ENTRON

APPLICATION NOTE 700138H
EN1000 CASCADE TERMINAL STRIP SKIP OPTION (TSS)
WIRING DIAGRAMS (available as of 5-14)

421214-030	Wiring Diagram, EN1000/S99/TSS-(1-8) Series, NEMA Cabinet, 460VAC
421214-040	Wiring Diagram, EN1000/TSS-(1-8) Series, 230/380/460/575V
421214-041	Wiring Diagram, EN1000/VE/TSS-(1-8) Series, 230/380/460/575V, with DC Valve Output
421214-046	Wiring Diagram, EN1000/TSS-(1-8)FP(SCR), 230/380/460/575V
421214-051	Wiring Diagram, EN1000/VE/TSS-(1-8) Series, 230/380/460/575V
421438-021	Wiring Diagram, EN1001/TSS-(1-8) Series, 230/380/460/575V

EN1000 CASCADE TERMINAL STRIP SKIP option allows the ability to deactivate (skip) any schedule associated with selected Contactor using an external switch. A single pole contact connection is necessary for each Contactor being skipped. This feature requires setting SCHEDULE SELECT *S.S.* in EXTENDED FUNCTIONS to *04* when used **without an S99 option**; set to *03* when using this option in conjunction **with an S99 option**. For more information, see Instruction Manual 700194, Section 5.4 Extended Functions.

External connections to TERMINAL STRIP SKIP option circuit board are shown in Figure 1. With switches in the state shown, all Contactors selected in a programmed schedule will be active. Any closure will disable the Contactor indicated by the Terminal Strip designation and corresponding LED.

A single pole contact (relay or switch) is necessary for each Contactor being skipped. Switches are **NOT** supplied.
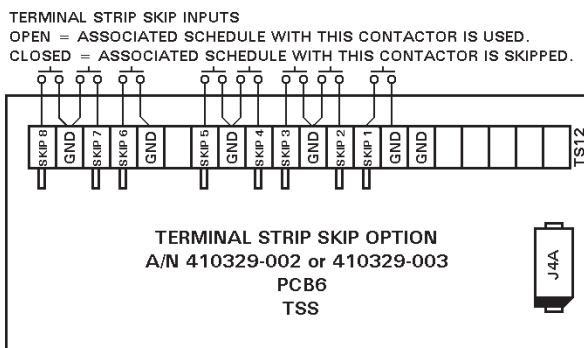

Figure 1. *TSS Circuit Board connections*

To retrofit an existing EN1000 Cascade Control with a TERMINAL STRIP SKIP option, the PROM (Integrated Circuit) on Cascade/Multi-Valve PCB (A/N 410321) **MUST** be P/N firmware version 619011-001**F** (or later), 619011-002 **ORIG** (or later) or 619044-002 **ORIG** (or later). If control was manufactured on or after January 1, 1998, it includes PROM firmware version 619011-001**F** (or later), 619011-002 **ORIG** (or later) or 619044-002 **ORIG** (or later). If control was manufactured before January 1, 1998, you must replace PROM on PCB 410321 with PROM included with retrofit kit. If control has PROM firmware version 619011-998 on 410321, replace it with current PROM firmware version.

For the retrofit application of TERMINAL STRIP SKIP in a Cascade Control **with S99** in an "L", "H", "G", or "U" Cabinet, substitute PCB 410329-003 for 410329-002. For TERMINAL STRIP SKIP to work with S99, PROM on PCB A/N 410321 must be firmware version 619011-001**K** (or later), 619011-002 **ORIG** (or later) or 619044-002 **ORIG** (or later). Also for Harness Assembly J4A-J4A-J4A-J4A-J4A, substitute A/N 322456 for 322356 in Door Mounted Controls and substitute A/N 322457 for 322357 in Side Mounted Controls. See pages 5 and 6 for installation instructions.

