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	3	17.50 444.5	32.50 825.5	11.62 295.1	11.50 292.1	3.00 76.2	33.75 857.3
260 & 400		18.00 457.2	48.00 1219.2	13.00 330.2	12.00 304.8	3.00 76.2	49.25 1251.0
600 & 800		30.00 762.0	63.00 1600.2	17.50 444.5	24.00 609.6	3.00 76.2	64.25 1632.0
1000 & 1200		44.00 1117.6	79.00 2006.6	19.50 459.3	38.00 965.2	3.00 76.2	80.25 2038.4
1600 & 2000		CONSULT FACTORY					
3000 & 4000							

	FIG NO	G	H
30,70, 100,150	3	0.62 15.7	0.43 ø10.9
260 & 400		0.62 15.7	0.43 ø10.9
600 & 800		0.62 15.7	0.43 ø10.9
1000 & 1200		0.62 15.7	0.43 ø10.9
1600 & 2000		CONSULT FACTORY	
3000 & 4000			

GENERAL NOTES
(FIGURES 1,2, & 3)

1. ENCLOSURES CONSTRUCTED IN ACCORDANCE WITH UL STANDARD 508.
2. STANDARD FINISH-LIGHT GREY ANSI #61.
3. WIDTH, HEIGHT, AND DEPTH DIMENSIONS ON FIG. 1 & 2 ARE INSIDE DIMENSIONS. WIDTH, HEIGHT, AND DEPTH DIMENSIONS ON FIG 3 ARE OUTSIDE DIMENSIONS.
4. THE TRANSFER SWITCH UNIT IS MOUNTED ON THE INSIDE BACK SURFACE AND THE ACCESSORY CONTROL PANEL MOUNTED ON THE INSIDE DOOR SURFACE. THE CONTROL PANEL IS CONNECTED TO THE TRANSFER SWITCH PANEL BY A WIRE HARNESS WITH A QUICK DISCONNECT PLUG.
5. **AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.**

SIZES OF UL LISTED SOLDERLESS SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTIONS

SWITCH RATING (AMPS)	RANGE OF AL-CU WIRE SIZES
30	ONE #14 TO #6 AWG
70	ONE #14 TO 1/0 AWG
100	ONE #14 TO 2/0 AWG
150	ONE #8 TO 3/0 AWG
260-400	TWO #1/0 AWG TO 250 MCM OR ONE #4 AWG TO 600 MCM
600-800	THREE #2 AWG TO 600 MCM
1000-1200	FOUR #2 AWG TO 600 MCM
1600-4000	SUITABLE FOR BUS BAR

INCHES MM

THIRD ANGLE PROJECTION

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☒ AD	☐ AA	☐	☐	☐

COMPOSITE ENCLOSURE OUTLINE AND MOUNTING DIAGRAM FOR 2 OR 3 POLE 30 THROUGH 4000 AMPERES ASCO ® 940 AUTOMATIC TRANSFER SWITCHES AND 386 NON-AUTOMATIC TRANSFER SWITCHES

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7100 Broadway, Suite 7-E
Denver, CO 80221
1-303-427-8809

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Northeast Testing, Inc.
377 Research Parkway
Meriden, CT 06450
1-203-237-8446

FLORIDA
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440 S. 78th Street
Tampa, FL 33619
1-813-621-5661

GEORGIA
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P.O. Box 44088
3795 Wendell Drive, S.W.
Atlanta, GA 30336
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1-404-696-7705 – 24 Hr.

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1-708-941-9351

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6936 W. Roosevelt Rd.
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1-708-386-6668

INDIANA
High Voltage Maintenance
5230 Commerce Circle
Indianapolis, IN 46237
1-317-887-6133

Emergency Power Maintenance
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P.O. Box 68510
Indianapolis, IN 46268
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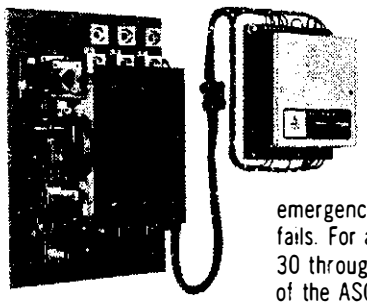
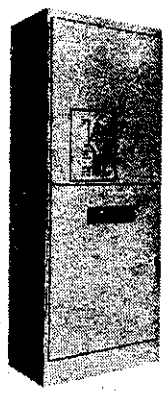
- Energy Management
- Other Electrical Applications



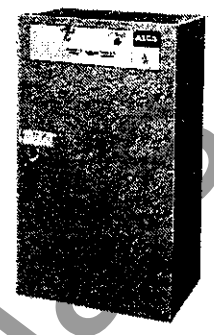
Automatic Transfer Switches

automatically transfer loads from a normal or preferred source to an emergency source when the normal fails. For all classes of loads from 30 through 4000 amps. See Section 1 of the ASCO Controls Catalog.



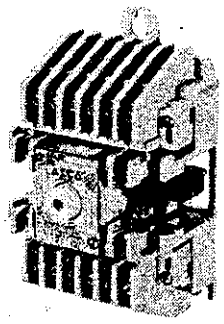
Automatic Transfer & Bypass-Isolation Switches

make it possible to perform periodic inspection and maintenance on the emergency power system without downtime on the loads. The ASCO 962 combines the functions of an automatic transfer switch along with a bypass-isolation switch. The transfer switch can be removed from the system without disturbing the loads. Sizes through 4000 amps. See Section 1 of the ASCO Controls Catalog.



