INVERTEC V450 PRO MACHINE SCHEMATIC G4875 REV: C

SWITCH BOARD #1

Schematic: L11385
(Located on left side of Machine)

Heatsink isolated from Switch Boards

Undervoltage = 200V
Overvoltage = 467V

C6 3500uF 500V

8 Hertz per Volt
325 Volts = 2600 Hertz

frequency = 20 kHz

CT

J40-1 414 RED(-)
J40-2 418 WHITE(+)

J40-4 V/F (+)
J40-5 V/F (-)
J40-3 IGBT DRIVE (+)
J40-6 IGBT DRIVE (-)

404 405 403 406

SWITCH BOARD #2

Schematic:L11385
Located on right side of machine

C6 3500uF 500V

8 Hertz per Volt
325 Volts = 2600 Hertz

frequency = 20 kHz

CT

J50-1 514 RED(-)
J50-2 518 WHITE(+)

J50-5 V/F (-)
J50-4 V/F (+)
J50-3 IGBT DRIVE (+)
J50-6 IGBT DRIVE (-)

505 504 503 506

MAIN TRANSFORMER T1

(Located Front Center of Machine)

13 S A 11 F
14 S B 12 F
15 S C 17 F
16 S D 18 F

OUTPUT DIODES

D1-D4
(Located above Main transformer)

C4 .022u 800V 2.2Ω 10W R2
C5 .022u 800V 2.2Ω 10W R3
C6 .022u 800V 2.2Ω 10W R4
C7 .022u 800V 2.2Ω 10W R5

Conductive Heatsink

CURRENT TRANSDUCER

125:1
(Located right of Work stud)

P91 212 +15V 213 -15V 211 I OUT 216 GND

MAIN CHOKE L1

(Located Behind Work Stud)

206D → TO 14-PIN AMPHENOL See Page 2

206 ELECTRODE *(Located bottom right side)*

206A *(Located Middle Front side)*

R1 50Ω
TP3 150V 80J
C2 .05uF 600V
TP2 320V 160J

202A

202C → TO 14-PIN AMPHENOL See Page 2

202 WORK *(Located bottom left side)*

C1 .05uF 600V
TP1 320V 160J

INPUT RECTIFIER

N.B. N.C.
AC3 AC2 AC1 + POS − NEG
POS NEG
Located behind reconnect panel

RECONNECT SWITCH

Top Rear
380-575V 208-230V
19 20 20D

HARMONIC FILTER

19 190 20C
N.B.
Located on rear horizontal baffle

INPUT LINE FILTER

N.A.
Located on rear horizontal panel

INPUT BOARD

Schematic: M19528
Located in reconnect cavity in rear of machine

+13V → J60-3 238
SINGLE PHASE DETECT *(LOW=1 PHASE)* → J60-8 231
J61-2 T1
J61-4 T2
J61-10 T3
PRECHARGE RELAY +13V
J61-8 H1D
J61-6 612
J60-5 604
MAIN CONTACTOR CONTROL +13V
J60-1 601
J60-2 232
X3

frequency = 20 kHz
J6-6 IGBT DRIVE (+) ← 503
J6-14 IGBT DRIVE (-) ← 403
J6-15 IGBT DRIVE (+) ← 506
J6-7 IGBT DRIVE (-) ← 406

J10A-1 CT CURRENT (-) ← 414
J10A-2 CT CURRENT (+) ← 418
J10B-1 CT CURRENT (-) ← 514
J10B-2 CT CURRENT (+) ← 518

J4-12 ← +15V 225
J4-10 ← CONTROL BOARD COMMON 222
J6-5 ← V/F (+) 504
J6-10 ← V/F (-) 505
Switch Board 2
J6-8 ← V/F (-) 405
J6-16 ← V/F (+) 404
Switch Board 1
8 Hertz per Volt 325 Volts = 2600 Hertz
J6-9 ← +13V 238
J6-1 ← SINGLE PHASE DETECT (LOW=1 PHASE) 231
Single phase is limited to 325amps
J6-12 ← PRECHARGE CONTROL (Max Output = 325A) 604
J6-2 ← MAIN CONTACTOR CONTROL 232
J7-15 ← FAN CONTROL (+15 VDC) 3R
J7-16 ← FAN CONTROL (-) 3W
Fan comes on when output is enable

CONTROL BOARD

Schematic: G3789
Located on left side of control box

570A Max Output
Fold Back = 100A
Remove Load to reset

LEDS - 10 TOTAL
DIP Switch -1, Bank of 8
(See page 3 for detail)

Additional input / outputs are illustrated on schematic page 2.

