APPLICATION NOTE 700189L
DC VALVE OUTPUTS
EN1000/EN1001/2000 SERIES CONTROLS
Wiring Diagrams – see page 7

As low voltage DC electronic components become more prevalent in welding systems, weld guns, robotics, and PLCs need to meet European and International standards. Many valves are now being supplied with 24 volt DC coils.

Most resistance welding systems will use two-way, three-way or the most common four-way solenoid air valve with 120 VAC coils. Standard controls are equipped with 120VAC/230VAC 1A solid state triac relays for valve outputs. Triacs do not turn off until voltage or current goes to zero thus they will not work with DC components (see Figure 2). The DC option incorporates the use of mosfets which can switch DC voltages from 5-60 VDC at 1A. The mosfet device can turn on and off at any time (see Figure 1).

The DC valve output Terminal Strip/Firing Board (A/N 410319-011, 410319-013, 410319-016, 410319-017, 410360-004, 410360-005, 410333-012, 410322-002, or 410322-003 depending on control used) should be used in systems that require low voltage DC valves. This board would replace any 410319, 410360, 410333, or 410322 variant with equivalent valve output along with the valve power supply changed to DC. **See page 7 for related Wiring Diagrams.**

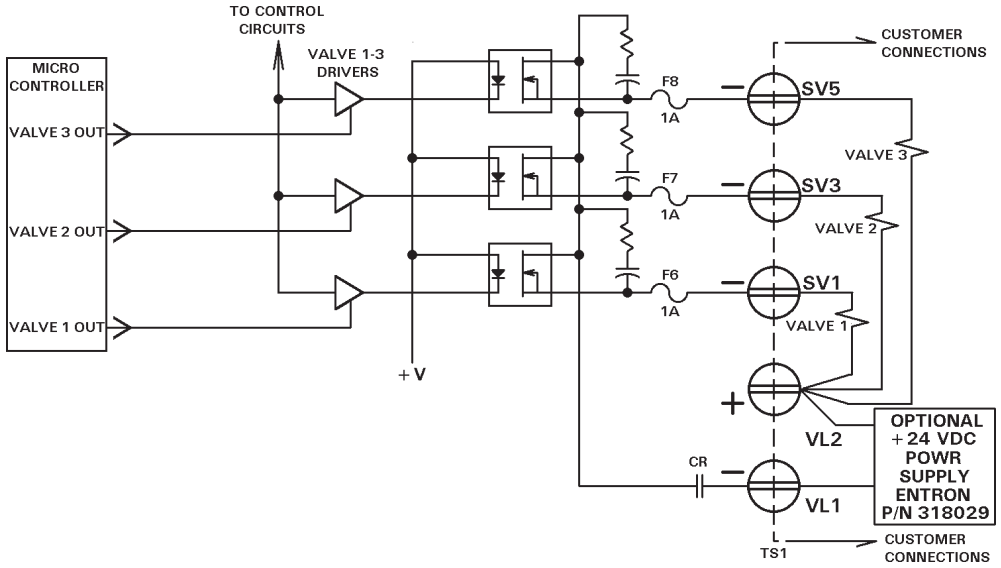

Figure 1. *Typical Block Diagram with DC Solid State Relays*

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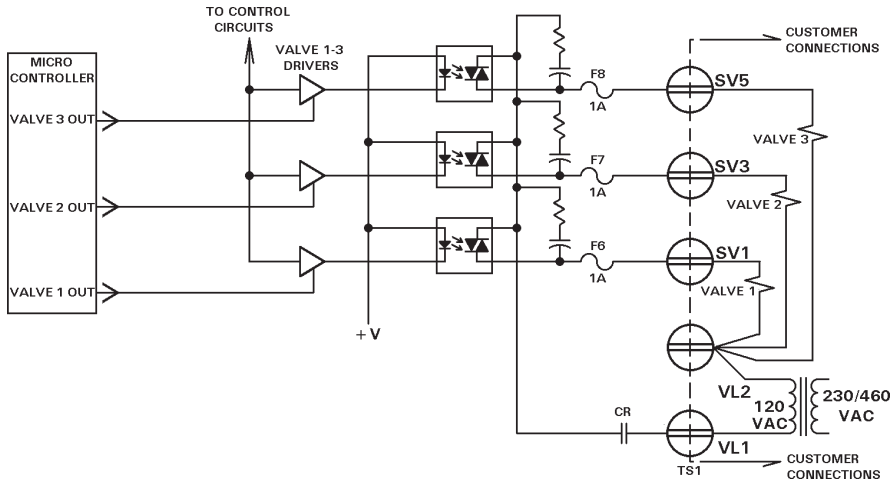
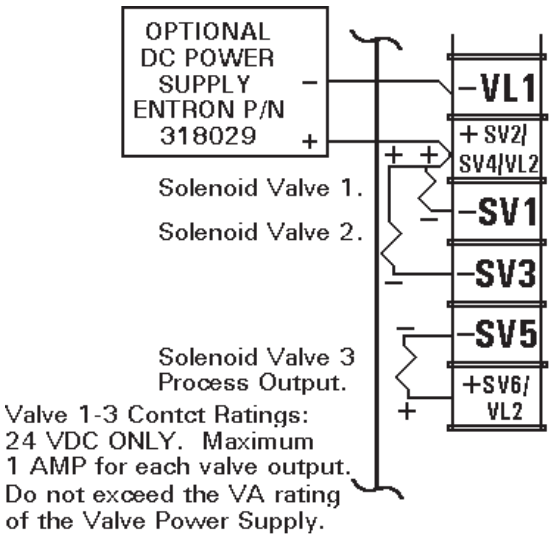


Figure 2. *Typical Block Diagram with AC Solid State Relays*

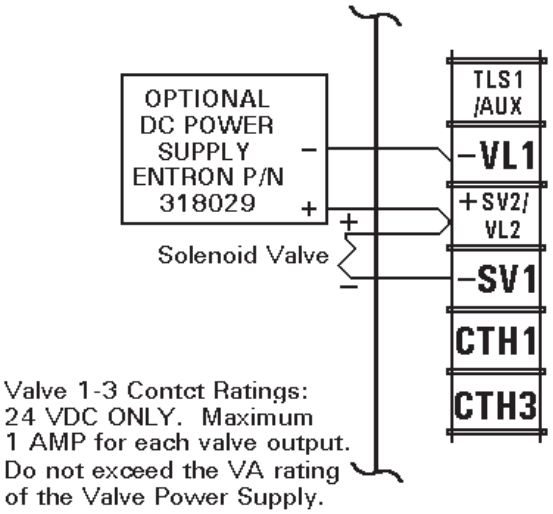
The DC output is accomplished by simply changing control Terminal Strip/Firing Board. Please consult factory for correct board replacement and availability.

The DC terminal strip 410319-011 or 410333-012 uses mosfet devices. These devices are rated at 5-60 VDC at 1A.

If the customer does not have a DC power supply, ENTRON can supply one at 120/240 VAC input with 24 VDC out at 1A (ENTRON P/N 318029 as of 6-30-05). See Page 3 for information on power supply specifications. When using more than 1 valve at a time, load should not exceed 1A per device and total load must not exceed power supply rating.



