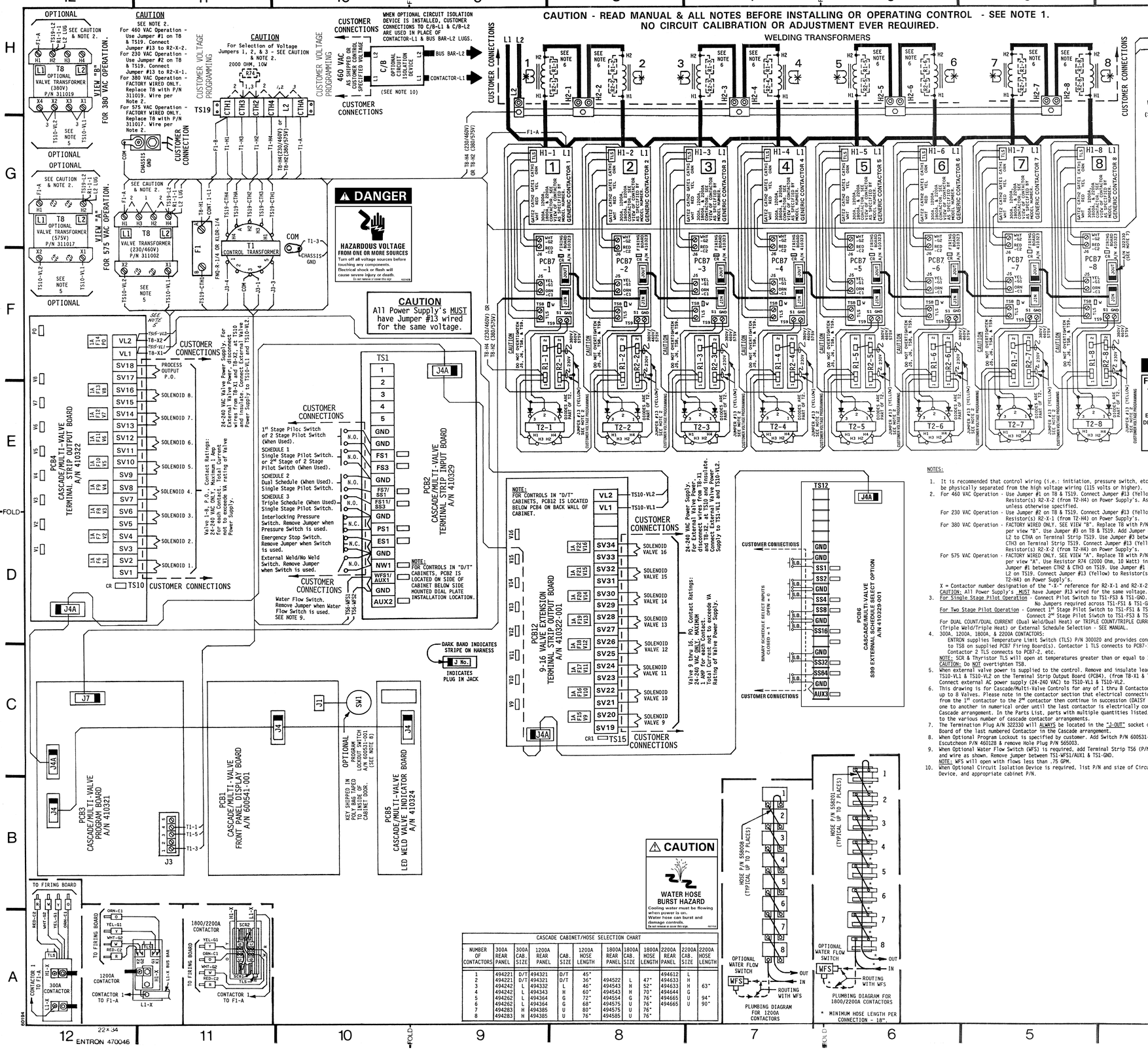


NOTICE

FOR SERVICE ON THIS CONTROL
Contact Your Machine Dealer Or
ENTRON CONTROLS LLC.
DIRECTLY: (864) 416-0190
601 HIGH TECH COURT
GREER, SC 29650
FAX# (864) 416-0195

NOTES:

