

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

VOLTAGE POLARITIES SHOWN ARE FOR MOTORING DA1(+)

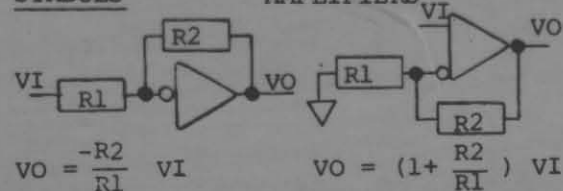
## SIGNAL DEFINITIONS AND LOCATIONS

## HARDWARE ABBREVIATIONS

MDM MODIFICATION MODULE  
 MFE MOTOR FIELD EXCITER  
 MCC MAIN CONTROL CARD  
 IFC INTERFACE CARD  
 PSC POWER SUPPLY CARD  
 SCR THYRISTOR ASSEMBLY  
 DGC DIAGNOSTIC CARD  
 MFC MOTOR FIELD CONTROL  
 FRP FIELD REVERSING PANEL  
 MDR MODIFICATION RACK  
 ARP ANTI-PLUG PANEL  
 TOC TIMED OVERCURRENT

## SYMBOLS

## AMPLIFIERS



CASE GROUND

$VO = \text{SIGN} () \times \text{ABSOLUTE VALUE OF VI}$   
 STAB ON TERMINAL

TERMINAL AT 2TB, 3TB, 4TB, RTB.  
 EX: 9 - 2TB9; X2 - RTB2

TERMINAL AT T.B.'s

POTENTIOMETER ARROWS ON THE CARD  
 ELEMENTARY DIAGRAMS INDICATE THE  
 WIPER DIRECTION AS THE POTENTIOMETER  
 SHAFT IS ROTATED CLOCKWISE TO INCREASE  
 FUNCTION.

THESE RESISTORS ARE CRIMPED IN WIRE  
 HARNESS.

| FUNCTION    | USE | LOC | JUMPERS             |
|-------------|-----|-----|---------------------|
| 60HZ        |     | MFC | ZA-ZB (IF USED)     |
| 50HZ        | X   |     | (NONE)              |
| IOC-400%    | X   |     | (NONE)              |
| -500%       |     | IFC | I-IHI               |
| -300%       |     | IFC | I-ILO               |
| SR5 - 9v    |     |     | (NONE)              |
| 9 - 20v     | X   | MCC | SRH - COM           |
| JOGR 10v    |     |     | (NONE)              |
| 20v         |     | MCC | JH - COM            |
| LT. 3-7sec. | X   |     | (NONE)              |
| 2 - 60sec   |     | MCC | 332 FROM LT1 TO COM |
| VREG        |     | IFC | NT-CEME, CC-COM     |
| DC TACHO    | X   |     | (NONE)              |
| AC TACHO    |     | MCC | AT1 - AT2           |
| TACHO FILT  |     | IFC | TC - TC             |
| TACHO V.    |     | IFC | NT-NT1, PT-PT1      |
| 24-64vdc    |     | IFC | NT-NT1, PT-PT1      |
| 27-71vac    |     | IFC | NT-NT2, PT-PT2      |
| 60-160vdc   |     | IFC | NT-NT2, PT-PT2      |
| 66-177vac   |     | IFC | NT-NT2, PT-PT2      |
| 110-300vdc  | X   | IFC | NT-NT3, PT-PT3      |
| 120-300vac  |     | IFC | NT-NT3, PT-PT3      |
| G134 G256   |     | MF  | MFC OR MFE          |
| 1.7         |     | MF  | NONE                |
| 1.3         |     | MF  | YB - YD             |
| 2.4         |     | MF  | YA - YB             |
| 4.0         |     | MF  | YA-YB, YC-YD        |
| 7.0         |     | MF  | YA - YC             |
| 13          | X   | MF  | YA-YC, YB-YD        |
| 13          |     | MF  | YA-YC, YB-YD        |
| L/R < .25S  |     | MFC | QA - QB             |
| INH RUN     |     | DGC | D1-D2 (IF USED)     |
| COMP POS    |     | MCC | CF-CFP, CFN-COM     |
| NEG         | X   | MCC | CF-CFN, CFP-COM     |