TERMINAL BOARD ASSEM. NO. 410319-011, 410319-013, 410319-016, 410319-017, 410360-004, OR 410360-005



TERMINAL BOARD ASSEM. NO. 410333-012

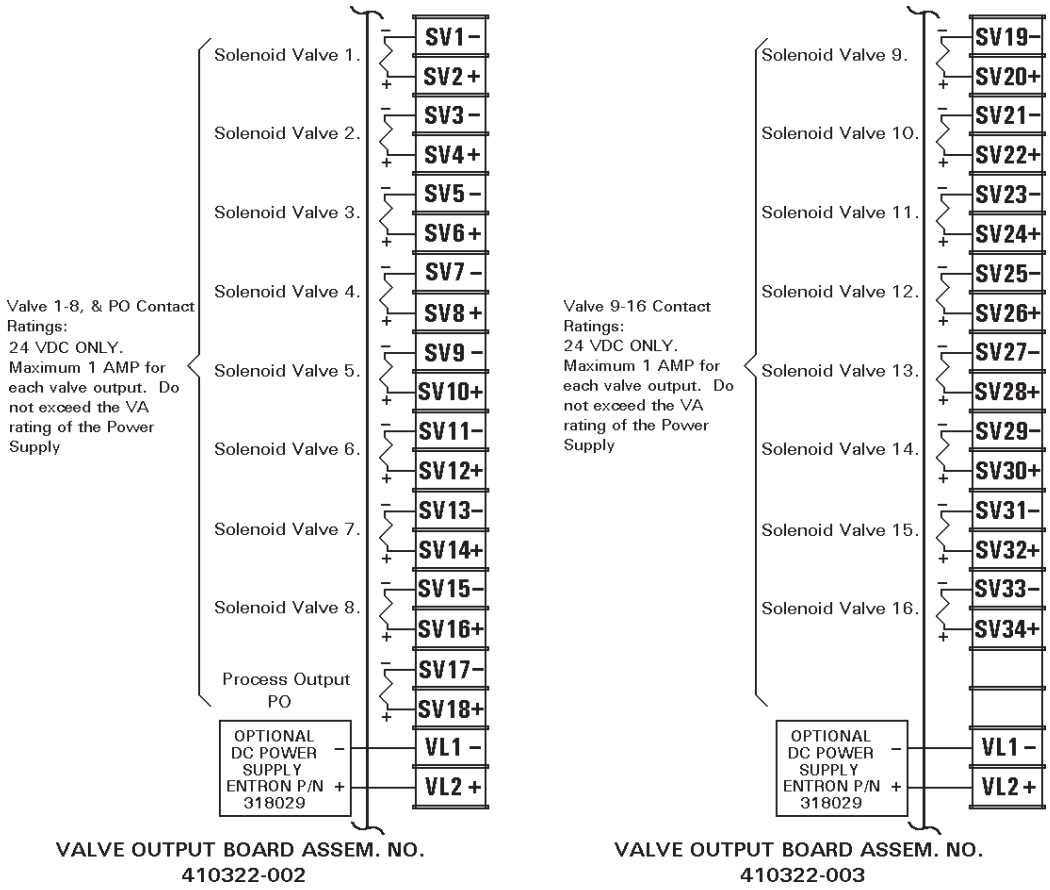


Figure 4. *Valve Output Board Diagram (Cascade Controls Only)*

Model Number Nomenclature

ENTRON uses a modifier (SP) to Model Numbers to indicate Special Features. In the case of 24 VDC Options, there are three different possibilities:

SP = 24 VDC Valve Outputs
SP = 24 VDC Power Supply
SP = 24 VDC Valves and 24 VDC Power Supply

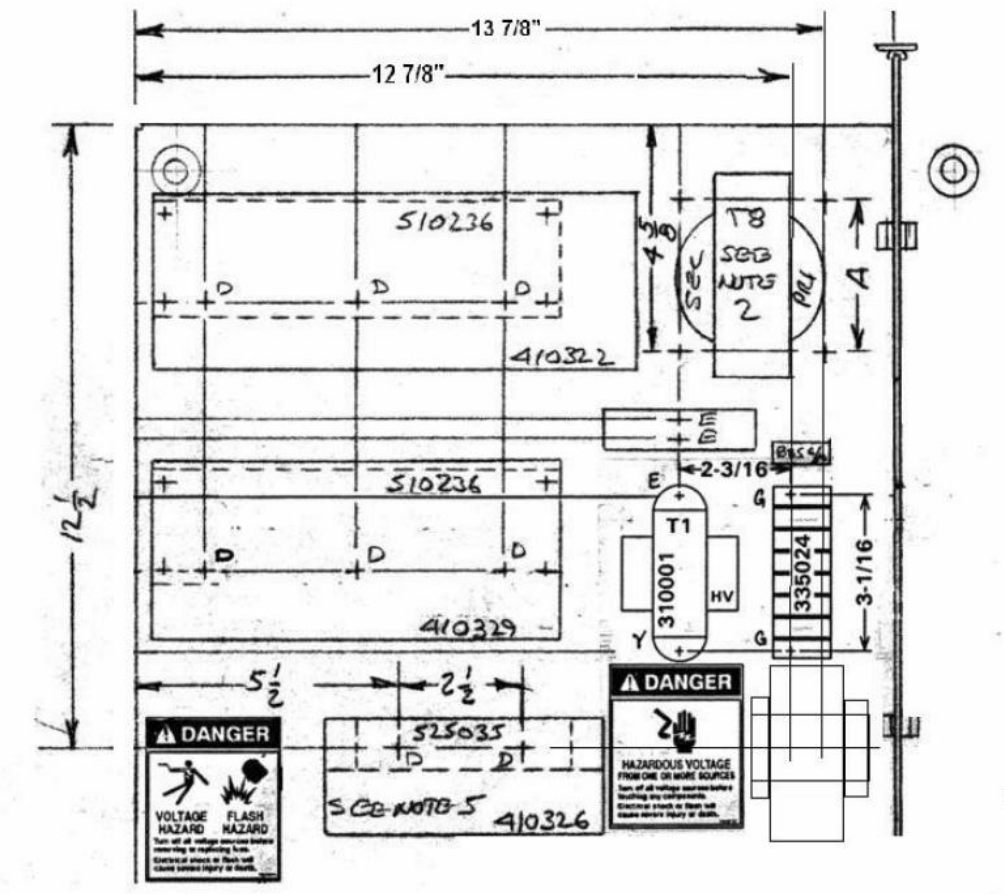
This modifier is placed at the end of the Model Number.