J4-8 ← +5V 225
J4-11 ← −15V 223
J11-4 ← +5V ARCLINK 227
J11-3 ← ARCLINK COM 226
J4-7 ← POWER DOWN 228
J4-6 ← RS232 +5V 266
J4-5 ← RS232 COM 267
J4-2 ↔ +15V SPI 268
J4-1 ↔ SPI COM
J4-3 ↔ +5V SPI

Toroid from main harness

POWER BOARD

Schematic: G3631
Located on rear of control box (left)

J41-2 NTC
J41-4
J41-1
3J41

J42-1 +15V
J42-5 COM
J42-3 +5V
J42-2 −15V
J43-5 +5V
J43-10 COM
J42-4 POWER DOWN INTERUPT
J43-4 +5V
J43-9 COM
J43-6 +15V
J43-11 COM
J43-3 +5V
J43-12 COM

CONTROL | CAN | POWER DOWN | RS232 | SPI

LEDS - 2 TOTAL
(See page 3 for detail)

Toroid from main harness

216 212 213 211

4V=500AMPS
J8-1 CURRENT FEEDBACK
J8-2 +15V
J8-3 -15V
J8-6 CONTROL BOARD COMMON
J5-2 (NORMALLY CLOSED) THERMOSTAT
J5-3 (NORMALLY CLOSED) THERMOSTAT

J9-1 +ELECTRODE VOLTAGE SENSE
J9-3 - ELECTRODE VOLTAGE SENSE

224 224A 220 291 224A
OUTPUT RECTIFIER THERM (Bolted Connection)
CHOKE THERM (Connected with epoxy)

206 202

41 42 24 32A 31A → TO 14-PIN AMPHENOL See Page 2

CR1

Located behind reconnect panel
Not recommended for single phase operation.
G
U V W
L1 L2 L3 T1 T2 T3
L1B L3B
SWITCH LEAD FILTER *(Located right of Contactor)*
C8 .0047uF 440 C9
CR1 24Vac
N.B. N.C.
L1A L3A
601 X4

AUX. RECONNECT

S1 POWER
Located on top right of case front
ON OFF
A H1D
N.B.
H2 200-208V
H3 220-230V
H5 440-460V
H6 550-575V
Located in rear of machine behind reconnect panel.

AUXILIARY TRANSFORMER T3

(left, rear, on base)

H6 (550-575)
H5 (440-460)
H4 (380-415)
H3 (220-230)
H2 (200-208)
H1
115V X5
24V X4
0V X3
42VAC X9
28VAC X8
24VAC X7
0V X6
612B 612 H6A N.A.

J59-3 42
J59-4 24
J59-2 51
J59-1 41A 41B

Located near Auxiliary Transformer

AUXILIARY TRANSFORMER T2

(right, rear, on base)

H6 (550-575)
230V 352A J51-6
115V 352 J52-2
33A J52-4 Not used
350 J52-1
0V 34 J51-4
31 J51-1
H1B H1A 1 H1

CB3

located on reconnect panel
3.5 A

Located on the right side of Harmonic Filter
Located on the left side of Harmonic Filter

J54 115V RECEPTACLE

Located on case front

CB1

located on lower center case front
10 A
51 41 41A

CB2

located on lower center case front
15A
34 N.B.
32 N.B.
31 32A
31A 31A

CB2

352A 5A 351
J51-1 31
J54 220V RECEPTACLE
located on case front
N.A.

Located on the right side of Harmonic Filter

Located on reconnect area opposite of contactor

FUSE 10A

SOLID STATE RELAY

CR2
X3A TP4 444
FAN
Located behind control board (left side)

POWER BD. RECT.

Located on center baffle right of lift bale

41B X8
POS POS
65VDC C3 24000uF/100V
NEG NEG

Located in Rear of PowerSource

TO 14-PIN AMPHENOL

LEGEND

LEAD COLOR CODE:

B-BLACK
G-GREEN
O-ORANGE
R-RED
U-BLUE
W-WHITE
Y-YELLOW

LABELS:
COMMON
FRAME GROUND
EARTH GROUND

COMPONENT VALUE UNITS:

CAPACITOR: MFD/VOLTS
RESISTOR: OHMS/WATTS

CONNECTOR PIN NUMBERS:

EX. 12 PIN CONNECTOR
1 2 → 6
7 → 12 LATCH
VIEW OF CONNECTOR ON PC BOARD

Schematic numbers are given for reference only.