\* CEMF COUNTER EMF ( 16)  
 \* CFB CURRENT FEEDBACK ( 16)  
 CMFA ABSOLUTE VALUE CEMF ( 08)  
 CRM CROSSOVER MODIFY ( 11)  
 DFP DELAYED FIRING POWER ( 25)  
 \* DR DRIVER REFERENCE ( 33)  
 \* EAO ERROR AMP OUTPUT ( 33)  
 EST EXTERNAL FLT STOP INPUT ( 14)  
 FALT FAULT ( 14)  
 \* FC FIELD CURRENT (NS26)  
 FDR FIELD DIAGNOSTIC REFERENCE ( 08)  
 FEA FIELD ECONOMY ADJUST ( 25)  
 FF FIELD FAULT ( 28)  
 IABS MOTOR CURRENT ABSOLUTE ( 09)  
 ILA CURRENT LIMIT ADJUST ( 23)  
 IMET CURRENT SIGNAL FOR METER ( 10)  
 \* IPU INITIAL PULSE ( 20)  
 \* LR LOCAL REF. FROM DGC ( 33)  
 \* JOG JOG SWITCH INPUT ( 23)  
 \* JOGR JOG REFERENCE INPUT ( 31)  
 \* MAC MAX/MA CONTROL SIGNAL ( 20)  
 MSW MODE SWITCH ( 30)  
 \* OSC OSCILLATOR ( 17)  
 \* PCR PHASE CONTROL REF. ( 26)  
 \* PRE DRIVE PRECONDITION ( 21)  
 ØSEQ PHASE SEQUENCE ( 14)  
 RERR REGULATOR ERROR ( 27)  
 RIJ INTEGRATOR SUMMING JUNCTION ( 27)  
 RJ REGULATOR SUMMING JUNCTION ( 31)  
 RRA REGULATOR RESPONSE ADJUST ( 30)  
 RSET RESET ( 16)  
 \* RTR READY TO RUN ( 16)  
 \* RUN RUN SWITCH INPUT ( 21)  
 \* SA-C PHASE SYN OUTPUT ( 16)  
 \* SFB SPEED FEEDBACK ( 20)  
 SMET SPEED SIGNAL FOR METER ( 12)  
 \* SR SYSTEM REFERENCE INPUT ( 29)  
 \* SYS SYSTEM FAULT TRIP ( 13)  
 \* TA OUTPUT FOR TACHO TRIP ADJUST ( 20)  
 TF TACHO FAULT (NS28)  
 \* TFB TACHOMETER FEEDBACK ( 20)  
 TFR AC TACHO FREQUENCY OUTPUT ( 13)  
 \* TR TIMED REFERENCE ( 33)  
 \* VFB VOLTAGE FEEDBACK ( 19)  
 \* WFR WEAK FIELD REFERENCE ( 20)

( \* - TEST POINT ON DOOR FRONT)