Example: EN1000-1200T/402/SP
SP = 24 VDC Valves and 24 VDC Power Supply

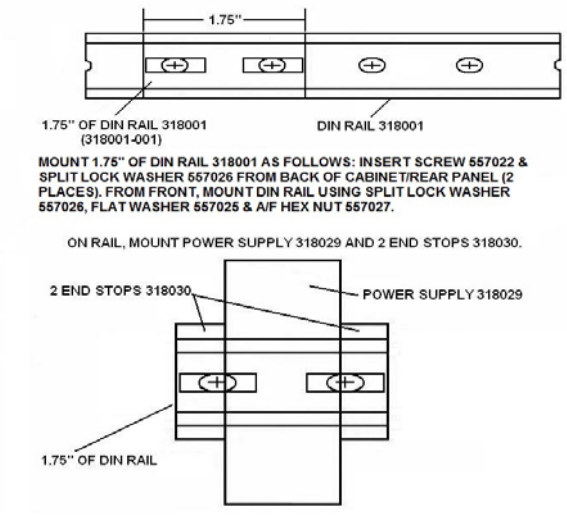
For specifications on Phoenix Contact's Power Supply (current part #2866446 or previous part #2938840 or #2938497), refer to Phoenix Contact's website – www.phoenixcon.com.

Mounting Detail for Cascade Controls (L, H, G or U Cabinets)

Typical mechanical detail of mounting DC power supply for Cascade Controls in L, H, G or U cabinets.