Contact Factory for available option combinations

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
In an existing "L", "H", "G" or "U" Cabinet

KIT ASSEMBLY NO. 600618-001		
Parts List, Door Mounted Control Panel Parts:		
1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB, Terminal Strip Skip
1	510236	Assembly, PCB Mounting Plate
1	322356	Harness Assembly, J4A-J4A-J4A-J4A
4	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
3	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-040	Wiring Diagram, EN1000/TSS, Selectable 230/380/460/575V
1	700138	Application Note, TSS Option

KIT ASSEMBLY NO. 600618-002		
Parts List, Side Mounted Control Panel Parts:		
1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB Terminal Strip Skip
1	510236	Assembly, PCB Mounting Plate
1	322357	Harness Assembly, J4A-J4A-J4A-J4A
4	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
3	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-040	Wiring Diagram, EN1000/TSS, Selectable 230/380/460/575V
1	700138	Application Note, TSS Option

1. Remove **ALL** power to control. Open door.
2. Remove J4A-J4A-J4A harness from Program Board/Terminal Strip Output Board/Terminal Strip Input Board.
3. Remove the four (4) screws holding the Terminal Strip Input Board (A/N 410329) to its mounting bracket. Rotate the Board 180° (so the terminal strip is at the top) and re-mount the Board using the same four (4) screws.
4. Drill and tap rear panel per Figure 2, be sure to vacuum or otherwise remove ALL metal chips before assembling PCB Mounting Plate (A/N 510236) to rear panel using 3 ea. 6-32 x 1/4 PHSMS, Phil., Brite. Add extra spacer (P/N 555031) to each existing spacer (4 places) to offset PCB 1″ from panel.
5. Mount External Terminal Strip Skip PCB (A/N 410329-002) to bracket (P/N 510236) using four (4) #6-32 x 1/4 PHSMS, Phil., Brite. See Figure 2.
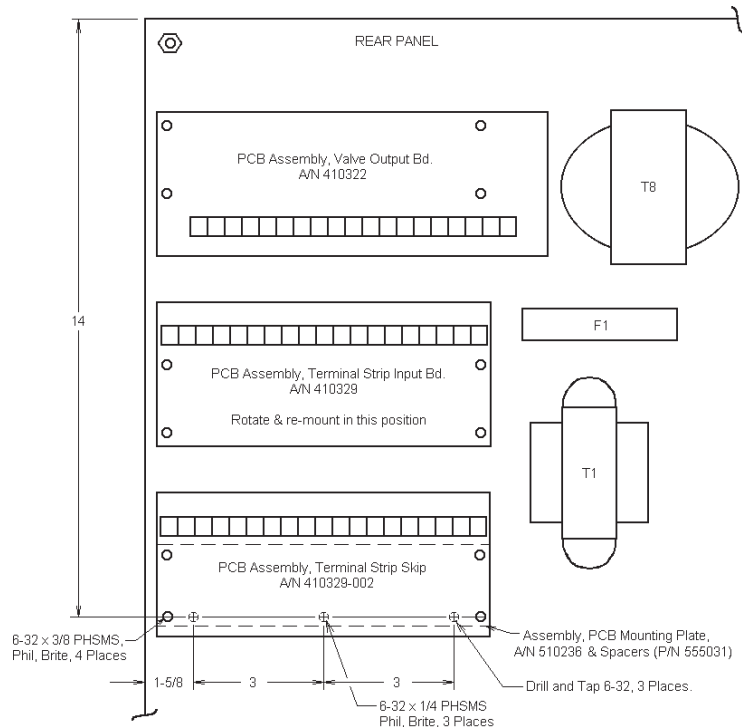6. Connect J4A-J4A-J4A-J4A Harness (A/N 322356 or 322357) per Cascade Wiring Diagram included with this kit.

Figure 2. *Mounting detail for "L", "H", "G" or "U" Cabinet*

NOTICE
On the Wiring Diagram, the dark band on connectors indicates stripe on ribbon harness. Harness **MUST** be installed with ribbon harness stripe oriented correctly.

7. Close door. Reapply power.

NOTICE
EN1000 Cascade/Multi-Valve Controls in "L", "H", "G", or "U" Cabinets with RS232 Driver Board **CANNOT** be modified for External Terminal Strip Skip Option (TSS).

