Operator's Manual

ASCO® Series 300L Service Entrance Power Transfer Load Centers 200 & 400 amp., single & three phase

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

An experienced licensed electrician must install the PTLC.

200 amp.

Refer to the outline and wiring drawings provided with ASCO Series 300L PTLC for installation details.

Rating Label

Each Power Transfer Load Center (PTLC) has 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 can cause personal injury or serious equipment damage.

Nameplate

The Transfer Switch nameplate includes data for each specific Series 300L PTLC. Use the switch only within the limits shown on this nameplate.

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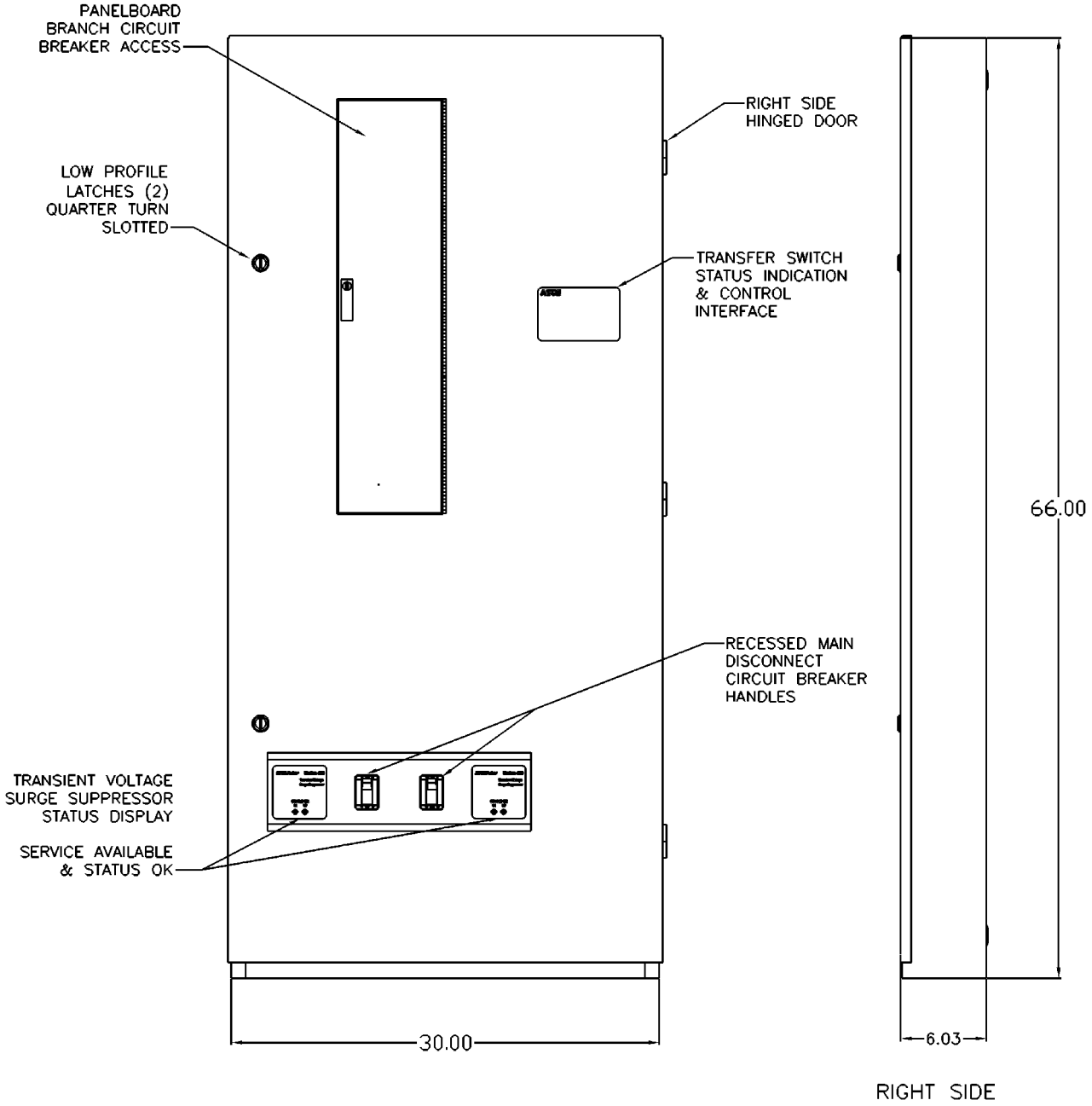
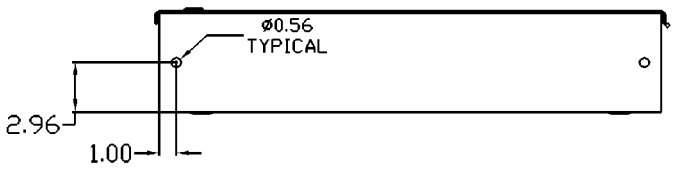
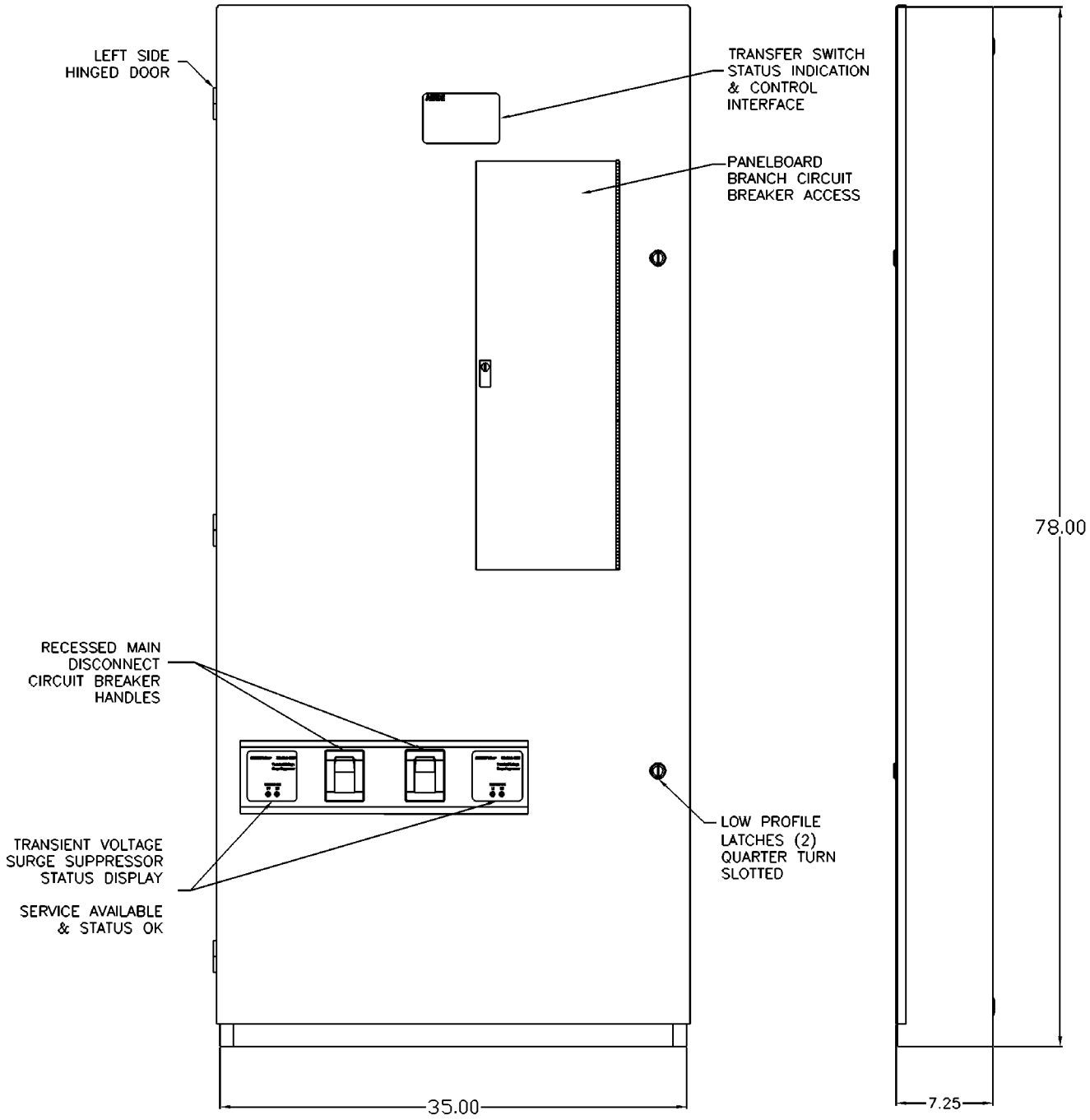
The ASCO Series 300L Power Transfer Load Center (PTLC) is suitable as service entrance equipment. Each PTLC contains an ASCO Series 300 Automatic Transfer Switch (ATS) which is Listed under Underwriters Laboratories UL 1008 Standard for Safety for Automatic Transfer Switches. All control features are UL Component Recognized, which assures that the PTLCs meet OSHA Safety Requirements and will be acceptable to electrical inspectors.

