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भारत सरकार – रेल मंत्रालय  
 अनुसंधान अभिकल्प और मानक संगठन  
 लखनऊ – 226011  
 Government of India - Ministry of Railways  
 Research, Designs & Standards Organization,  
 LUCKNOW - 226011

No. EL/3.1.35/2/Elect

Dated:25.04.2016.

**Chief Electrical Engineers,**

- Central Railway, 2<sup>nd</sup> floor, Parcel Office Bldg., Mumbai CST-400 001.
- East Central Railway, Hazipur – 844 101 (Bihar).
- Eastern Railway, Fairlie Place, Kolkata -700 001.
- North Central Railway, Allahabad – 211 001.
- Northern Railway, Baroda House, New Delhi-110 001.
- South Central Railway, Rail Nilyam, Secunderabad – 500 071.
- South East Central Railway, Bilaspur-495 004.
- South Eastern Railway, Garden Reach, Kolkata-700 043.
- Southern Railway, Park Town, Chennai-600 003.
- West Central Railway, Jabalpur 482 001.
- Western Railway, Churchgate, Mumbai –400 020.
- Chittaranjan Locomotive Works, Chittaranjan-713 331.

**MODIFICATION SHEET NO. RDSO/2012/EL/MS/0413, Rev. '1' Dated 25.04.2016**

**1.0 Title:**

Paralleling of interlocks of EP contactors and auxiliary contactors of three phase locomotives to improve reliability.

**2.0 Object:**

2.1 Paralleling of interlocks as indicated in modification sheet no. ROSO/2012/EL/MS/413 Rev.0 dated 28.09.12 other interlocks of EP contactors and auxiliary contactors of three phase locomotives were identified for paralleling to improve the reliability as indicated in para 3.0(i) to (iv).

2.2 Further, S.C. Railway vide their letter no. C/E.221/ELS/LGD/Tech/27B dated 25.02.13 has suggested that instead of additional LADN-22 required for paralleling 52.5/1&2, it may be interchanged from 126.7/1&2 and paralleling of two NO interlocks of 8.41 may be achieved by shorting 2 & 4 terminal interlock available (normally only one contactor is used and other is not used, second interlock is used only when other Bogie is isolated) by providing an additional loop instead of asking the manufacturer to provide two additional NO interlocks. Thus, Rev.'1' of this Modification Sheet is issued.

**3.0 Existing Arrangement with cross-references of respective design document:**

The circuit of following contactor/relays have been revised.

- (i) Contactor for SR precharging contactor: Sch. Pos. 12.3/1&2: ABB document no. 3EHP281164.

- (ii) Auxiliary contactor: Sch. Pos: 52/1, 2, 3, 4&5: ABB document no. 3EHP281165.
- (iii) Contactor oil pump: Sch. Pos: 52.5/1&2. ABB document no. 3EHP281165.
- (iv) Contactor for discharging resistor: Sch. Pos: 8.41 : ABB document no. 3EHP281164.
- (v) Contactor power supply cab: Sch. 20s: 126.7/1&2: ABB document no. 3EHP281165.

The existing control circuits of the above are enclosed as Annexure-1.

**4.0 Modified Arrangement to replace existing arrangement as given above in 3.0:**

Sl. No.	Cont./ Relay No.	Description	Aux. contact / interlocks in use		Aux. contact / interlocks available in spare.		Location	Remarks
			Type LADN 13	Type LADN 22	Type LADN 13	Type LADN 22		
1.	12.3/1 & 2	SR Precharging contactor	0	01 NO	....	01 NO	SR Cubicle	In type LADN-22, the spare NO interlock 3-4 is to be paralleled with used NO interlock 1-2.
2.	52/1	Auxiliary Contactor	01 NO + 03 NC	01 NO	NIL	01 NO + 02 NC	BUR-2/3	In type LADN-22. The spare NO interlock 43-44 is to be paralleled with used NO interlock 13-14.
3.	52/2	Auxiliary Contactor	01 NO + 02 NC	Not in service	01 NC	Not in service	BUR-2/3	In type LADN-13. The spare NC interlock 81-82 is to be paralleled with used NO interlock 71-72.
4.	52/3	Auxiliary Contactor	01 NO + 01 NC	02 NO	02 NC	02 NC	BUR-2/3	In type LADN-13 the spare NC I/L 71-72 is to be paralleled with use N/C I/L 61-62. In type LADN-22 the spare NO I/L 43-44 is to be paralleled with used NO I/L 13-14.
5.	52/4 & 52/5	Auxiliary Contactor	01 NO + 02 NC	01 NO	01 NC	01 NO + 02 NC	HB-1	In type LADN-13 the spare 81-82 NC I/L is to be paralleled with used NC I/L 71-72. In type LADN-22 the spare NO I/L 43-44 is to be

								paralleled with used NO I/L 13-14.
6.	52.5/1 & 2*	Contactor oil pump	Replaced by LADN-22 of sch. pos. 126.7/1 & 2	01 NO	....	01 NO + 02 NC	HB-2	In place of LADN-13, LADN-22 is to be used hence the spare NO I/L 43-44 is to be paralleled with used NO I/L 13-14.
7.	126.7/1 & 2*	Contactor power supply cab	01 NO + 01 NC	Replaced by LADN-13 of sch. pos. 52.5/1 & 2	02 NC	....	SB-1 /SB-2	Cable no. 2097 A and 2099A are connected across NO I/L 53-54 and cable no. 2503B and 2504B are connected across NC I/L 61-62 for 126.7/1. Similarly circuit to be modified for 126.7/2.
8.	8.41	Contactor discharging resistor	....	02 NO + 01 NC	....	01 NC	FB	The spare NC interlock 7-8 is to be paralleled with used NC interlock 5-6, connect cable no. 2863A & 2863B. For the modified circuit diagram refer to Rev. '1' modified schematic position: 8.41 of Annexure-2

**\* to facilitate SN 6 and 7 above, the LADN-13 of contactor 52.5/1&2 to be interchanged with LADN-22 of 126.7/1&2.**

**The Revised control circuits of above are attached as Annexure-2.**

**5.0 Application to class of locomotives:**

WAP5, WAP7, WAG-9 and WAG-9H class of locomotives.

**6.0 Material Required per Loco:**

0.5 mm<sup>2</sup> cable as per CLW spec. no. CLW/ES/3/0458: 01 m.

**7.0 Material Rendered Surplus:**

NIL.

**8.0 Reference:**

- 1) Decision on item NO.8 of XXXV MSG meeting held at ELS/Erode, Southern Railway on 10th & 11th May'12.
- 2) S.C. Railway letter no. C/E.221/ELS/LGD/Tech/278 dated 25.02.13.

**9.0 Modification Drawing:**

Attached.

**10.0 Agency of Implementation:**

CLW in the new locos and Loco Sheds holding 3-phase locomotives.

(Suresh Kumar)  
for Director General/Elect.

Encl: As above,

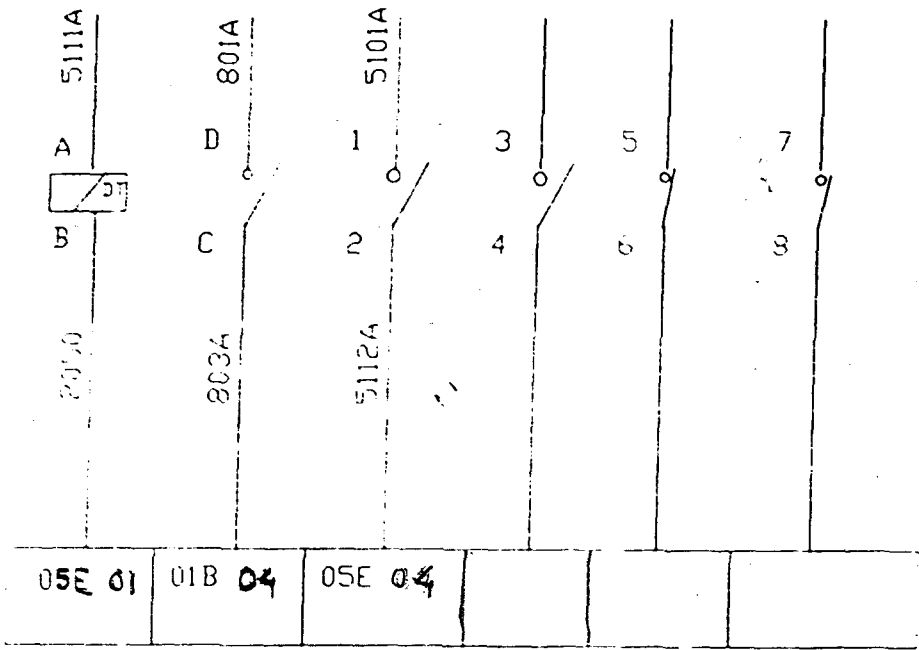
**Copy to:-**

Secretary (Electric Traction), Railway Board, Rail Bhavan, New Delhi-110 001.	For kind information please.
<ol style="list-style-type: none"> <li>1. Chief Electrical Engineer, Chittaranjan Locomotive Works, Chittaranjan-713 331.</li> <li>2. Chief Works Manager, Electric Loco Workshop, Central Railway, Bhusawal-425 201.</li> <li>3. Chief Works Manager, Electric Loco Workshop, Eastern Railway, Kancharapara, 24 Pargana (N) – 743145 (W.B.)</li> <li>4. Chief Works Manager, Loco, Carriage &amp; Wagon Works, Western Railway, Dahod, P.O. Freeland Gank – 389160 (Gujrat)</li> <li>5. <b>Sr. DEE (TRS), Electric Loco Sheds,</b> <ul style="list-style-type: none"> <li>▪ Central Railway, Ajni (Nagpur)-440008.</li> <li>▪ Central Railway, Kalyan-421304 (Maharashtra)</li> <li>▪ East Central Railway, Gomoh-828 401</li> <li>▪ Eastern Railway, Howrah-711 106</li> <li>▪ Northern Railway, Ghaziabad (UP)-201 001.</li> <li>▪ North Central Railway, Fazalganj, Kanpur – 208 003</li> <li>▪ South East Central Railway, BMY Complex, Bhilai, Durg-490 025.</li> <li>▪ South Central Railway, Lallaguda, Secunderabad – 500 017.</li> <li>▪ South Eastern Railway, Tatanagar-831 002.</li> <li>▪ Southern Railway, Royapuram, Chennai-600 013.</li> <li>▪ West Central Railway, Tughlakabad, New Delhi-110 044.</li> <li>▪ Western Railway, Vadodara-390 002.</li> </ul> </li> </ol>	For information and necessary action please.