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
In an existing "T" or "D" Cabinet

KIT ASSEMBLY NO. 600618-003
Parts List, "T" Cabinet:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB, Terminal Strip Skip
1	322356-001	Harness Assembly, J4A-J4A-J4A-J4A
8	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
4	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-040	Wiring Diagram, EN1000/TSS, Selectable 230/380/460/575V
1	700138	Application Note, TSS Option

KIT ASSEMBLY NO. 600618-004
Parts List, "D" Cabinet:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB, Terminal Strip Skip
1	322357-001	Harness Assembly, J4A-J4A-J4A-J4A
8	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
4	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-040	Wiring Diagram, EN1000/TSS, Selectable 230/380/460/575V
1	700138	Application Note, TSS Option

1. Remove **ALL** power to control. Open door.
2. Remove J4A-J4A-J4A harness from Program Board/Terminal Strip Output Board/Terminal Strip Input Board.
3. Remove the four (4) screws mounting the Terminal Strip Input Board (A/N 410329) to the Cabinet. Rotate the Board 180° (so the terminal strip is at the top) and re-mount the Board using the same four (4) screws.
4. Drill and tap the left side of the cabinet per Figure 3, be sure to vacuum or otherwise remove ALL metal chips before installing four (4) 6-32 x 3/8 PHSMS, Phil., Brite from outside the cabinet. On the inside of the cabinet, mount two (2) 6-32 x 1/2 spacers (P/N 555031) on each exposed thread (4 places) to offset PCB 1″ from cabinet wall.
5. Mount External Terminal Strip Skip PCB (A/N 410329-002) to spacers using four (4) 6-32 x 1/4 PHSMS, Phil., Brite. See Figure 3.
6. Connect J4A-J4A-J4A-J4A Harness (A/N 322356-001 for "T" Cabinets, A/N 322357-001 for "D" Cabinets) per Cascade Wiring Diagram included with this kit.

> ### NOTICE
> On the Wiring Diagram, the dark band on connectors indicates stripe on ribbon harness. Harness **MUST** be installed with ribbon harness stripe oriented correctly.
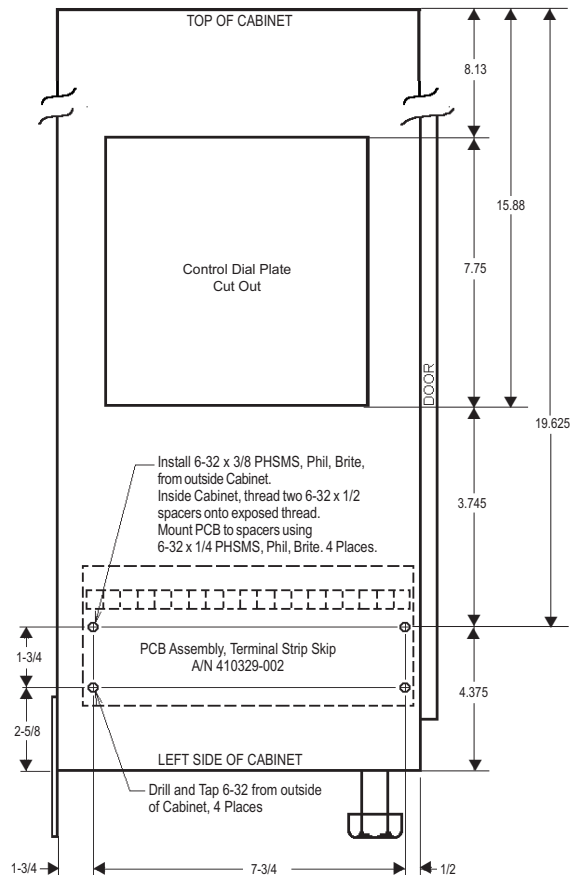
7. Close door. Reapply power.

Figure 3. *Mounting detail for "T" or "D" Cabinet*

> ### NOTICE
> EN1000 Cascade/Multi-Valve Controls in "T" or "D" Cabinets with RS232 Driver Board **CANNOT** be modified for External Terminal Strip Skip Option (TSS).

