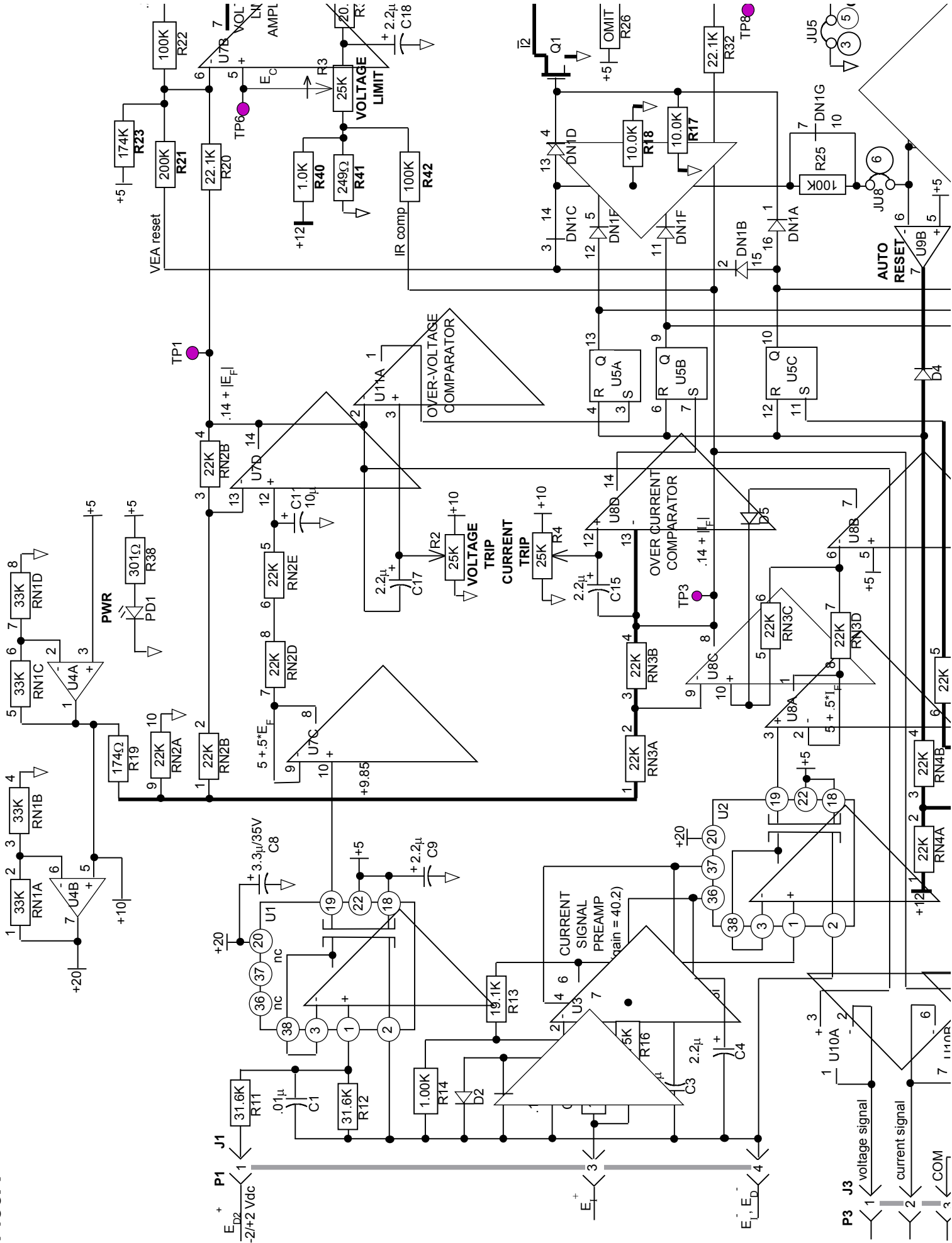
