

# SDC1V

## ARTEH DC SERVO UNIT

### Maintenance Manual

#### CONTENTS

1. Main features .....	2
2. Technical specification .....	2
3. Operating conditions .....	2
4. Compositions .....	2
5. Interface .....	2
5.1. Details of signals .....	2
5.2. Interface connectors .....	4
5.3. Connection of DC Servo Unit .....	4
6. Adjustment .....	10
6.1. Items available without removing of the front panel.	10
6.2. Location of variable resistors, jumpers, test points..	10
7. Installation of DC servo unit .....	10
7.1. Installation conditions .....	10
7.2. Outer dimensions .....	10

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The ARTEH DC servo drive systems are intended for feed drives of high precision NC machine tools.

### 1. Main features.

- ▶ Fully regenerative four-quadrant operation
- ▶ Low response times
- ▶ Adaptive speed regulator
- ▶ Speed control range 1:10000
- ▶ Extensive fault sensing and diagnostics
- ▶ Internal shunt resistor
- ▶ Self-synchronization
- ▶ Dynamic current limitation
- ▶ Compact construction

### 2. Technical specifications.

- ▶ Power supply 3x380V, 50Hz
- ▶ Speed reference signal - analog 0 ... ± 7V = ±full speed
- ▶ Speed feedback signal - analog

Drive Model	Motor Model	Cont. Torque	Cont. Current	Maximum Speed
		Nm	A	RPM
SDC1-5.4	Model 0, Model 5	up to 5.4	13	2000
SDC1-34.3	Model 15, 2MTA	up to 17.6	30	1500
	3MTA, 4MTA, 4MTB	up to 30	30	1500
	Model 25	up to 34.3	30	1000
SDC1-47	47MBH3, MT	47	70	1500
	1MK	47	25	2000
SDC1-70	70MB03	70	120	1000
	2MK	70	40	2000
SDC1-100	100MB03	100	150	1000
	3MK	100	55	2000

### 3. Operating conditions.

- ▶ Ambient temperature 0°C .. 50°C
- ▶ Maximal humidity at 30°C 85%
- ▶ Degree of protection IP00

### 4. Compositions.

The DC servo drive system consists of the following units and parts:

- (1). DC brush motor with 2000 or 2500 p/rev pulsecoder and/or built-in tachogenerator;
- (2). Mains transformer;
- (3). Thyristor DC servo unit.

### 5. Interface.

#### 5.1. Details of Signals.

No.	Signal	Designation	Connector	Type	Active level	Remark
1	Velocity control "ON" signal	PRDY2 PRDY1	X2-1 X2-9	Contact 10 mA	Contact ON	DC Servo unit is in operational state when this contact signal is ON. Dynamic braking is made for servomotor, when this signal is OFF.
2	Firing control ENABLE signal	ENBL2 ENBL1	X2-2 X2-10	Contact 10 mA	Contact ON	Thyristors are fired when this contact signal is ON. The motor current is cut, but no dynamic braking is made when this signal is OFF.
3	Velocity control READY signal	VRDY1 VRDY2	X2-4 X2-12	Contact 20 mA permissible load	Contact ON	The contact turns ON when the unit is ready to operate.
4	Velocity command signal	VCMD AGND	X2-8 X2-15	Analog voltage	0 ±7V Analog voltage	X2-8 (VCMD) is an active pin. X2-15 (AGND) is connected to ground (reference point).
5	Tachogenerator signal	TSA TSB	X2-6 X2-5	Analog voltage		Velocity feedback signal. X2-6 (TSA) is the active pin. X2-5 (TSB) is connected to ground (reference point).
6	Emergency stop signal	ES1 ES2	X5-5 X5-6	Contact 100 mA	Contact OFF	The motor current is cut and dynamic braking is made when this contact signal is OFF, regardless of the PRDY and ENBL state.
7	DC servo motor drive signal	A1A A2A	X5-7 X5-8	0 ±60V DC 0 ±90V DC 0 ±120V DC 0 ±130V DC Depending on the DC motor type.		
8	DC servo motor power	XL XM XN	X5-2 X5-3 X5-4	60V AC 90V AC 120V AC		
9	Synchronization signal	50U 50V 50W 0V	X3-5, 13 X3-6, 14 X3-7, 15 X3-1, 9	50V AC 50V AC 50V AC		A signal to provide synchronization for thyristor gate signal.
10	Power input	18A 18B 18C 0V	X3-2, 10 X3-3, 11 X3-4, 12 X3-1, 9	18V AC 18V AC 18V AC Ref. point		Supplied to a printed circuit board for ±24V, ±15V, +5V DC powers
11	Thermostat contact	TOH1 0V	X3-8 X3-1, 9	Contact	Contact OFF	When this contact is OFF the OL protection is actuated.

5.2. Interface connectors - Fig.3.

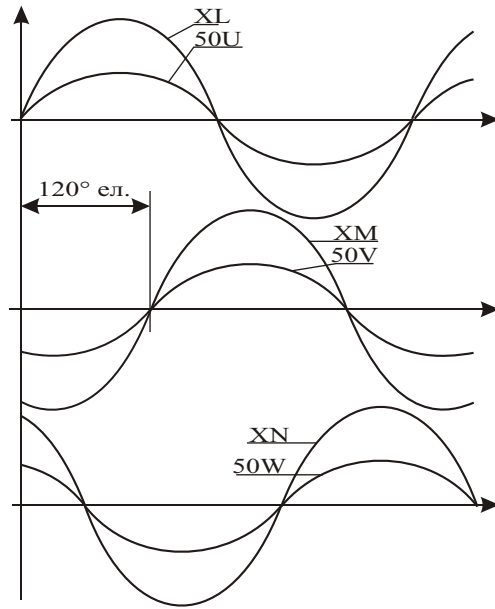


Fig. 1. Relation between XL and 50U, XM and 50V, XN and 50W signals.