## MAPPING SYSTEM

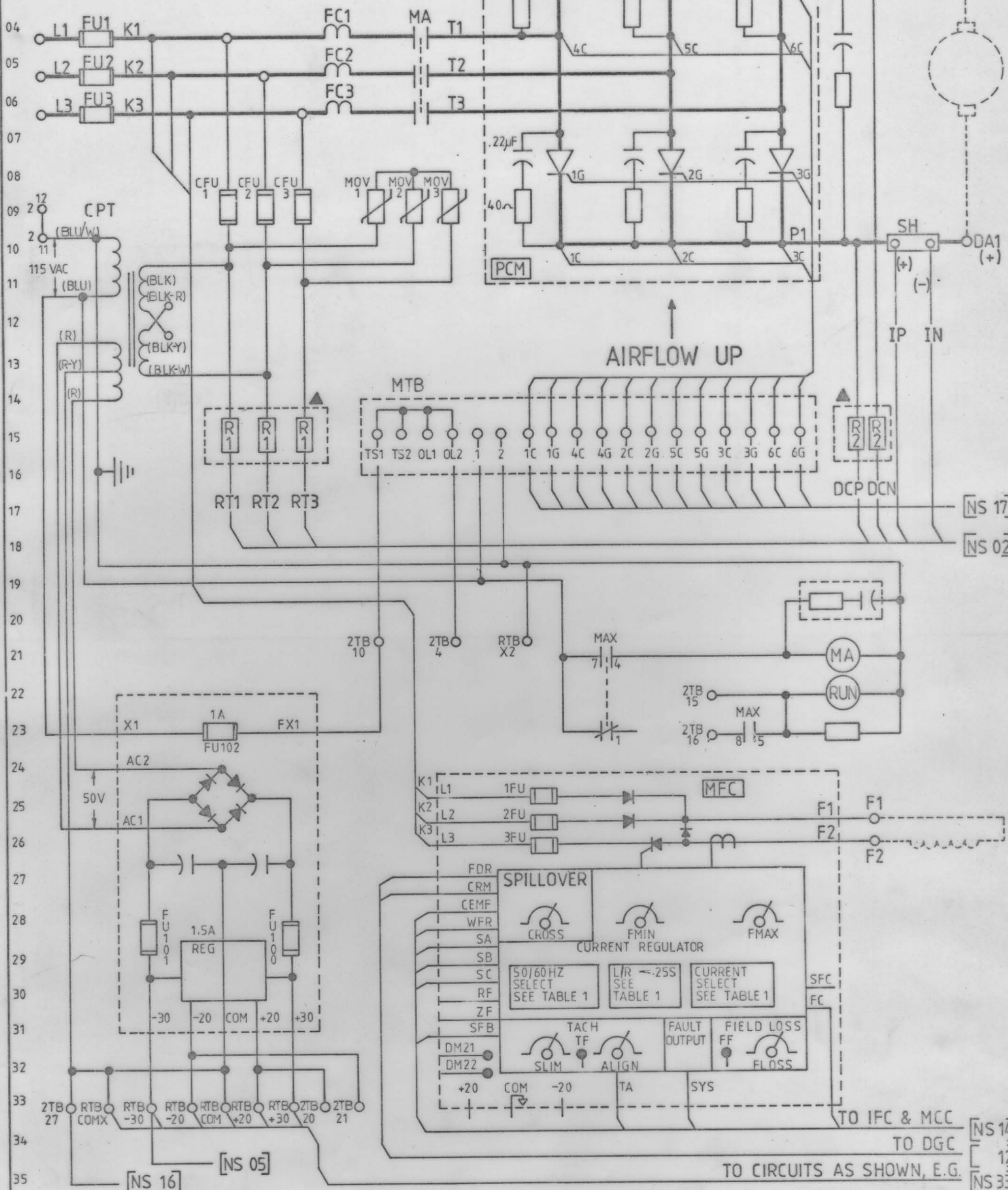
(NS/PS/TS) PS - PAST SHEET  
 NS - NEXT SHEET  
 TS - THIS SHEET

HENCE (PS -12) DENOTES LOCATION ON PAST SHEET LINE 12. OTHER LOCATIONS ARE  
 DENOTED BY SHEET NUMBER AND LINE, E.G.(1A16) SIGNIFIES LOCATION ON SHEET  
 1A, LINE 16 ETC.

NOTE: FIELD EFFECT TRANSISTOR: THE  
 CLOSED/OPEN (I/O) STATE OF THESE  
 SWITCHED FOR "PRECONDITION" - "RUN"  
 OR JOG" - "DIAGNOSTIC STATIC" -  
 "DIAGNOSTIC RUN" IS SHOWN BY A  
 FOUR DIGIT WORD WITH STATE SEQUENCE.

|                              |      |       |        |      |       |        |          |                                                                                 |                                                                 |                    |        |                 |
|------------------------------|------|-------|--------|------|-------|--------|----------|---------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------|--------|-----------------|
| TECHN.                       | ENG. | APPD. | TECHN. | ENG. | APPD. | DATE   | 23/10/81 | <br><b>Simplex</b><br>VARIABLE SPEED<br>DRIVES OPERATION,<br>BRIGHTON, ENGLAND. | BDC 3064, 22KW<br>WHEELHEAD DRIVE<br>NEWALL ENGINEERING CO. LTD |                    | IDENT  | <br>DR SH<br>01 |
| AS SHIPPED -<br>SEE SHEET 11 |      |       |        |      |       | TECHN. |          |                                                                                 | GO NUMBER                                                       | ELEMENTARY DIAGRAM | CONTD. |                 |
| 18/11/82                     |      |       |        |      |       | ENG.   | NGM      |                                                                                 | 139N03                                                          | 902M126BD          | 02     |                 |

|    |     |    |    |
|----|-----|----|----|
| 02 | VAC | R1 | R2 |
|    |     |    |    |



| A      |  | B    |  | C     |  | D      |  | E        |  |
|--------|--|------|--|-------|--|--------|--|----------|--|
| TECHN. |  | ENG. |  | APPD. |  | TECHN. |  | ENG.     |  |
|        |  |      |  |       |  | DATE:  |  | 23/10/81 |  |
|        |  |      |  |       |  | TECHN: |  |          |  |
|        |  |      |  |       |  | ENG:   |  | NGM      |  |
| DATE:  |  |      |  | DATE: |  | APPD:  |  | Z        |  |

ALLENWEST  
VARIABLE SPEED  
DRIVES OPERATION  
BRIGHTON ENGLAND

BDC 3064, 22KW

NEWALL ENG. CO. LTD.