1. It is recommended that control wiring (i.e.: initiation, pressure switch, etc.) be physically separated from the high voltage wiring (115 volts or higher).
2. For 460 VAC Operation - Use Jumper #1 on T8 & TS19. Connect Jumper #13 (Yellow) to Resistor(s) R2-X-2 (from T2-H4) on Power Supply's. As shipped unless otherwise specified.
   For 230 VAC Operation - Use Jumper #2 on T8 & TS19. Connect Jumper #13 (Yellow) to Resistor(s) R2-X-1 (from T2-H4) on Power Supply's.
   For 380 VAC Operation - FACTORY WIRED ONLY. SEE VIEW "B". Replace T8 with P/N 311019. Wire per view "B". Use Jumper #3 on T8 & TS19. Add Jumper #3 between L2 to CTH4 on Terminal Strip TS19. Use Jumper #3 between CTH2 & CTH3 on Terminal Strip TS19. Connect Jumper #13 (Yellow) to Resistor(s) R2-X-2 (from T2-H4) on Power Supply's.
   For 575 VAC Operation - FACTORY WIRED ONLY. SEE VIEW "A". Replace T8 with P/N 311017. Wire per view "A". Use Resistor R74 (2000 Ohm, 10 Watt) in place of Jumper #1 between CTH2 & CTH3 on TS19. Use Jumper #1 between CTH4 & L2 on TS19. Connect Jumper #13 (Yellow) to Resistor(s) R2-X-2 (from T2-H4) on Power Supply's.
   X = Contactor number designation of the "-X-" reference for R2-X-1 and R2-X-2.
   CAUTION: All Power Supply's MUST have Jumper #13 wired for the same voltage.
3. For Single Stage Pilot Operation - Connect Pilot Switch to TS1-FS3 & TS1-GND. No Jumpers required across TS1-FS1 & TS1-GND.
   For Two Stage Pilot Operation - Connect 1st Stage Pilot Switch to TS1-FS1 & TS1-GND. Connect 2nd Stage Pilot Siwtch to TS1-FS3 & TS1-GND.
   For DUAL COUNT/DUAL CURRENT (Dual Weld/Dual Heat) or TRIPLE COUNT/TRIPLE CURRENT (Triple Weld/Triple Heat) or External Schedule Selection - SEE MANUAL.
4. 300A, 1200A, 1800A, & 2200A CONTACTORS:
   ENTRON supplies Temperature Limit Switch (TLS) P/N 300020 and provides connections to TS8 on supplied PCB7 Firing Board(s). Contactor 1 TLS connects to PCB7-1. Contactor 2 TLS connects to PCB7-2. etc.
   NOTE: SCR & Thyristor TLS will open at temperatures greater than or equal to 150 F.
   CAUTION: Do NOT overtighten TS8.
5. When external valve power is supplied to the control. Remove and insulate leads TS10-VL1 & TS10-VL2 on the Terminal Strip Output Board (PCB4). (from TB-X1 & TB-X2). Connect external AC power supply (24-240 VAC) to TS10-VL1 & TS10-VL2.
6. This drawing is for Cascade/Multi-Valve Controls for any of 1 thru 8 Contactors and up to 8 Valves. Please note in the contactor section that electrical connections connect from the 1st contactor to the 2nd contactor then continue in succession (DAISY CHAIN) from one to another in numerical order until the last contactor is electrically connected in the Cascade arrangement. In the Parts List, parts with multiple quantities listed, correspond to the various number of cascade contactor arrangements.
7. The Termination Plug A/N 322330 will ALWAYS be located in the "J-OUT" socket on the Firing Board of the last numbered Contactor in the Cascade arrangement.
8. When Optional Program Lockout is specified by customer. Add Switch P/N 600531-001 and Escutcheon P/N 460128 & remove Hole Plug P/N 565003.
9. When Optional Water Flow Switch (WFS) is required. add Terminal Strip TS6 (P/N 335017) and wire as shown. Remove jumper between TS1-WFS1/AUX1 & TS1-GND.
   NOTE: WFS will open with flows less than .75 GPM.
10. When Optional Circuit Isolation Device is required. list P/N and size of Circuit Isolation Device. and appropriate cabinet P/N.

MANUFACTURING INSTRUCTIONS:
SEE DRAWINGS #440024, #515055, & #510095 FOR MECHANICAL ASSEMBLY INSTRUCTIONS.
See Drawing #440093 for Crating Instructions.
See Drawing #440428 for Label Locations.

CAUTION
SEE NOTE 2.
Control Shipped is Wired for 460 VAC Operation unless otherwise specified.