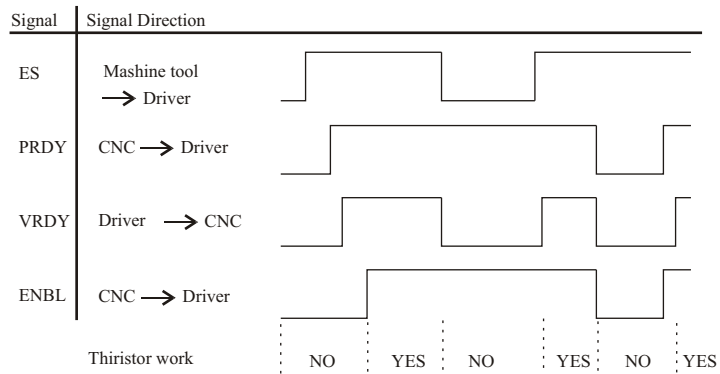
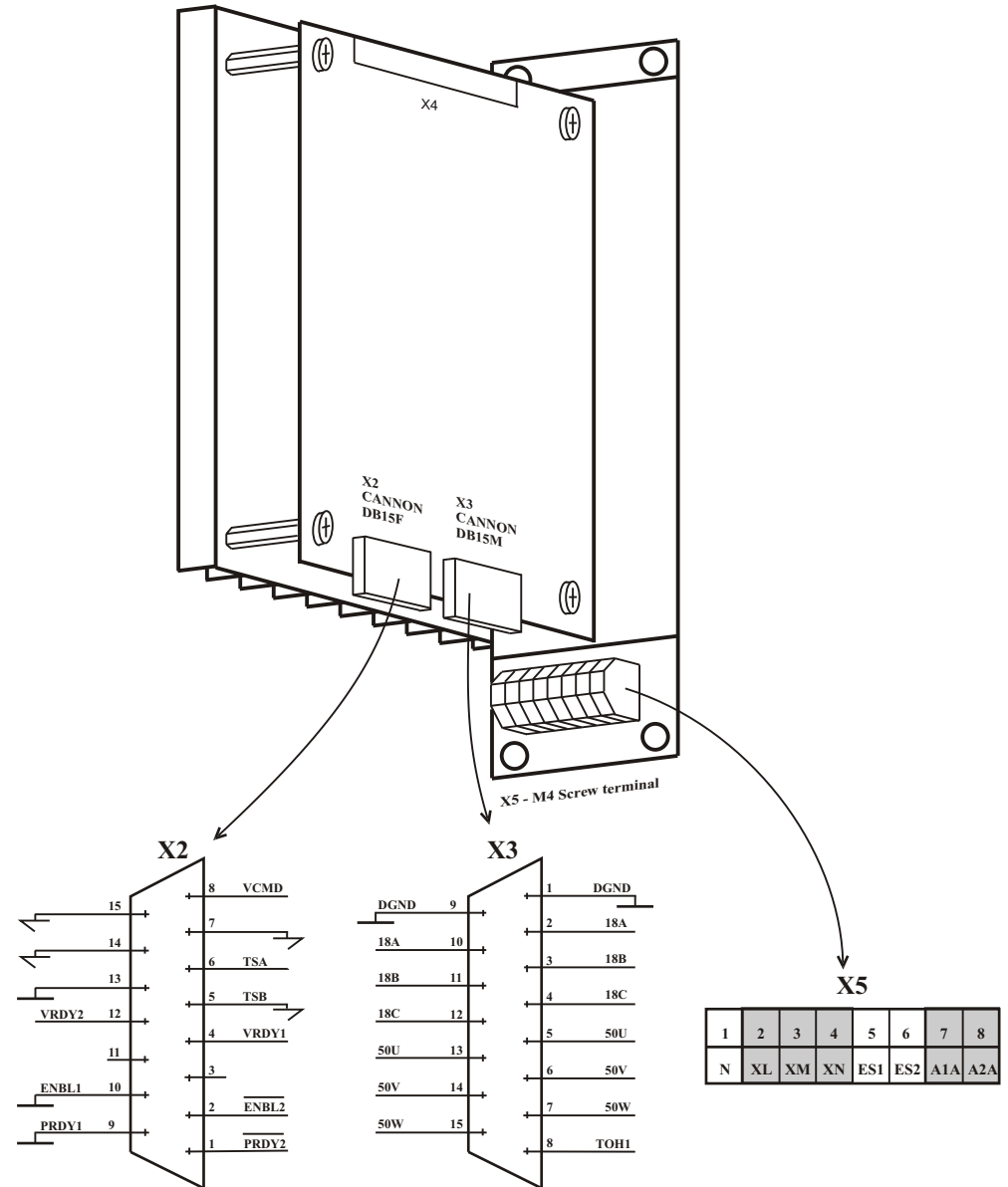
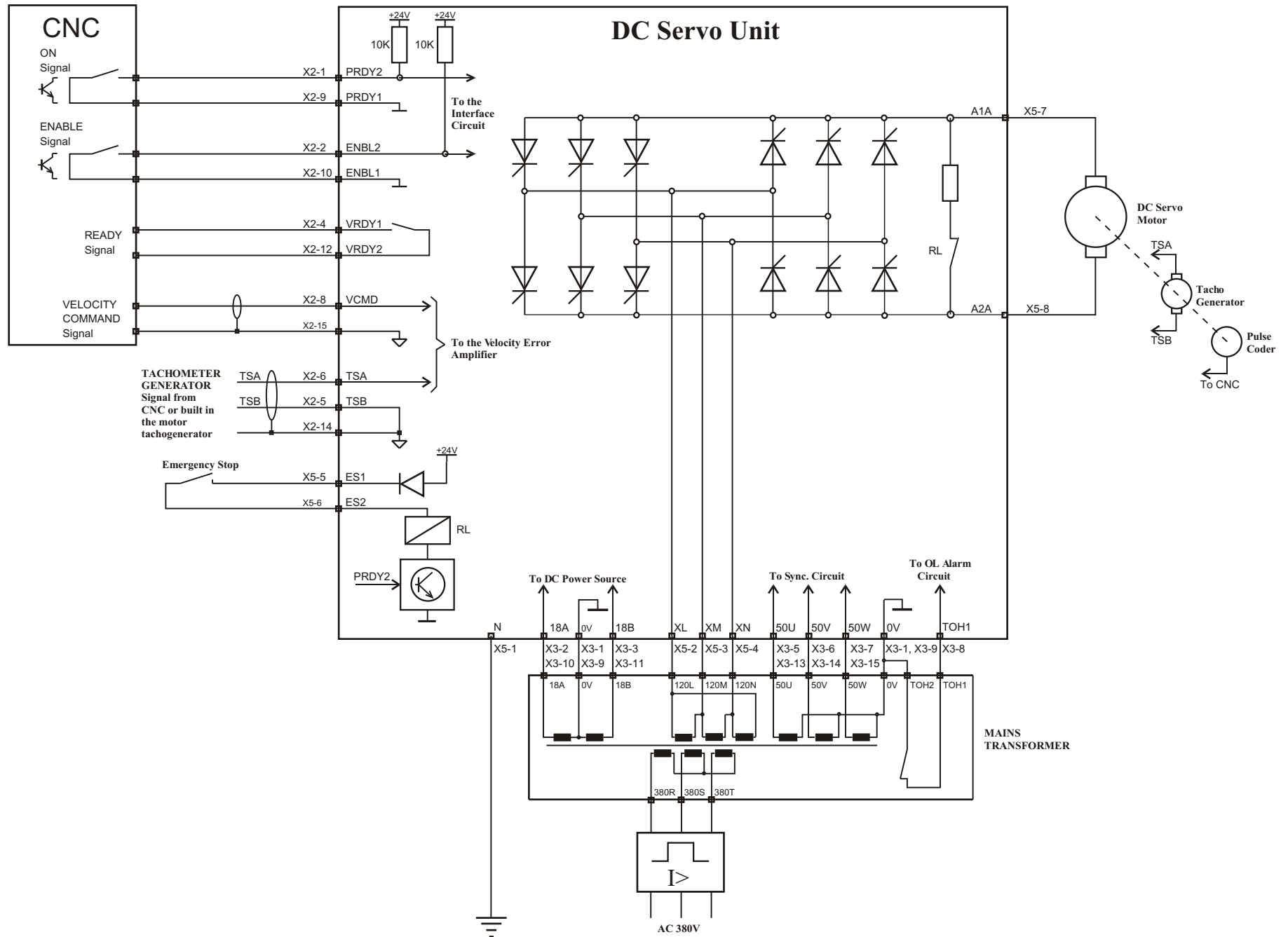


Fig. 2. Relation between ES, PRDY, VRDY and ENBL.



5.3. Connection of DC Servo Unit - Fig.4.



Notes:

1.Utilization of shielded wire is recommended for connection between CNC system and reference input (VCMD Velocity Command Signal). The shield has to be connected to X2-15 pin (AGND).

2.Utilization of shielded wire is recommended for connection between tachogenerator and velocity feedback input (TSA Signal). The shield has to be connected to X2-14 pin (AGND).

If there is not built-in tachogenerator in DC motor the velocity feed back signal should be generated by CNC.

3.Use wires as short as possible.

4.

The signal wires must be placed as far as possible from the power cables.