G.O. NUMBER

|                    |
|--------------------|
| ELEMENTARY DIAGRAM |
|--------------------|

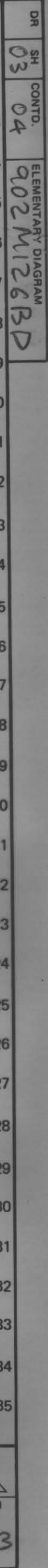
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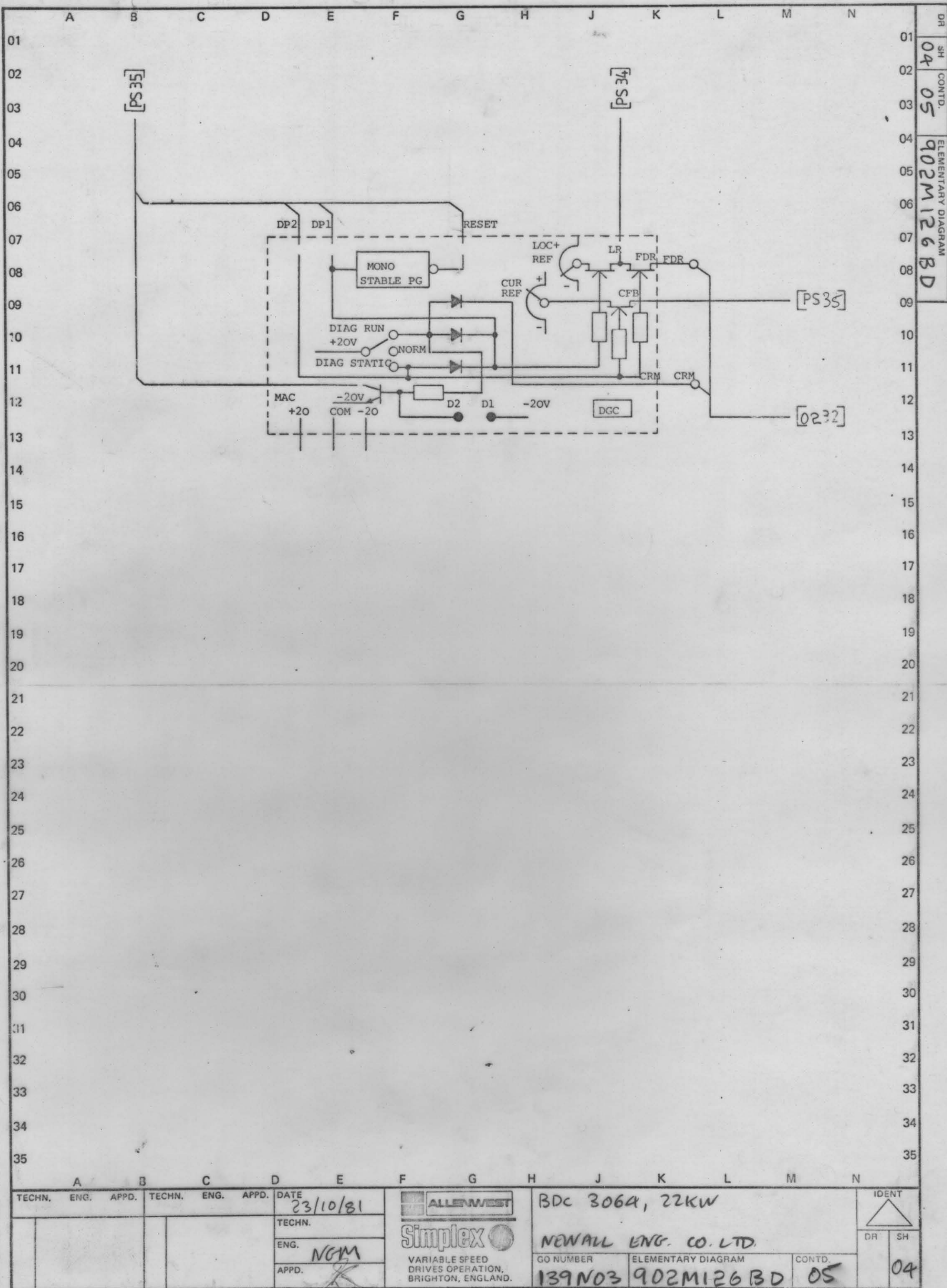
IDENT