CASCADE CABINET/HOSE SELECTION CHART

| NUMBER OF CONTACTORS | 300A REAR PANEL | 300A CAB. SIZE | 1200A REAR PANEL | CAB. SIZE | 1200A HOSE LENGTH | 1800A REAR PANEL | 1800A CAB. SIZE | 1800A HOSE LENGTH | 2200A REAR PANEL | 2200A CAB. SIZE | 2200A HOSE LENGTH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 494221 | D/T | 494321 | D/T | 45" | | | | 494612 | L | |
| 2 | 494221 | D/T | 494321 | D/T | 36" | 494522 | L | 47" | 494633 | H | |
| 3 | 494242 | L | 494332 | L | 46" | 494543 | H | 52" | 494633 | H | 63" |
| 4 | 494242 | L | 494343 | H | 60" | 494543 | H | 70" | 494644 | G | |
| 5 | 494262 | L | 494364 | G | 72" | 494554 | G | 76" | 494665 | U | 94" |
| 6 | 494262 | L | 494364 | G | 68" | 494575 | U | 76" | 494665 | U | 90" |
| 7 | 494283 | H | 494385 | U | 80" | 494575 | U | 76" | | | |
| 8 | 494283 | H | 494385 | U | 76" | 494585 | U | 76" | | | |

PARTS LIST - CONTROL SECTION

| SIDE MT'D DIAL PLATE | DOOR MT'D DIAL PLATE | DESIG. | PART NO. | DESCRIPTION |
|---|---|---|---|---|
| 1 | 1 | | 600558 | Assem., Dial Plate, EN1000 Cascade, Consisting of: |
| 1 | 1 | PCB1 | 600541-001 | Assem., Switch, Front Panel Display Board |
| 1 | 1 | | 540248 | Illustrated Panel, Dial Plate, EN1000 Cascade/Multi-Valve |
| 2 | 2 | | 515096 | Display Window, Panel, Red Filter, Cont. & Valve, EN1000 Cascade |
| 1 | 1 | | 515104 | Display Window, Panel, Red Filter, LED, EN1000 Cascade |
| 1 | 1 | PCB5 | 410324 | Assem., PCB, Contactor Weld & Valve Indicator Board, EN1000 Casc. |
| 1 | 1 | PCB3 | 410321 | Assem., PCB, Program Board, EN1000 Cascade/Multi-Valve |
| Ø | Ø | SW1 | 600531-001 | Assem., Switch, Keylock, Momentary, SPST |
| 1 | 1 | | 565003 | Hole Plug, 3/4" Diam., Black, (For Keylock Hole) |
| | 1 | J3 | 322340-004 | Assem., Harness, Power, Door Mounted |
| 1 | 1 | J1 | 322341-004 | Assem., Harness, Power, Side Mounted |
| 1 | 1 | J4-/J6-/J4 | 322342 | Assem., Harness, Seq. Display Bd./Program Bd./LED Indicator Bd. |
| | *1 | J4A-J4A-J4A -J4A-J4A | 322456 | Assem.,Harness,Program/Output/Input/VE Bd./S99 Bd.,Door Mt'd. |
| | *1 | J4A-J4A-J4A -J4A-J4A | 322457 | Assem.,Harness,Program/Output/Input/VE Bd./S99 Bd.,Side Mt'd. |
| 1 | 1 | TS10-TS15 | 322435 | Assem., Harness, Term Output Bd. to Valve Extension Term Bd. |
| | *1 | J7-IN | 322346 | Assem., Harness, Program Bd. to Firing Board, Door Mounted |
| | *1 | J7-IN | 322347 | Assem., Harness, Program Bd. to Firing Board, Side Mounted |