**CAUTION:**

**Do not connect or disconnect any connector under voltage.**

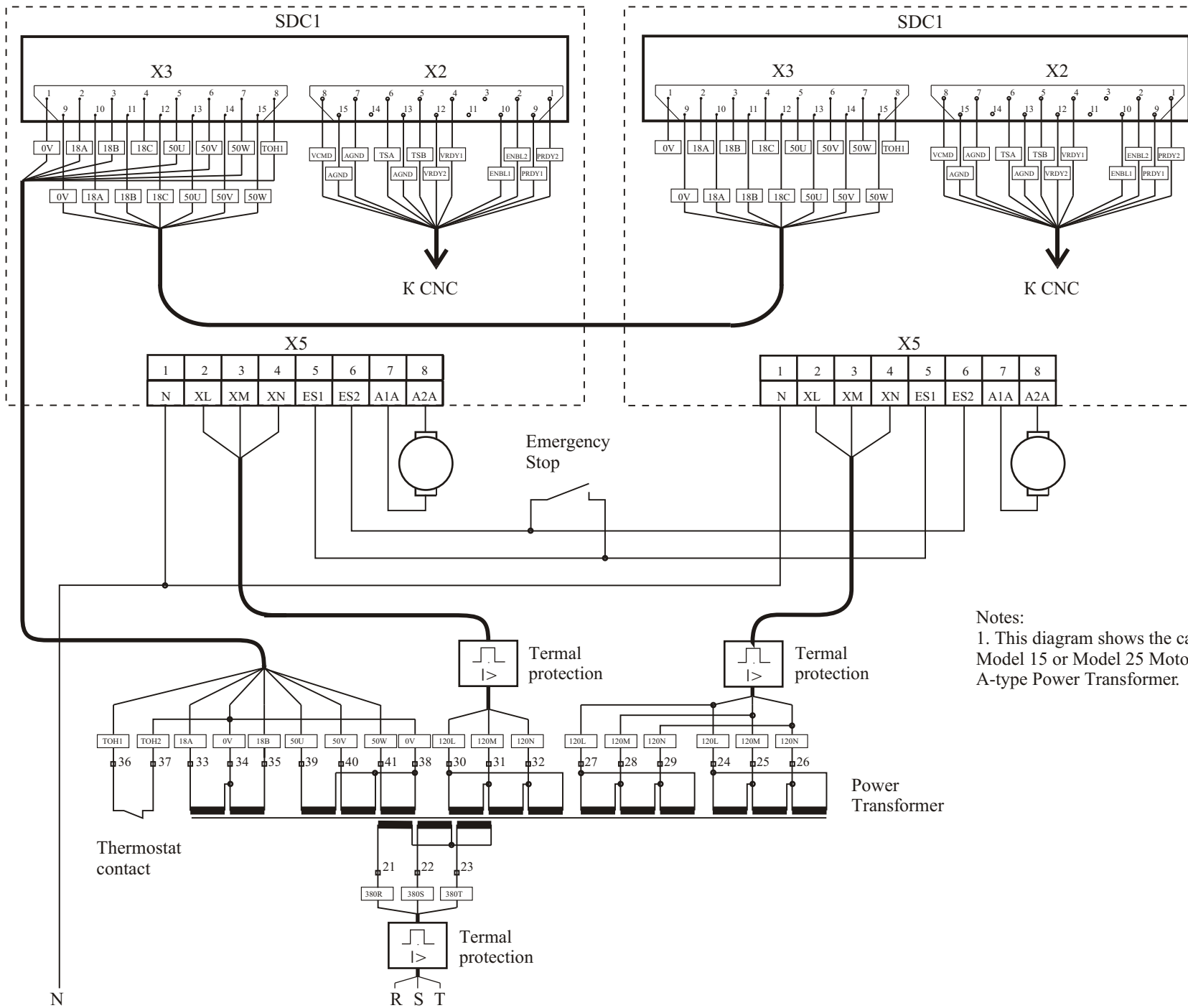
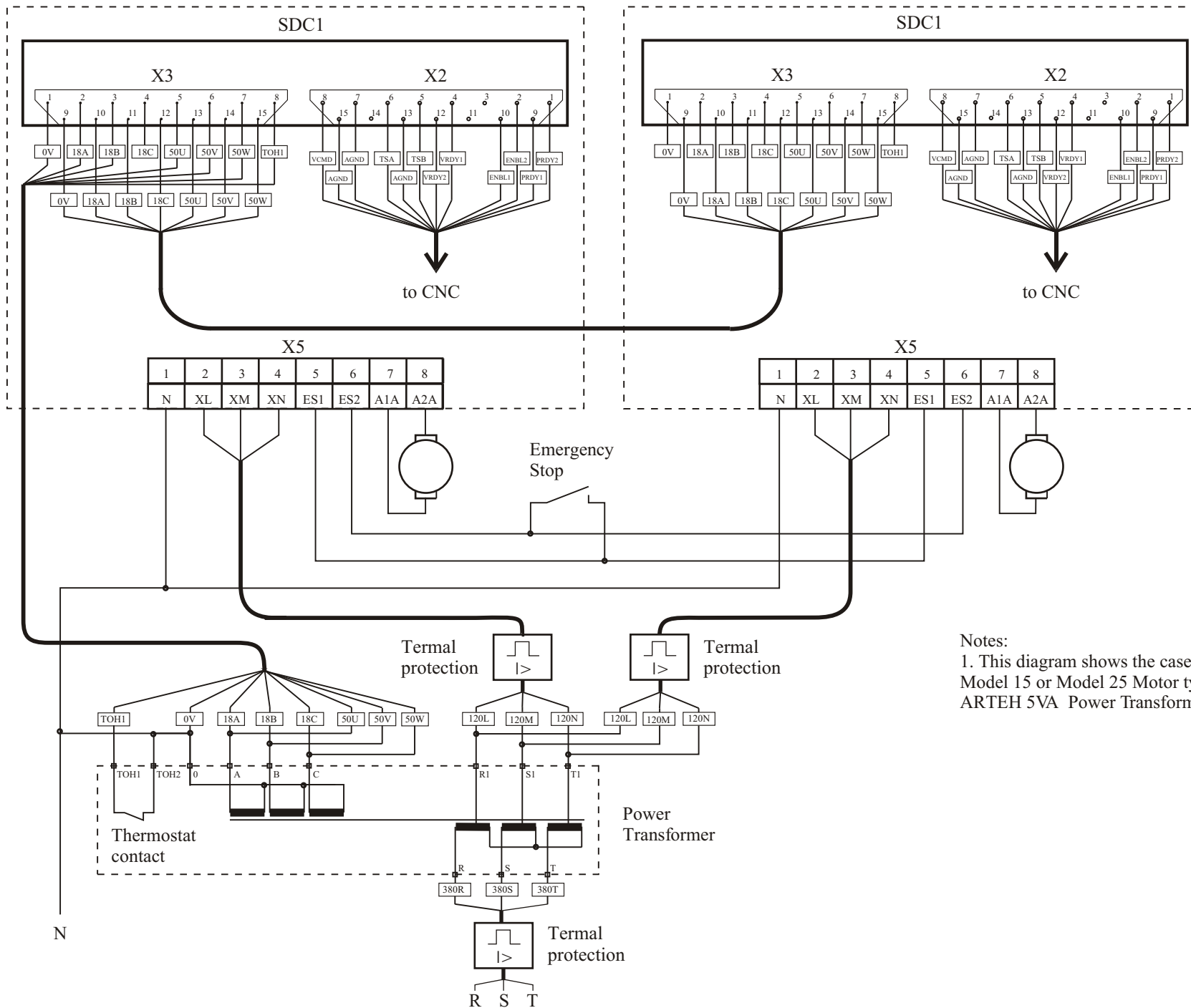


Fig. 5



Notes:  
 1. This diagram shows the case of 2-axes, Model 15 or Model 25 Motor type and ARTEH 5VA Power Transformer.

Fig. 6

# SDC1 DC SERVO UNIT

	<b>RD</b>	READY Indicator
	<b>EN</b>	ENABLE Indicator
	<b>CP</b>	PHASE FAILURE Indicator
	<b>TG</b>	TACHOMETER GENERATOR LOSS Ind.
	<b>OS</b>	OVERSPEED DETECTION Indicator
	<b>OC</b>	OVERCURRENT DETECTION Indicator
	<b>OL</b>	OVERLOAD DETECTION Indicator

	<b>Angle</b>	INITIAL FIRING ANGLE adj.	P302
	<b>I Limit</b>	CURRENT LIMIT adj.	P501
	<b>Gain</b>	SPEED CONTROLLER GAIN adj.	P203
	<b>Offset</b>	SPEED CONTROLLER OFFSET adj.	P202
	<b>Tacho</b>	VELOCITY FEEDBACK GAIN adj.	P201

	<b>P Term</b>	Prop. Term of PID Speed Controller	J209 J210	Short J209, J210 or both of them for lower value of Proportional Term of PID Speed Controller		
	<b>I Term</b>	Integral Term of PID Speed Controller	J211 J212	Short J211, J212 or both of them for higher value of Integral Term of PID Speed Controller		
	<b>LS Gain</b>	Low Speed Gain of Speed Controller	J202	Short J202 to achieve lower Speed Controller Gain for lower speeds		
	<b>Enable Ctrl</b>	Enable Speed Controller	J201	Short J201 to set Speed Controller proportional		
	<b>Tacho Scale</b>	Velocity Feedback Gain adj.	J207	Use these jumpers to set appropriate gain of Velocity Feedback signal depending on the Tachometer V/rpm constant		
			J206		Motor type	Model 5
			J205		Tacho constant, V/1000rpm	6
			J204		J203	C
			J204		J204	C
			J205		J205	C
			J206		J206	C
	J207	J207	O			



Fig. 7



NOTES:  
 1. Items concerning Velocity Error Amplifier adjustment  
 2. Items concerning Current Amplifier adjustment