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
On an existing Flat Plate Cascade Control

KIT ASSEMBLY NO. 600618-005

Parts List, Flat Plate:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB, Terminal Strip Skip
1	322446	Harness Assembly, J4A-J4A-J4A-J4A
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-046	Wiring Diagram, EN1000/TSS, Selectable 230/380/460/575V
1	700138	Application Note, TSS Option

1. Remove **ALL** power to control.
2. Remove J4A-J4A-J4A harness from Program Board/Terminal Strip Output Board/Terminal Strip Input Board.
3. Mount External Terminal Strip Skip PCB (A/N 410329-002) to existing spacers using four (4) 6-32 x 3/8 PHSMS, Phil., Brite. See Figure 4.
4. Connect J4A-J4A-J4A-J4A Harness (A/N 322346) per Cascade Wiring Diagram included with this kit.

NOTICE
On the Wiring Diagram, the dark band on connectors indicates stripe on ribbon harness. Harness **MUST** be installed with ribbon harness stripe oriented correctly.

5. Reapply power.

TO CONTROL PANEL

ROUTE NEW HARNESS UNDER PCB.

T8

T1

F1

A/N 410329

Terminal Strip Input Bd.

TSS Terminal Strip Skip Option A/N 410329-002

Terminal Strip Output Bd. A/N 410322
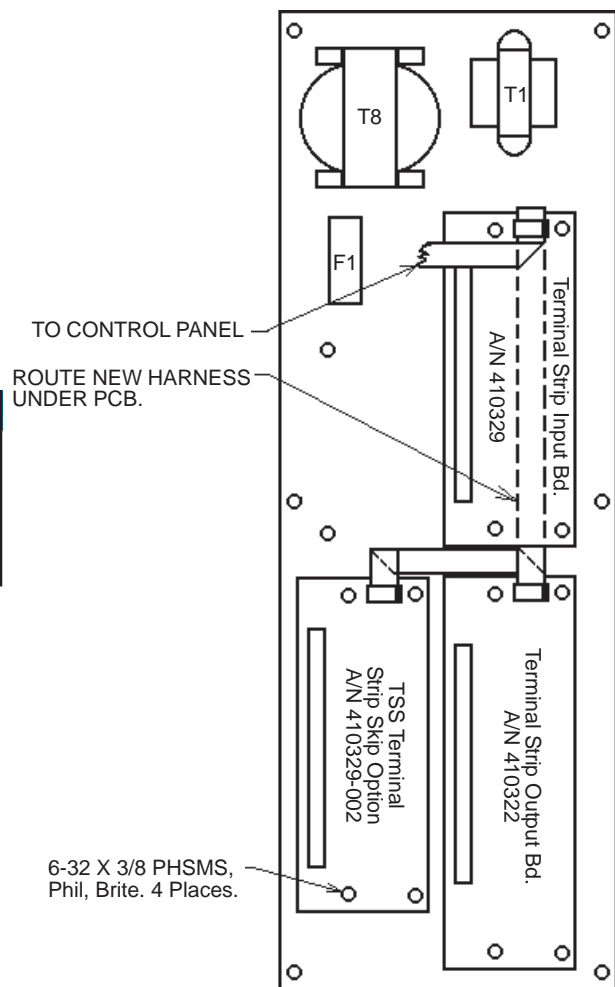
6-32 X 3/8 PHSMS, Phil, Brite. 4 Places.

Figure 4. *Mounting detail for Flat Plate Cascade*

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
In an existing "L", "H", "G" or "U" Cabinet with S99 Option

KIT ASSEMBLY NO. 600618-006
Parts List, Door Mounted Control Panel Parts:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-003	Assembly, PCB, Terminal Strip Skip
1	322456	Harness Assembly, J4A-J4A-J4A-J4A-J4A
12	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
4	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-030	Wiring Diagram, EN1000/S99/TSS, 460V
1	700138	Application Note, TSS Option

KIT ASSEMBLY NO. 600618-007
Parts List, Side Mounted Control Panel Parts:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-003	Assembly, PCB Terminal Strip Skip
1	322457	Harness Assembly, J4A-J4A-J4A-J4A-J4A
12	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
4	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-030	Wiring Diagram, EN1000/S99/TSS, 460V
1	700138	Application Note, TSS Option