(Suresh Kumar)  
for Director General/Elect

Encl: As above,

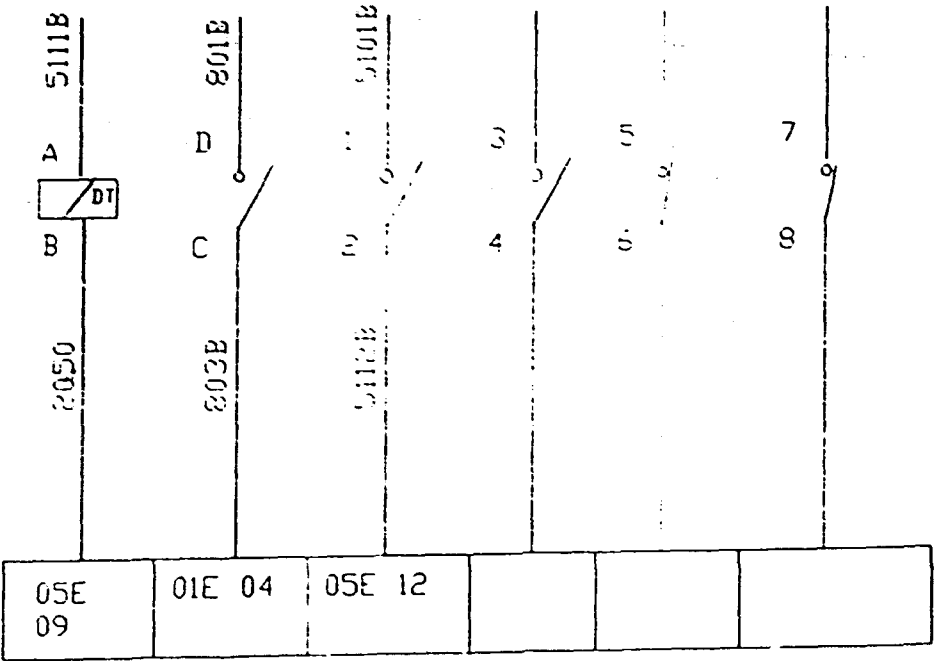
Annexure 1/1



SCHEMATIC POSITION : 12.3/1  
SR Precharging Contactor-1

140740

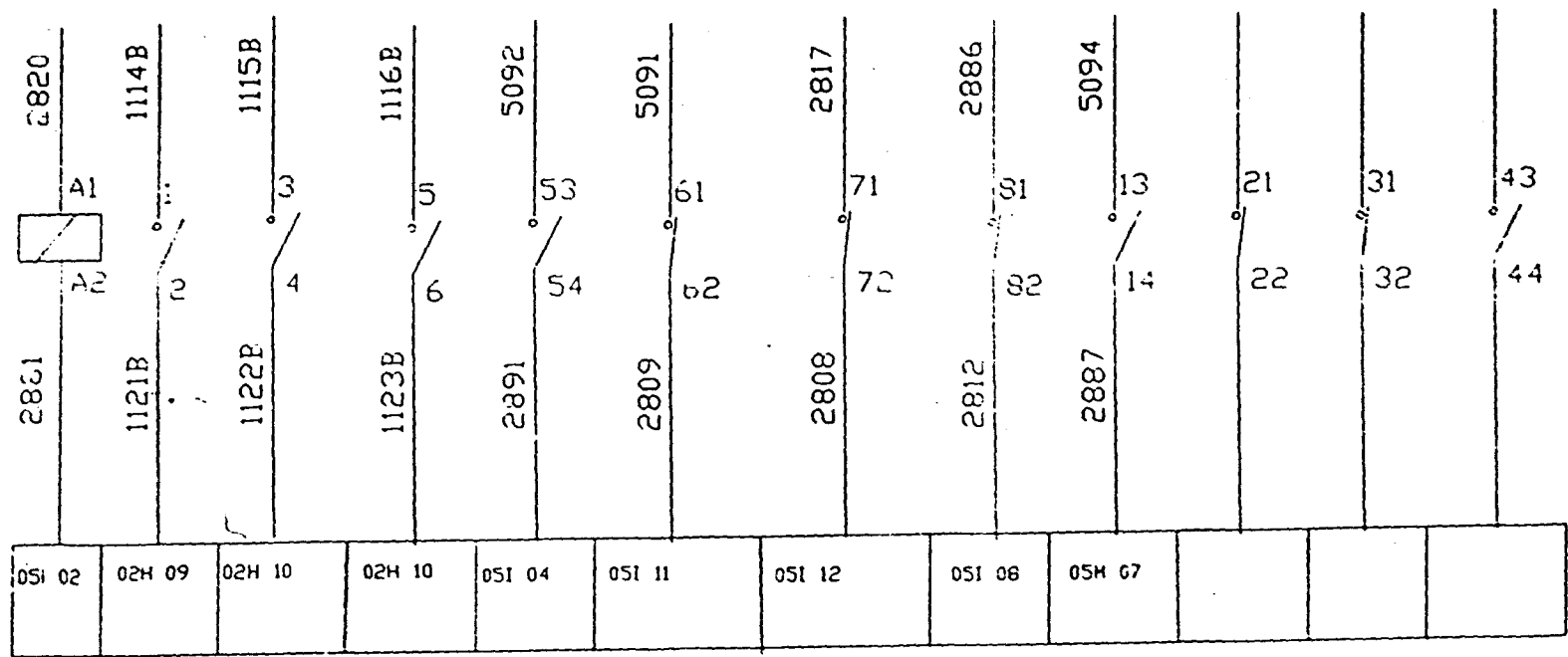
Annexure: 1/2



SCHEMATIC POSITION : 12.3/2  
SR Precharging Contactor-2

140741

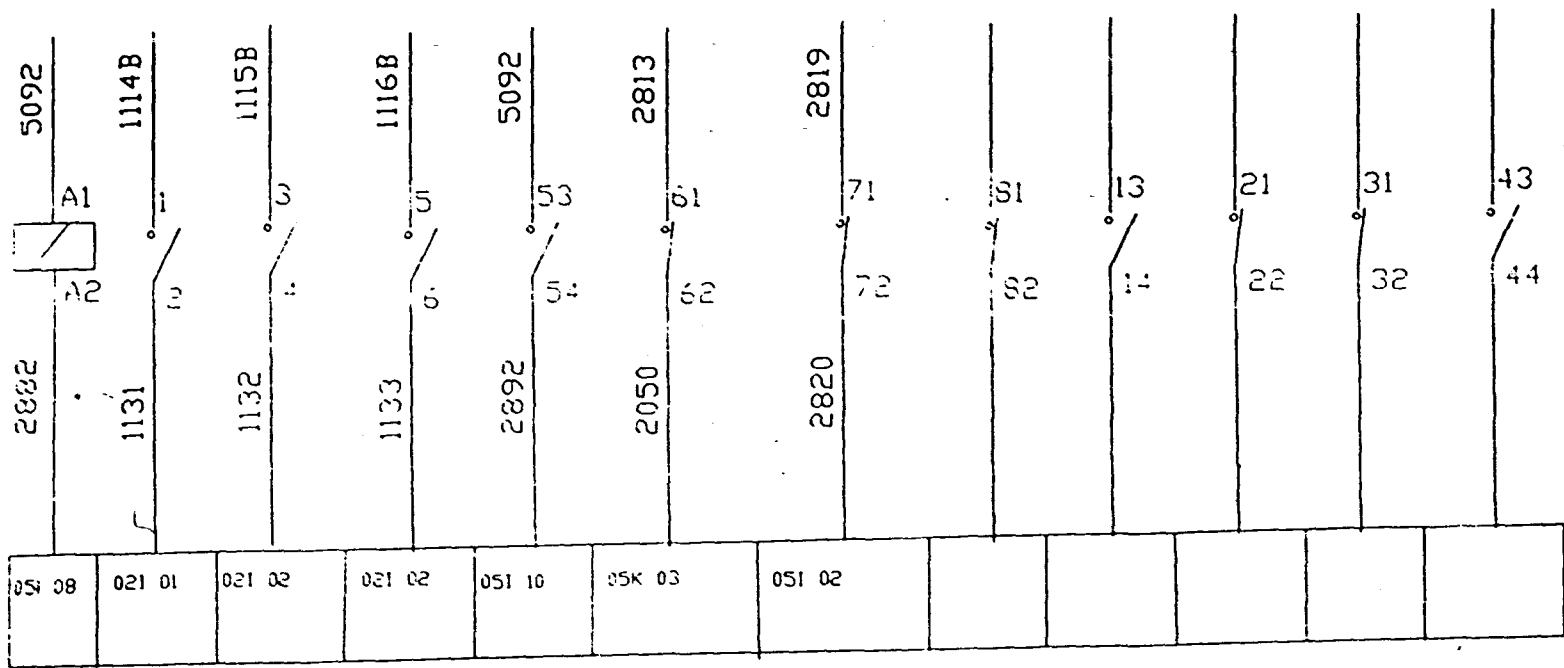
Annexure: 1/3



SCHEMATIC POSITION : 52/1  
AUXILIARY CONTACTOR

140742

Annexure: 1/4

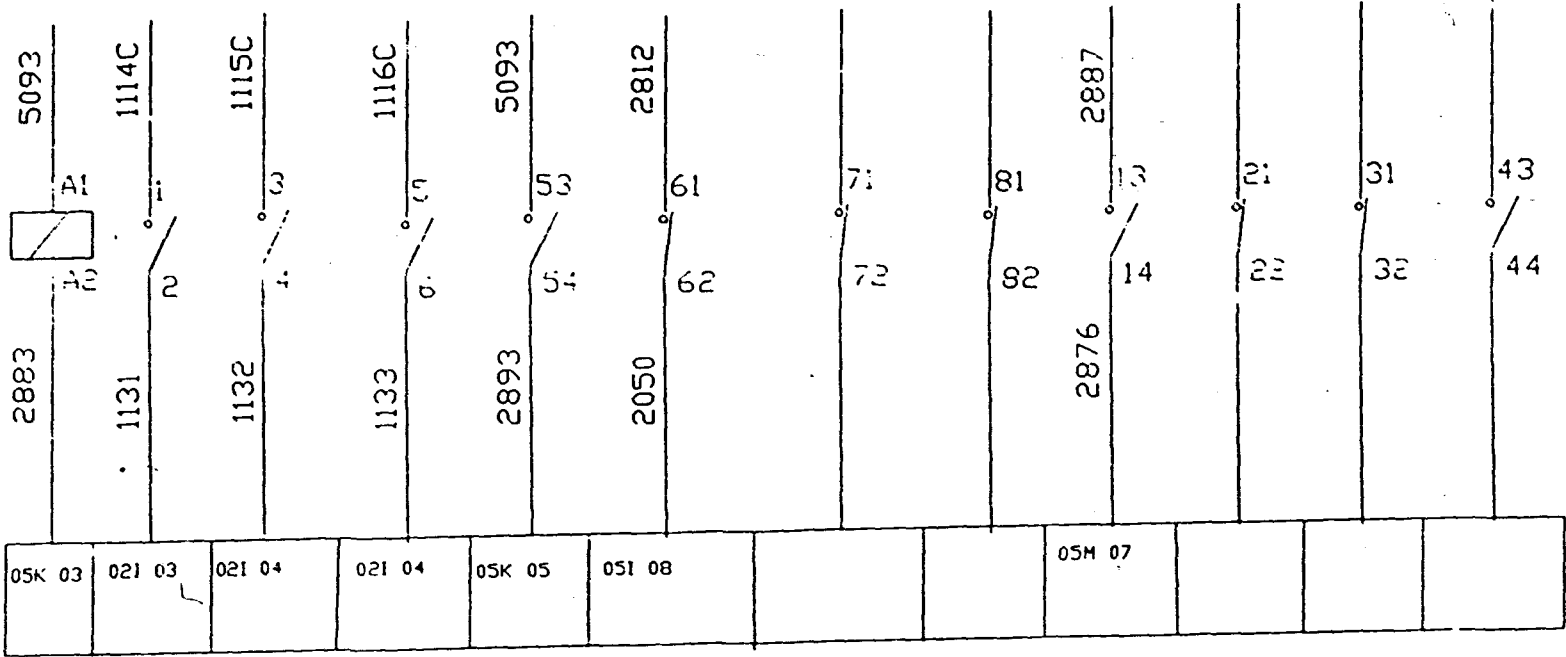


SCHEMATIC POSITION : 52/2  
AUXILIARY CONTACTOR

140743