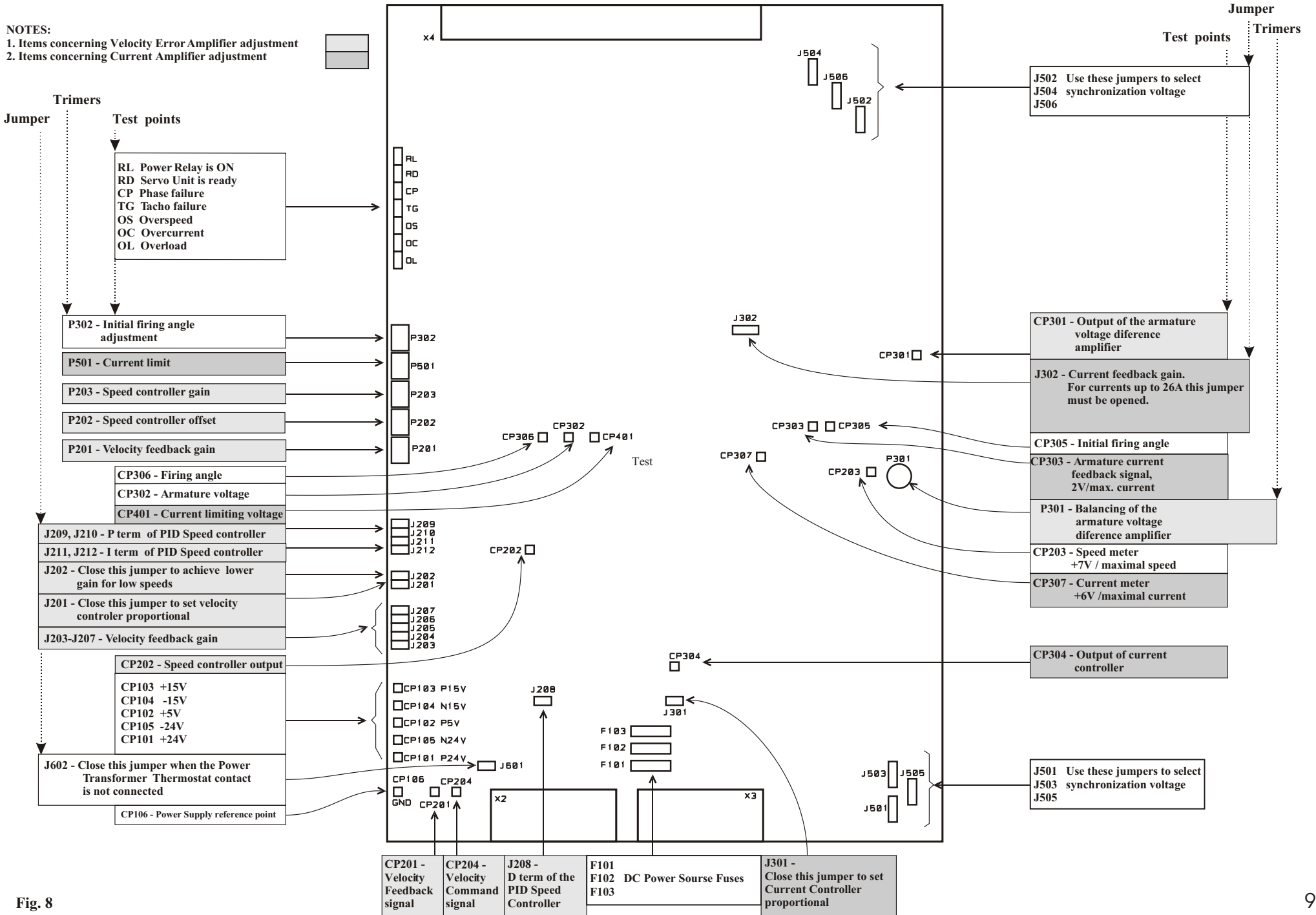


Fig. 8

## 6. Adjustment of DC Servo Unit.

### 6.1. Items available without removing of the front panel.

### 6.2. Location of the variable resistors, jumpers and test points.

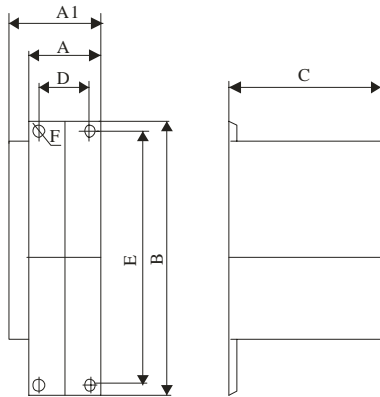
## 7. Installation of DC servo unit.

### 7.1. Installation conditions.

The servo drive modules are intended for installation in metal cabinets.

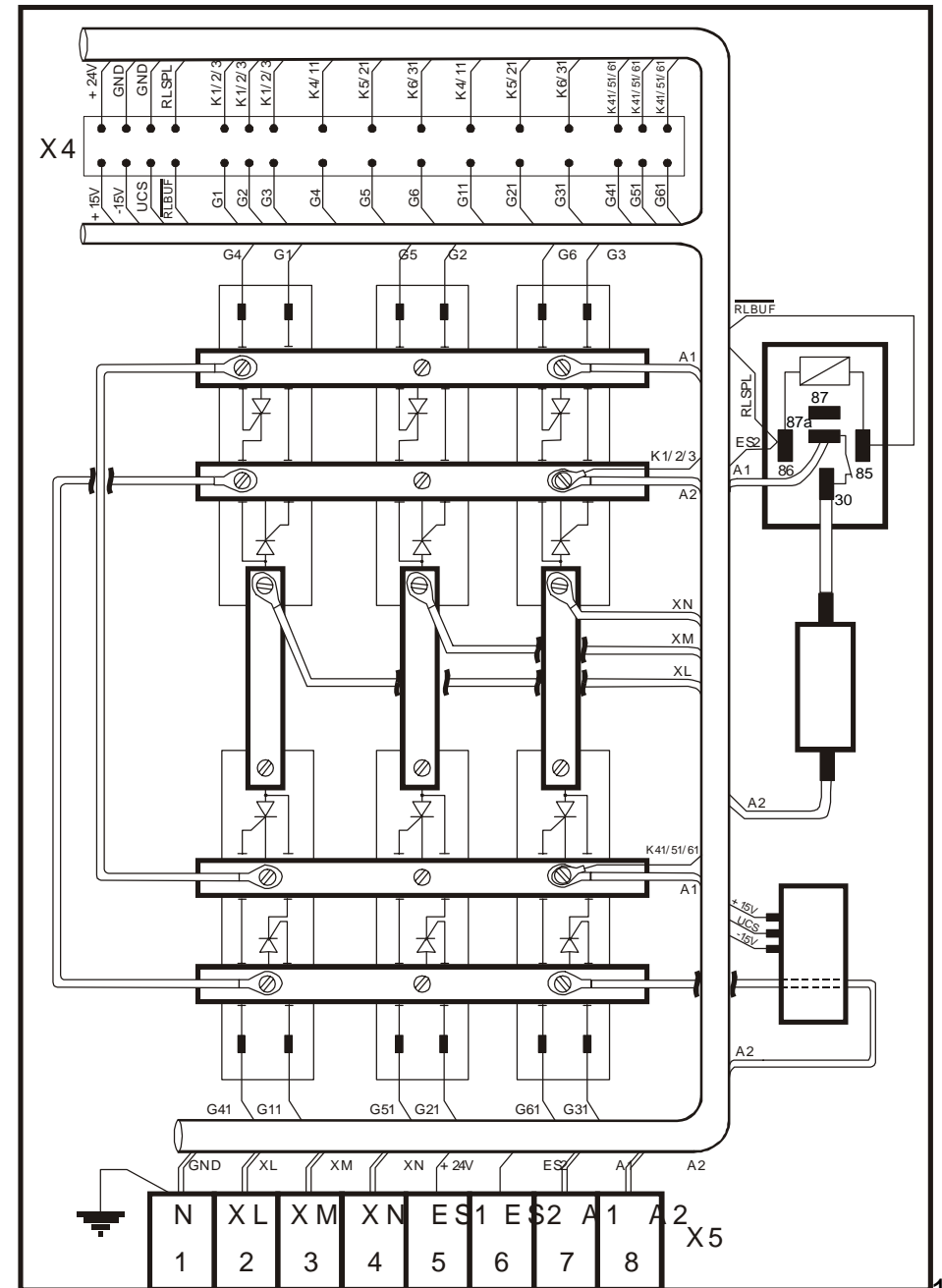
The ventilation system of the cabinet must ensure vertical air circulation through thyristor sections of the drive.

### 7.2. Outer dimensions - Fig.9.

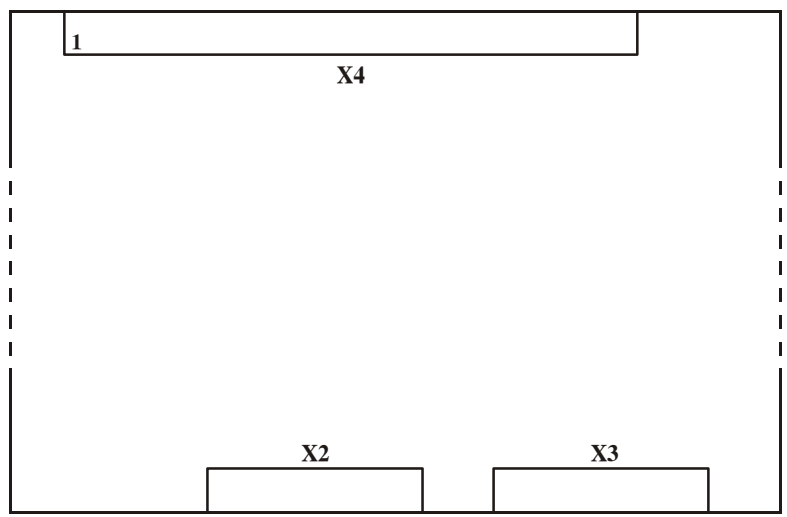


Type	A mm	B mm	C mm	D mm	E mm	F mm
SDC1-5.4 - SDC1-34.3	90	345	190	65	327	∅ 9

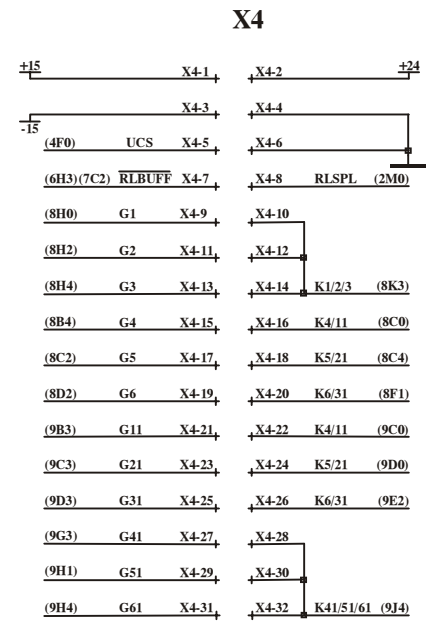
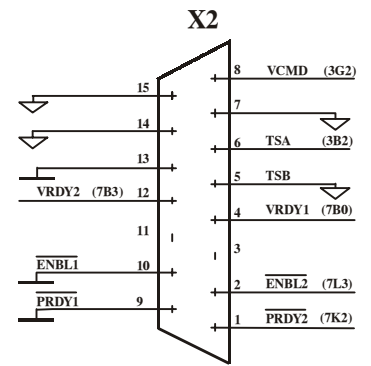
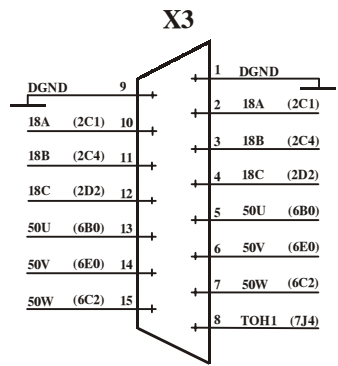
Fig. 10. Location of the thyristors.

