IPC D3000 DOOR OPERATOR BOARD ADJUSTMENT GUIDE 3-03
WITH PUSHBUTTONS

POTENTIOMETER PRE-ADJUSTMENTS:

CLOSE SPEED HIGH (R23)	FULLY CCW – 4 TURN POT
CLOSE SPEED MED (R21)	FULLY CCW - 4 TURN POT
CLOSE SPEED LO (R17)	2 TURNS CW - 4 TURN POT
OPEN SPEED HI (R11)	FULLY CCW - 4 TURN POT
OPEN SPEED MED (R7)	FULLY CCW - 4 TURN POT
OPEN SPEED LO (R2)	FULLY CCW - 4 TURN POT
ACCEL/DECEL (R3 & R1)	MID RANGE - 1 TURN POTS
NUDGE (R27)	FULLY CCW - 4 TURN POT
TRIP THRESHOLD (R37)	2 TURNS CW - 4 TURN POT
CLOSE FORCE (R16)	FULLY CW - 4 TURN POT
FIELD VOLTAGE- STANDBY (R91)	Set to ~ 50 VDC at F1, F2 or less
FIELD VOLTAGE- RUN (R92)	Set accordingly –most settings use ~ 60-90VDC – DO NOT OVERVOLTAGE-see notes

CAUTION !!! – HEATSINKS ARE AT LINE VOLTAGE POTENTIAL –USE CAUTION WHEN UNIT IS ENERGIZED TO PREVENT ELECTRICAL SHOCK

Set the motor field voltage and check the connections: See important notes regarding OTIS 6970 operators below.

Door Field connection recommendations:

It is recommended that the field connections be set for series rather than parallel configuration for the following reasons:

- Connecting the field windings in series will help prevent applying too much current to the field winding and ultimately damaging the motor.

Example: For a 115vac typical replacement motor set up for parallel field connections, it requires approximately *only 50 VDC* applied to the field to cause currents *in excess* of the nameplate rating of the typical motor field. **USE CAUTION WHEN SETTING THE FIELD VOLTAGE**.

- Connecting the windings in series will reduce the current consumption from the controller and motor allowing them to run cooler adding to a longer service life.

- The field output voltage from the controller board when it is wired for 115vac input is ~160vdc max. Wiring the fields in series allows for a "safer" installation in that if the field voltage were inadvertently set for maximum, the controller would be applying ~160vdc to a connection that should have been set for 120-130vdc (not too far off). If the field is wired for parallel, the same applied 160vdc could produce over 500 ma that is very much over the current rating of the typical field winding of the motor. (Typically rated for 100 ma).

The IPC D3000 now incorporates automatic and manual motor field management. The operation of the field output follows the settings of the three "mini-link" jumper/header settings (upper left-hand portion of the PCB). The operation is as follows:

- Whenever Jumper SP1 is installed **only**, This is "FIELD BOOST MANUAL mode" Connect this jumper ONLY to make the field output follow the "STBY" field switching contact input. When this input is *de*-energized, field output will revert to the RUN setting pot (R92).

Field settings Contd.:

When this input is *energized*, field output will revert to the STANDBY setting pot (R91). GENERALLY USED FOR OTIS APPLICATIONS.

- Whenever Jumper SP2 is installed only, This is "AUTO OPEN mode" Connect this jumper ONLY to make the field follow the "RUN" Pot (R92) when the directional input Pilot calls for an OPEN command. With this jumper installed, the field will follow the STBY setting at all times in the CLOSE direction. (Reduced torque close only).

- Whenever Jumper SP3 is installed only, This is "AUTO CLOSE mode" Connect this jumper ONLY to make the field follow the "RUN" Pot (R92) when the directional input Pilot calls for a CLOSE command. With this jumper installed, the field will follow the STBY setting at all times in the OPEN direction. (Reduced torque open only). In most applications this mode will not be used.

- With Jumpers SP2 AND SP3 both installed (no SP1 connection), This is "FULLY AUTOMATIC OPERATION" Connect these jumpers to make the field follow the "RUN" Pot (R92) when the directional input Pilot calls for an OPEN *or* CLOSE command. With these jumpers installed, the field will follow the RUN setting at all times in both directions. **MOST COMMON OPERATING MODE** FOR GAL OR GENERAL USE when no input is available for connection to "STBY"input.

Speed & Accel/Decel settings:

NOTES:

Full CCW rotation denotes zero (0) speed for speed pots and slowest rates for ACCEL/DECEL pots. Fully CW on the C-TRIP FORCE and C-STALL FORCE pots *eliminates* their effects, which is the clamping of speed and current to low values during a door obstruction in the close direction.

- All door motion adjustments must be made with the hall doors engaged with the car doors.