NOTES:
N.A. CE MACHINE ONLY.
N.B. NON-CE MACHINE ONLY. (EARLIER MODELS USED 10A CIRCUIT BREAKERS).
N.C. ON CE MODELS LEADS T1, T2 AND T3 ARE REPLACED BY LEADS A, B AND C. LEADS A, B AND C ARE CONNECTED TO THE INPUT RECTIFIER TERMINALS RATHER THAN CR1.

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INVERTEC V450 PRO MACHINE SCHEMATIC G4875 REV: C PAGE 2

NOTES:

N.E. THE REMOTE UI PCB ALWAYS RESPONDS AS A REMOTE SPI BOARD. CONNECTING PINS 1 & 2 OF J333 TOGETHER WILL ENABLE THE REMOTE UI PCB TO RESPOND AS A STATUS SPI. CONNECTING PINS 11 & 14 OF J332 TOGETHER WILL ENABLE THE REMOTE UI PCB TO RESPOND AS A MODE PCB.

LEDS - 10 TOTAL
DIP SWITCH - 1 BANK OF 8
SEE PAGE 3 FOR DETAILS

CONTROL BOARD
Schematic: G3789
Located on left side of control box

Additional input / outputs are illustrated on schematic # 1.

251 253 254 — OR

J2-1 J2-3 J2-4
RS232 COMMON — RECEIVE — TRANSMIT

N.D.

J3-1 (+)15 VOLT SPI
J3-2 (+)5 VOLT SPI
J3-3 /SS
J3-4 CS1
J3-5 CS2
J3-6 CS3
J3-7 MSO
J3-8 SCK
J3-9 MOSI
J3-10 GROUND SPI

Output Studs
See page 1

206D — Positive
202C — Negative
S2 — Polarity Switch for wire feeder meter
Located next to 14 pin amphenol

See page 1
24
41
42

To 115v Case Front Recepticle
(For Domestic used only)
Not on CE Models
31A
32A

WIRE FEEDER REMOTE

AMPHENOLS ARE VIEWED FROM FRONT OF MACHINE

6 PIN REMOTE

2 77 76A 4A 75 4 76

"2" LEAD — J331-11
"77" LEAD — J331-10
14 PIN'S "76" LEAD SOLENOID COIL (+) — J331-9
14 PIN'S "4" LEAD 6 PIN'S "4" LEAD — J331-8 J331-6 J331-5 J331-4
"75" LEAD — J331-3
6 PIN'S "76" LEAD SOLENOID COIL (-) — J331-2

+10 Volts
graphical representation of potentiometer connection

REMOTE BOARD
Schematic: G4017-1D0

Located in the middle of Control Panel

SPI CIRCUIT

N.D.

J333-16 3316
J333-15 3315
J333-14 3314
J333-13 3313
J333-12 3312
J333-8 276
J333-7 275 com
J333-6 277 +10V
J333-5 3305
J333-4 3304
J333-3 3303
J333-2
J333-1

J332-16 3216
J332-15 3215
J332-14
J332-13 3213
J332-12 3212
J332-11 3211
J332-7 3207
J332-6 3206
J332-5 3205
J332-4 3204
J332-3 3203
J332-2 3202
J332-1 3201

N.E.

SPI CIRCUIT

Factory Install

251 254 253

3207 LED 1 CC-Stick soft — J61-3
3202 LED 2 CC-Stick crisp — J61-2
3201 LED 3 Tig Gtaw — J61-1
3216 LED 4 CV - wire — J61-6
3215 LED 5 CV - Innershield — J61-7
+15V

3212 — J61-4 +15V
3206 — J61-14 +10V
3204 — J61-12
3213 — J61-5 +15V MODE SWITCH
HOT START — J61-13 +10V — 3203
ARC CONTROL — J61-15 +10V — 3205

MODE PANEL
Schematic: S25258-1B0

OR

Field Install

N.D.

251 254 253

ADVANCED PROCESS PANEL (OPTIONAL)
Schematic: G3872-1B1

3313 — J60B-1 +15V
3316 — J60B-2 REMOTE +15V
3314 — J60B-3 LOCAL +15V
3305 — J60B-4 +15V

OUTPUT CONTROL
Led select pc board
Schematic: S25259-1

R6
10K/2W
276 +10V
277 275 com

3303 — J60A-1 +15V
3315 — J60A-2 +15V +15V ON
3312 — J60A-3 REMOTE +15V
3304 — J60A-4 +15V

WELD TERMINALS
Led select pc board
Schematic: S25259-1

SPI CIRCUIT

N.D.
THERMAL
AMPS — Average actual current ± 3%
VOLTS — Average actual voltage ± .5V