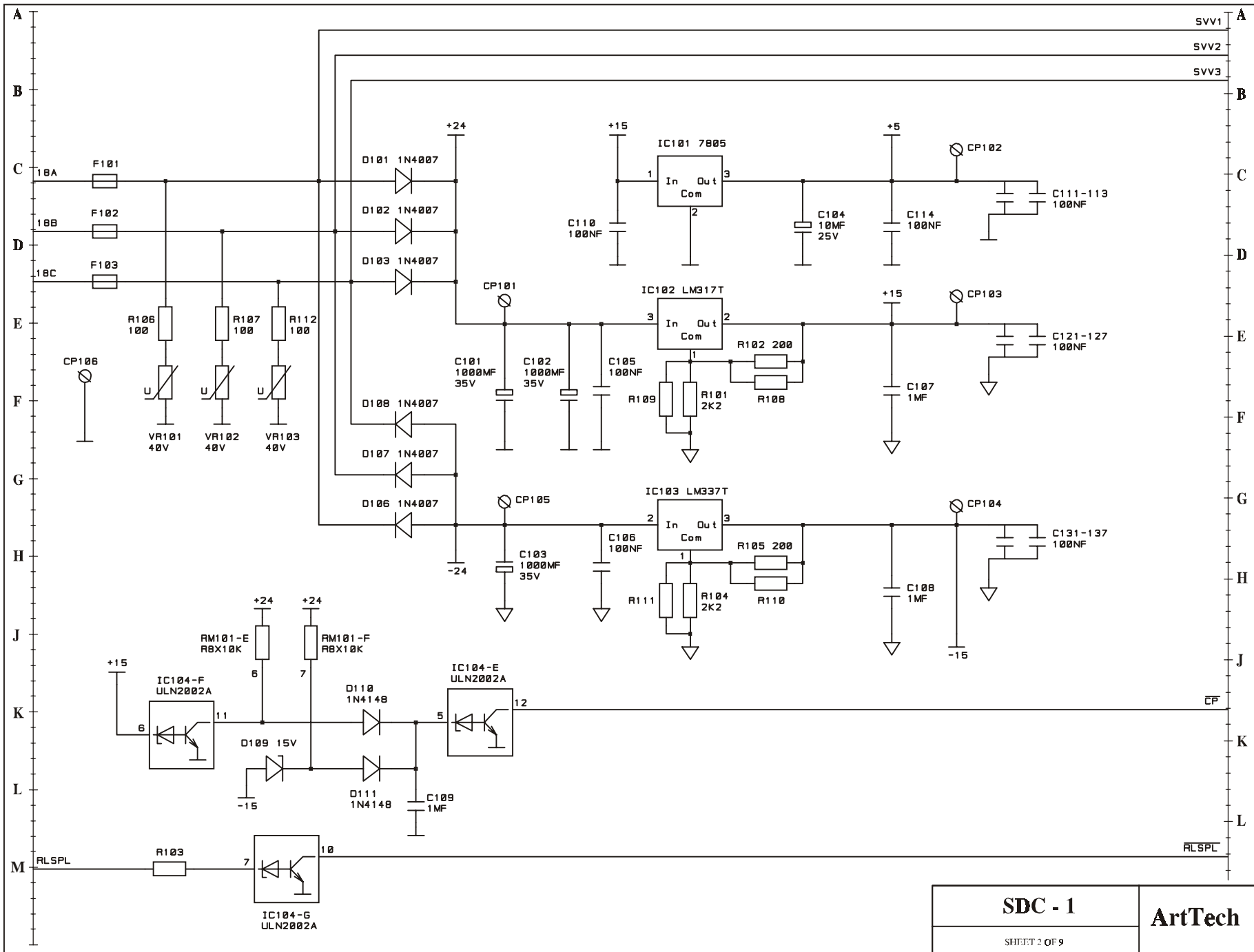


A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M



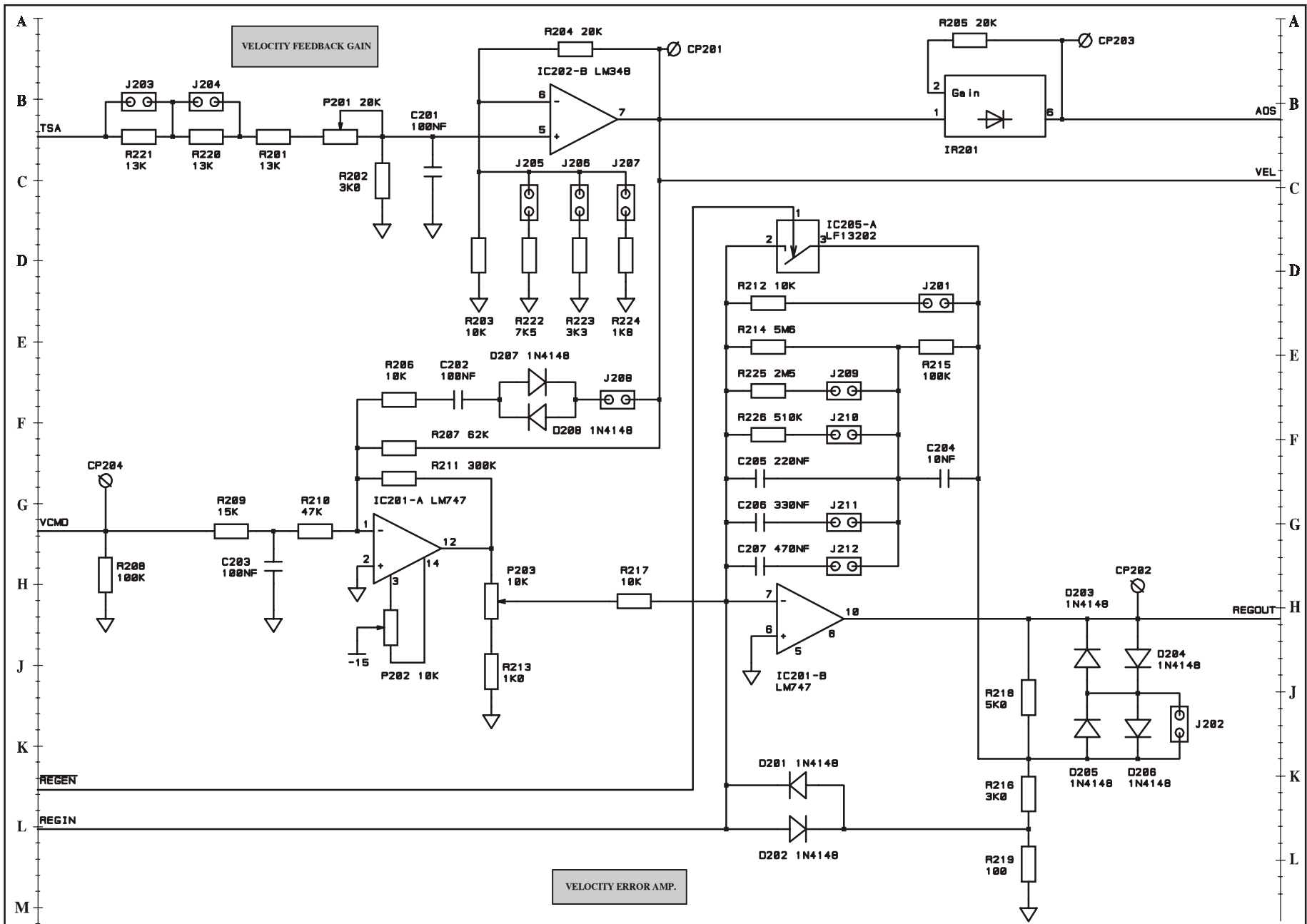
A  
B  
C  