1. Remove **ALL** power to control. Open door.
2. Remove J4A-J4A-J4A-J4A harness from Program Board/Terminal Strip Output Board/Terminal Strip Input Board.
3. Remove the four (4) screws mounting the Terminal Strip Input Board (A/N 410329) to the Cabinet. Rotate the Board 180° (so the terminal strip is at the top) and re-mount the Board using the same four (4) screws.
4. Drill and tap the left side of the cabinet per Figure 5, be sure to vacuum or otherwise remove ALL metal chips before installing four (4) 6-32 x 3/8 PHSMS, Phil., Brite from outside the cabinet. On the inside of the cabinet, mount two (2) 6-32 x 1/2 spacers (P/N 555031) on each exposed thread (4 places) to offset PCB 1″ from cabinet wall.
5. Remove S99 PCB (A/N 410329-001) from bracket on rear panel, retaining 4 screws to mount TSS PCB in Step 6. Move S99 PCB to spacers on left side of cabinet; mount using four (4) 6-32 x 1/4 PHSMS, Phil., Brite. See Figure 5.
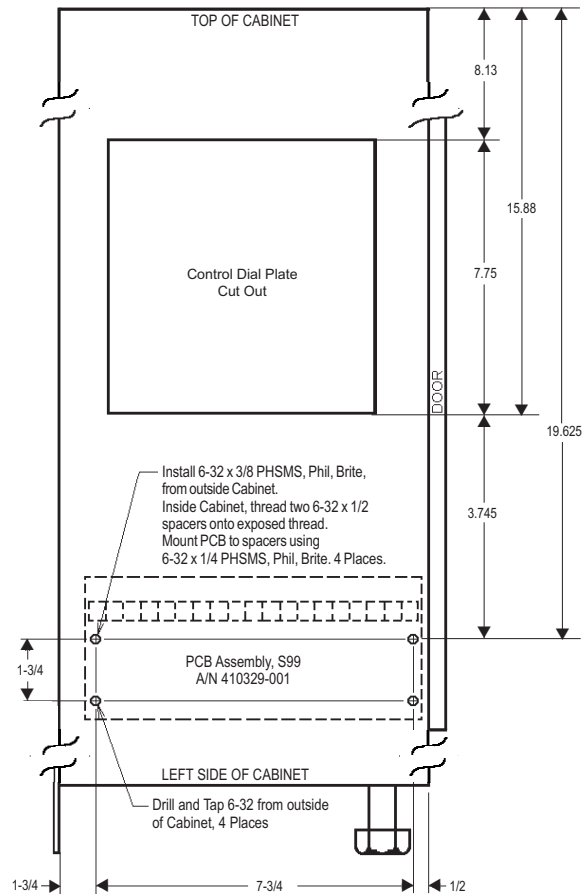
(Instructions continued on following page)

TOP OF CABINET

8.13

15.88

7.75

Control Dial Plate
Cut Out

DOOR

19.625

3.745

Install 6-32 x 3/8 PHSMS, Phil, Brite, from outside Cabinet.
Inside Cabinet, thread two 6-32 x 1/2 spacers onto exposed thread.
Mount PCB to spacers using 6-32 x 1/4 PHSMS, Phil, Brite. 4 Places.

1-3/4

PCB Assembly, S99
A/N 410329-001

LEFT SIDE OF CABINET

Drill and Tap 6-32 from outside of Cabinet, 4 Places

1-3/4   7-3/4   1/2

Figure 5. *Mounting detail for "L", "H", "G" or "U" Cabinet with S99*

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
In an existing "L", "H", "G" or "U" Cabinet with S99 Option (cont.)

6. Add extra spacer (P/N 555031) to each existing spacer (4 places) to offset PCB 1″ from panel. Mount External Terminal Strip Skip PCB (A/N 410329-003) to existing bracket (P/N 510236) using four (4) screws retained from S99 PCB. See Figure 6.