PARTS LIST - CONTACTOR SECTION

| EN1000-2200 | EN1000-1800 | EN1000-1200 | EN1000-300 | DESIG. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|---|
| + | + | + | | TS6 | 335017 | Terminal Strip, 2 Pin, 15A, (For WFS) |
| 1 | 1 | 1 | 1 | TS19 | 335024 | Terminal Strip, 6 Pin, 20A |
| 1 | 1 | 1 | 1 | T1 | 310001 | Transformer, Control, (Part of J3 Harness) |
| 1 | 1 | 1 | 1 | T8 | 311002 | Transformer, Valve, 150VA, 230/460V |
| ⊠ | ⊠ | ⊠ | ⊠ | T8 | 311017 | Transformer, Valve, 150VA, 575V |
| X | X | X | X | T8 | 311019 | Transformer, Valve, 150VA, 380/408/415V |
| X | X | X | X | T8 | 311022 | Transformer, Valve, 250VA |
| X | X | X | X | T8 | 311021 | Transformer, Valve, 500VA |
| 2 | 2 | 2 | 2 | (T8) | 325149 | Assem., Wire, Valve Transformer, 22 Ga., Black |
| 1-3 | | | | | 341040 | Insulator, Standoff, L2 Bus Bar |
| | | | 1 | | 346011 | Lug, Screw, 1/4" Bolt to 2/0 Wire, L1, L2, H1, & 600A Contactor |
| | | | 1-4 | | 346015 | Lug, Screw, 1/4" Bolt to Dual 2/0 Wire, L2 Bus Bar |
| | | 2-10 | | | 346002 | Lug, Screw, 1/4" Bolt to 4/0 Wire, L1, L2, & H1 |
| | | 1-4 | | | 346006 | Lug, Screw, 1/4" Bolt to Dual 4/0 Wire, L2 Bus Bar |
| | 2-12 | | | | 346005 | Lug, Screw, 1/4" Bolt to 350 MCM Wire, L1, L2, & H1 |
| | 1-10 | | | | 346010 | Lug, Screw, 1/4" Bolt to Dual 350 MCM Wire, L2 Bus Bar |
| 3-14 | | | | | 346003 | Lug, Screw, 1/4" Bolt to 500 MCM Wire, L1, L2, & H1 |
| 0-2 | | | | | 346016 | Lug, Screw, 1/4" Bolt to Dual 500 MCM Wire, L2 Bus Bar |
| | | | #1-2 | | 600520 | Assem., Contactor, Air, 300A, w/TLS, 460/575V |
| | | | #2-7 | | 600549-004 | Assem., Contactor, Air, 300A, w/TLS, 460/575V, w/o L1 Lug |
| | | 1-8 | | | 600598 | Assem., Contactor, Water, 1200A, 460/575V |
| | 1-8 | | | | 600549 | Assem., Contactor, Water, 1800A, 460/575V |
| 1-8 | | | | | 600535 | Assem., Contactor, Water, 2200A, 460/575V |
| 1-8 | | | | TLS | 300020 | Switch, Temp. Limit, (N.C.). (Part of 600520 & 600520-004) |
| 1-8 | 1-8 | | | | 530021 | Plate, Mounting, 1800/2200A Contactor |
| 1-8 | 1-8 | | | | 535136 | Bracket, Mounting, 1800/2200A Contactor Plate |
| | | | 1-8 | | 525035-001 | Bracket, Mounting, 300A Contactor |
| 1-8 | | | | | 600547-005 | Assem., Power Supply, Selectable 230/380/460/575V, Consisting of: |
| 1-8 | | | | T2 | 600548-003 | Transformer, Sense. (Part of 600547-005) |
| 2-16 | | | | R1,2 | 225016 | Resistor, Power, Surge, 500 Ohm, 100W. (Part of 600547-005) |
| 1-8 | | | | (R1,2) | 325024 | Assem., Wire, Surge Resistor, 18 Ga., Black.(Part of 600547-005) |
| 1-8 | | | | PCB7-1 thru -8 | 410323 | Assem., PCB, Firing Board, Cascade, (Mounted on Power Supply) |
| *6-7 | | | | JIN-JOUT | 322348 | Assem., Harness, Firing Bd., Input to Output |
| 1 | 1 | 1 | 1 | JOUT | 322330 | Assem., Termination Plug, Cascade Firing Bd. (SEE NOTE 7) |
| ⊠ | ⊠ | ⊠ | ⊠ | R74 | 600048 | Assem., Resistor, Power, 2000 Ohm, 10W. (For 575V) |
| 1 | 1 | 1 | 1 | F1 | 308010 | Fuseholder, 1 Pole, Mini, 600V, HPC-iLBB5) |
| 1 | 1 | 1 | 1 | F1 | 307024 | Fuse, Control, 1/4-A, 1/4Q-K-1/4 or KLDR-1/4 |
| 9 | 9 | 9 | 9 | F6-14 | 307022 | Fuse, 1 Amp, Slow Blow, 2AG, (Part of 410322) |
| 1 | 1 | 1 | 1 | PCB6 | 410329-001 | Assem., PCB, S99 External Schedule Select |
| 1 | 1 | 1 | 1 | PCB12 | 410322-001 | Assem., PCB, 9-16 Valve Extension Terminal Strip Output Bd. |
| 1 | 1 | 1 | 1 | | 346004 | Lug, Screw, Chassis GND, 5/16" Bolt to 2/0 Wire |
| 1 | 1 | 1 | 1 | PCB2 | 410329 | Assem., PCB, Terminal Strip Input Bd., Cascade |
| 1 | 1 | 1 | 1 | PCB4 | 410322 | Assem., PCB, Terminal Strip Output Bd., Cascade |
| 2 | 2 | 2 | 2 | | 510236 | Plate Mounting, Terminal Strip Input & Output Boards |
| SEE CAB/HOSE SELECT CHART | | | | | 900045 | Hose, 3/8" I.D. |
| 0-7 | 0-7 | 0-7 | | | 558008 | Hose, 3/8" I.D. x 12" Long |
| 4-18 | | | | | 558201 | Hose, 3/8" I.D. x 2-3/8" Dia. Coil x 18" Long |
| 2 | 2 | 2 | | | 556010 | Hose Clamp, 3/8" Hose |
| + | + | + | | | 600179 | Assem., Water Fitting, 3/8" Hose |
| | | | | WFS | 600297-004 | Assem., Water Flow Switch, 3/8" Hose |
| △ | △ | △ | △ | C/B | | Circuit Breaker, Pole, Amp, V. (SEE NOTE 10) |
| SEE CASCADE CABINET/HOSE SELECTION CHART | | | | | 510247 | Cabinet, Control, Style "D/T", w/Circuit Breaker |
| | | | | | 510257 | Cabinet, Control, Style "LS/LF", w/Circuit Breaker |
| | | | | | 510053 | Cabinet, Control, Style "HS/HF", w/Circuit Breaker |
| | | | | | 510055 | Cabinet, Control, Style "GS/GF", w/Circuit Breaker |
| | | | | | 510114 | Cabinet, Control, Style "US/UF", w/Circuit Breaker |
| 1 | 1 | 1 | 1 | | 700115 | Application Note, S99 Option |
| 1 | 1 | 1 | 1 | | 700146 | Application Note, 9-16 Valve Output Circuits |
| 1 | 1 | 1 | 1 | | 700194 | Manual, EN1000 Cascade |
| 1 | 1 | 1 | 1 | | 421386 | Logic Diagram, EN1000 Cascade |
| 1 | 1 | 1 | 1 | | 421214-042 | Wiring Diagram, EN1000/VE/S99-Series. Cascade/Multi-Valve |