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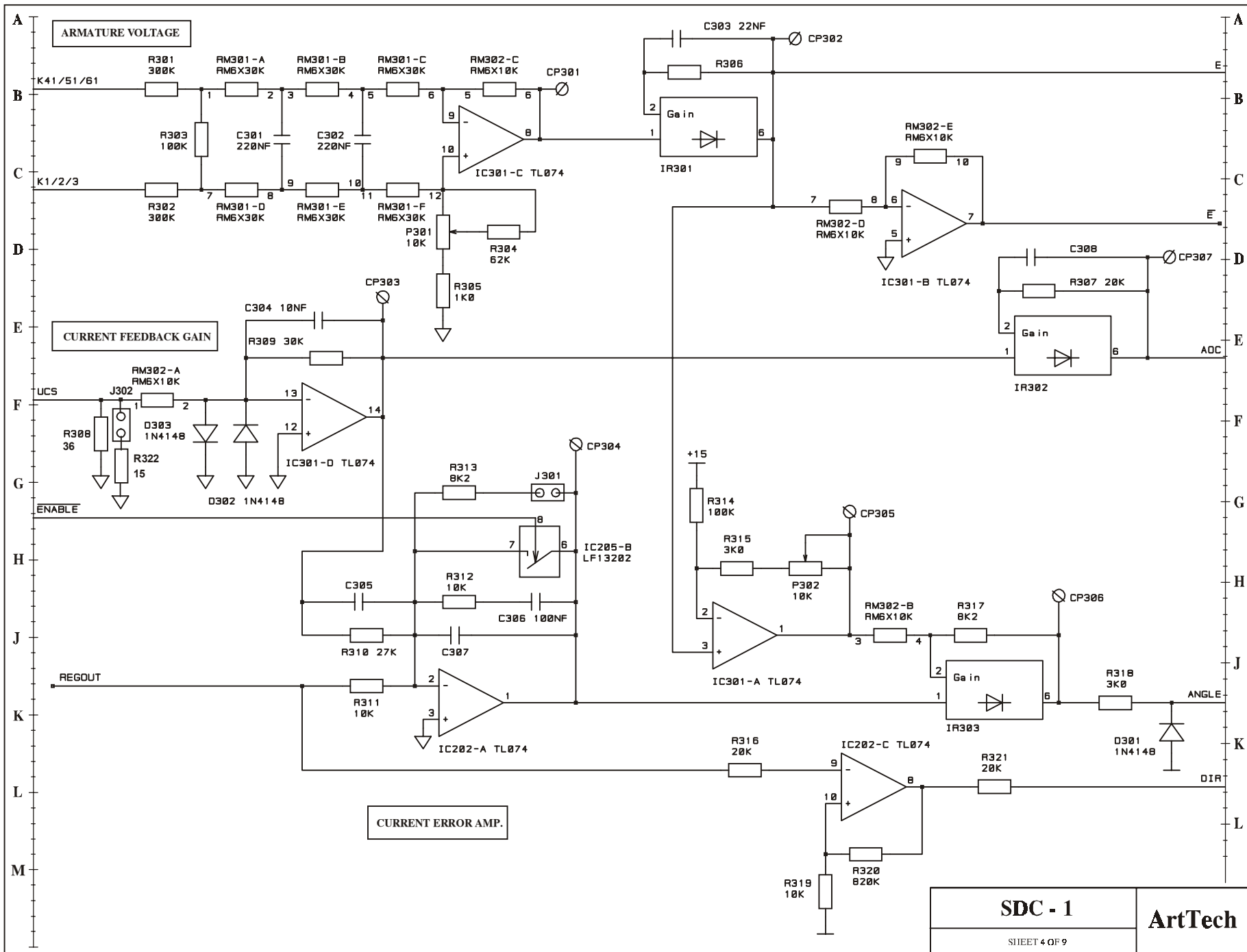
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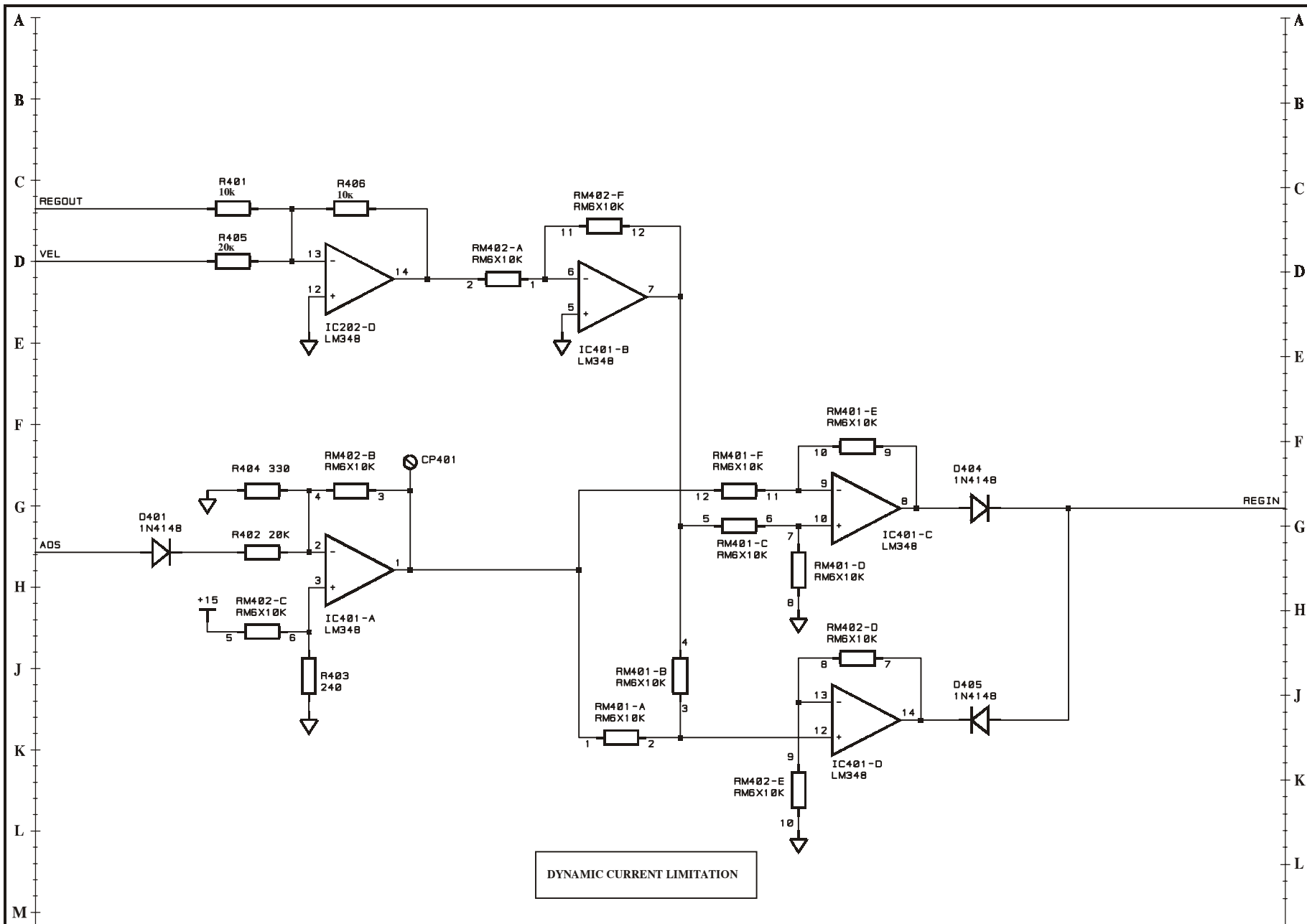