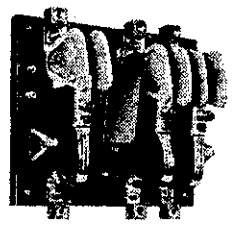
Non-Automatic Transfer Switches

are for use in applications where operating personnel are present and the load is not of an emergency nature. Two types: electrically operated from one or more toggle switches and manually operated by a handle. Sizes from 150 through 800 amps. See Section 1 of the ASCO Controls Catalog.



Remote Control (RC) Lighting Contactors

provide convenient and accessible control of lighting and power circuits from any number of control stations. Ideally suited for use with energy management systems. Mechanically held, for all classes of loads from 20 through 4000 amps. See Section 2 of the ASCO Controls Catalog.

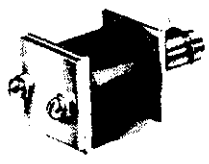


Contactors

for load circuits that are closed and opened repeatedly. Designs allow unlimited combinations including multipole, special contact arrangements, etc. For all classes of loads, magnetically held, normally open or closed. See Section 3 of the ASCO Controls Catalog.

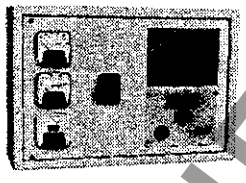
Relays

magnetically and mechanically held in unlimited pole combinations. Also, a highly diversified selection of special purpose relays that are listed as standard items. Moreover, ASCO will design relays to meet your needs. See Section 4 of the ASCO Controls Catalog.



Solenoids. AC and DC

for applications where a load must be pushed or pulled in a straight line. ASCO Solenoid Engineering Specification Forms make it easy to get the solenoid that meets your needs. See Section 5 of the ASCO Controls Catalog.

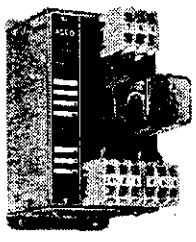


Engine and Generator Controls

include battery chargers for trickle, high rate, or fully automatic charging; engine starting controls; remote and prealarm panels; engine generator controls for starting, stopping, and monitoring the operation of engine generator sets; and load demand controls. See Section 6 of the ASCO Controls Catalog.

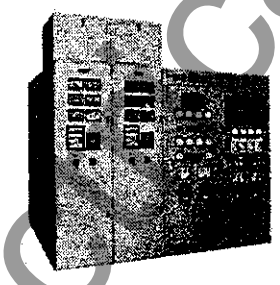
Accessory Equipment

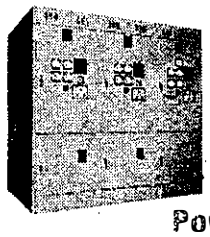
includes break-glass switches for stopping equipment in emergencies; and control stations for operating mechanically held relays and remote control switches. See Section 7 of the ASCO Controls Catalog.



Solid-State Electronic Monitors and Controls

for monitoring voltage, frequency and current; controls for original equipment manufacturers. Also, monitors for synchronizing, phase band monitoring, area protection, etc. See Section 8 of the ASCO Controls Catalog.

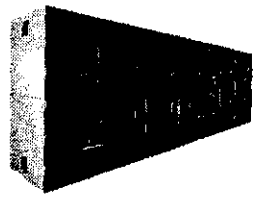




Power Control Systems

for cogeneration; peak load shaving; prime power; emergency and standby power; selective load transfer; etc. Modular units easily assembled and installed to control one engine generator, or to control multiple engine generators using ASCO SYNCHROPOWER® systems to parallel the generators. See Section 9 of the ASCO Controls Catalog.

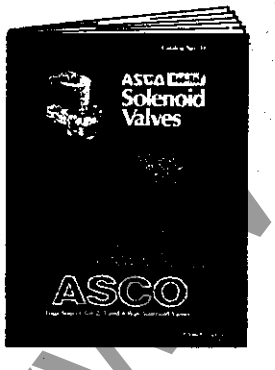
ASCO Electrical Products: Switchboards, Switchgear, Panelboards and Electrical Enclosures



Electrical Division

Metal Division

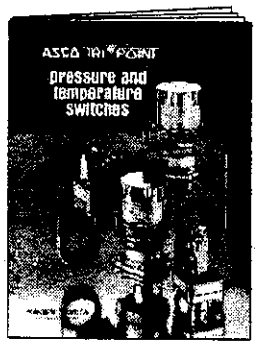
for standard and custom industrial, commercial and utility applications. Also, a complete line of screw-cover wireway, fittings, boxes and cabinets (JIC and NEMA). See Section 10 of the ASCO Controls Catalog.



Solenoid Valves

Full color ASCO RED-HAT® Solenoid Valve Catalog. Includes nearly 2000 standard 2, 3 and 4 way solenoid valves plus manual reset and special purpose valves, air operated valves, fluid power accessories, air controls, and a complete selection of UL, FM and CSA listed or approved solenoid valves for combustion service.

It's simple to select and order ASCO products from the ASCO Solenoid Valve Catalog (separate price list included).



ASCO TRI-POINT® Pressure and Temperature Switches

ASCO offers a complete line of pressure and temperature switches to meet all OEM and Industrial requirements, including pressure switches for combustion service and nuclear applications. The Tri-Point line of switches includes: Adjustable and fixed deadband types; two-stage (dual) types; manual reset types; differential pressure controls; vacuum types. Pressure ranges from 12" H_2O to 6000 P.S.I.G., temperature ranges from –60°F. to +640°F. Transducers for air, water, gas, oil, steam and corrosive service. Complete catalog information is available upon request.

Combinations of the above controls are also available to meet individual requirements. For information, contact your nearest ASCO source or the ASCO Customer Engineering Department.

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