|    |    |
|----|----|
| DR | SH |
|----|----|

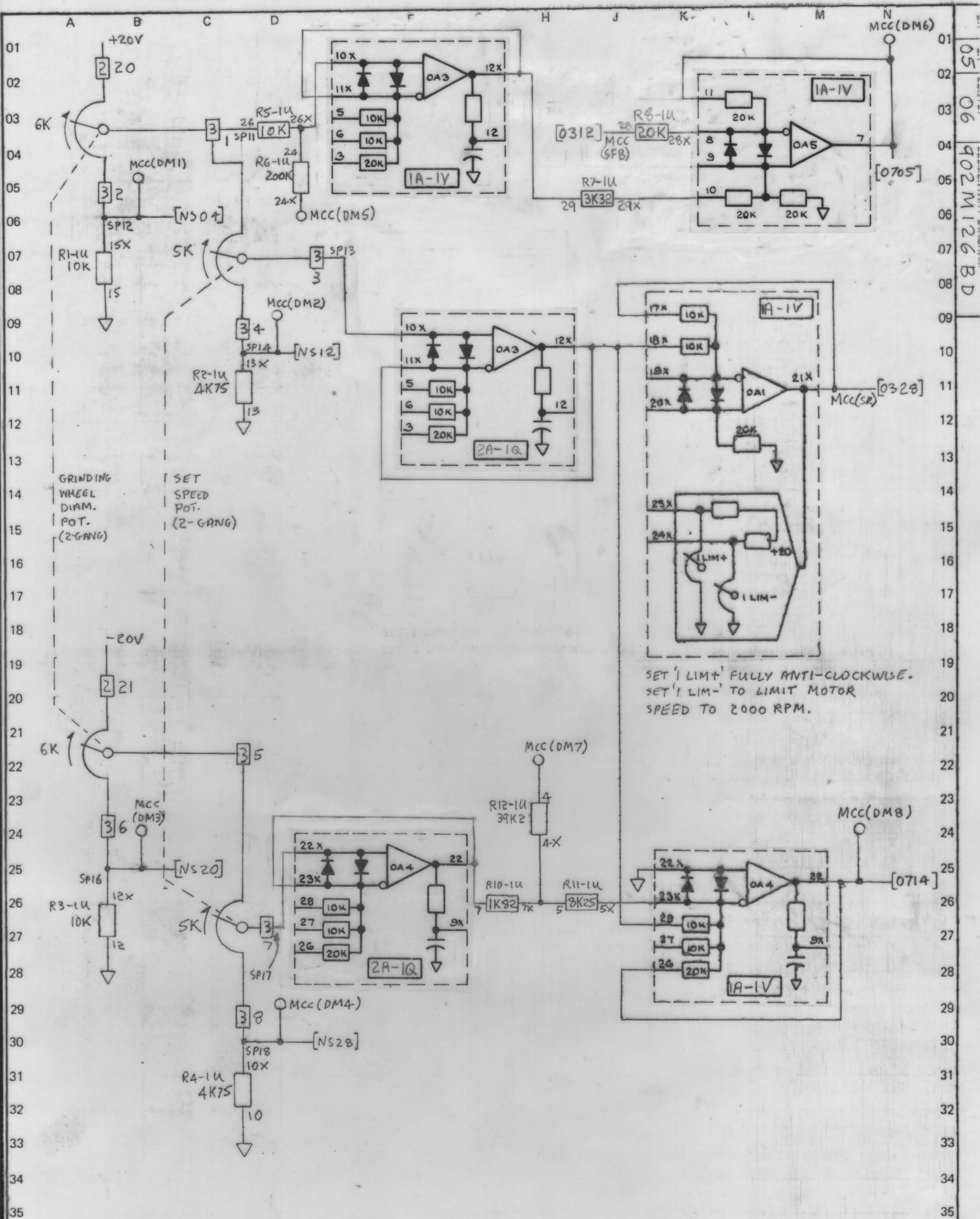
102



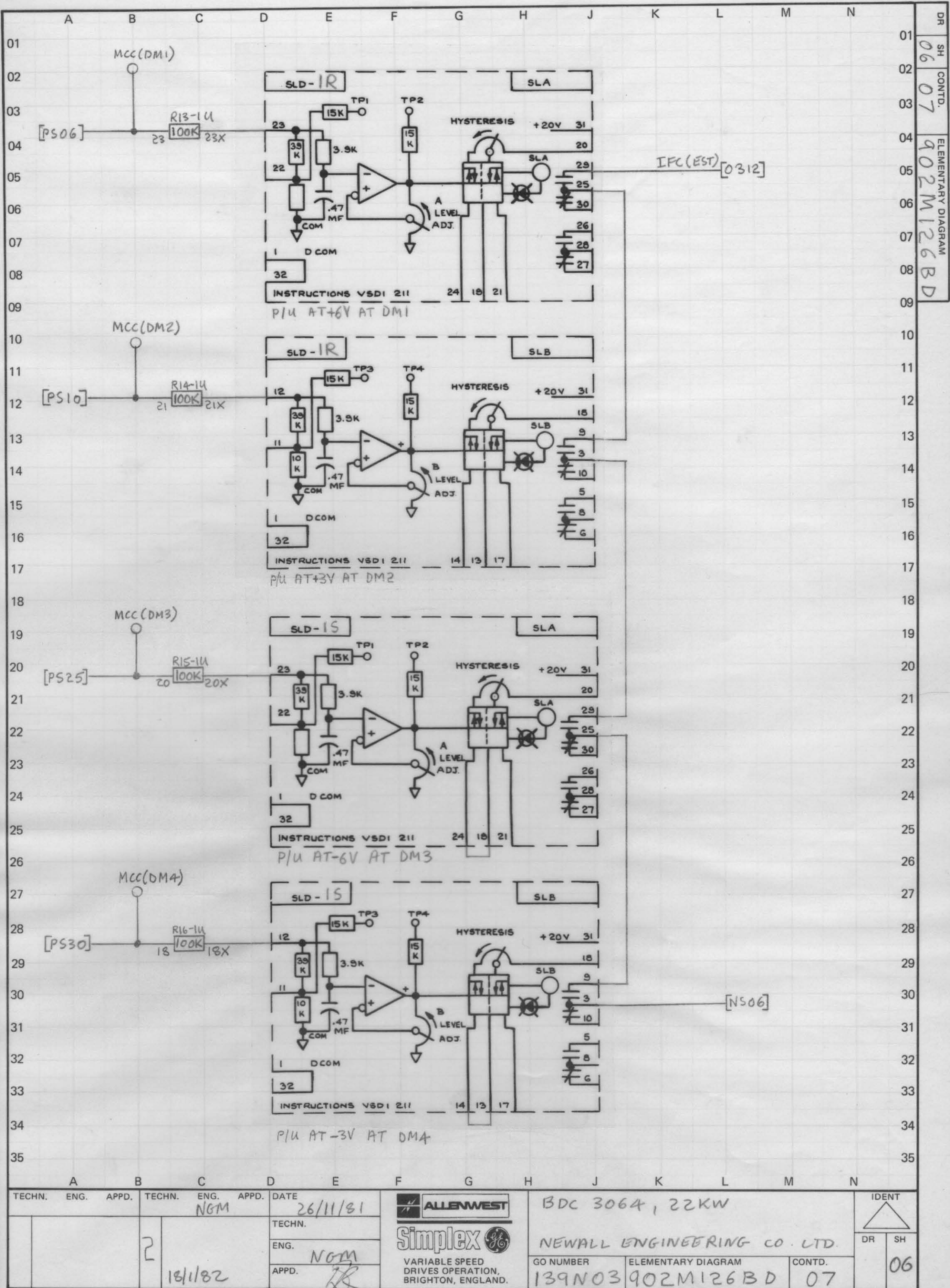




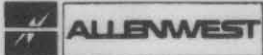




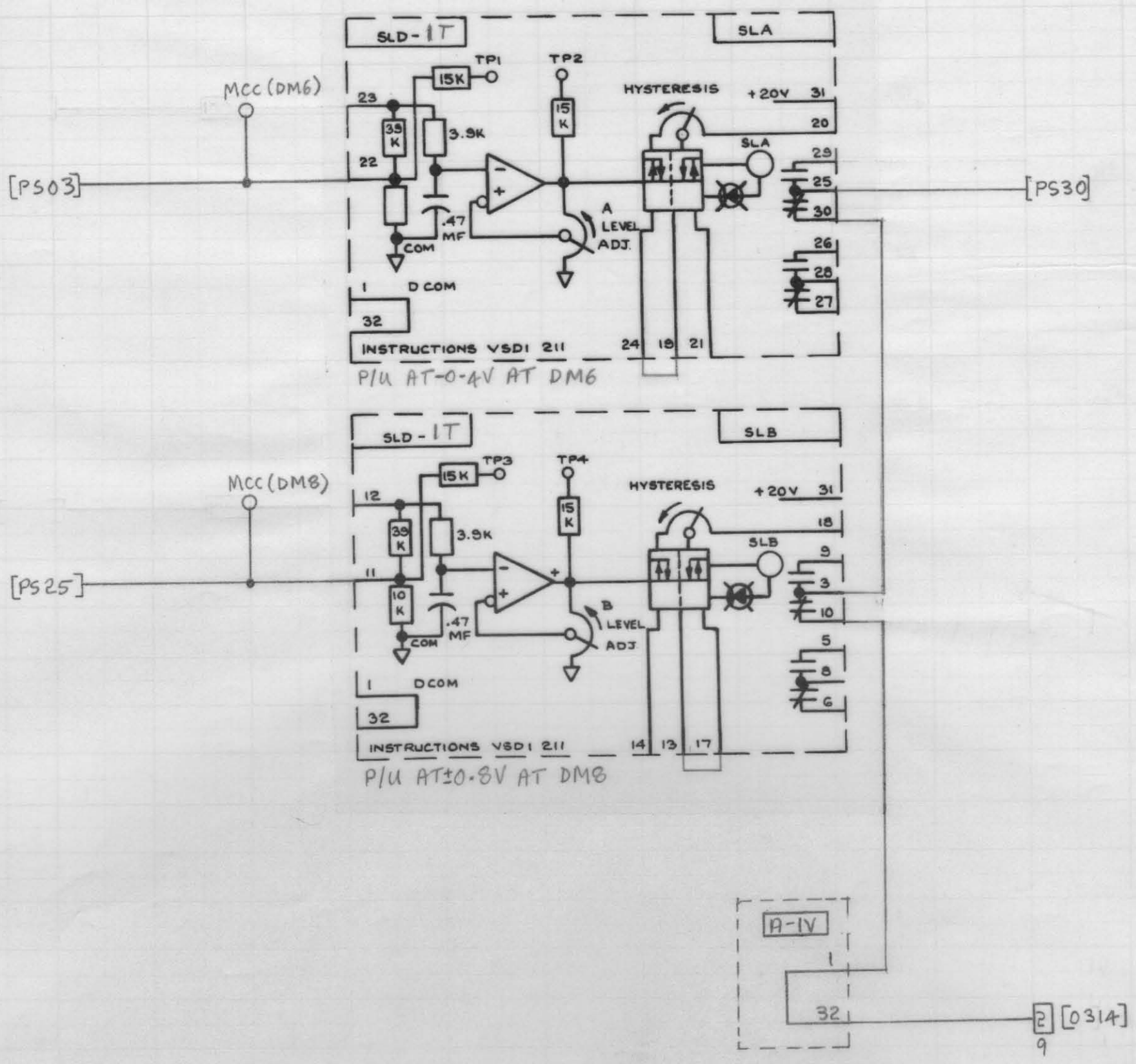
| TECHN. | ENG. | APPD. | TECHN. | ENG. | APPD. | DATE     | Simplesix                                           |  |        | BDC 3064, 22KW              |  |  | IDENT |    |
|--------|------|-------|--------|------|-------|----------|-----------------------------------------------------|--|--------|-----------------------------|--|--|-------|----|
|        |      |       |        | NGM  |       | 26/11/81 | Variable Speed Drives Operation, Brighton, England. |  |        | NEWALL ENGINEERING CO. LTD. |  |  | DR    | SH |
|        |      |       | 2      |      |       |          |                                                     |  |        | GO NUMBER 139N03 902M126BD  |  |  | 06    | 05 |
|        |      |       |        |      |       |          |                                                     |  | CONTD. |                             |  |  |       |    |



DR SH CONTD. ELEMENTARY DIAGRAM  
06 07 902M126BD

|        |      |       |        |      |       |         |          |    |                                                                                                                                                               |                             |  |                                                                                                      |
|--------|------|-------|--------|------|-------|---------|----------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--|------------------------------------------------------------------------------------------------------|
| TECHN. | ENG. | APPD. | TECHN. | ENG. | APPD. | DATE    | 26/11/81 |    | <br><b>Simplex</b><br>VARIABLE SPEED DRIVES OPERATION, BRIGHTON, ENGLAND. | BDC 3064, 22KW              |  | <br>DR SH<br>06 |
|        |      |       |        |      |       | TECHN.  |          |    |                                                                                                                                                               | NEWALL ENGINEERING CO. LTD. |  |                                                                                                      |
|        |      |       |        |      |       | ENG.    | NGM      |    |                                                                                                                                                               | GO NUMBER                   |  |                                                                                                      |
|        |      |       |        |      |       | APPD.   | NGM      |    |                                                                                                                                                               | ELEMENTARY DIAGRAM          |  |                                                                                                      |
|        |      |       |        |      |       | 18/1/82 |          | 28 |                                                                                                                                                               | 139N03 902M126BD            |  | CONTD. 07                                                                                            |