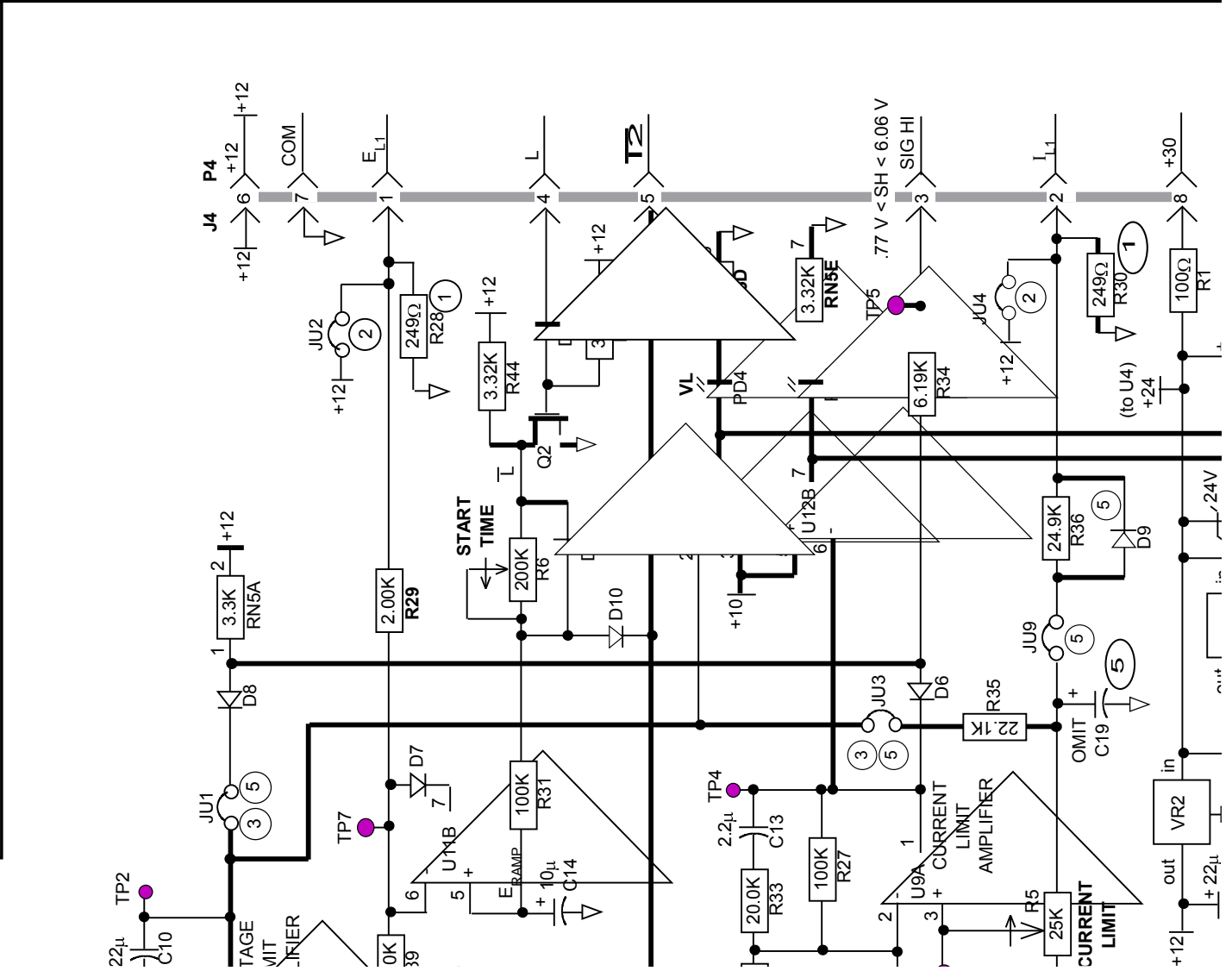