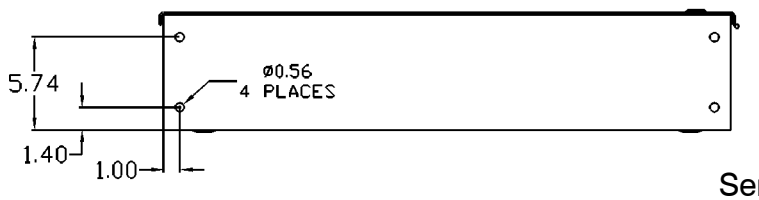




Series 300L single phase 200 amp. Outline Drawing with door installed.

ASCO Series 300 Automatic Transfer Switches are suitable for emergency and standby system applications. They meet emergency system rating requirements as defined in National Electrical Code (NEC) Article 700 and UL 1008. Also, they are suitable for the requirements of NEC Article 517 – Health Care Facilities, NEC Article 701 – Legally Required Standby Systems, NEC Article 702 – Optional Standby Systems, NFPA 99 Health Care Facilities, and NFPA 110 Emergency and Standby Power Systems.





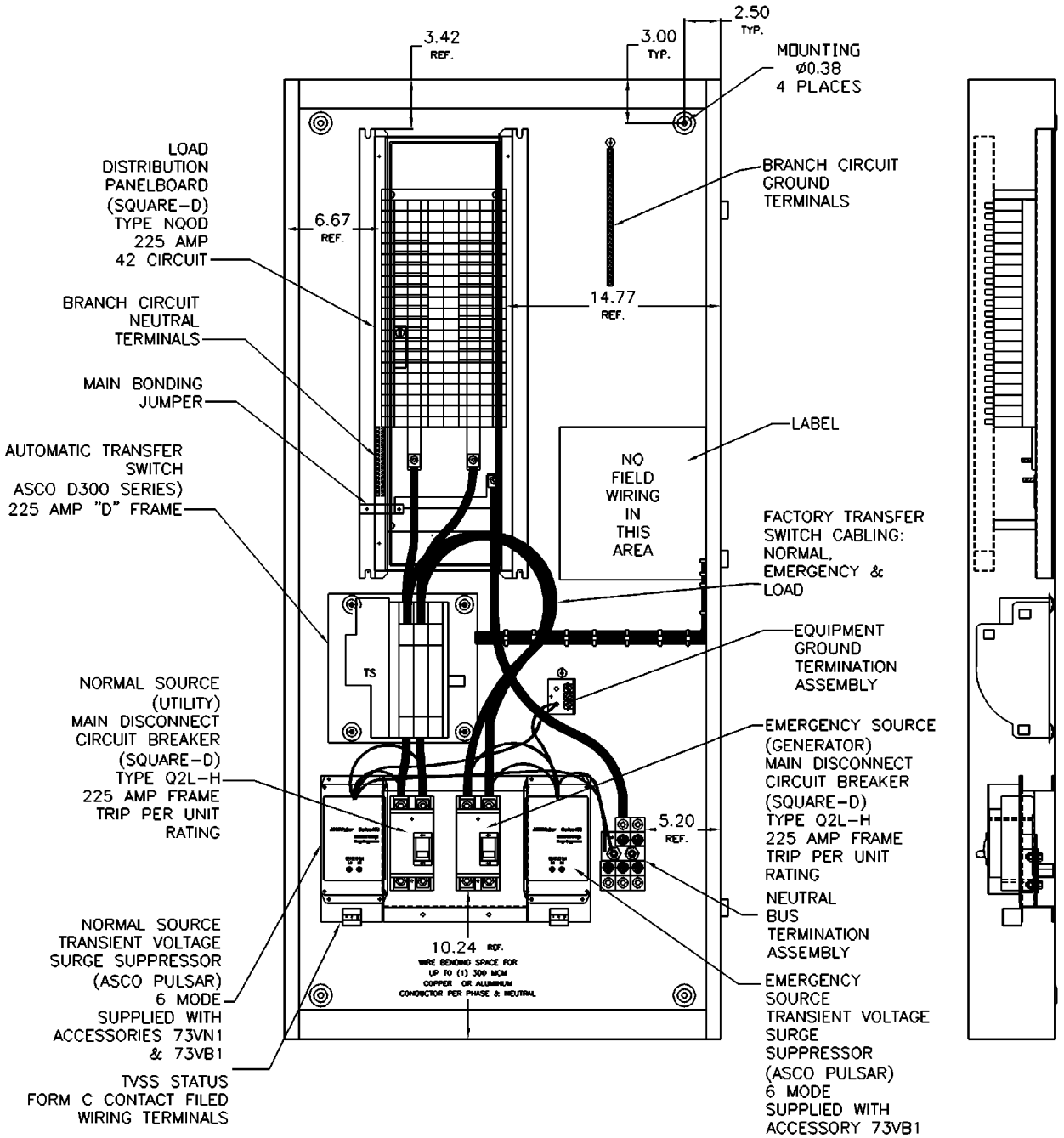
Series 300L single phase 400 amp.
Outline Drawing with door installed.

200 amp. Catalog Number Identification

A typical 200 amp. Catalog Number is shown below. The example is for a Series 300L PTLC 2 pole, 200 amp, 240 V, with Accessories 11BG and 73VB1, in a Type 1 enclosure:

D	300L	4	2	200	F	1	X	C
design prefix letter								

Load Center	Phase Poles	Amperes	Voltage	Controller	Accessories	Enclosure
4 – 42 position	2 – single Ø 3 – three Ø	200	C 208 F 240	1 – standard	X accessories	C – type 1 F – type 3R



Series 300L single phase 200 amp.
Outline Drawing with door removed.

FRONT WITH DOOR REMOVED

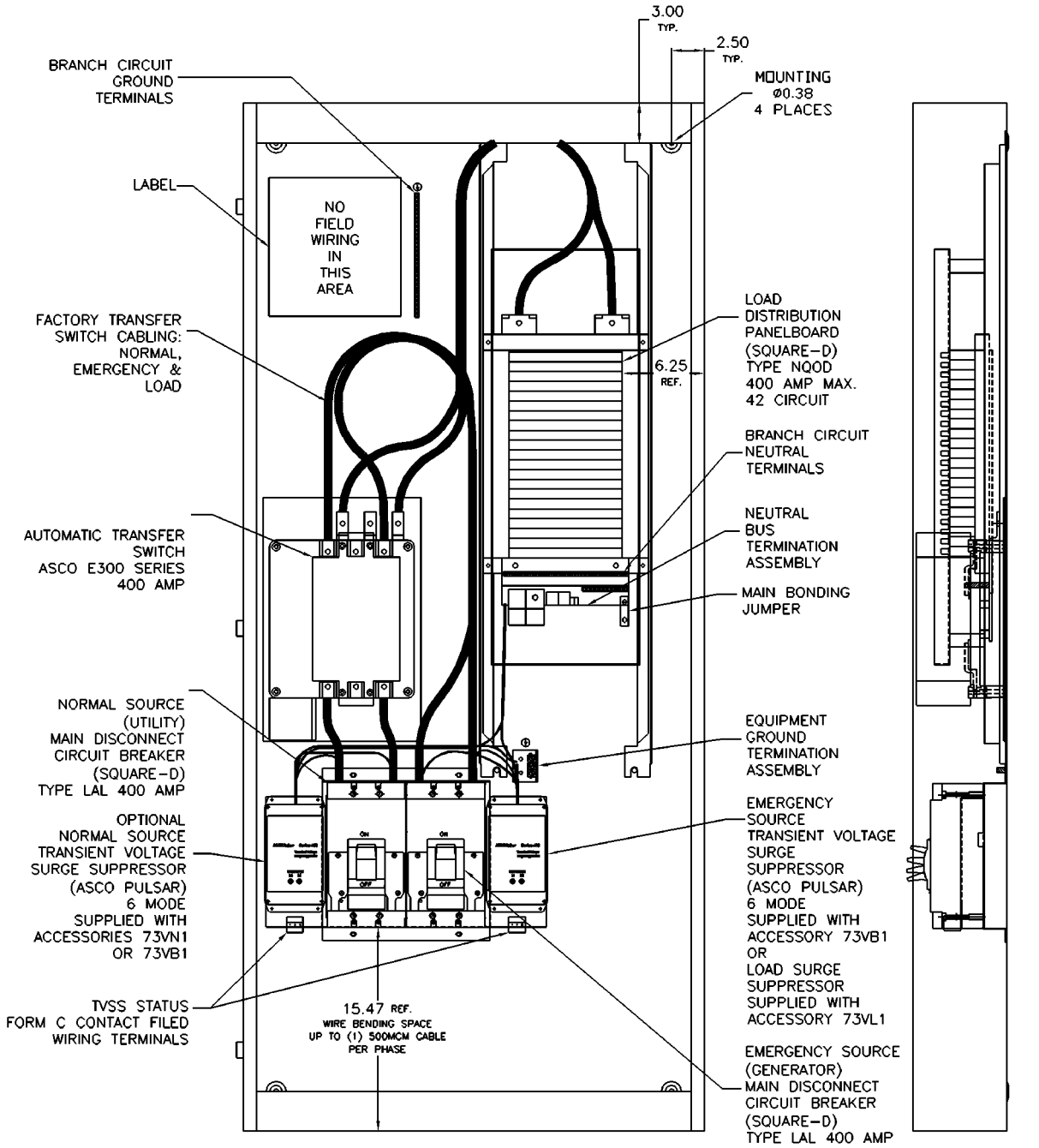
RIGHT SIDE WITH DOOR REMOVED

400 amp.Catalog Number Identification

A typical 400 amp. Catalog Number is shown below. The example is for a Series 300L PTLC 2 pole, 400 amp, 240 V, with Accessories 11BG and 73VB1, in a Type 1 enclosure:

E	300L	4	2	400	F	1	X	C
design prefix letter								

Load Center	Phase Poles	Amperes	Voltage	Controller	Accessories	Enclosure
4 – 42 position	2 – single Ø 3 – three Ø	400	C 208 F 240	1 – standard	X accessories	C – type 1 F – type 3R



Series 300L single phase 400 amp.
Outline Drawing with door removed.