DISPLAY PANEL
Schematic: L11108-3

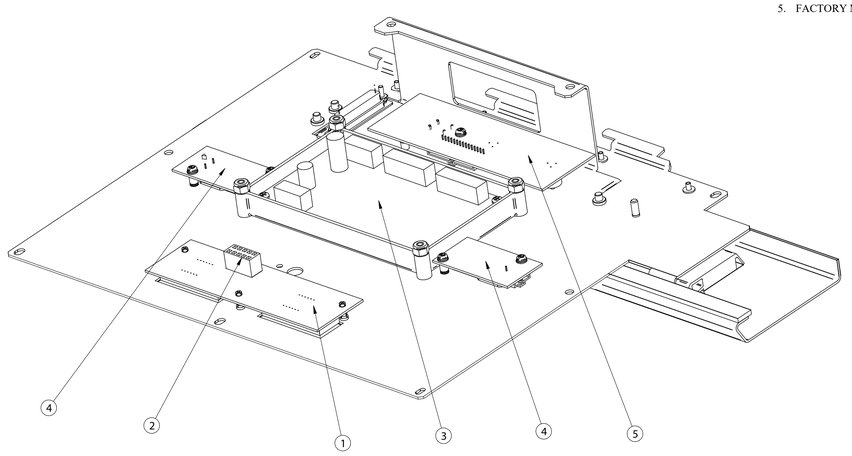
Open view of Control Panel

LEAD COLOR CODE:	LAST No. USED	COMPONENT VALUE UNITS:
B-BLACK G-GREEN O-ORANGE R-RED U-BLUE W-WHITE Y-YELLOW	R- 6 C - 9 S - 2 TP - 4 J-Numbers J2,J3,J4,J5,J6,J7,J8, J9,J10A,J10B,J11, J4Q,J50,J42,J43,J51, J52,J54,J59, J60 and J61(InputPCB), J61(Mode PCB), J60A,J60B J91,J331, J332,J333	CAPACITOR: MFD/VOLTS RESISTOR: OHMS/WATTS CONNECTOR PIN NUMBERS: EX. 12 PIN CONNECTOR 1 2 6 7 12 LATCH VIEW OF CONNECTOR ON PC BOARD
LABELS: COMMON FRAME GROUND EARTH GROUND		

Schematic numbers are given for reference only.

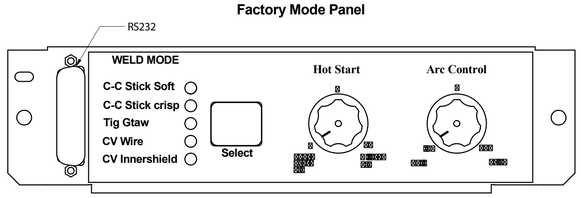
LEGEND
DASHED = "– — –" OPTION
PHANTOM = "— · · —" PC BOARDS

1. STD DISPLAY PC BOARD ASSEMBLY
2. SPI ASSEMBLY
3. REMOTE PC BOARD ASSEMBLY
4. LED SELECT PC BOARD ASSEMBLY
5. FACTORY MODE PANEL ASSEMBLY

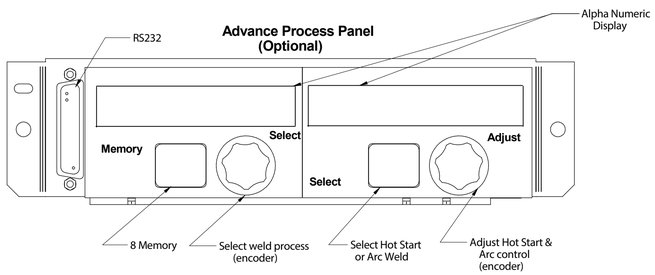


Control Panel

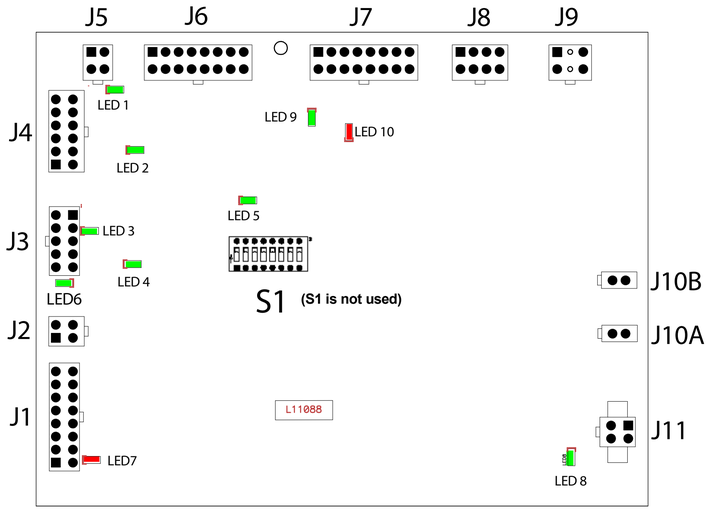
Factory Mode Panel



Advance Process Panel (Optional)