E1453A



REVISIONS			
LTR	DESCRIPTION	DATE	APPD.
A	Modify Auto-Reset circuit, Add L signal inverter	07-13-05	fjb



PART	DESCRIPTION	STOCK NUMBER
U1-U2	AD202KN	I1AD202KN
U3	OPA277P	I1OPA277P
U4	LM34072P	I134072P
U5	CD4044B	I14044B
U6	ULN2004A	I12004A
U7	MC34074P	I134074P
U8	MC34074P	I134074P
U9	MC34072P	I134072P
U10	MC34072P	I134072P
U11	MC34072P	I134072P
U12	MC34072P	I134072P
VR1	LM340LAH-5.0	T2VLM340-5.0
VR2	T2VLM340	T2LM78M12
Q1-Q2	BS170	T2BS170P
DN1	MAD1108P	D1MAD1108
D1-D2	1N914	D1N914B
D3	1N5359A(24V)	D1N15359
D4-D12	1N914	D1N914B
PD1	555-2204(gm)	DIL5502204R
PD2	550-2404(red)	DIL5502404R
PD3	550-2404(red)	DIL5502404R
PD4	5381H3ID(am b)	DIL5381H3
PD5	550-2404(red)	DIL5502404R
PD6	5381H3ID(am b)	DIL5381H3
C1	.01uf MKS03	C1FL100103
C2	.10uf MKS03	C1FL100104
C3	2.2uf 16V tant.	C1TN016225
C4	2.2uf 16V tant	C1TN016225
C5	3.3uf 35V tant	C1TN035335
C6	22uf 16V tant	C1TN016226
C7	22uf 35V tant	C1TN035226
C8	3.3uf 35V tant	C1TN035335
C9	2.2uf 16V tant	C1TN016225
C10	.22uf MKS3	C1FL063224

PART	DESCRIPTION	STOCK NUMBER
R1	CW2C-100Ω	R1W03W100
R2-R5	93PR25K	R1P93P253
R6	93PR200K	R1P93P204
R11	RN60 - 31.6K	R1F3162
R12	RN60 - 31.6K	R1F3162
R13	RN60 - 19.1K	R1F1912
R14	RN60 - 1.00K	R1F1001
R15	RN60 - 1.00K	R1F1001
R16	RN60 - 475K	R1F4753
R17	RN60 - 10.0K	R1F1002
R18	RN60 - 10.0K	R1F1002
R19	RN60 - 174Ω	R1F1740
R20	RN60 - 22.1K	R1F2212
R21	RN60 - 200K	R1F2003
R22	RN60 - 100K	R1F1003
R23	RN60 - 174K	R1F1743
R24	RN60 - 115K	R1F1153
R25	RN60 - 100K	R1F1003
R26	OMIT	
R27	RN60 - 100K	R1F1003
R28	RN60 - 249Ω	R1F2490
R29	RN60 - 2.00K	R1F2001
R30	RN60 - 249Ω	R1F2490
R31	RN60 - 100K	R1F1003
R32	RN60 - 22.1K	R1F2212
R33	RN60 - 20.0K	R1F2002
R34	RN60 - 6.19K	R1F6191
R35	RN60 - 22.1K	R1F2212
R36	RN60 - 24.9K	R1F2492
R37	RN60 - 10.0K	R1F1002
R38	RN60 - 301Ω	R1F3010
R39	RN60 - 20.0K	R1F2002
R40	RN60 - 1.00K	R1F1001
R41	RN60 - 249Ω	R1F2490
R42	RN60 - 100K	R1F1003
R43	RN60 - 3.32K	R1F3321
R44	RN60 - 3.32K	R1F3321
RN1	R1-S08-223	R1S08223
RN2	R1-S010-223	R1S10223

COORDINATION OF THE REGULATOR BOARD AND THE FIRING BOARD ENABLE/INHIBIT CIRCUITS

NOTES

- Install 249 ohm burden resistors R28 and R30 when applying 4-20 mA voltage or current command signals.
- Install JU2 and JU4 for on-board voltage and current commands.
- For parallel voltage and current regulation loops:
 - Install JU1, JU6, omit JU3
 - Apply voltage command to J3-1 and current command to J3-2 (see Note 2).
- For outer voltage regulation loop and inner current regulation loop:
 - omit JU1 and C17, install JU3 and JU5.
 - Apply voltage command to J3-1 and apply current limit reference to J3-2. The current limit reference must be current sinking with impedance of less than 2 kohm.
- To use the ISOVLCL-4 board as a slave current regulator with its current command taken from the current signal at J2-2 of the master current regulator ISOVLCL-4 board:
 - on the master regulator board:
 - Configure parallel voltage and current regulation loops by installing JU1 and omitting JU3.
 - Adjust the voltage command to obtain the desired load voltage with the current command at 100%, or adjust the current command to obtain the desired load current with the voltage command at 100%.
 - On the slave regulator board:
 - Remove JU5 and JU6.
 - Remove Current Limit Amplifier proportional gain resistor R27.
 - Set the voltage command to 100%.
- For automatic latch reset: install JU7.