FRONT WITH DOOR REMOVED

RIGHT SIDE WITH DOOR REMOVED

SECTION 1 INSTALLATION

The Series 300L Power Transfer Load Center is factory wired and tested. Installation requires mounting and connection of service cables, distribution circuits, and generator–control wiring.

Mounting

Refer to the enclosure outline drawing included with the Series 300L for all mounting details. Mount the enclosure vertically to a rigid supporting structure (a wall). Level all mounting points with flat washers behind the holes to avoid distortion of the enclosure.

⚠ CAUTION

Protect the automatic transfer switch from construction grit and metal chips to prevent malfunction or shortened life of the ATS.

Electrical Line Connections

Refer to the wiring diagram included with the Series 300L for all wiring details. The wiring must be performed by an experienced licensed electrician in accordance with the National Electrical Code and all local codes.

⚠ DANGER

De–energize the conductors before making any line or auxiliary circuitry connections. Place engine generator starting control in the OFF position. Make sure the generator is not operating.

Connect the power cables to the appropriate terminal lugs on the main circuit breakers as shown on the wiring diagram provided with this Series 300L. Be careful when stripping insulation from the cables; avoid nicking or ringing the conductor. Remove surface oxides from cables by cleaning with a wire brush. When aluminum cable is used, apply joint compound to conductors. Tighten cable lugs to the torque specified on rating label. Install only circuit breakers specified by the panel board manufacturer and specified on the drawings. Connect the branch circuits to the circuit breakers.

Engine Starting Contacts

The engine control contact connections are located on the transfer switch. Connect signal wires to appropriate terminals as specified in Table A and shown in Figure 1–1.

Table A. Engine start connections.

When normal source fails	Terminals on transfer switch
contact closes	TB14 and TB15
contact opens	TB14 and TB16

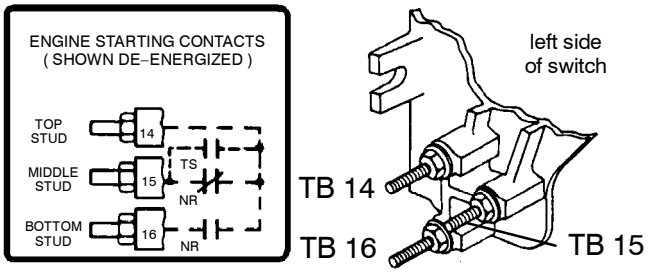


Figure 1-1. Engine starting contact label and terminals located on the 200 amp. transfer switch.

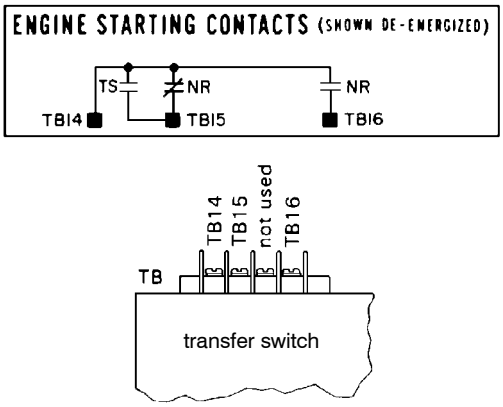


Figure 1-2. Engine starting contact label and terminals located on the 400 amp. transfer switch.

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 automatic transfer switch.

Read all instructions on the Wiring Diagram and labels affixed to the automatic transfer switch. Note the control features that are provided and review their operation before proceeding.

1 – Manual Operation Test

A maintenance handle (detachable on the 400 amp. transfer switch) is provided on the transfer switch for maintenance purposes only. Manual operation of the transfer switch should be checked before it is energized (operated electrically).

⚠ WARNING

Do not manually operate the transfer switch until both power sources are disconnected: open both circuit breakers.

1. Select the appropriate transfer switch amp. size and follow the directions for using the maintenance handle.

   200 amp. Transfer Switch Figure 1–3
   Grasp the attached maintenance handle and turn it with thumb and fingers as shown to manually operate it. The maintenance handle turns the opposite direction of the weight.

   400 amp. Transfer Switch Figure 1–4
   Locate and remove the maintenance handle stored on the transfer switch. Insert the maintenance handle into the hole in the shaft, left side of the operator.

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

3. Return the transfer switch to the *N* (normal) position. For 400 amp. transfer switches, remove the maintenance handle and store it on the transfer switch in the place provided.

Now continue to **2 – Voltage Checks** on next page.

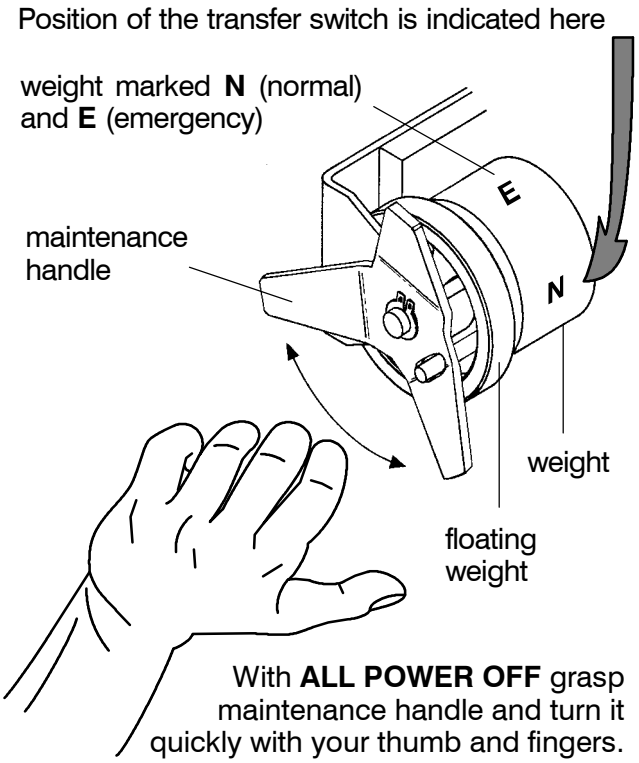


Figure 1-3. Attached maintenance handle for 200 amp. transfer switch.

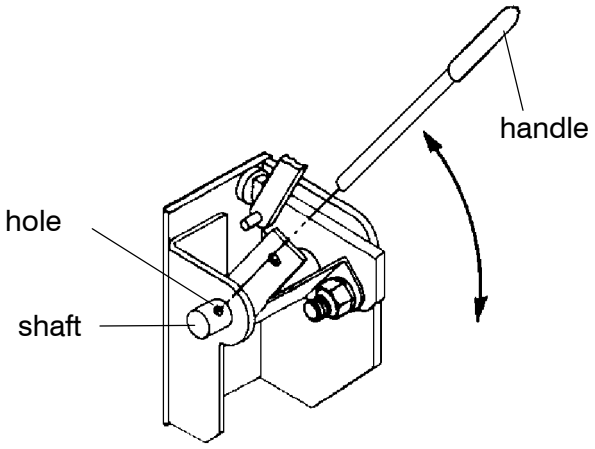


Figure 1-4. Removable maintenance handle for 400 amp. transfer switch.

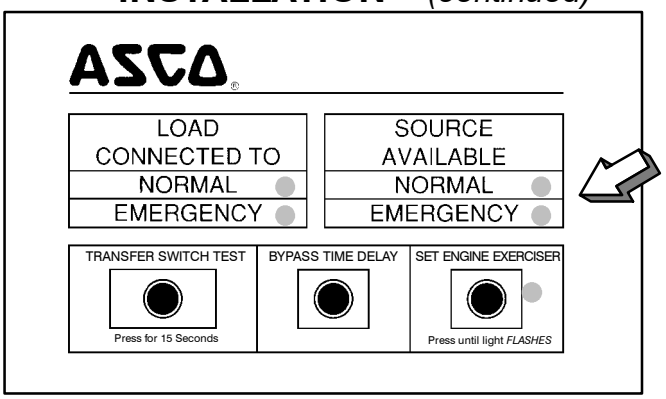


Figure 1–5. Transfer switch status indicator & control interface.

2 – Voltage Checks

First check nameplate on transfer switch; rated voltage must be the same as normal and emergency line voltages.

⚠ CAUTION

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

⚠ DANGER

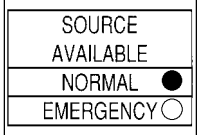
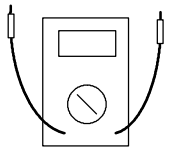
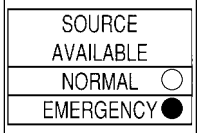
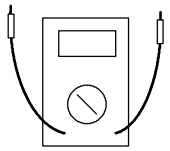
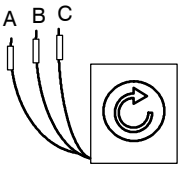
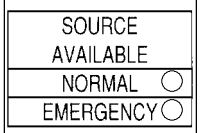
Use extreme caution when using a meter to measure voltages in the following steps. Do not touch power terminals; shock, burns, or death could result !