CONTROL BOARD



Description of LED functions on the Invertec V450-PRO

For reference only

L11088 Digital Control PC Board		
LED #	**COLOR**	**FUNCTION**
1	Green	Indicates +15VDC from power supply board is present
2	Green	Indicates –15VDC from power supply board is present
3	Green	Indicates +5VDC for +5SPI from power supply board is present
4	Green	Indicates +15VDC for +15SPI from power supply board is present
5	Green	Indicates +5VDC for +5V from power supply board is present
6	Green	Indicates +5VDC for +5VRS232 from power supply board is present
7	Red	FAULT Signal (See software group for coding)
8	Green	Indicates +5VDC for +5CAN from power supply board is present
9	Green	ArcLink Status Indicators (Main System ***Master*** ArcLink Connection) Solid
10	Red	Green only when functional (See software for error codes)

POWER BOARDS

Description of LED functions on the Invertec V450-PRO

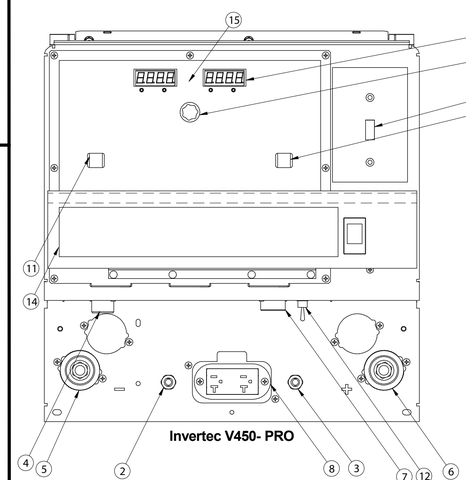
For reference only

G3632 Digital Power Supply Board		
LED #	**COLOR**	**FUNCTION**
1	Red	Indicates +5VDC SPI supply is present
2	Red	Indicates +5VDC control supply is present

Error codes for the Invertec V450-PRO

The following is a list of possible error codes that the Power Wave can output via the status light

Error Code #	Indication
21 Unprogrammed Weld Mode.	Contact the Service Department for instructions on reloading the Welding Software.
22 Empty Weld Table.	Contact the Service Department for instructions on reloading the Welding Software.
23 Weld Table checksum error.	Contact the Service Department for instructions on reloading the Welding Software.
31 Primary overcurrent error.	Excessive Primary current present. May be related to a switch board or output rectifier failure.
32 Capacitor “A” under voltage (Left side facing machine)	Low voltage on the main capacitors. May be caused by improper input configuration, or an open/short circuit in the primary side of the machine.
33 Capacitor “B” under voltage (Right side facing machine)	
34 Capacitor “A” over voltage (Left side facing machine)	Excess voltage on the main capacitors. May be caused by improper input configuration, or an open/short circuit in the primary side of the machine.
35 Capacitor “B” over voltage (Right side facing machine)	
36 Thermal error	Indicates over temperature. Usually accompanied by Thermal LED. Check fan operation. Be sure process does not exceed duty cycle limit of the machine.
37 Softstart error	Capacitor precharge failed. Usually accompanied by codes 32-35.
41 Secondary overcurrent error	The secondary (weld) current limit has been exceeded. When this occurs the machine output will phase back to 100 amps, typically resulting in a condition refered to as “noodle welding”
43 Capacitor delta error	The maximum voltage difference between the main capacitors has been exceeded. May be accompanied by errors 32-35.
49 Single phase error	Indicates machine is running on single phase input power. Usually caused by the loss of the middle leg (L2).
Other	Use Snap Shot to interpret other errors or Diagnostic Sofware



1. Power Switch
2. 24V-42V 10 Amp Wire Feeder Circuit Breaker
3. 115V Auxiliary Power & Wire Feeder Circuit Breaker
4. 6 pin Remote
5. Work Stud
6. Electrode Stud
7. 14 Pin Wire feeder Remote
8. Auxiliary Output (110V or 220V)
9. STD Display Board
10. Weld Terminal /Remote ON
11. Output Control /Remote Local
12. Wire Feeder Polarity Switch
13. Control Knob
14. Mode Panel or (optional) Advance Process Panel found underneath Front Panel Door.
15. Thermal Light

Case front Detail