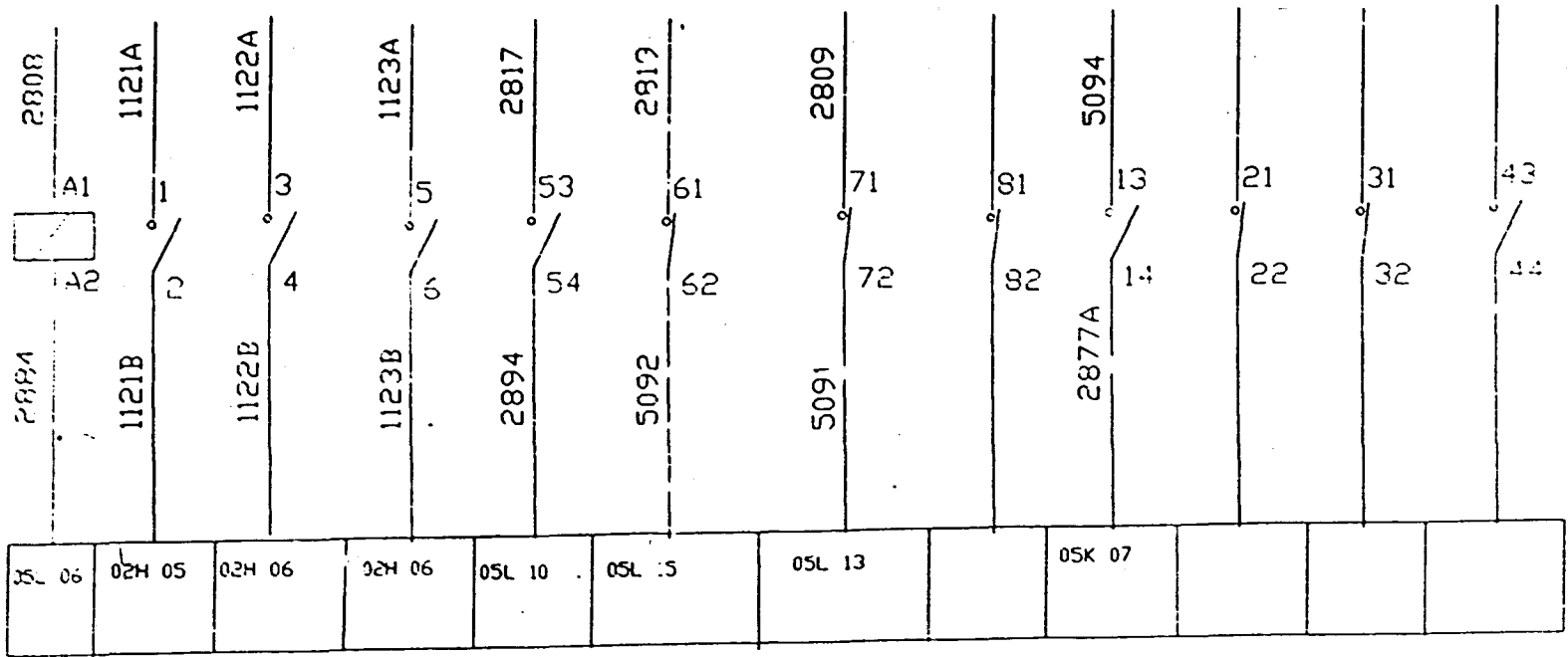
Annexure: 1/5



SCHEMATIC POSITION : 52/3  
AUXILIARY CONTACTOR

140744

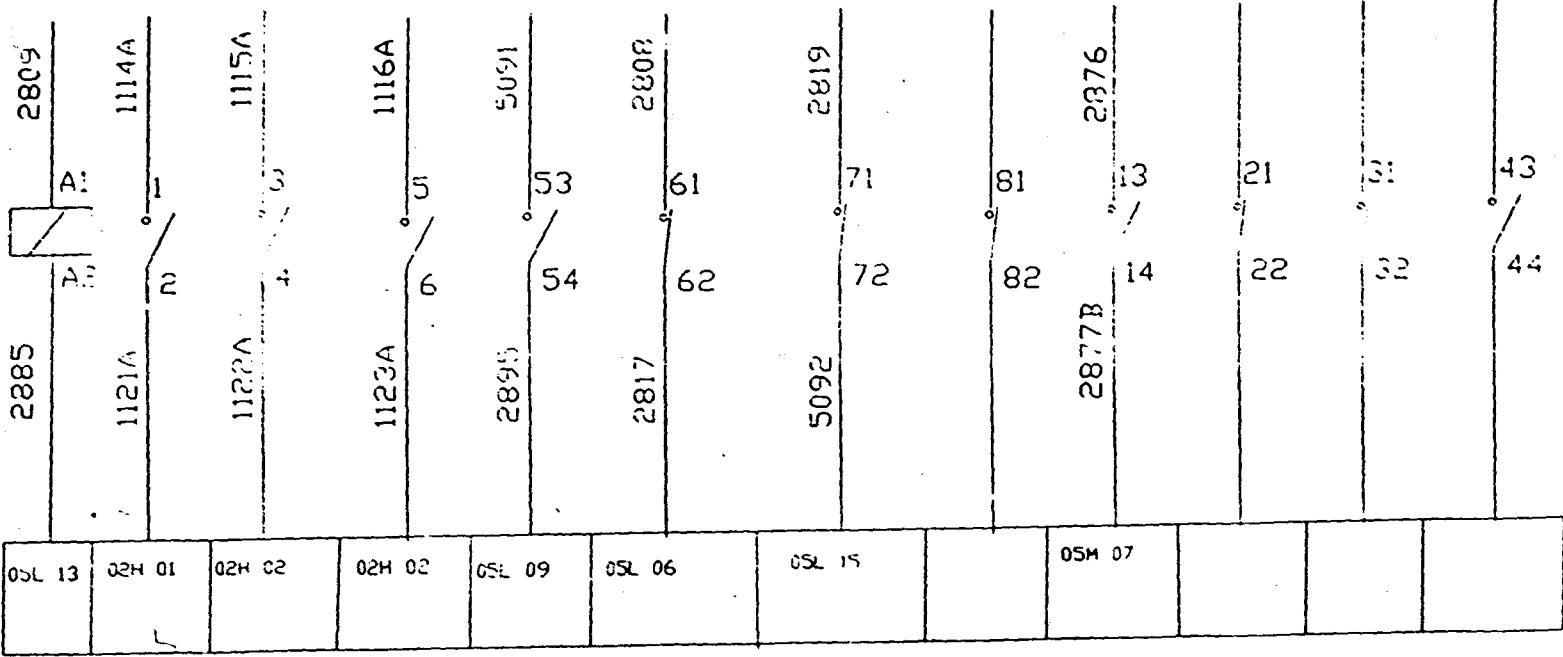
Annexure: 1/6



SCHEMATIC POSITION : 52/4  
AUXILIARY CONTACTOR

140745

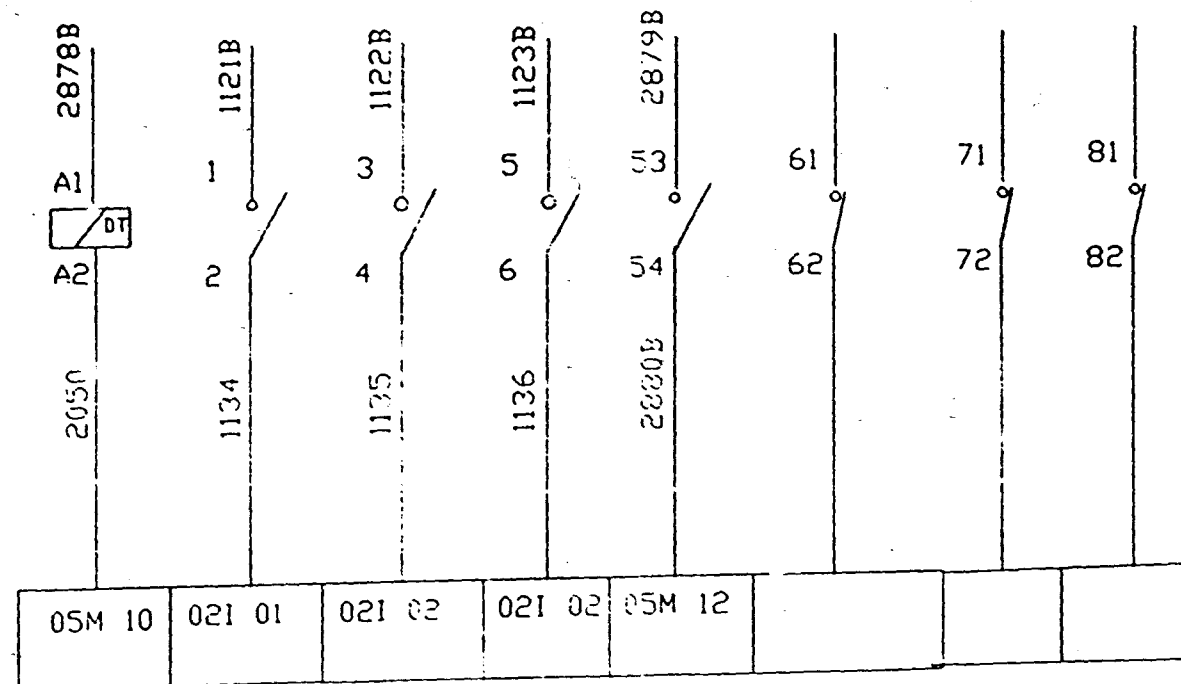
Annexure: 1/7



SCHEMATIC POSITION : 52/5  
AUXILIARY CONTACTOR

140746

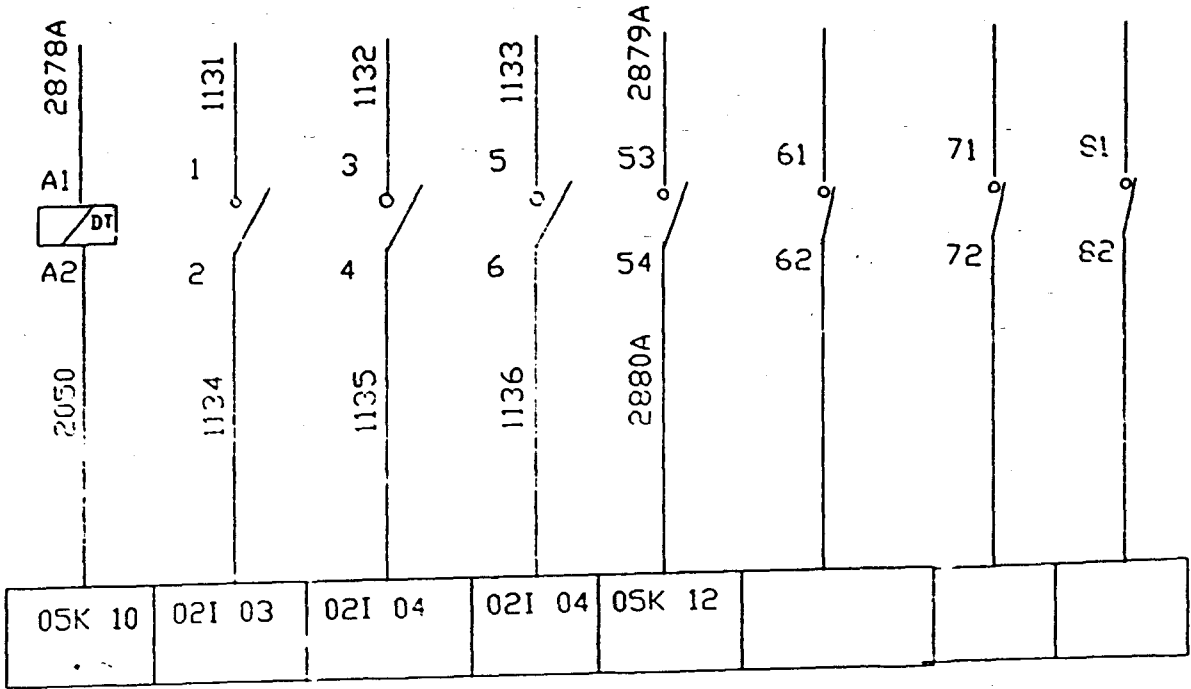
Annexure: 1/8



SCHEMATIC POSITION : 52.5/1  
Contactor Oil Pump-1

140747

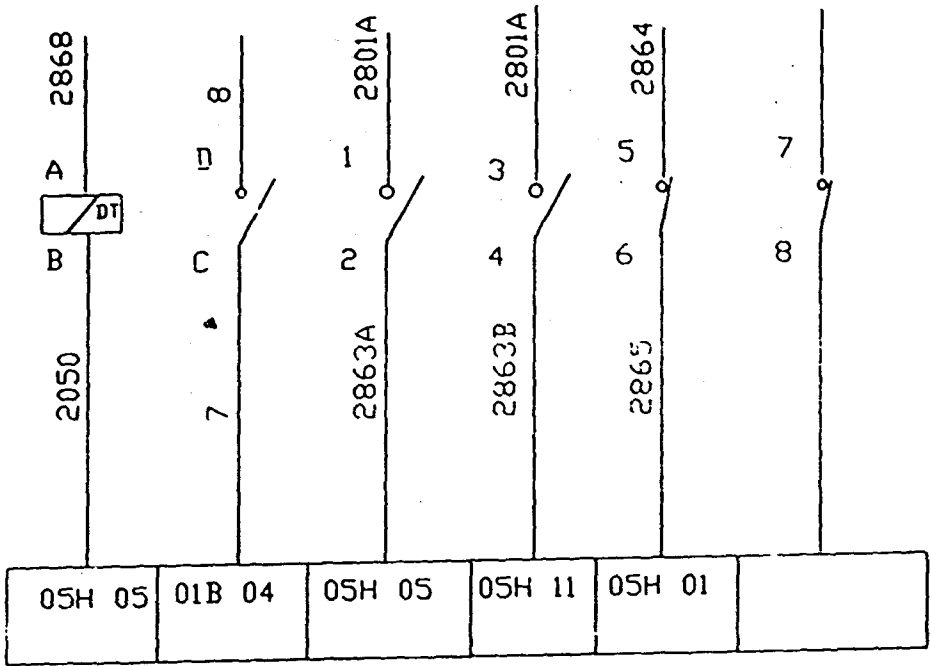
Annexure: 1/9



SCHEMATIC POSITION : 52.5/2  