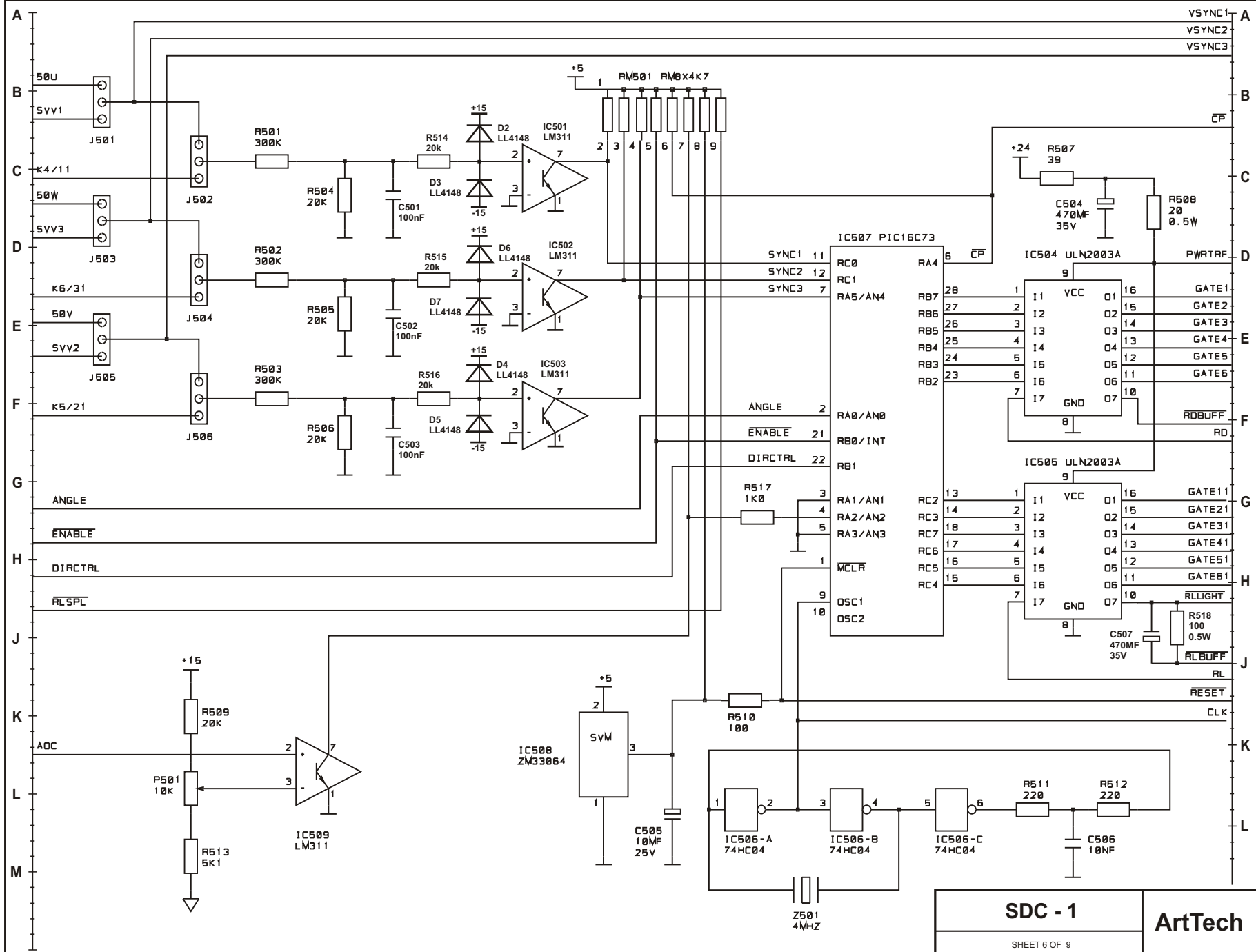
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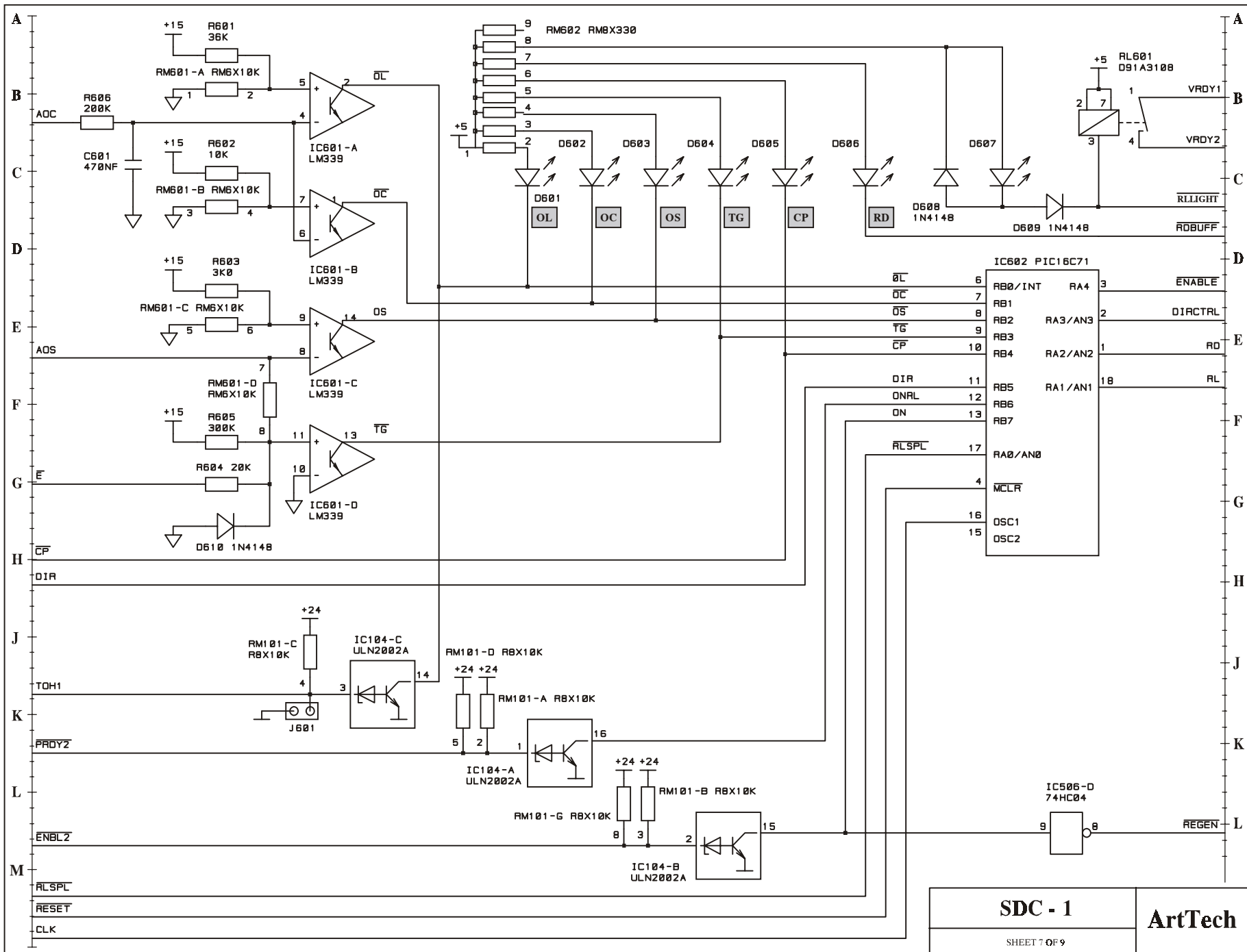
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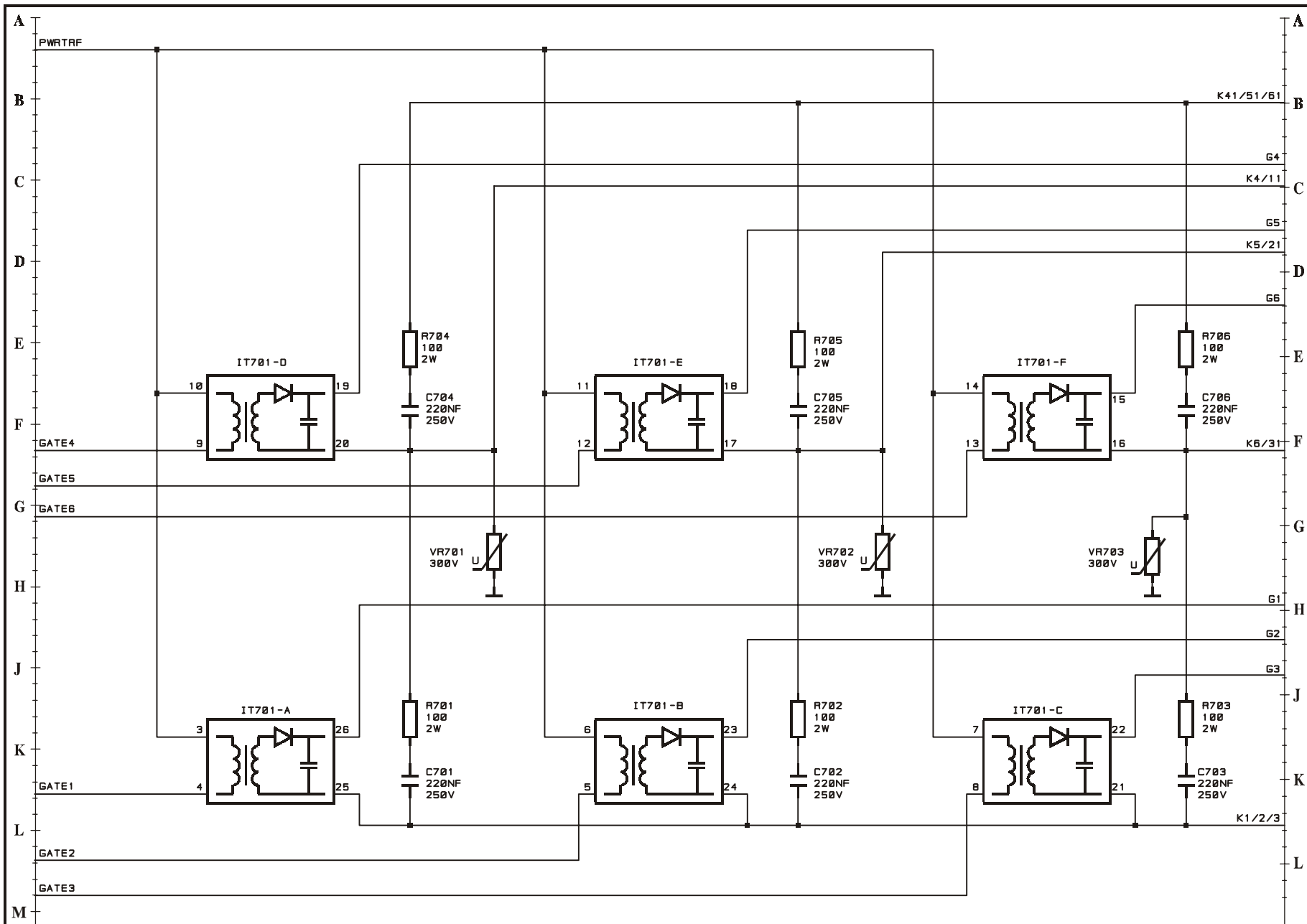