7. Connect J4A-J4A-J4A-J4A-J4A Harness (A/N 322456 for Door Mounted Cabinets or 322457 for Side Mounted Cabinets) per Cascade Wiring Diagram included with this kit.

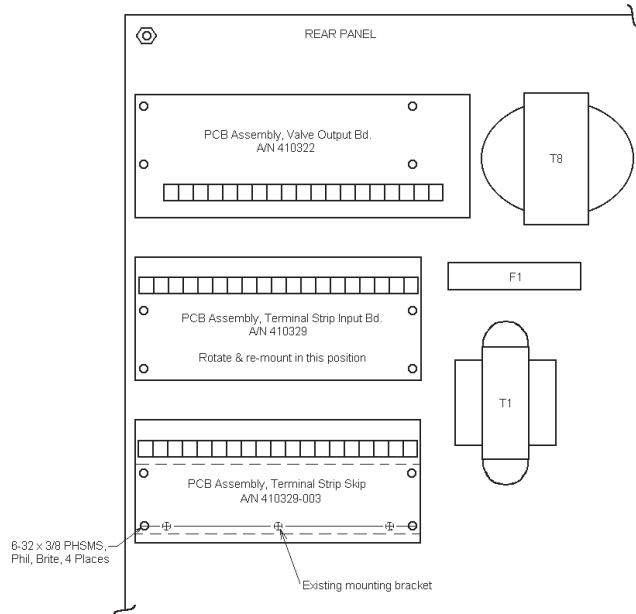| NOTICE |
|---|
| On the Wiring Diagram, the dark band on connectors indicates stripe on ribbon harness. Harness **MUST** be installed with ribbon harness stripe oriented correctly. |

8. Close door. Reapply power.

REAR PANEL

PCB Assembly, Valve Output Bd.
A/N 410322

T8

F1

PCB Assembly, Terminal Strip Input Bd.
A/N 410329

Rotate & re-mount in this position

T1

PCB Assembly, Terminal Strip Skip
A/N 410329-003

6-32 x 3/8 PHSMS,
Phil, Brite, 4 Places

Existing mounting bracket

Figure 6. *External TSS Mounting detail for "L", "H", "G" or "U" Cabinet*

NOTICE
EN1000 Cascade/Multi-Valve Controls in "L", "H", "G", or "U" Cabinets with RS232 Driver Board **CANNOT** be modified for External Terminal Strip Skip Option (TSS).

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
In an existing "L", "H", "G" or "U" Cabinet with VE Option

KIT ASSEMBLY NO. 600618-008
Parts List, Door Mounted Control Panel Parts:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB, Terminal Strip Skip
1	322456	Harness Assembly, J4A-J4A-J4A-J4A-J4A
4	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
4	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-051	Wiring Diagram, EN1000/VE/TSS, 460V
1	700138	Application Note, TSS Option

KIT ASSEMBLY NO. 600618-009
Parts List, Side Mounted Control Panel Parts:

1	619044-002	EPROM, 64K x 8, Programmed
1	410329-002	Assembly, PCB Terminal Strip Skip
1	322457	Harness Assembly, J4A-J4A-J4A-J4A-J4A
4	555031	Spacer, 6-32 x 1/2, 1/4 Hex Brass, Brite
4	557003	6-32 x 1/4 PHSMS, Phil., Brite
4	557006	6-32 x 3/8 PHSMS, Phil., Brite
1	421214-051	Wiring Diagram, EN1000/VE/TSS, 460V
1	700138	Application Note, TSS Option