Contactor Oil Pump-2

140743

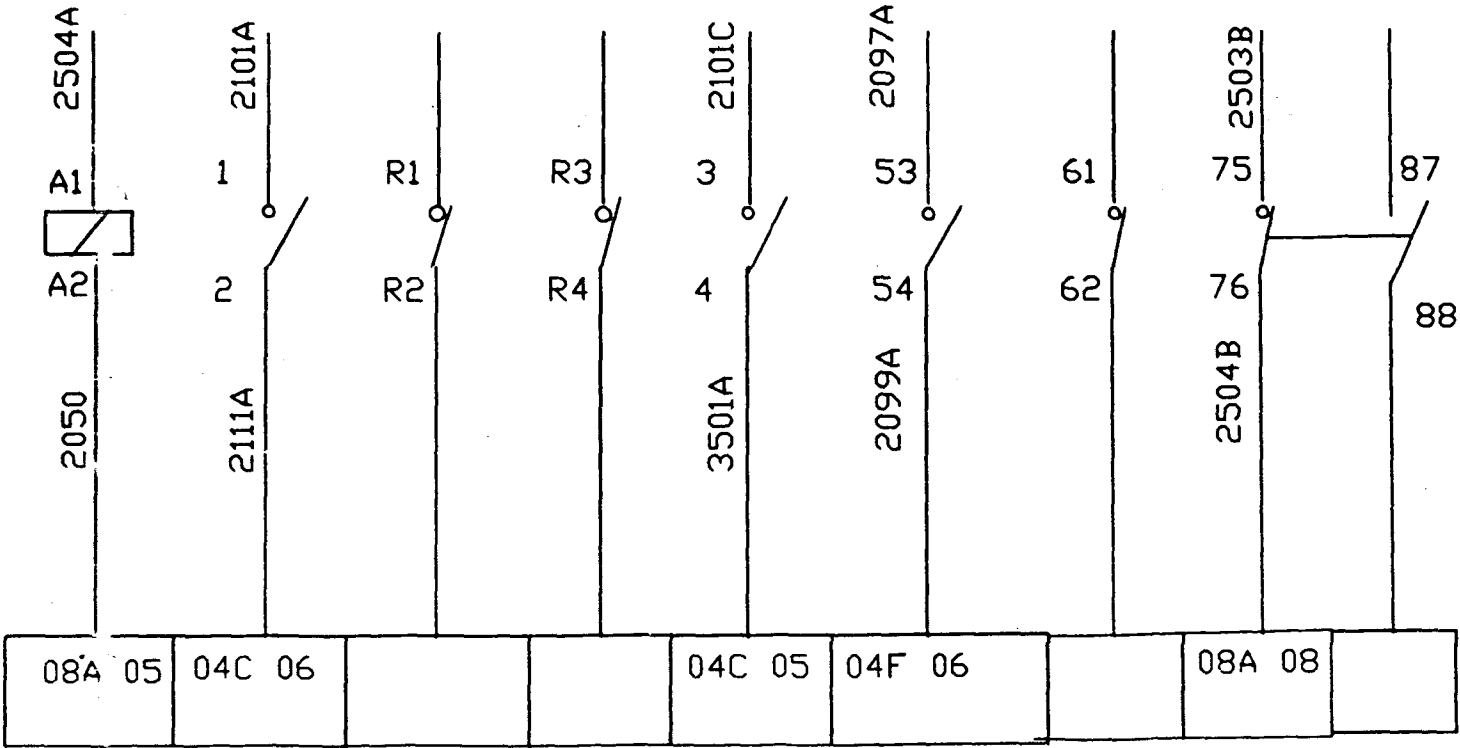
Annexure: 1/10



SCHEMATIC POSITION : 8.41  
Contactor For Discharging Resistor

140749

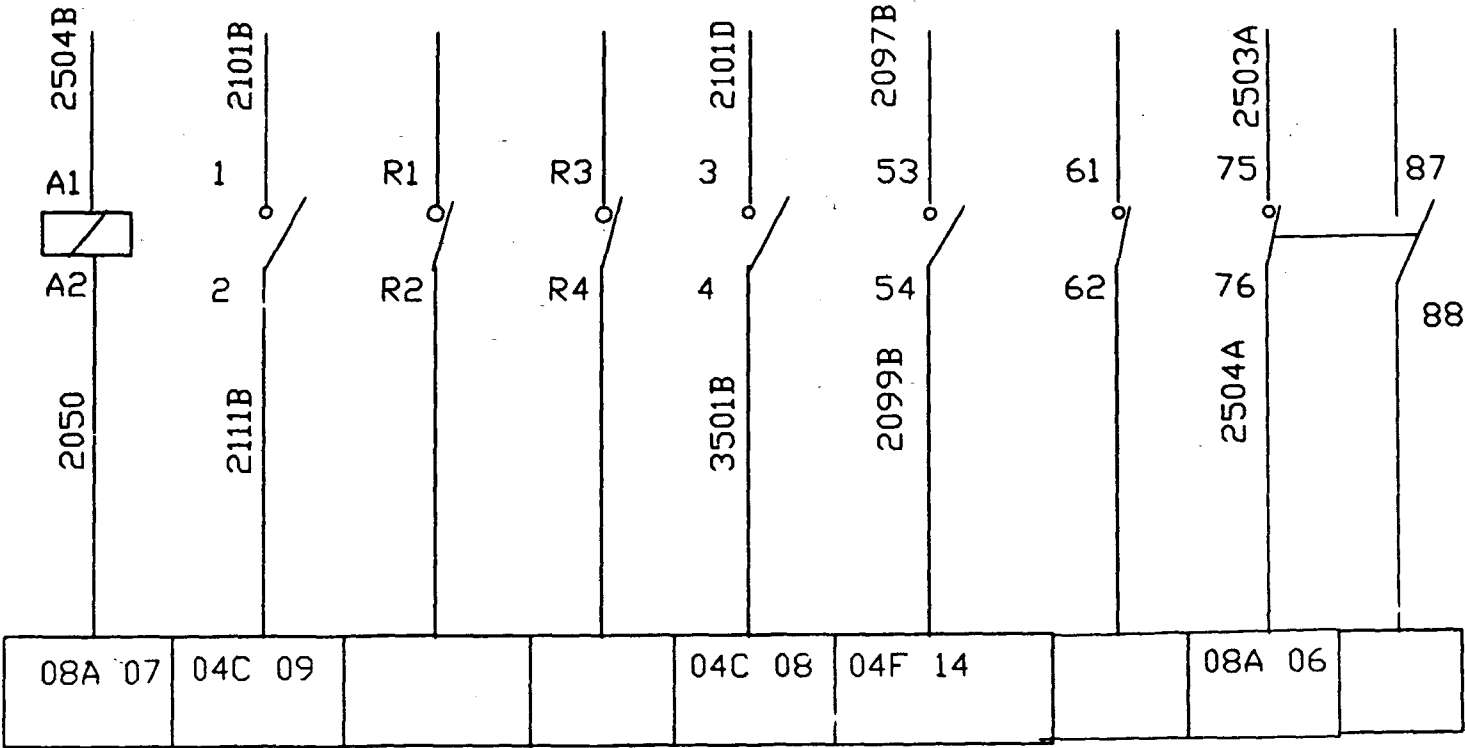
Annexure: 1/11



SCHEMATIC POSITION : 126.7/1  
Contactor Power Supply Cab

140750

Annexure: 1/12

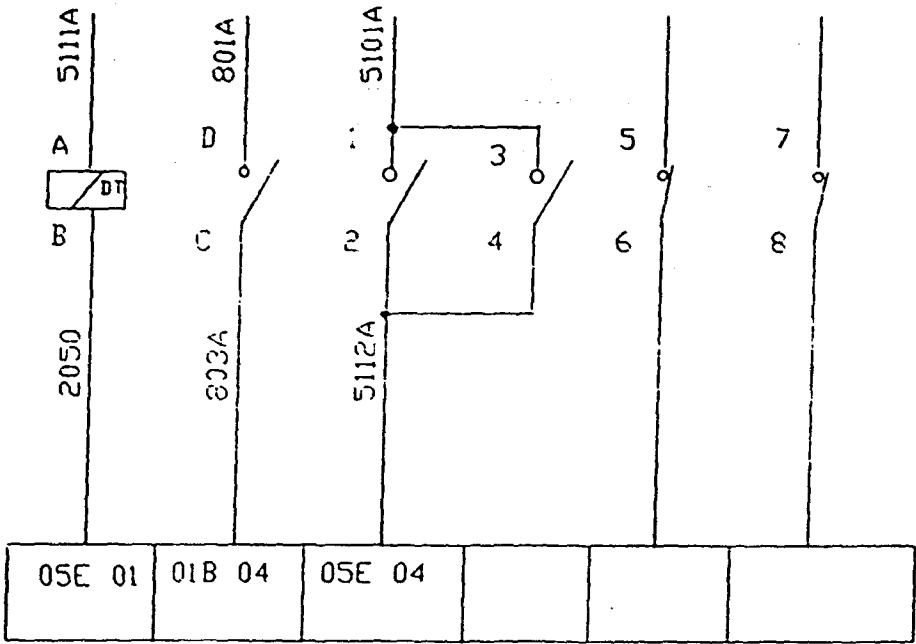


SCHEMATIC POSITION : 126.7/2  
Contactor Power Supply Cab

140751



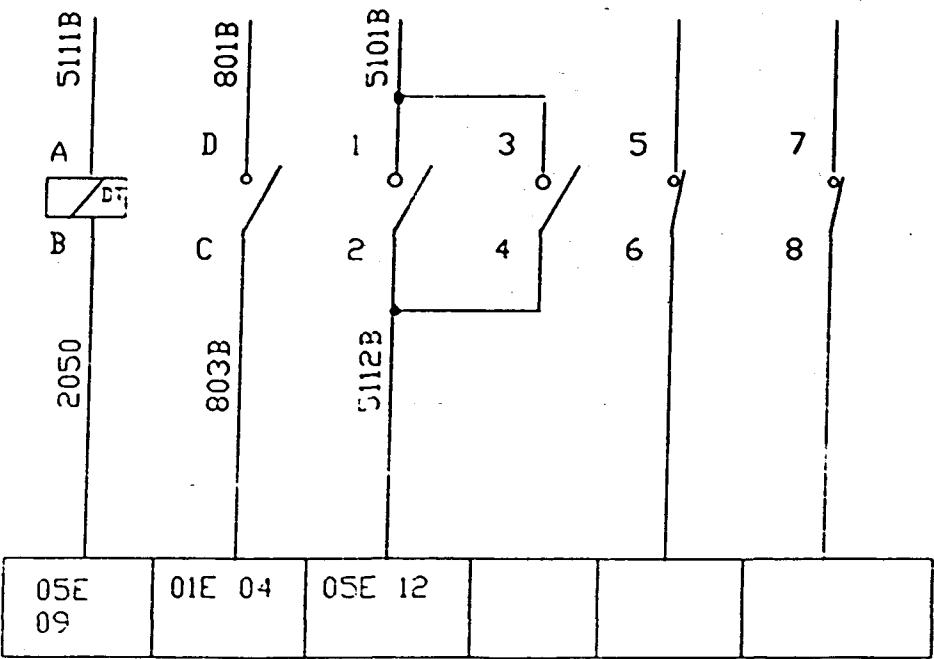
Annexure: 2/1



MODIFIED SCHEMATIC POSITION : 12.3/1  
SR Precharging Contactor-1