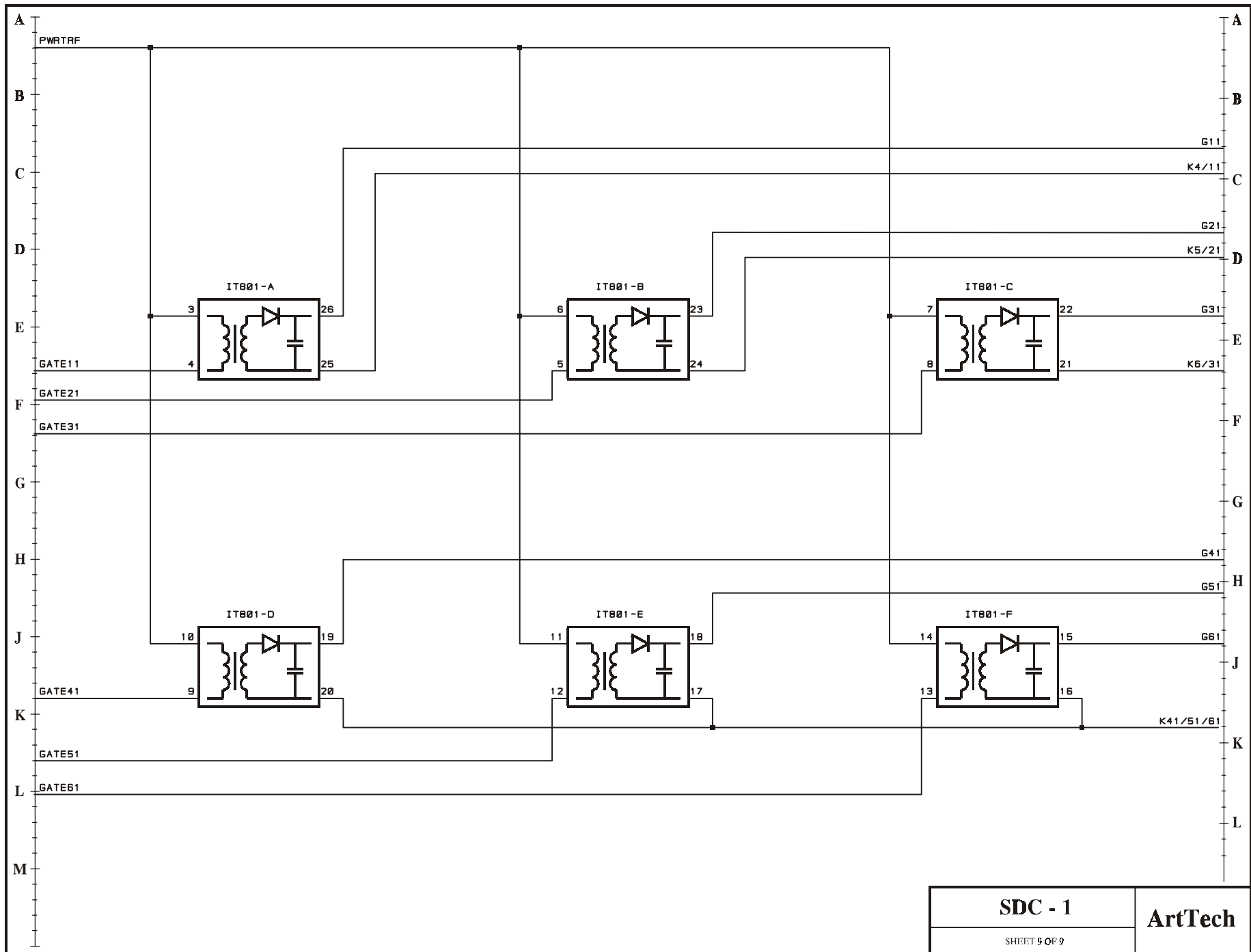






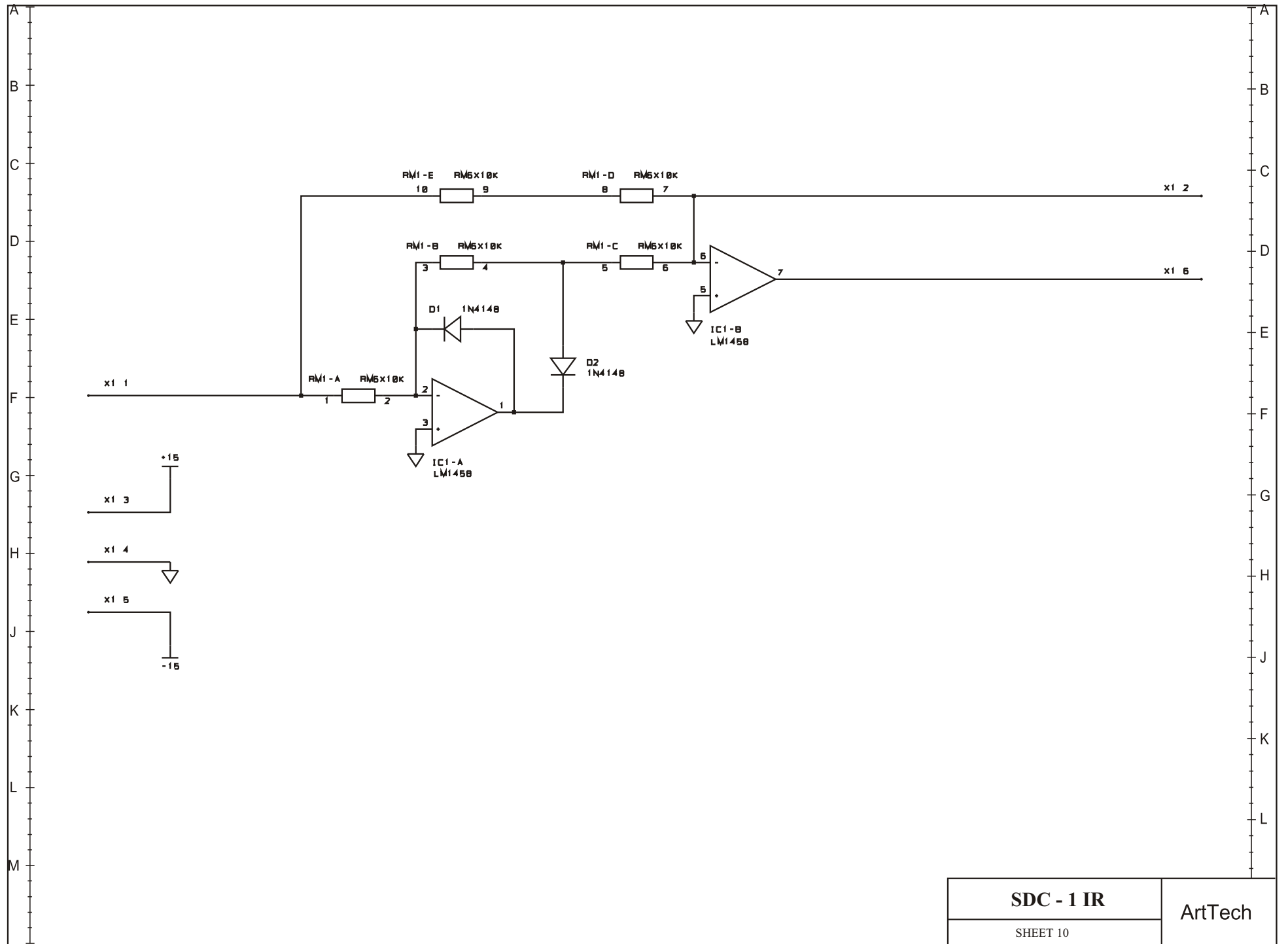
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SHEET 8 OF 9	

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