Perform steps 1 through 6 at the right. Observe the status lights. See Figure 1–5.

- ● Black circle means light is on.
- ❍ White circle means light is off.

* If necessary, adjust 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 Transfer Switch nameplate.

Also see page 4–1 for the HI–LOW voltage adjust setting in the controller. The LOW setting shifts all voltage settings down 4.2%; for example, 240 V to 230 V.

1	Close the normal source circuit breaker. The *Load Connected To Normal* and the *Normal Source Available* lights should come on.	
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 generator, if necessary.) The *Load Connected To Normal* and the *Emergency Source Available* lights should come on.	
4	Use an accurate voltmeter to check phase to phase and phase to neutral voltages present at the transfer switch emergency source terminals.*	
5	Use a phase rotation meter to check phase rotation of emergency source; it must be the same as the normal source.	
6	Shut down the engine–generator, if applicable. The *Emergency Source Available* light should go off. Then put the starting control selector switch (on the generator set) in the *automatic* position. Close enclosure door.	

Now continue to **3 – Electrical Operation** on next page.

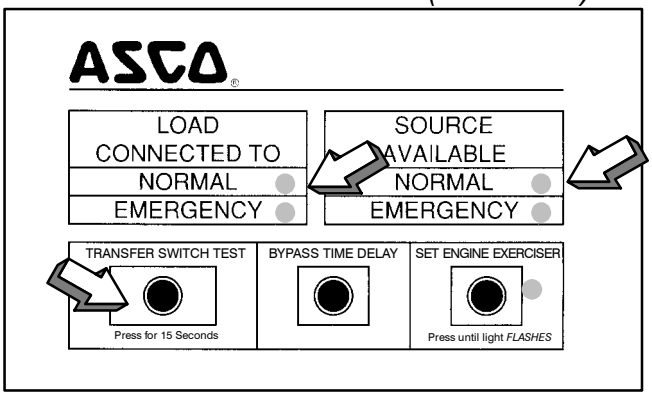


Figure 1–6. Transfer switch status indicator & control interface.

3 – Electrical Operation

First check nameplate on transfer switch; rated voltage must be the same as normal and emergency line voltages.

⚠ WARNING

Close the enclosure door before performing this electrical operation.

Perform steps 1 through 8 at the right. Observe the status lights. See Figure 1–6.

- ● Black circle means light is on.
- ❍ White circle means light is off.

NOTE: If Motor Load Transfer feature is activated, then transfer may not occur immediately after the respective time delays. Transfer will only occur when the phase relationship between sources is correct.

This completes the Functional Test of the ASCO Series 300L Power Transfer Load Center. Leave the engine–generator starting control in the *automatic* position.

1	The normal source must be available and the generator must be ready to start. Check that the *Normal Source Available* light is on.	SOURCE AVAILABLE NORMAL ● EMERGENCY ○
2	Press and hold the *Transfer Switch Test* button until the engine starts and runs. This should happen within 15 sec.	TRANSFER SWITCH TEST
3	The *Emergency Source Available* light should come on.	SOURCE AVAILABLE NORMAL ● EMERGENCY ●
4	If the *transfer to emergency delay* is used the transfer should occurs after a time delay (up to 5 minutes). For immediate transfer press the *Bypass Time Delay* button.	BYPASS TIME DELAY
5	The transfer switch should transfer to the Emergency position. The *Load Connected to Emergency* light should come on and the *Load Connected to Normal* light should go off.	LOAD CONNECTED TO NORMAL ○ EMERGENCY ●
6	If the *retransfer to normal delay* is used the retransfer should occur after a time delay (up to 30 minutes). For immediate retransfer press the *Bypass Time Delay* button.	BYPASS TIME DELAY
7	The transfer switch should transfer back to the Normal position. The *Load Connected to Normal* light should come on and the *Load Connected to Emergency* light should go off.	LOAD CONNECTED TO NORMAL ● EMERGENCY ○
8	The *unloaded running delay* keeps the generator running for 5 minutes (cool–down period). Then the generator should stop and the *Emergency Source Available* light should go off.	SOURCE AVAILABLE NORMAL ● EMERGENCY ○

SECTION 2 SEQUENCE OF OPERATION

Transfer To Emergency

The sequence for load transfer to emergency source begins automatically when normal source voltage falls below the preset dropout point or when *Transfer Switch Test* button is pressed. 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 Switch Test* button is pressed, the SE relay de-energizes and relay NR begins its timing cycle (1 or 3 seconds, *momentary normal source outage delay*). 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.

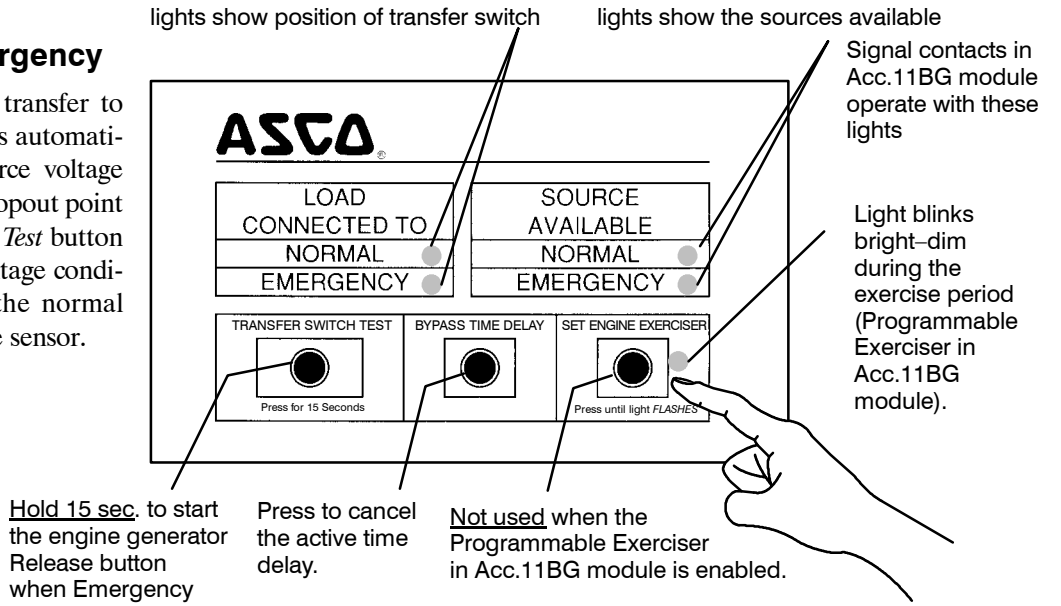


Figure 2–1. Membrane controls and indicator lights.

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 Switch Test* button is pressed 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 (*transfer to emergency delay*). ER relay is provided with an adjustable (0 to 5 minutes) time delay on pickup to delay transfer of the load to the emergency source. For immediate transfer press *Bypass Time Delay* button.

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 Switch Test* button is used, the transfer switch will remain on emergency until the *retransfer to normal delay* 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 (adjustable 1 sec. to 30 min., *retransfer to normal delay*). For immediate retransfer press *Bypass Time Delay* button. 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 for more than 4 seconds 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 (*unloaded running delay [engine cooldown]*). NR relay is provided with a 5 minute 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.

Activation of standard control features shown in Section 5 will alter the sequence of operation and introduce additional time delays during transfer operations.

SECTION 3 TESTING & SERVICE

⚠ DANGER

Hazardous voltage capable of causing shock, burns, or death is used in this power transfer load center. Deenergize both Normal and Emergency power sources before performing any service!

PREVENTIVE MAINTENANCE

Reasonable care in preventive maintenance will ensure high reliability and long life for the Series 300L PTLC.

Operate the switch at least once a month. Perform this 4–step Electrical Operation Test (test with load transfer).

Transfer Switch Test

1.	Press and hold the door-mounted *TRANSFER SWITCH TEST* button until the engine starts and runs. This should happen within 15 seconds.
2.	The transfer switch will operate to the Emergency position. If the *Transfer To Emergency Delay* is used, the transfer will occur after a time delay (up to 5 minutes). For immediate transfer press *BYPASS TIME DELAY* button.
3.	The Transfer Switch will operate back to the Normal position after the *Retransfer To Normal Delay* (up to 30 minutes). For immediate retransfer press *BYPASS TIME DELAY* button.
4.	*Unloaded Running (Engine Cooldown) Delay* allows engine to run unloaded for 5 minutes.

Checklist for Yearly Inspection

❒ **Clean the PTLC enclosure.** Brush and vacuum away any excessive dust accumulation. Remove any moisture with a clean cloth.

❒ **Check the transfer switch contacts**. Remove the transfer switch barriers and check contact condition. Replace the contacts if they become pitted or worn excessively. Reinstall the barriers carefully.

❒ **Maintain transfer switch lubrication**. The transfer switch has been properly lubricated, and under normal operating conditions no further lubricating is required. Renew factory lubrication if the switch is subjected to severe dust or abnormal operating conditions. Relubricate the operator if TS coil is replaced. Order **lubrication 625550–001** (Castrol *Endurex*^{R} 4000 lubricant).

❒ **Check all cable connections & retighten them**. Torque to values shown on transfer switch label.