140750

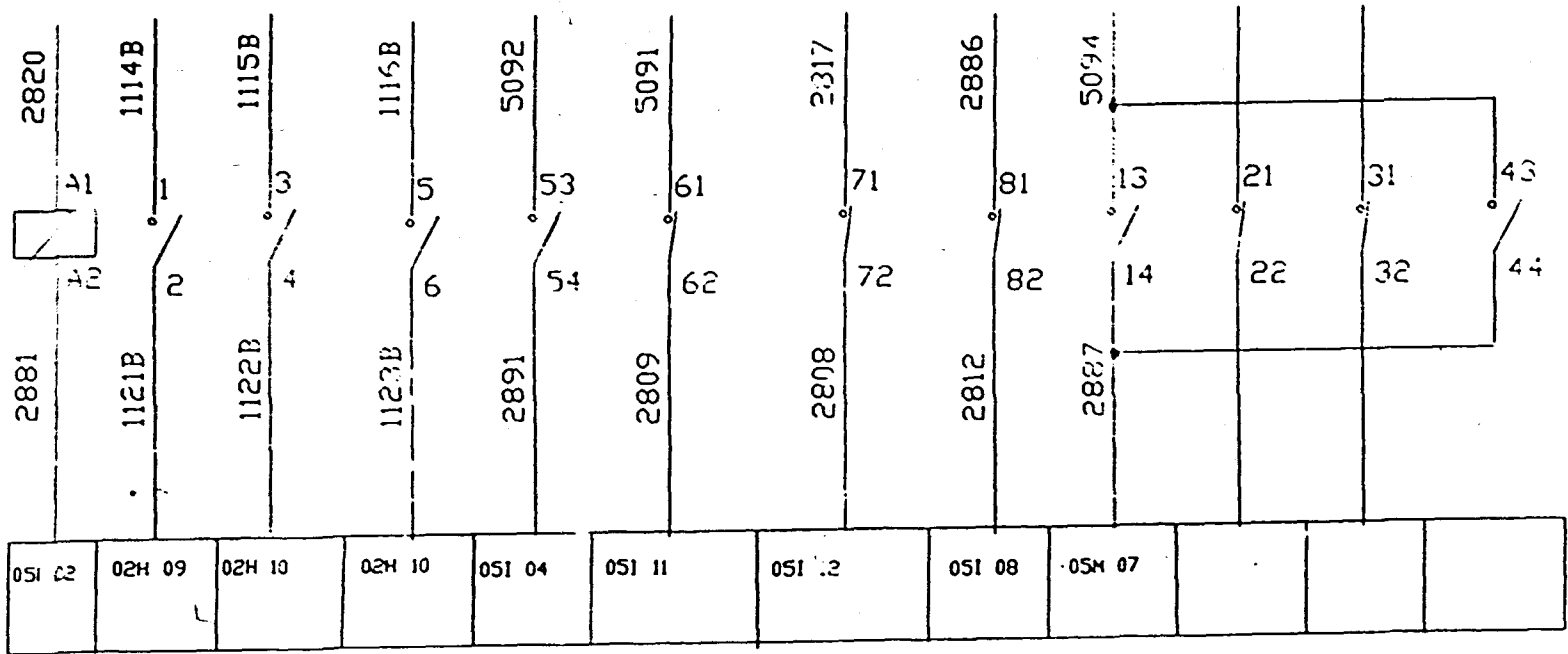
Annexure: 2/2



MODIFIED SCHEMATIC POSITION : 12.3/2  
SR Precharging Contactor-2

140753

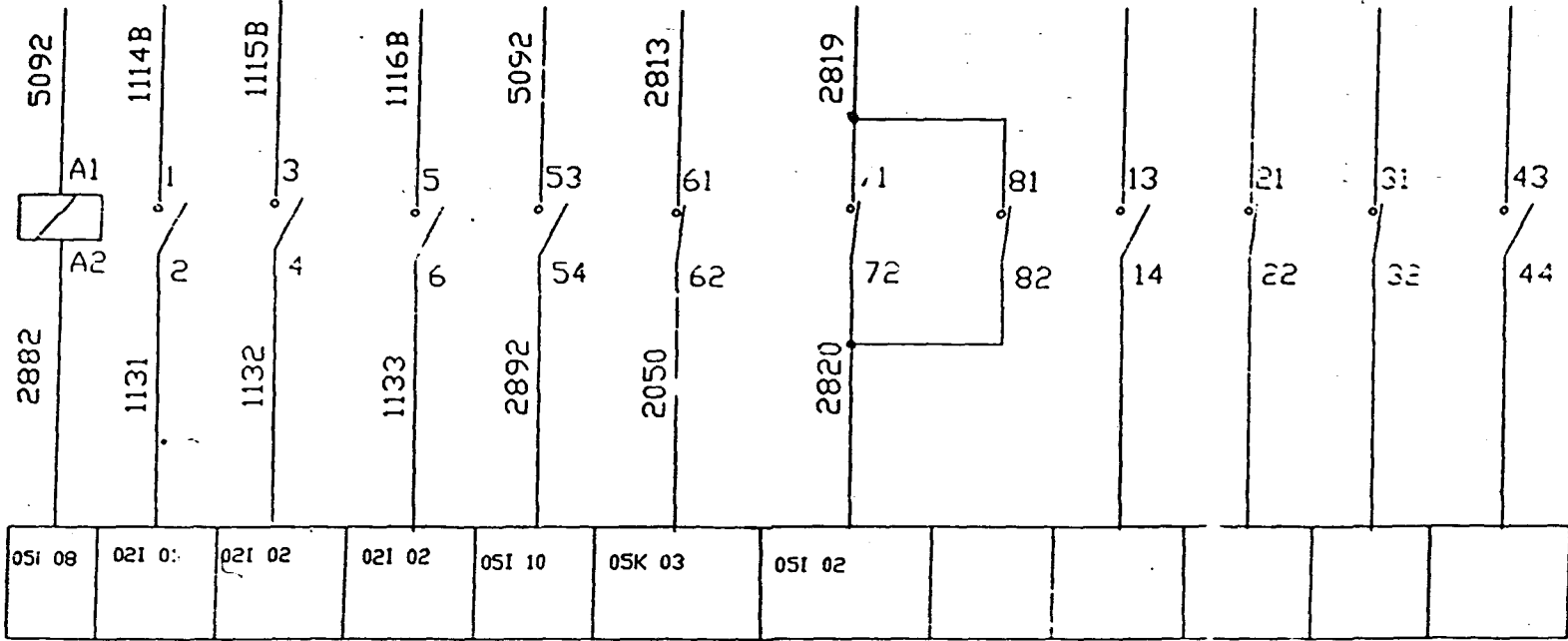
Annexure: 2/3



MODIFIED SCHEMATIC POSITION : 52/1  
AUXILIARY CONTACTOR

140754

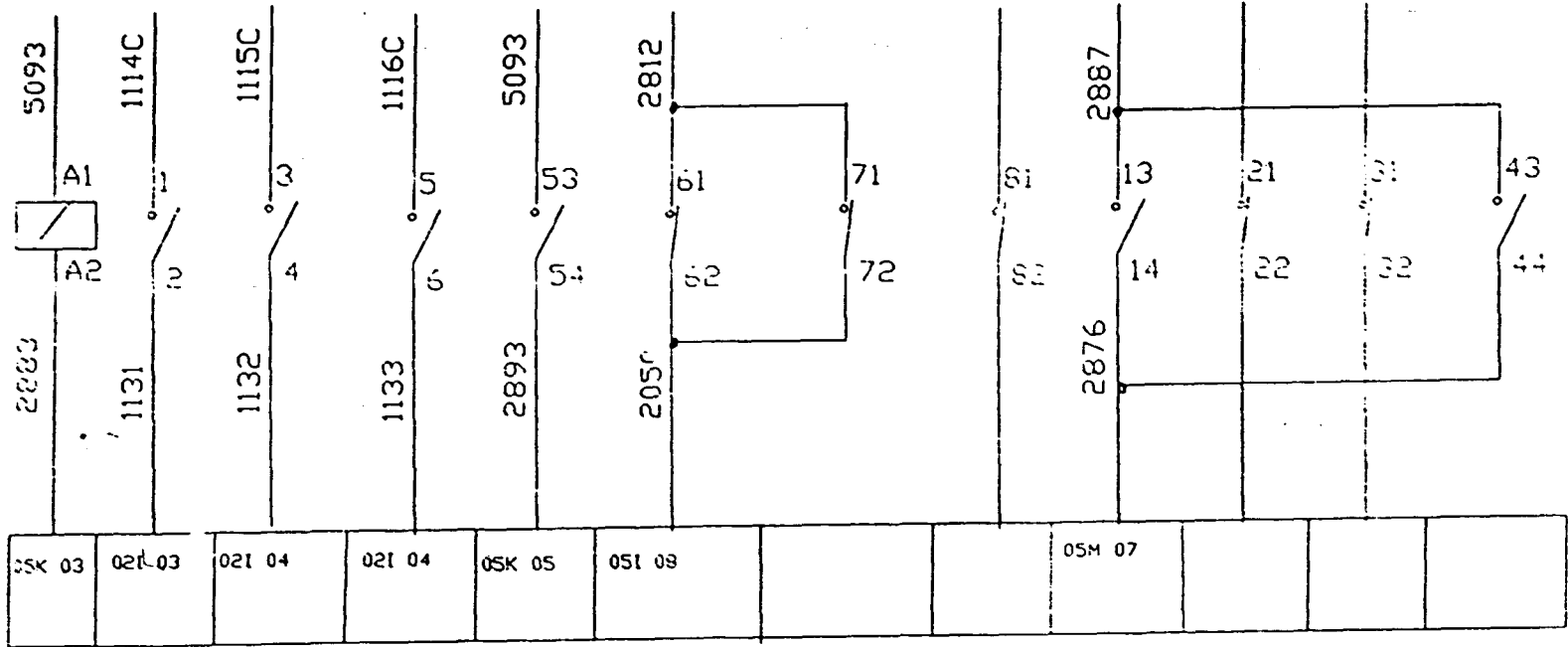
Annexure: 2/4



MODIFIED SCHEMATIC POSITION : 52/2  
AUXILIARY CONTACTOR

140755

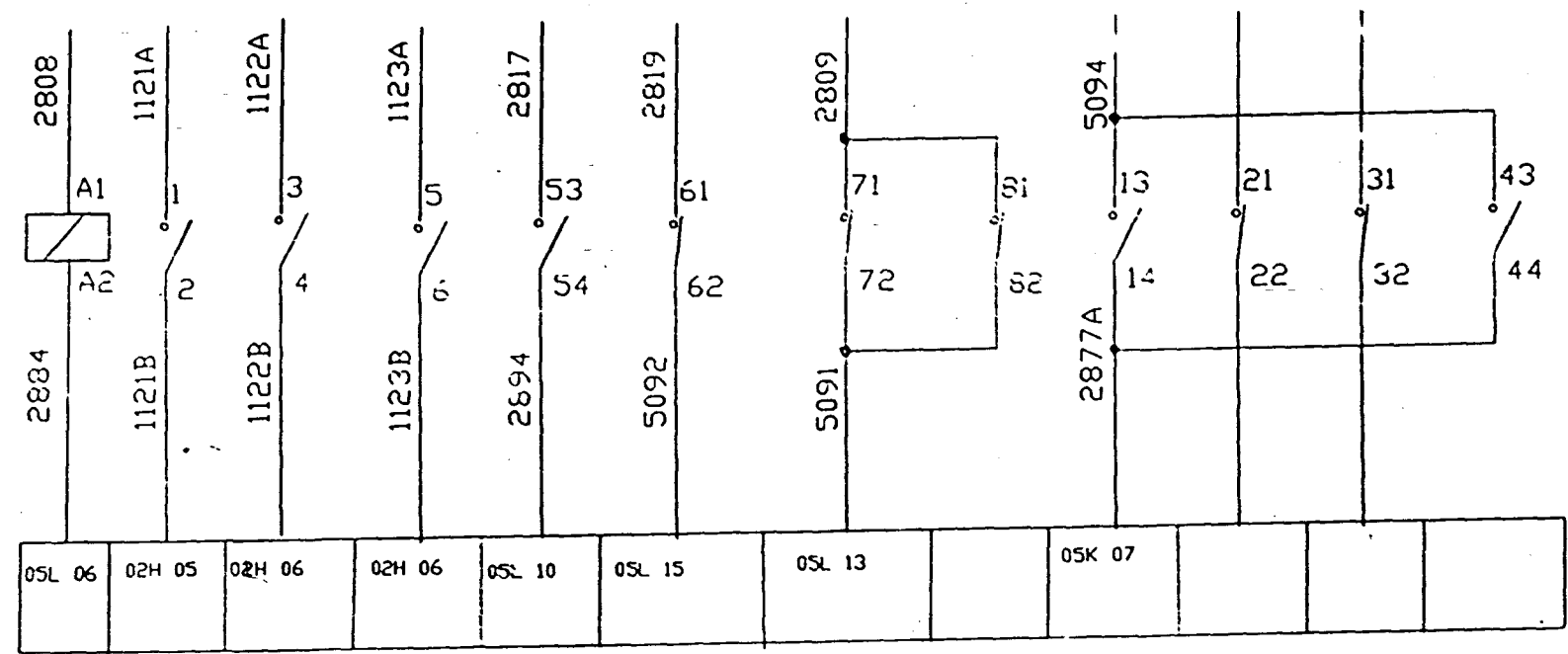
Annexure: 2/5



MODIFIED SCHEMATIC POSITION : 52/3  
AUXILIARY CONTACTOR

140756

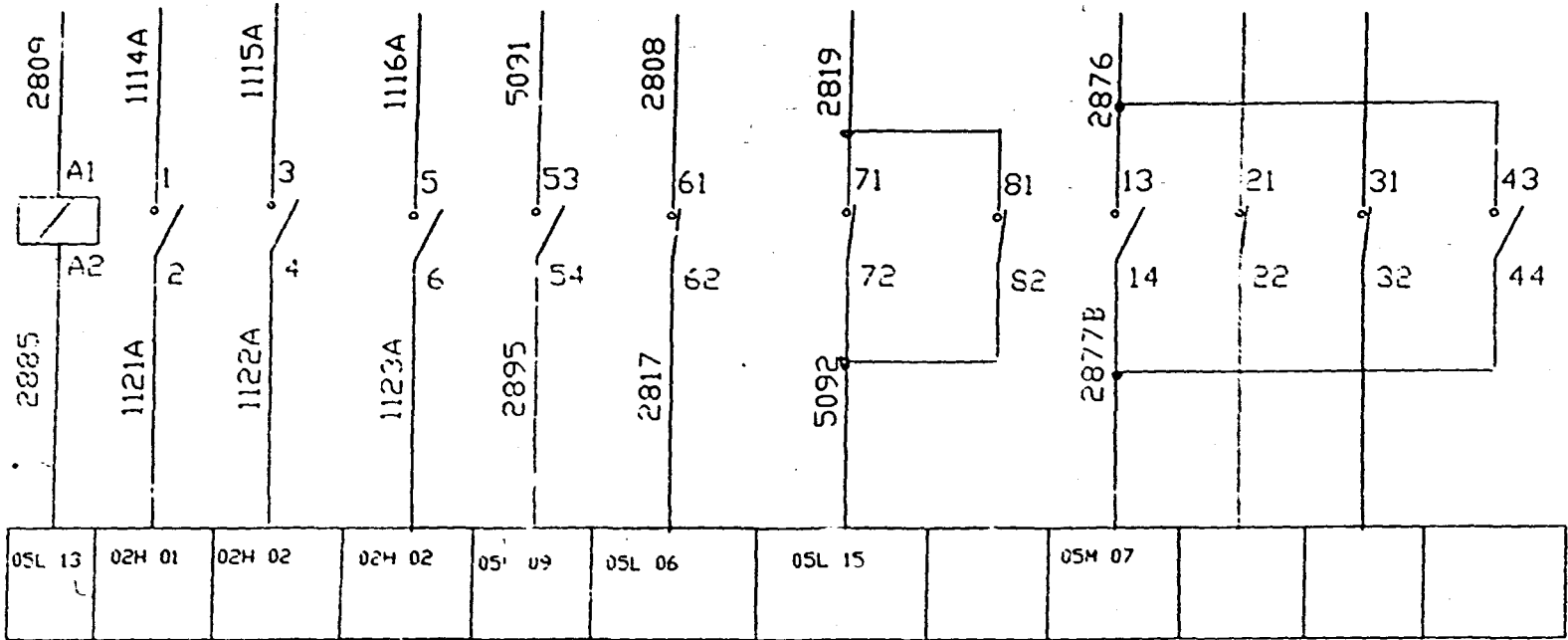