ENABLE:

- Manual latch output U5-10 goes low, DN1A blocks, Q1 turns off, NOT(I2) goes high, pulled up by 1.5 K on FCOG61C 12V bias is removed from VEA reset resistor R21.
- Firing board enables about 50 ms after NOT(I2) goes high. The L signal from the firing board goes low and NOT(L) allowing soft-start capacitor C14 to charge toward 12 V.
- Ramp voltage E_{RAMP} at U11-5 is initially clamped to about 0 V by turned-on Q2 (NOT(L) = 0) acting through DN1D and R U11B/D10 ramp clamp circuit, acting through voltage divider R3/ R29, clamps the initial voltage command E_{CMD} to less:
 - When L goes low, Q2 blocks and the ramp clamp allows E_{CMD} to ramp up to the voltage command setpoint established external command voltage E_{L1} or by the VOLTAGE LIMIT pot setting if E_{L1} is a fixed voltage.
 - The actual load voltage tracks E_{CMD} with zero steady-state error.

INHIBIT:

- Opening the external STOP switch sets latch U5C which turns on Q1 and applies 12 V through DN1A and R40 to the inverting input of U7A.
 - Q1 clamps NOT(I2) low.
 - Q1 discharges the soft-start capacitor C14 through R30 and DN1D.
 - 12 V applied to R40 causes U7A output to ramp to zero V at a rate of $12/(R40 * C10) = 12/(200 * .68) = .088$ V/ms
 - The ramp-clamp pulls E_{CMD} down to about .4 V.
 - The firing board is inhibited after a period determined by its soft-stop circuit. (with an inductive load, the firing board should inhibit after the load current has decayed to zero).

AUTO RESET : (JU7 is installed to connect R25 and DN1G to the inverting input of U9B)

- An over-current or over-voltage fault causes the output of U5A or U5B to go to 12 V.
- DN1E or DN1F conduct to place 12V across R39.
- DN1C conducts to apply 12 V to VEA reset resistor R21.
- DN1D conducts to turn on Q1, clamping NOT(I2) low.
- The firing circuit inhibits after a period determined by its soft-stop circuit
- R25 conducts into R42, applying 6V to the inverting input of U9B.
- U9B output goes low, resetting the over-current or the over-voltage latch output to 0 V.
- DN1E or DN1F cease to conduct, removing voltage from R39.
- DN1C ceases to conduct, removing voltage from the VEA reset resistor R21.
- DN1D ceases to conduct, removing voltage from the gate of NOT(I2) clamp transistor Q1.
- NOT(I2) goes high and the firing board enables after about 50 ms.

CHANGES FOR REV. A

- Delete SS LED PD5 and RN6B
- Delete TP7
- Delete DN1E
- Delete DN1G
- Add Q2
- Add IR comp and command bias resistors R36, R24 and R40
- Redo auto-reset circuit: reconnect DN1 and add R41 and R40.
- Add D9 in place of DN1D

12-19-05 Rename comments

PART	DESCRIPTION	STOCK NUMBER
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10.