1. Remove **ALL** power to control. Open door.
2. Remove J4A-J4A-J4A-J4A harness from Program Board/Terminal Strip Output Board/ Terminal Strip Input Board.
3. Drill and tap the left side of the cabinet per Figure 5, be sure to vacuum or otherwise remove ALL metal chips before installing four (4) 6-32 x 3/8 PHSMS, Phil., Brite from outside the cabinet. On the inside of the cabinet, mount one 6-32 x 1/2 spacers (P/N 555031) on each exposed thread (4 places) to offset PCB 1/2″ from cabinet wall.
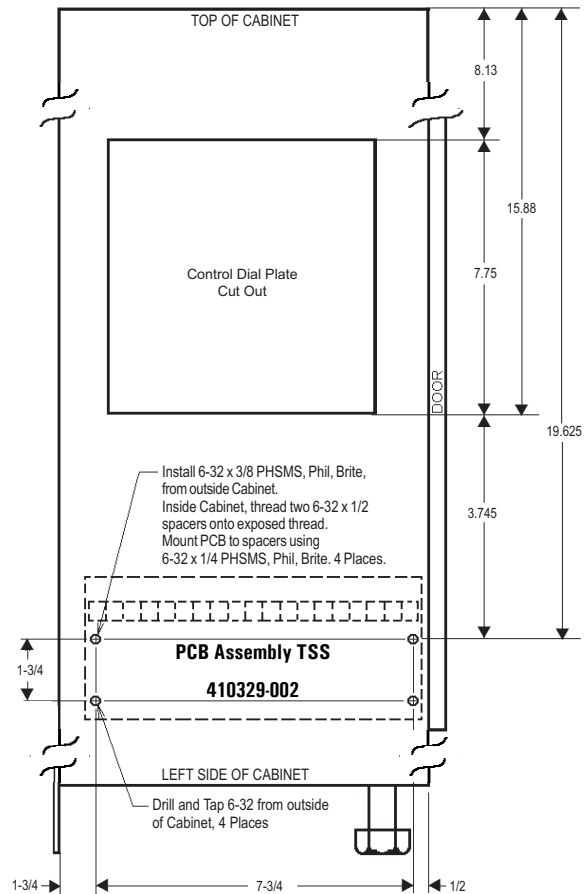
(Instructions continued on following page)

Figure 7. *Mounting detail for "L", "H", "G" or "U" Cabinet with VE*

CUSTOMER INSTALLATION OF TERMINAL STRIP SKIP OPTION (TSS)
In an existing "L", "H", "G" or "U" Cabinet with VE Option (cont.)

4. Mount External Terminal Strip Skip PCB (A/N 410329-002) to spacers installed in step 3 using four (4) screws See Figure 7.

5. Connect J4A-J4A-J4A-J4A-J4A Harness (A/N 322456 for Door Mounted Cabinets or 322457 for Side Mounted Cabinets) per Cascade Wiring Diagram included with this kit.

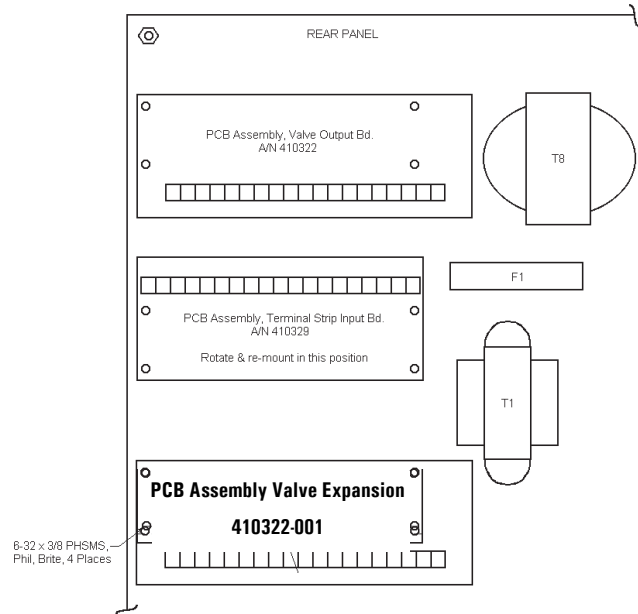| *NOTICE* |
|---|
| On the Wiring Diagram, the dark band on connectors indicates stripe on ribbon harness. Harness **MUST** be installed with ribbon harness stripe oriented correctly. |

6. Close door. Reapply power.

Figure 8. *External VE Mounting detail for "L", "H", "G" or "U" Cabinet*

NOTICE
EN1000 Cascade/Multi-Valve Controls in "L", "H", "G", or "U" Cabinets with RS232 Driver Board **CANNOT** be modified for External Terminal Strip Skip Option (TSS).