⚠ DANGER

The line side of the source circuit breaker may still be energized. Use a meter to verify that terminals are deenergized before touching them!

DISCONNECTING THE CONTROLLER

The harness disconnect plugs are furnished for repair purposes only and should not have to be unplugged. If the controller must be isolated, follow these steps carefully.

Disconnecting the Plugs

⚠ WARNING

Do not unplug the controller until step 1a. or 1b. below is completed.

1. Observe the position of the transfer switch.
   a. If the transfer switch is in the *Normal* position, place standby engine starting control in the *off* position. Then open the emergency source circuit breaker.
   b. If the transfer switch is in the *Emergency* position, open the normal source circuit breaker. Place the engine starting control in the *test* or *run* position.
2. Separate the quick disconnect plugs by squeezing the latches. Do not pull on the harness wires.
3. Label, remove, and tape the signal wires connected to the engine start terminals. Refer to the wiring diagram.

Reconnecting the Plugs

⚠ WARNING

Do not reconnect the controller until step 1a. or 1b. and 2 below are completed.

1. Observe the position of the transfer switch.
   a. If the transfer switch is in the *Normal* position, be sure that the standby engine starting control is still in the *off* position. The emergency source circuit breaker should still be open.
   b. If the transfer switch is in the *Emergency* position, normal source circuit breaker should still be open.
2. Reconnect the signal wires connected to the appropriate engine start terminals. Refer to the wiring diagram.
3. The harness plugs and sockets are keyed. Carefully align the plugs with the sockets and press straight in until both latches click.
4. Restore the opposite source as follows:
   a. If the transfer switch is in the *Normal* position, place the standby engine starting control in the *automatic* position. Then 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 the *Retransfer to Normal Delay*. For immediate retransfer, press *BYPASS TIME DELAY* button. Place the engine starting control in the *automatic* position.

TROUBLE-SHOOTING

Note the control features that are activated or furnished on the switch and review their operation. Refer to **Section 5**, **Control Features**.

⚠ WARNING

Proceed with care!
The automatic transfer switch is energized.

⚠ DANGER

Use extreme caution when using a meter to measure voltages during trouble–shooting checks. Do not touch power terminals; shock, burns, or death could result !

Table 3-1. Trouble-Shooting Checks.

PROBLEM	CHECK IN NUMERICAL SEQUENCE		
	1 OPERATION	2 GEN-SET	3 VOLTAGE
Gen-Set does not start when the *TRANSFER SWITCH TEST* button is pressed and held for 15 seconds or when the normal source fails.	Hold the *TRANSFER SWITCH TEST* button 15 sec. or the outage must be long enough to allow for the 1 or 3 sec. *Momentary Normal Source Outage 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.	—
Transfer switch does not transfer the load to emergency source after the gen-set starts.	Wait for *Transfer to Emergency Delay* (0 to 5 min.) to time out. For immediate transfer, press the *BYPASS TIME DELAY* button. If Motor Load Transfer is active, wait for in-phase condition (see below).	Generator output circuit breaker must be closed. Generator frequency must be at least 57 Hz.	Voltmeter should read at least 90% of nominal phase to phase voltage between transfer switch terminals EL1 and EL2. * * These are factory settings.
Transfer switch does not transfer the load to normal source when normal returns or when *TRANSFER SWITCH TEST* button is released.	Wait for *Retransfer to Normal Delay* (1 sec. to 30 min.) to time out. For immediate re–transfer, press *BYPASS TIME DELAY* button. If Motor Load Transfer is active, wait for in-phase condition (see below).	—	Voltmeter should read at least 90% of nominal phase to phase voltage between transfer switch terminals NL1 and NL2. * * These are factory settings.
Gen-Set does not stop after load retransfer to the normal source.	Wait for the 5 minute *Unloaded Running Delay* to time out.	Starting control must be in automatic position.	—
L1 and/or *L2* green lights OFF on the Normal source transient voltage surge suppressor status display. If the Normal source voltage is acceptable, the SPD has reduced protection (not fully functional) and must be replaced.	Check that the Normal source main circuit breaker is closed. Reset the CB if it has tripped open.	—	Voltmeter should read nominal phase to phase voltage between Normal source circuit breaker terminals (load side).
L1 and/or *L2* green lights OFF on the Emergency source transient voltage surge suppressor status display (if furnished). If the Emergency source voltage is acceptable, the SPD has reduced protection (not fully functional) and must be replaced.	Check that Emergency source main circuit breaker is closed. Reset the CB if it has tripped open.	Start the engine–generator if necessary.	Voltmeter should read nominal phase to phase voltage between Emergency source circuit breaker terminals (load side).

Trouble-Shooting the Motor Load Transfer Feature (refer to page 5–4)

⚠ 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. Connect a voltmeter (set for twice system phase–to–phase voltage) between Transfer Switch terminals NA and EA.
2. Manually start generator. Voltmeter needle should sweep back and forth at a regular rate between 0 and about twice system voltage.
3. Press and hold TRANSFER SWITCH TEST button. The load should transfer to emergency source when meter needle is near 0 volts. If transfer does not occur, Motor Load Transfer feature is not operating.
4 Release the **Transfer Switch Test** button. The load should retransfer back to the normal source after the *Retransfer to Normal Delay*, if used. The retransfer should occur when the needle is near 0 volts. If retransfer does not occur after the time delay, the Motor Load Transfer feature is not operating.
5. For immediate retransfer, press the BYPASS TIME DELAY button. Then disconnect the voltmeter.

If the problem is isolated to circuits on the controller or the transfer switch, call your local ASCO Power Technologies sales office or ASI. In the United States, call 1–800–800–2726. In Canada, call 1–888–234–2726. Furnish the Serial No., Bill of Material (BOM) No., & Catalog No. from transfer switch nameplate.

MANUAL LOAD TRANSFER

This procedure will manually transfer the load if the controller is disconnected.

⚠ WARNING

Do not manually operate the transfer switch until both power sources are disconnected: open both circuit breakers.

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

TRANSFER SWITCH INSULATOR for 400 amp. Transfer Switches

The 400 amp. transfer switches is mounted on an insulator backing piece (installed behind the transfer switch). If the transfer switch is removed from the enclosure for inspection and/or service and then reinstalled, this insulator piece must be placed behind the transfer switch. See Figure 3–1.

⚠ WARNING

Be sure that the insulator piece is behind the 400 amp. transfer switch.

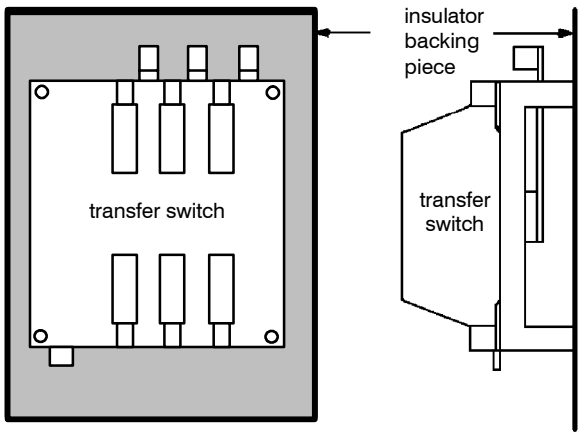


Figure 3–1. Required insulator behind the 400 amp. transfer switch.

SECTION 4 ADJUSTMENTS

Time Delay Adjustment

Standard time delays are set to customer specifications (if none specified, standard factory settings are used).

To change a setting, follow procedure on page 4-2. Use Table 4-1 as a guide to time delay values and their corresponding adjustment DIP switch or potentiometer.

Table 4-1. Time Delay Settings

DESCRIPTION	LABELS	FACTORY SETTING	ADJUSTMENT RANGE	S3 DIP SWITCH		ADJUSTMENT POTENTIOMETER
Override Momentary Normal Source Outages	TD ES	3 seconds	1 second	Actuator 1 on		—
			3 seconds	Actuator 1 off		
Transfer to Emergency	TIMER N/E	0 minutes (full ccw)	0 to 5 minutes	—	—	P2
Override Momentary Emergency S. Outages	—	4 seconds	non-adjustable	—	—	—
Retransfer to Normal	TIMER E/N	30 minutes (full cw)	1 second to 30 minutes	—	—	P1
Unloaded Running (Engine Cooldown)	—	5 minutes	non–adjustable	—	—	—

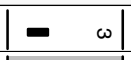
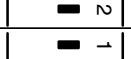
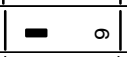
Sensor Adjustments

Voltage and frequency sensor pickup and dropout points are set to customer specifications (if none specified, standard factory settings are used). To change a setting, follow procedure on page 4-2. Use Tables 4-2 and 4-3 for settings and corresponding DIP switch actuators.

⚠ WARNING

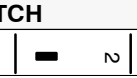
Any change in these settings may affect the normal operation of the automatic transfer switch. This change could allow the load circuits to remain connected to a low voltage source.

Table 4-2. Voltage and Frequency Settings. (☐ Shaded DIP switches are standard factory settings).