Ø Optional Keylock when specified by customer. See Note 8. Pack key in poly bag P/N 900148 & attach to door w/yellow tape P/N 900118.
△ Optional. See Note 10.
X Optional.
⊠ Substitution or addition of part when 575V control is specified.
\+ Optional Water Flow Switch Assembly (WFS). An additional Thirty-Six inches (36") of hose. P/N 900045 (as specified), and two (2) hose clamps, P/N 556010 are to be supplied. Add TS6 P/N 335017. See Note 9.
\# For 1 & 2 Cascade controls with 300A Contactor(s). use Contactor P/N 600520.
For 3 thru 8 Cascade controls with 300A Contactors. use 600520 for Contactor number 1 & use 600520-004 for Contactor Numbers 2 thru 8.
* For 1 or 2 Cascade control in "T" Cabinet substitute J7-IN Harness 322346-001 for 322346.
For 1 or 2 Cascade control in "D" Cabinet substitute J7-IN Harness 322347-001 for 322347.
For 2 Cascade control in "D" or "T" Cabinet substitute JIN-JOUT Harness 322348-001 for 322348.

| REV | AUTH | DESCRIPTION | DRWN BY DATE | CHK BY DATE |
|---|---|---|---|---|
| — | — | ORIGINAL RELEASE | | |

ENTRON CONTROLS INC

| SCALE | DATE | DRAWN BY | CHK'D BY | APPROVED BY |
|---|---|---|---|---|
| | 10/31/07 | DPD | | |

TOLERANCE UNLESS SPECIFIED
ANGLES: ± ½°
DECIMALS: ± .010
FRACTIONS: ± 1/64

REVISED: REV LTR | APPROVED BY | DATE

WIRING DIAGRAM, EN1000/VE/S99-SERIES, CASCADE/MULTI-VLV CONTROL, 1-8 CONTACTORS/8 VALVE OUTPUT CIRCUITS, WIRED FOR SELECTABLE 230/380/460/575 VAC OPERATION

NEXT ASSM/USED ON | DRAWING NUMBER 421214-042 | REV orig

DRAWING NUMBER 421214-042 REV orig