Cabinet Modification and Mounting for DC Power Supply

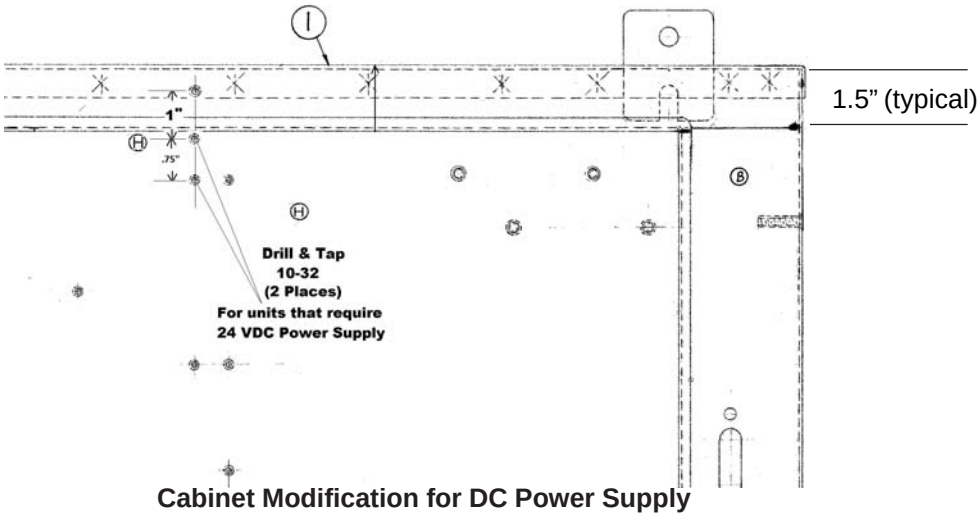


Assembly of DC Power Supply

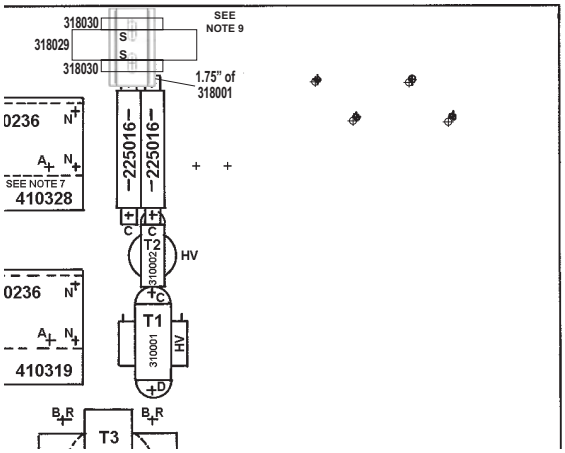
Figure 5. *Typical mechanical detail of mounting DC power supply for Cascade Controls*

Mounting Detail D/T and L Cabinets

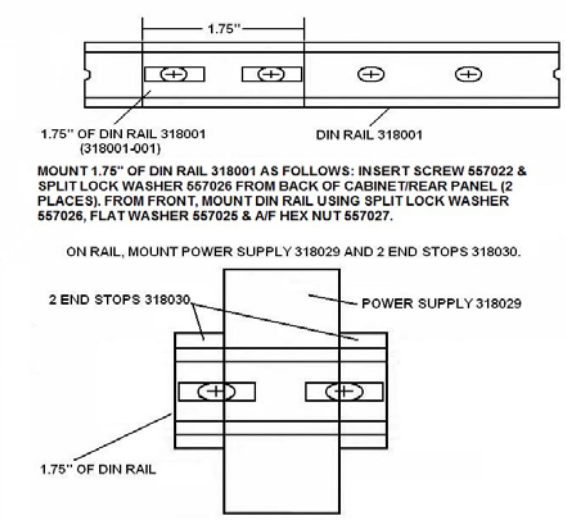
Typical mechanical detail of mounting DC power supply in D/T and L cabinets.



Cabinet Modification for DC Power Supply



Mounting of DC Power Supply (PS4)

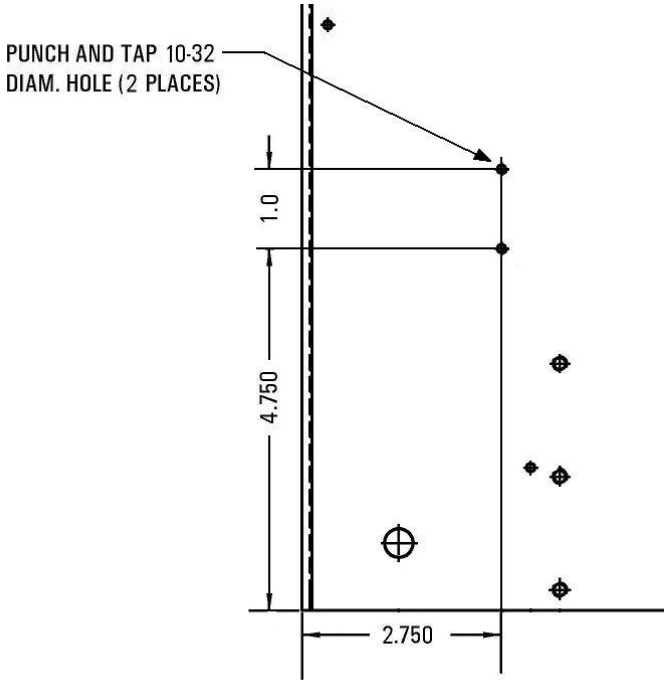


Assembly of DC Power Supply (PS4)

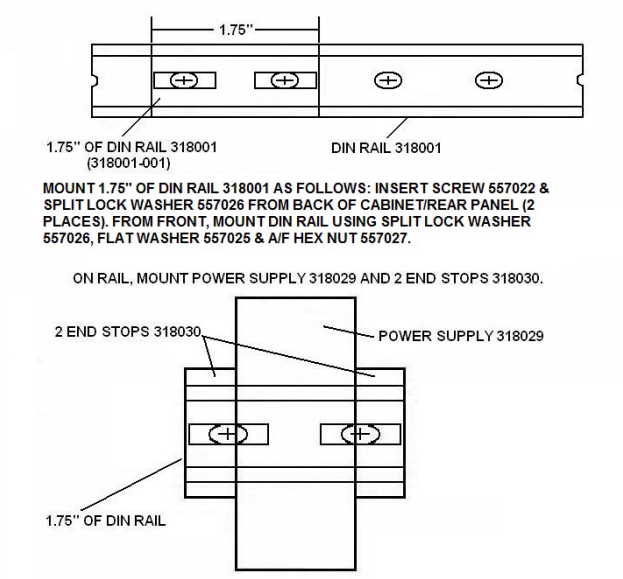
Figure 6. *Typical mechanical detail of mounting DC power supply in D/T and L Cabinets*

Mounting Detail C Cabinets

Typical mechanical detail of mounting DC power supply in C cabinet.