- **Closing the slowdown switch inputs to the control *disables* the corresponding speed. I.e.: If MED and HI open inputs are closed (energized) , open LO is enabled and open MED and HI are disabled**

- **The control will automatically disable high speed when the medium speed inputs are closed (energized). This is a safety feature to reduce door speed in the event that the high-speed cam switch fails to close during a normal run. Thus to achieve high speed, both the medium and high-speed slowdown inputs must be *open (de-energized).***

1. With the CLOSE slowdown switches "HI" (High Speed Close) and "MS" (Medium speed) *closed* (inputs energized), adjust the CLOSE LO speed pot to close doors softly without stalling. **NOTE FOR OTIS 6970 OPERATORS**: Maximum voltage applied to OPEN or CLOSE LO should not be over 17-18vdc (measured at A1/A2) if using on a OTIS 6970 operator with the Open and Close Pilots maintained (energized) when the door is held in the limit (powered open and/or closed). See further notes below.

2. With the CLOSE medium speed input *open* (de-energized) and the HIGH speed input still closed (energized) adjust the CLOSE MED speed slightly faster than the CLOSE LO speed.

3. With the CLOSE HI speed input open (de-energized) (both MED and HI remain open (de-energized) at this time), adjust CLOSE HI speed pot slightly faster than CLOSE MED speed.

4. Increase the CLOSE HI and CLOSE MED pots to obtain desired door speed.

Speed & Accel/Decel settings Contd:

5. Adjust ACCEL and DECEL pots to obtain desired transitions between speeds and smooth acceleration at the start and end of the cycle. Generally pots are set to 50%.

6. Repeat the above procedure for the OPEN door cycle.

7. Nudging speed is independent of cams and has it own dedicated pot (NUDGE) for Nudge speed adjustment. This function is only active whenever ***both*** the NUDGE and CLOSE inputs are energized.

Setting the door obstruction detection and trip settings (PLEASE READ CAREFULLY)

1. Begin these adjustments during a normal close cycle only...do *not* hold back on the door.

2. CLOSE FORCE: (This pot must be adjusted *before* the CL TRIP THRESH pot is set.

3. During a normal close (Do not obstruct the door) adjust the "CLOSE FORCE" pot adjustment *slowly* CCW ***until the door "trips" by itself during a normal (unobstructed) close run*** (when the trip occurs the door speed will default to the CLOSE LO speed setting.
   NOTE: If the CLOSE LO or CL TRIP THRESH pots are set too low, doors may completely stop after the "trip" occurs due to not enough armature voltage being applied to the motor to move the door from a standing start.

If this is the case, turn the CLOSE LO pot slightly CW (See notes regarding the CLOSE LO setting with the use of an OTIS 6970 operator). If this adjustment has a negative effect on the final low speed close operation when the doors are set up, it may be necessary to move the low speed slowdown cam position further *toward* the open direction (slow down sooner). Alternately, turning the ACCEL/DECEL pots slightly CW may improve the final close action)

4. After the door "trips" on it's own during an unobstructed run, turn the CLOSE FORCE pot ½ to 1 turn CW to add "headroom" so the door does not trip on it's own during a normal (unobstructed) run.

TRIP THRESH (remaining door edge force after "trip") adjustment:

1. Stall the door during the close operation, generally 1/3 of the way into the opening.

2. Using a spring-force gauge on the door edge, adjust the TRIP THRESH pot CCW (from full CW) until the door pressure indicated on the spring gauge is 30lbs or less (or whatever local codes dictate).

PUSHBUTTONS:

On-board pushbuttons for OPEN and CLOSE are provided for convenience of the installer. Press OPEN TEST for open operation, CLOSE for closing operation. For Nudging press NUDGE TEST and CLOSE TEST buttons simultaneously.

IMPORTANT NOTES FOR OTIS 6970 AND OTHER OPERATORS THAT MAINTAIN THE OPEN OR CLOSED PILOTS IN THE FULLY OPEN OR FULLY CLOSED POSITIONS:

In certain conditions the door controller board output is maintained by additional relay contacts (such as "DOX" and "DCX") which maintain the DO and DC pilots keeping the output energized in a fully open or fully closed door position (In the limit). This is sometimes necessary in OTIS equipment due to the need to power the doors close during a run and to keep them from closing from the full open position.

Care must be exercised when this condition is maintained. In this typical setup, the door controller board and cam switches cause the CLOSE "LO" or OPEN "LO" to be enabled when the door is in the physical limit. In this stalled condition, armature current is being delivered to the motor and the voltage across the armature represents primarily resistive losses that contribute to heating in the motor, as there is no door motion.

Armature output setting Recommendations:

1. When the door is in the open or close limits and assuming that the cam switches are set up correctly, the cams should be calling for Open "LO" or Close "LO" speed settings on the controller board. These "LO" voltages must be set as low as possible while not significantly retracting from the door operation during a "normal" open and close cycle.

2. Set the applied "LO" voltage to approx. 17vdc or lower as measured on the A1, A2 (armature) output from the door board. This will keep stalled armature current down and help prevent overheating when the LO is maintained in the Open or Closed limits.

3. If a Close or Open "LO" setting of 17vdc and under seems to be too low for good performance during "normal" door operation, than it will be necessary to move the cams to compensate for the final slowdown (slow down sooner).

4. Be absolutely certain that there is no "rollover" of the slowdown cams. Be sure that at the very end of an Open or Close cycle, the Medium or High speed cams *do not* "re-open" again calling for a much higher applied voltage to the motor at stall and even greater amounts of stalled motor currents.