DESCRIPTION	LABELS	SETTING	% of nominal		S1 DIP SWITCH	
			FACT. SET	ADJ RANGE		
Normal Source Voltage (also see Extended Features on page 4–3)	PU / N	Pickup	90 %	95 % *	Actuator 3 off	
				90 %	Actuator 3 on	
	DO / N	Dropout	85 %	90 % *	Actuator 1 off Actuator 2 off	
				85 %	Actuator 1 on Actuator 2 off	
				80 %	Actuator 1 off Actuator 2 on	
				70 %	Actuator 1 on Actuator 2 on	
Emergency Source Voltage (also see page 4–3)	—	Pickup	90 %	non-adjustable	—	
	—	Dropout	75 %	non-adjustable		
Emergency Source Frequency (also see Extended Features on page 4–3)	—	Pickup	95 %	non-adjustable	—	
	—	Dropout	85 %	non-adjustable		
	60 / 50 Hz	60 / 50 Hz	60 Hz	60 Hz	Actuator 4 off	
				50 Hz	Actuator 4 on	
Voltage Phases	3 ø , 1 ø	3 ø / 1 ø	1 ø	3 phase	Actuator 6 off	
				1 phase	Actuator 6 on	

* If dropout voltage is set to 90%, the pickup voltage must be set to 95%.

Table 4-3. Transformer Voltage Adjust.
(Low setting shifts all voltage settings down 4.2%; for example, 240 V to 230 V)

DESCRIPTION	LABELS	FACTORY SETTING	ADJUSTMENT	S3 DIP SWITCH	
Voltage Adjust (4.2%)	LOW / HI	HI	LOW	Actuator 2 off	
			HI	Actuator 2 on	

⚠ WARNING

Do not make any setting changes while the controller is energized.

How to Change a Setting

1. Prevent the transfer switch from operating by disconnecting one source first, then the other, 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*. Then open the normal source circuit breaker.
   b. If the transfer switch is in the Emergency position, open the normal source circuit breaker. Turn engine starting control to *test* or *run*. Then open the emergency source circuit breaker.
2. Disconnect both harness plugs from controller by squeezing the latches. Do not pull on the wires.
3. Remove cover from the controller by releasing latch on right side with your thumb. See Figure 4-1.
4. Locate the appropriate adjustment potentiometer or DIP switch for the setting that you want to change. Refer to Table 4-1 and Table 4–2 on page 4-1 and Figure 4-2, Figure 4–3, Figure 4–4 on page 4–2.
5. Use a small screwdriver to turn the potentiometer clockwise to increase the time delay or counterclockwise to decrease it. See Figure 4-3.
6. Use a ball-point pen (or similar pointed tool) to slide the switch actuators left or right so they match the illustration next to the setting (left = off, right = on). Recheck the setting. See Figure 4-4.
7. Install the cover on the controller by hooking it on the left side and latching the right side.
8. Reconnect both harness plugs to the controller by aligning and pressing straight in until latches click.

⚠ WARNING

Close the enclosure door.

9. Close the enclosure door, then restore both sources:
   a. If the transfer switch is in the Normal position first close the normal source circuit breaker, then 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. Then close the emergency source circuit breaker.
10. Turn the engine starting control to *automatic*.

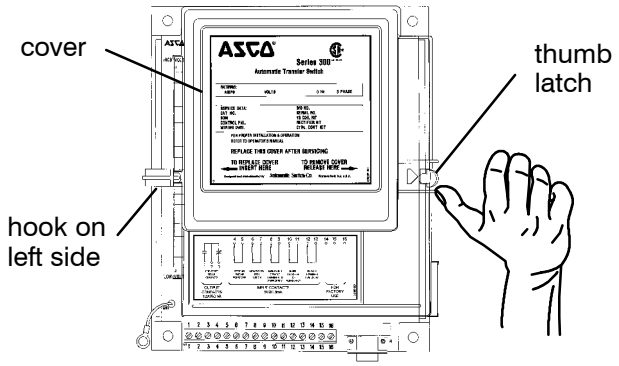


Figure 4-1. Controller cover latch.

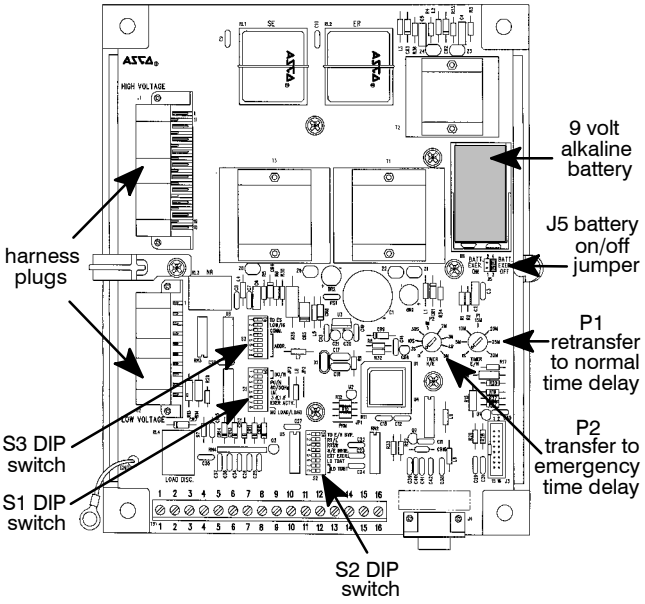


Figure 4-2. Location of potentiometers, DIP switches, battery, and battery jumper.

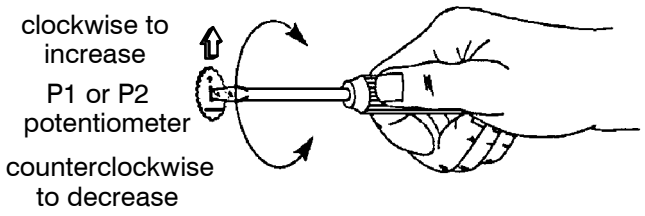


Figure 4-3. Changing time delay potentiometers.

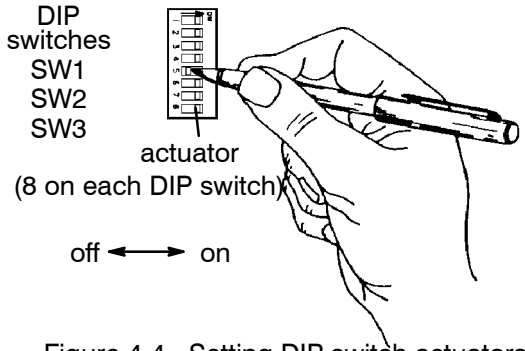


Figure 4-4. Setting DIP switch actuators.

Extended Features ON / OFF Switch

Five additional (extended) Features are available when S3 DIP switch actuator 3 is put in the ON (enabled) position (see Table 4–4 below). These extended features are in addition to the standard time delays, voltage, and frequency settings shown in Tables 4–1, 4–2, and 4–3.

Table 4–4. Time Delay Settings . (☐ Shaded DIP switch is standard factory setting)

DESCRIPTION	LABEL	NAME	SETTING	S3 DIP SWITCH	
Extended Features	COMM.	Extended Features	disabled	Actuator 3 off	
			enabled	Actuator 3 on	

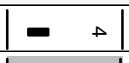
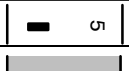
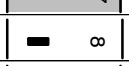
Extended Features Settings

If the S3 DIP switch actuator 3 is ON (enabled), the following extended features are available (see Table 4–5). If the S3 DIP switch actuator 3 is OFF (disabled), the extended features are not available. To change a setting, follow procedure on page 4–2. Use Tables 4-4 and 4–5 for settings and corresponding DIP switch actuators.

⚠ WARNING

Any 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 inadequate source.

Table 4-5. Voltage and Frequency Settings. (☐ Shaded DIP switches are standard factory settings)

DESCRIPTION	LABEL	NAME	% of nominal		S3 DIP SWITCH	
			SETTING	ADJUSTMENT		
Normal Source Voltage	ADDR.	Over Voltage Trip	—	disabled	Actuator 4 off	
			108 %	enabled	Actuator 4 on	
Normal Source Frequency	ADDR.	Over /Under Frequency Trip	—	disabled	Actuator 5 off	
			OF=105 % UF= 95 %	enabled	Actuator 5 on	
Emergency Source Voltage	ADDR.	Over Voltage Trip	—	disabled	Actuator 6 off	
			108 %	enabled	Actuator 6 on	
Emergency Source Frequency	ADDR.	Over Frequency Trip	—	disabled	Actuator 7 off	
			105 %	enabled	Actuator 7 on	
Unloaded Running (Engine Cooldown)	ADDR.	Time Delay	0	disabled	Actuator 8 off	
			5 minutes	enabled	Actuator 8 on	