Cabinet Modification for DC Power Supply



Assembly of DC Power Supply

Figure 7. *Typical mechanical detail of mounting DC power supply in C cabinet*

Related Wiring Diagrams

EN1000

421210-031	EN1000-Series/SP, "D/T/LS/LF" Cab., SP=24 VDC Valve Output
421210-036	EN1000-FPX(SCR), 11x11 Flat Plate, with DC Valve Output & Optional DC Power Supply
421210-038	EN1000-/S49 Series SP, "D/T/LS/LF" Cab., SP=24 VDC Valve Output
421498-001	EN1000-Series, "C" Cab., with 24 VDC Valve Output

EN1000 Guns

421387-007	EN1000/ERG-1200, "D/T" Cab. w/ERG Conn. for ERGOLINE Gun, 24 VDC Valves and Power Supply
421387-008	NK1000-1200/GF, "D/T" Cab. w/Conn. for NIMAK Gun, 24 VDC Valves, Ground Fault, Ground Detection, and Circuit Breaker
421387-009	EN1000-600/1200/GF, "D/T" Cab. w/24 VDC Valve Output
421387-010	EN1000/PW-1200, "D/T" Cab. w/PW Conn. for PW Gun, 24 VDC Valves and Power Supply, Ground Fault, Ground Detection, and Circuit Breaker

EN1000 Cascade

421214-037	EN1000/S99-(1-8) Series, 230/380/460/575V w/DC Valve Output
421214-038	EN1000-(1-8) Series, 230/380/460/575V w/DC Valve Output
421214-041	EN1000/VE/TSS-(1-8) Series, 230/380/460/575V w/DC Valve Output

EN1001

421269-024	EN1001/S49/SP-Series/RDH, "D/T/LS/LF" Cab., SP=24 VDC Valve Output and Power Supply
421269-029	EN1001-1200/SP, "D/T/LS/LF" Cab., SP=24 VDC Valve Output & Power Supply
421269-031	EN1001/485/SP, "D/T/LS/LF" Cab., SP=24 VDC Valve Output & Power Supply
421269-032	EN1001-FPX(SCR), 11x11 Flat Plate, with DC Valve Output & Optional DC Power Supply
421269-035	EN1001-Series/485/SP, "D/T/LS/LF" Cab., SP=24 VDC Valve Output and Power Supply; 380 VAC
421499-002	EN1001-Series, "C" Cab., with 24 VDC Valve Output

EN1001 Guns

421377-004	NK1001-600/1200/GF, "D/T" Cab. w/Conn. for NIMAK Gun, 24 VDC Valves, Ground Fault, Ground Detection, and Circuit Breaker
421377-009	EN1001/ERG-1200, "D/T" Cab. w/ERG Conn. for ERGOLINE Gun, 24 VDC Valves & Power Supply, Ground Fault, Ground Detection & Circuit Breaker
421377-010	EN1001-600/1200/GF/SP, "D/T" Cab., SP=24 VDC Valve Output
421377-011	EN1001/PW-1200, "D/T" Cab. w/PW Conn. for PW Gun, 24 VDC Valves and Power Supply, Ground Fault, Ground Detection, and Circuit Breaker

EN1001 Cascade

421438-011	EN1001/S99-(1-8) Series, NEMA Cab., 230/380/460/575V w/DC Valve Output
421438-012	EN1001-(1-8) Series, NEMA Cab., 230/380/460/575V w/DC Valve Output
421438-017	EN1001-(1-8) (SCR), NEMA Cab., 230/380/460/575V w/DC Valve Output

EN1003

421291-002	EN1003/SP-Series, "HS/HF" Cab., SP=w/DC Valve Output

EN2000

421283-005	EN2000-FPX(SCR), 11x11 Flat Plate, with DC Valve Output & Optional DC Power Supply