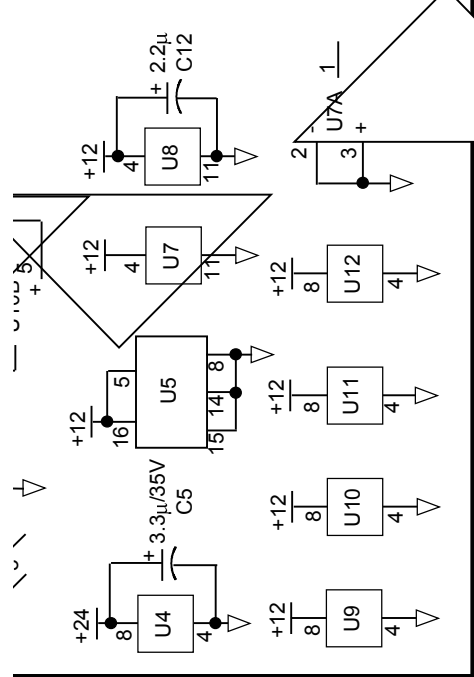
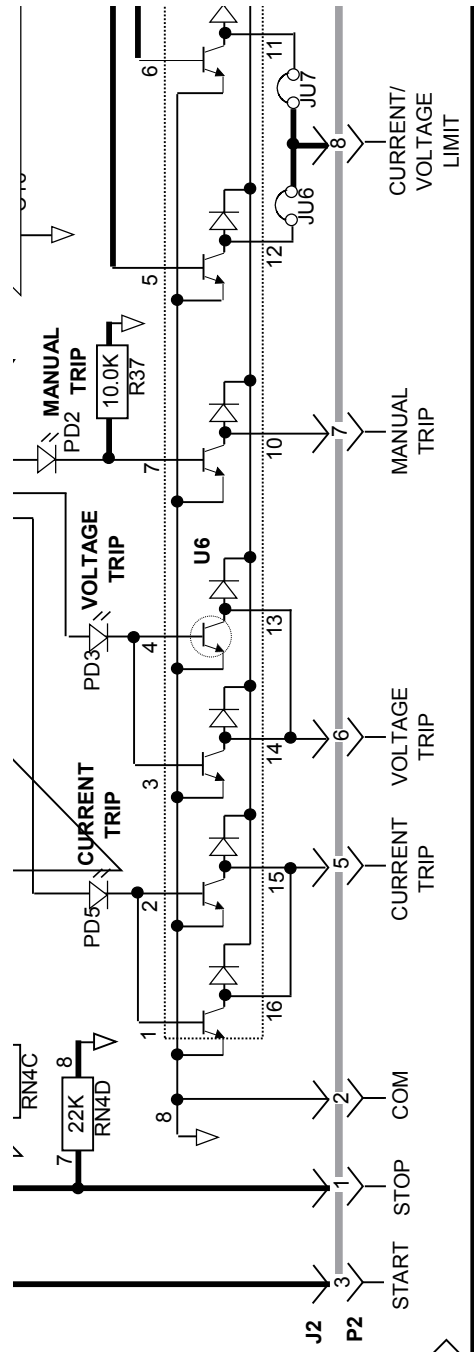
When Q2 goes high,

6.

is than 4 V.

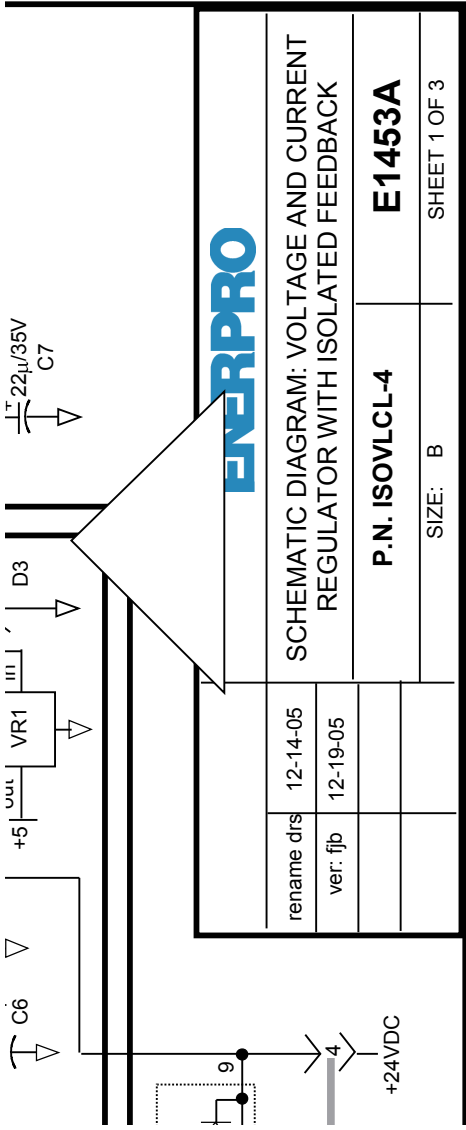
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RN3	R1-S08-223	R1S08223
RN4	R1-S08-333	R1S08333
RN5	R1-S08-332	R1S08332

C11	10uf 16V tant	C1TN016106
C12	2.2uf 16V tant	C1TN016225
C13	2.2uf MKS3	C1FL050225
C14	10uf 16V tant	C1TN016106
C15	2.2uf 16V tant	C1TN016225
C16	10uf 16V tant	C1TN016106
C17	2.2uf 16V tant	C1TN016225
C18	2.2uf 16V tant	C1TN016225
C19	OMIT	





AND CURRENT
FEEDBACK

E1453A

SHEET 3 OF 3