SECTION 5 CONTROL FEATURES

Accessory 11BG – SOURCE AVAILABILITY SIGNAL & PROGRAMMABLE ENGINE EXERCISER MODULE

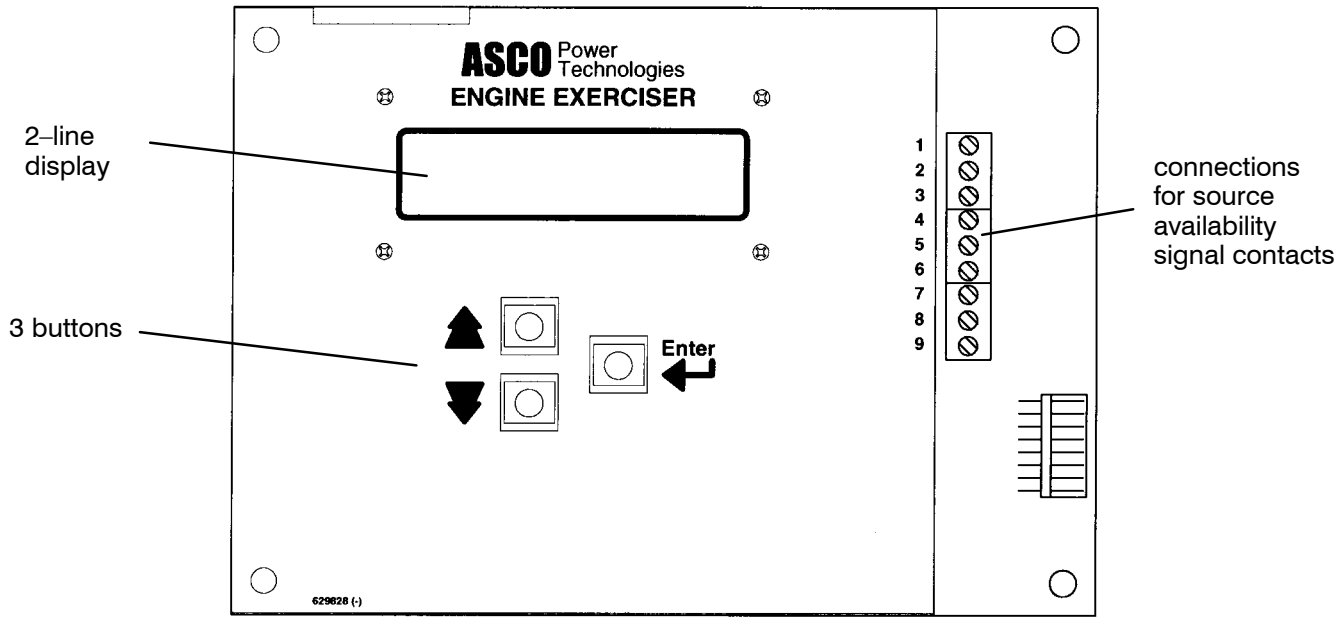


Figure 5–1. Accessory 11BG module (mounted behind operator interface and connected to the controller) includes source availability signal contacts and a programmable engine exerciser.

Source Availability Signal Contacts

The module provides one Form C contact each for the normal and emergency sources signal the acceptability of the source as sensed by the controller. The signal contacts operate in conjunction with the *Source Available* lights on the operator interface. Field wiring terminals are provided as shown in Figure 5–2 and the wiring diagram.

Contact ratings:

2 amps @ 30 Vdc, 0.5 amp. @ 125 Vac resistive

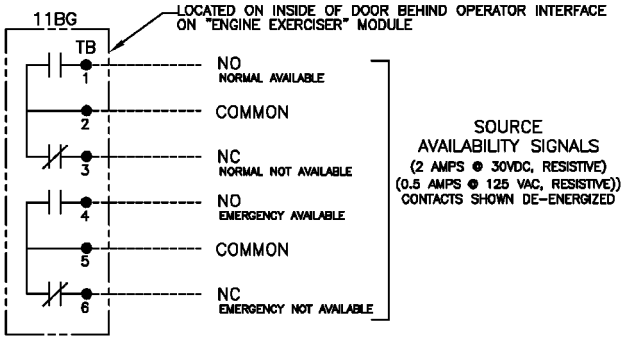


Figure 5–2. Source availability signal contacts.

Programmable Engine Exerciser

The module includes a programmable engine exerciser that provides for weekly or biweekly operation. This optional exercise timer may have to be turned on (enabled) by setting the S1 DIP switch actuator 7 to off, and S2 DIP switch actuator 5 to off. A backup battery in the controller (see page 4–2 and page 5–3) must be turned on to maintain the settings and to allow programming with the normal and emergency power turned off (page 5–2).

The programmable engine exerciser incorporates a 7 day or 14 day time base. Proper controller settings must be made to determine whether or not the test will be done with or without load transfer (S1 DIP switch actuator 8).

See next page for instructions on setting the timer.

DIP Switch Settings

FUNCTION	S1 DIP SWITCH		S2 DIP SWITCH	
Opt. Timer Enabled	Actuator 7 off	7	Actuator 5 off	5
Opt. Timer Disabled	Actuator 7 off	7	Actuator 5 on	5
Exercise without Load	Actuator 8 off	8		
Exercise with Load	Actuator 8 on	8		

Shaded DIP switches are standard factory settings.

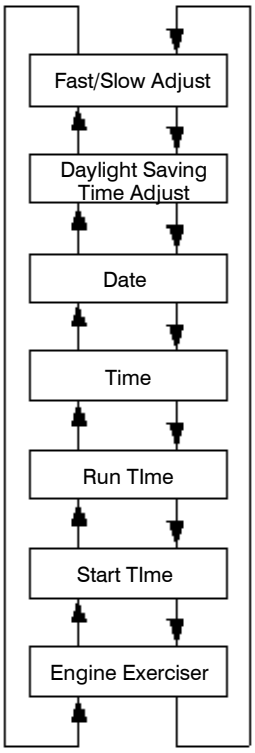
How to Set Optional Programmable Engine Exerciser (part of Acc. 11BG module)

⚠ DANGER

Hazardous voltage capable of causing shock, burns, or death is used in this transfer switch. Deenergize both Normal & Emergency power sources before programming the exerciser.

Navigating the Menu

Use the UP and DOWN arrow keys to move through the displays.



Changing the Parameters

Use the UP and DOWN arrow keys to move though the displays to the parameter to be changed. Push the ENTER key to start the editing process. The first parameter will flash. Use the UP and DOWN arrow keys to adjust the parameter to the desired value and press the ENTER key to save the value. The next parameter will now flash. Repeat the process until each parameter is properly configured.

Engine Exerciser Display

The Engine Exerciser Display shows the status of the engine exerciser. When the unit is shipped from the factory the programmable engine exerciser is "Disabled" and must be set to "Enabled" by the customer. When the engine exerciser is running, this display will count down the remaining time until the end of the exercise period.

Start Time Display

The Start Time Display shows the engine exerciser start time. There are four parameters that determine the start time:

weekly ("Every") or bi–weekly ("Alt") operation
day of week ("Sun" through "Sat")
start hour (0 through 23)
start minutes (0 through 59)

For example, if the user wants the exerciser to run every other Saturday at 3 PM, the proper configuration would be:

"Alt Sat @ 15:00"

NOTE: When choosing bi–weekly operation, the exerciser will always run on the week designated "(1)" on the date display.

Run Time Display

The Run Time Display shows the run time for the engine exerciser. The default setting from the factory is 30 minutes.

Time Display

The Time Display shows the present system time. The format is "hours:minutes:seconds".

NOTE: During total power outages, power to the accessory is maintained by a battery in the Controller (see page 4–2). Be sure that the 9–volt alkaline battery is fresh and enabled (jumper in ON position) so that the time and date settings are not lost.

Date Display

The Date Display shows the present system date. The format is "day of week (week) month/day of month/year".

NOTE: Week is either week 1 or week 2. This is used in conjunction with the bi–weekly timer.

Daylight Savings Time Adjust Display

This display shows whether the automatic daylight saving time adjustment is active. The factory default is "NO". If enabled, the unit will automatically adjust for daylight saving time at 2 AM on the first Sunday of April and the last Sunday of October.

Fast / Slow Adjust Display

This display shows the automatic fast/slow adjustment value. The factory default is 0. This feature can be used to trim a clock that runs fast or slow. For example, if your clock runs 10 seconds slow per week, change the fast/slow adjust value to "+10" and the unit will automatically add 10 seconds to the clock every week.

NOTE: Adjustments are made Sunday morning at 2 AM. If you want your exerciser period to start at 2 AM on Sunday, you cannot use this feature and the adjustment must be set to 0.

CONTROL FEATURES *(continued)*

The standard exericser timer can be used if the Acc. 11BG programmable exerciser is not used. It can be set to exercise with or without load transfer, or it can be completely disabled. 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. Refer to page 4–2 for location of DIP switches, battery (provided), and jumper block in the controller.

BUILT–IN ENGINE EXERCISER

The engine exerciser included in ASCO Series 300 Automatic Transfer Switches provides a once a week 20–minute exercise period. It occurs immediately when the SET ENGINE EXERCISER push button is pressed (and held for at least 5 seconds), and then at the same time weekly thereafter. A 9 volt alkaline battery (*DuracellR* MN1604, *EverreadyR* 522, or *PanasonicR* 6AM6) is furnished and installed in the controller to maintain the setting. The battery jumper block must be shifted to the ON position. See Figure 4–2 on page 4–2.

Fill in day and time set. Week Day _____ Time _____.

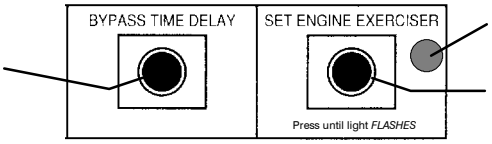
DIP Switch Settings

FUNCTION	S1 DIP SWITCH		S2 DIP SWITCH	
Std. Timer Enabled	Actuator 7 on	7	Actuator 5 on	5
Std. Timer Disabled	Actuator 7 off	7	Actuator 5 on	5
Exercise without Load	Actuator 8 off	8		
Exercise with Load	Actuator 8 on	8		

Shaded DIP switches are standard factory settings.

Press to cancel an active exercise period (stops generator).