Annexure: 2/6



MODIFIED SCHEMATIC POSITION : 52/4  
AUXILIARY CONTACTOR

140757

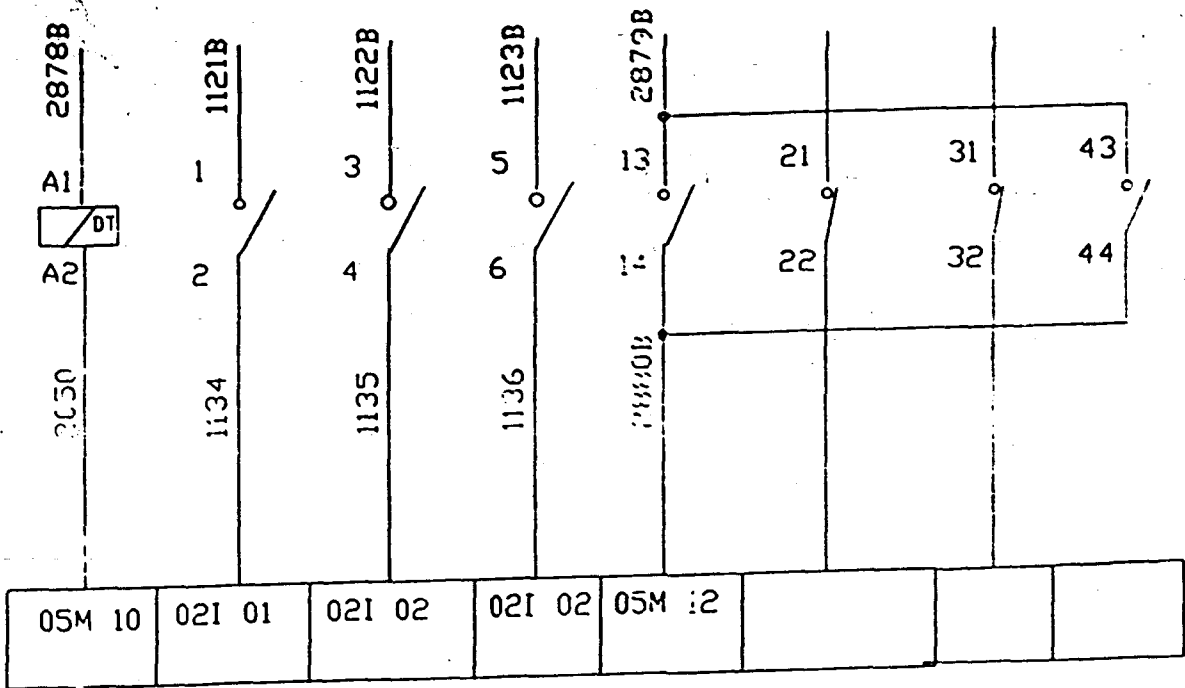
Annexure: 2/7



MODIFIED SCHEMATIC POSITION : 52/5  
AUXILIARY CONTACTOR

140753

Annexure: 2/8

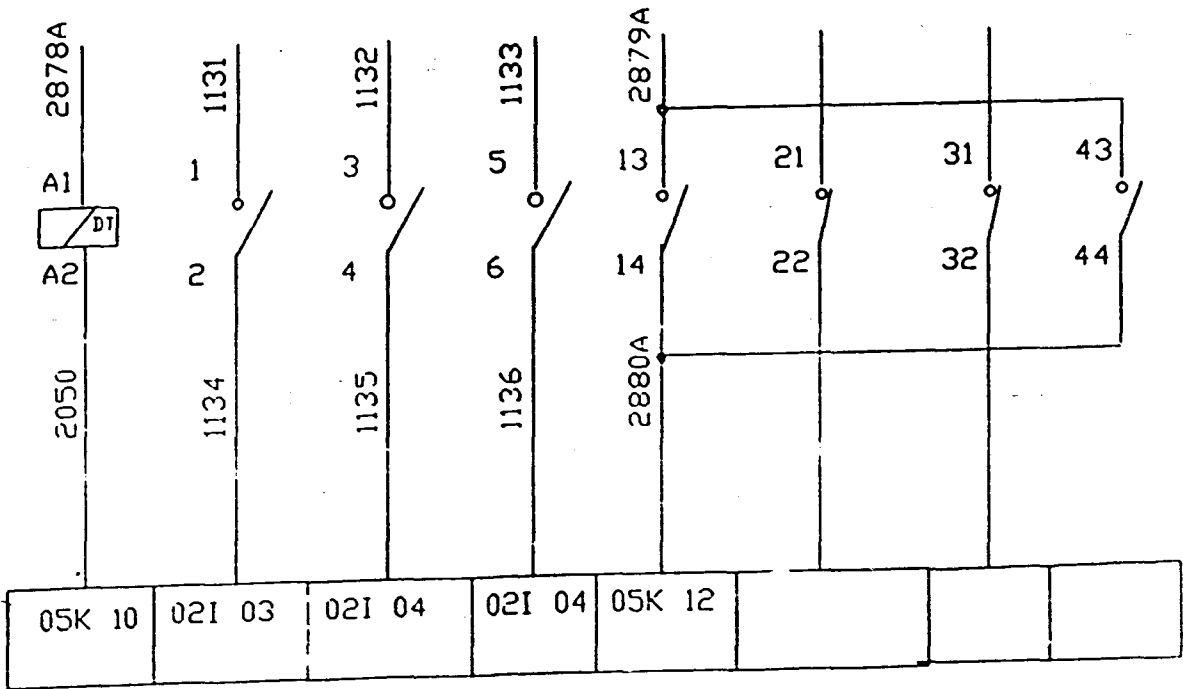


MODIFIED SCHEMATIC POSITION : 52.5/1  
Contactor Oil Pump-1

140759



Annexure: 2/9



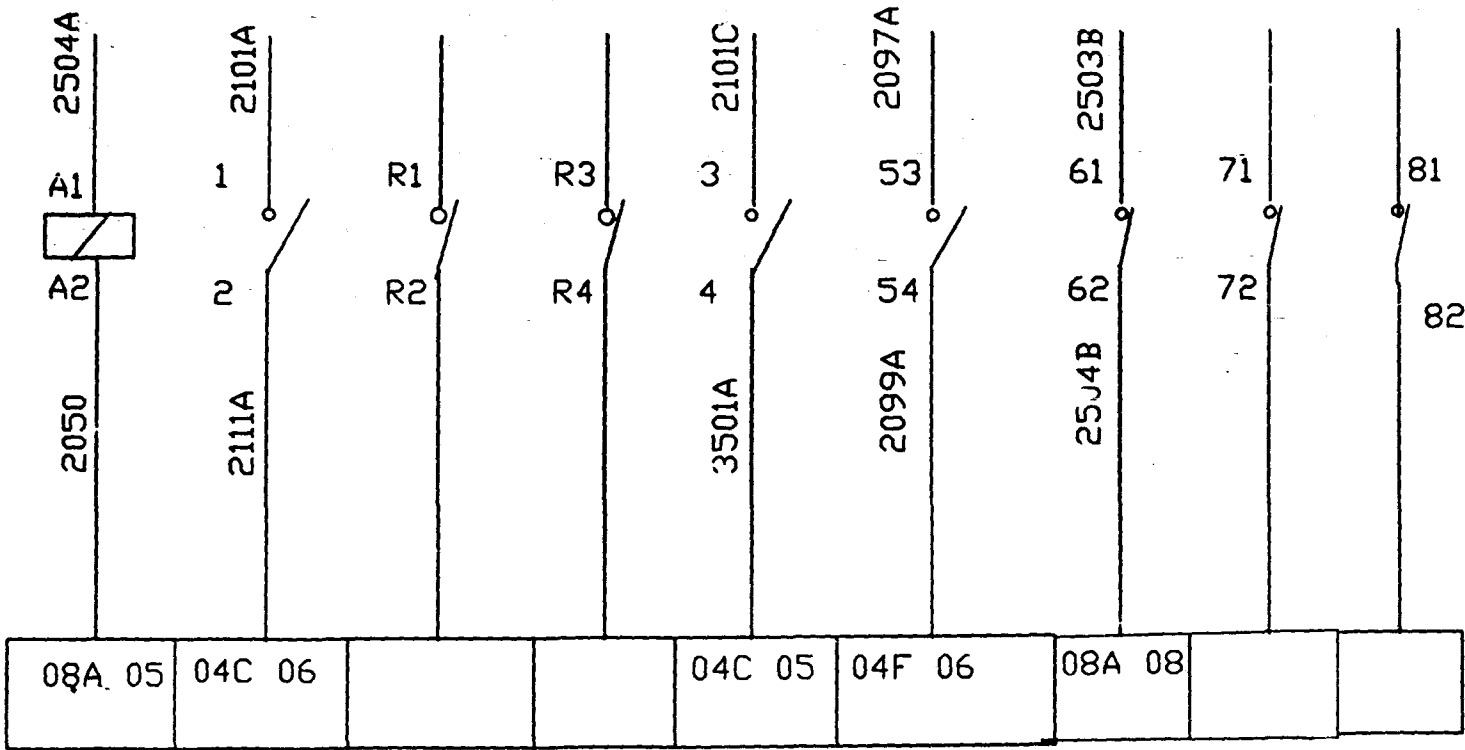
MODIFIED SCHEMATIC POSITION : 52.5/2  
Contactor Oil Pump-2

~~140760~~

The timing diagram illustrates the relationship between the clock (DT), data bus, and address bus for the 2801A microcontroller. The clock signal (DT) is shown as a square wave. The data bus is represented by a horizontal line with points A, B, C, and D marked. The address bus is represented by a horizontal line with points 1, 2, 3, and 4 marked. The diagram shows the timing of the data bus relative to the clock and address signals. The data bus is active during the clock cycle, and the address bus is active during the clock cycle. The diagram also shows the timing of the data bus relative to the address signals. The data bus is active during the clock cycle, and the address bus is active during the clock cycle. The diagram also shows the timing of the data bus relative to the address signals. The data bus is active during the clock cycle, and the address bus is active during the clock cycle.

140761

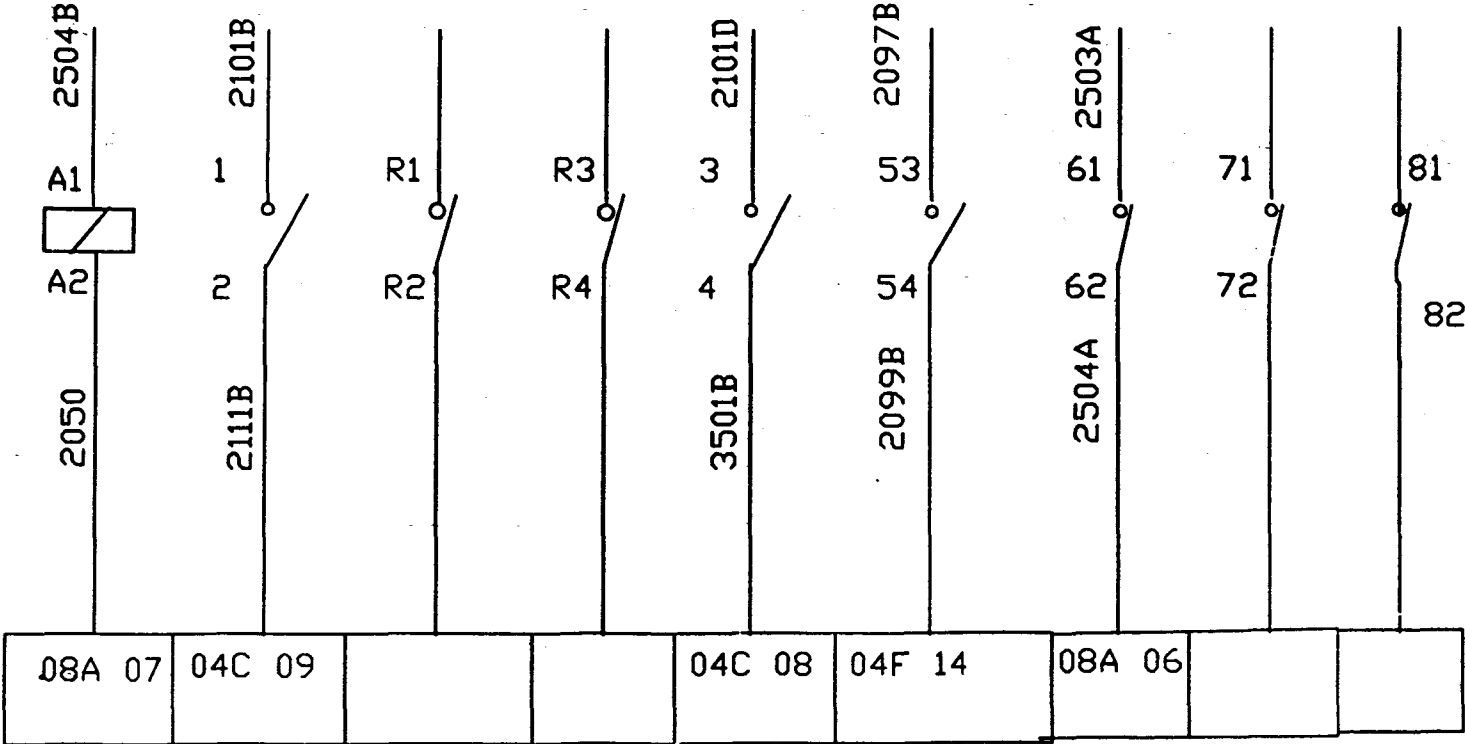
Annexure: 2/11



MODIFIED SCHEMATIC POSITION : 126.7/1  
Contactor Power Supply Cab

140762

Annexure 2/12



MODIFIED SCHEMATIC POSITION : 126.7/2  
Contactor Power Supply Cab

140763