If *Exercise with Load* is set, retransfers load to Normal, then stops generator after 5 min. cooldown.



status light

Press and hold for 5 sec. or until status light blinks rapidly to set exercise period immediately and every week hereafter (generator starts).

If *Exerciser with Load* is set, transfers load to Emergency.

Figure 5–3. Operator panel pushbuttons and light.

Select below either *Exercise without Load* or *Exercise with Load* according to the setting of DIP switch S1, actuator 8. The load transfers from the Normal source to Emergency source (generator) and back again if *Exercise with Load* is selected.

Exercise without Load, DIP Switch S1, Actuator 8 off **How to Set Built–In Timer**

Step	Push Button	Status Light	Function	Explanation
1	*SET ENGINE EXERCISER* hold 5 sec.	blinks rapidly ●○●○●○	set exercise period	Exercise the generator now and every week at this time hereafter.
2	release	blinks slowly ●○○●○○	exercise period now active	Generator starts and runs.
3	press *BYPASS TIME DELAY*	● stays on	cancel active exercise period	Generator stops.
4	—	● stays on	generator off	Exerciser enabled; repeats every 7 days.

Exercise with Load, DIP Switch S1, Actuator 8 on **How to Set Built–In Timer**

Step	Push Button	Status Light	Function	Explanation
1	*SET ENGINE EXERCISER* hold 5 sec.	blinks rapidly ●○●○●○	set exercise period	Exercise the generator now and every week at this time hereafter.
2	release	blinks slowly ●○○●○○	exercise period now active	Generator starts and runs; the load transfers to Emergency.
3	press *BYPASS TIME DELAY*	blinks slowly ●○○●○○	cancel active exercise period	The load retransfers to Normal; then generator runs for 5 minute cooldown (light blinks slowly during cooldown).
4	—	● stays on	generator off	Exerciser enabled; repeats every 7 days.

NOTE: Every time *SET ENGINE EXERCISER* push button is pressed (held 5 seconds) the exercise period is changed.

CONTROL FEATURES *(continued)*

INPHASE MONITOR FOR MOTOR LOAD TRANSFER

Inphase monitoring logic controls transfer and retransfer of motor loads, so that inrush currents do not exceed normal starting currents. It avoids nuisance tripping of circuit breakers and mechanical damage to motor couplings.

The Motor Load Transfer feature is built into the controller. DIP switch S1 (actuator 5) activates this feature: right = ON, left = OFF.

FUNCTION	S1 DIP SWITCH	
enable	Actuator 5 on	
disable	Actuator 5 off	

☐ Shaded DIP switches are standard factory settings.

Note

If the Motor Load Transfer feature is enabled, it will be activated following the Load Disconnect Feature Delay Before Transfer delay.

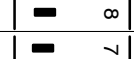
LOAD DISCONNECT FEATURE

Connect external circuits to the terminals indicated on the Wiring Diagram provided with the ATS.

The double throw (Form C) contact is rated for 28 VDC or 120 VAC (5 amps resistive). The contact operates prior to a selectable 0, 3, 10, or 20 second delay before transfer of the Automatic Transfer Switch. The contact resets either immediately following transfer or after the same delay as set for pre–signal before transfer.

Time delay between the load disconnect control signal and initiation of transfer is set on the controller with DIP switch S2 (actuators 6, 7, 8) as shown below:

Delay Before Transfer

LD TDBT	S2 DIP SWITCH	
0 (disable)	Actuator 7 on Actuator 8 on	
3 seconds	Actuator 7 on Actuator 8 off	
10 seconds	Actuator 7 off Actuator 8 on	
20 seconds	Actuator 7 off Actuator 8 off	

☐ Shaded DIP switches are standard factory settings.

Delay After Transfer*

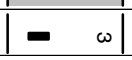
LD TDAT	S2 DIP SWITCH	
enable	Actuator 6 on	
disable	Actuator 6 off	

*Enabling the Delay After Transfer will cause the control signal to reset after the same delay as set for the Delay Before Transfer.

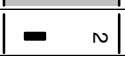
REMOTE CONTROL FEATURES

These remote control features require a customer–supplied normally closed contact suitable for a 5 V dc low energy circuit. Refer to the Wiring Diagram provided with the ATS. Activate appropriate DIP switch S2 actuators below.

Remote Test (terminals CP6–7)

RTSW	S2 DIP SWITCH	
disable	Actuator 3 on	
enable	Actuator 3 off	

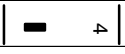
Remote Transfer to Emergency (CP8–9)

RT /E	S2 DIP SWITCH	
disable	Actuator 2 on	
enable	Actuator 2 off	

Bypass Transfer Time Delay (CP12–13)

TD E/N BYP.	S2 DIP SWITCH	
disable	Actuator 1 on	
enable	Actuator 1 off	

Inhibit Transfer to Emergency (CP10–11)

N/E INHIB.	S2 DIP SWITCH	
disable	Actuator 4 on	
enable	Actuator 4 off	

CONTROL FEATURES *(continued)*

TRANSIENT VOLTAGE SURGE SUPPRESSORS

(Accessory 73VN*, 73VB*, or 73VL*)

Accessory 73VN* or 73VB* provides ASCO Pulsar 458 Transient Voltage Surge Suppressors (TVSS) for the power sources. Acc. 73VN* has one TVSS connected to the Normal source only. Acc. 73VB* has two TVSSs, one connected to the Normal source, one connected to the Emergency source. Acc. 73VL* has a TVSS connected to the load side. Refer to the Wiring Diagram provided with the PTLC.

The TVSS offers high–energy level transient protection as well as electronic noise filtering.

Environment For use in an ambient temperature of –40˚C to +50˚C, with a relative humidity 0% to 95% (non–condensing)

Power System Requirements The TVSS is a parallel device. For best performance keep wire leads as short as possible. Make sure all power leads are connected (all phases, neutral, and ground wires)

Summary Alarm Contacts Dual (2 n.o. & 2 n.c.) summary alarm Form C relay contacts rated 125 Vac, 5 A, pf=1.0 are provided for remote indication of protection status. See the wiring diagram provided with the PTLC.

Refer to Troubleshooting on page 3–2.

* 1 or 3

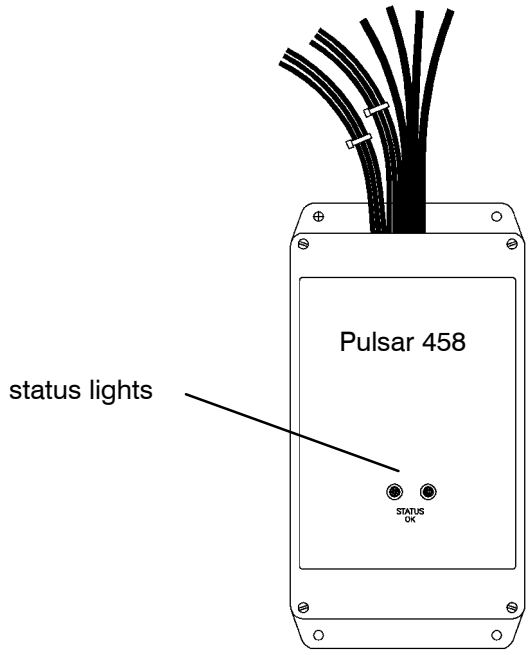


Figure 5–4. Transient Voltage Surge Suppressor.

If either *L1* or *L2* green status light is OFF on the transient voltage surge suppressor and if know that the source voltage is acceptable, the TVSS has reduced protection (not fully functional) and must be replaced.

OPTIONAL STRIP HEATER (Accessory 44)

Accessory 44 Strip Heater is designed to keep ambient temperatures within the Automatic Transfer Switch enclosure at acceptable levels. This accessory consists of a mounting bracket with strip heater, thermostat, and terminal block. A transformer with fuses is included when the power for the assembly is derived from voltages above 120 V ac. This optional accessory is available factory installed or in kit form.

Turn the thermostat's dial to required setting as shown.

Description	Accessory	Kit
208 – 480 volt ATS derived voltage (with transformer)	44G	K613127–002

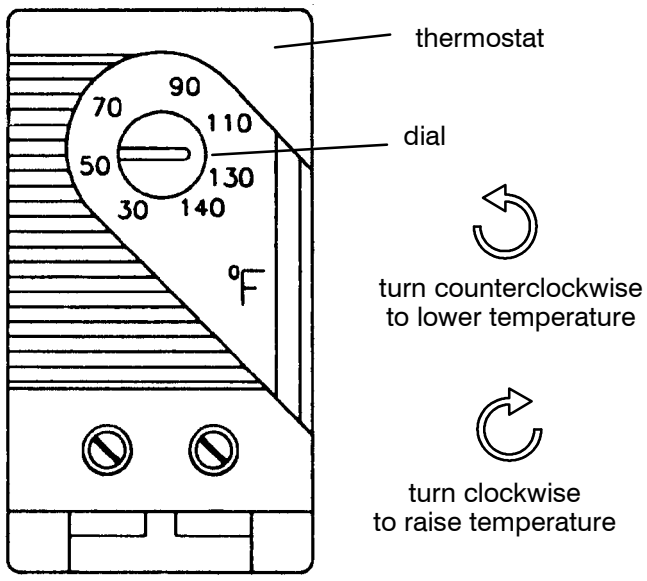


Figure 5–5. Thermostat.

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