NOTE

THE REFERENCE AND DRIVE MONITORING CIRCUITS SHOULD BE CHECKED REGULARLY, AS FOLLOWS. WITH DRIVE STATIONARY, CONNECT TEST POINTS DM1, DM2, DM3, DM4 & DM7 (LOCATED ON FRONT OF MAIN CONTROL CARD) TO COMMON IN TURN. EACH CONNECTION SHOULD TRIP THE DRIVE (READY TO RUN LIGHT EXTINGUISHED), THE DRIVE SHOULD BE RESET (CONTROL RESET P/B) BETWEEN EACH TEST. WITH DRIVE RUNNING AT APPROX 1000RPM DM5 SHOULD BE CONNECTED TO COM, THIS SHOULD ALSO CAUSE DRIVE TO TRIP. IF DRIVE DOES NOT TRIP DURING ANY OF THESE TESTS, IT SHOULD NOT BE OPERATED UNTIL THE FAULT HAS BEEN CORRECTED.

IMPORTANT

FOR SAFE OPERATION OF THE DRIVE AND CORRECT OPERATION OF THE MONITORING CIRCUITS, THE 'REF SCALE' POT (MCC) SHOULD BE SET TO GIVE 10 VOLTS AT TEST POINT 'TR' WHEN REF VOLTAGE EQUIVALENT TO 2000 RPM (MOTOR) APPLIED (SR=11.6V). 'MAX SPEED' POT (MCC) SHOULD BE SET TO GIVE 2000 RPM (MOTOR) WHEN TR = 10 VOLTS.

|        |      |       |        |      |       |          |                                                     |  |                            |  |           |  |
|--------|------|-------|--------|------|-------|----------|-----------------------------------------------------|--|----------------------------|--|-----------|--|
| TECHN. | ENG. | APPD. | TECHN. | ENG. | APPD. | DATE     |                                                     |  | BDC 3064, 22KW             |  | IDENT     |  |
|        |      |       |        | NGM  |       | 26/11/81 |                                                     |  | NEWALL ENGINEERING CO. LTD |  | DR SH     |  |
|        |      |       | 2      |      |       |          | VARIABLE SPEED DRIVES OPERATION, BRIGHTON, ENGLAND. |  | GO NUMBER                  |  | 07        |  |
|        |      |       |        |      |       |          |                                                     |  | 139N03                     |  | 902M126BD |  |
|        |      |       |        |      |       |          |                                                     |  | ELEMENTARY DIAGRAM         |  | CONTD. 08 |  |



|    | A | B | C | D | E | F | G | H | J | K | L | M | N |  |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 01 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 02 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 03 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 04 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 05 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 06 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 07 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 08 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 09 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 10 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| 11 |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

DR SH  
08  
09  
902M126BD  
ELEMENTARY DIAGRAM

ON PRINTED CIRCUIT CARDS USED IN THIS RACK THE LETTERS 'AA' AFTER BASIC CATALOGUE NUMBER INDICATES ORIGINAL DESIGN. SUBSEQUENT DESIGNS WITH THE SAME BASIC NUMBERS AND GROUP NUMBER WITH THE SECOND LETTER CHANGED, SUCH AS: AB, AC, AD, ETC., ARE DIRECTLY INTERCHANGEABLE AND MAY BE SUPPLIED IN PLACE OF THE 'AA' CARDS.

THE PRINTED CIRCUIT CARD SHOULD ALWAYS BE REMOVED WITH THE CARD EXTRACTOR WHICH IS ATTACHED ON TOP OF THE CARD RACK. SOME CARDS CONTAIN PARTS WHICH WILL BE THERMALLY HOT AFTER BEING IN OPERATION. CARE SHOULD BE EXERCISED IN HANDLING ALL CARDS AFTER REMOVAL UNTIL THESE PARTS HAVE COOLED. DO NOT REMOVE OR INSERT CARDS WITH POWER APPLIED.

FRONT VIEW OF 64 PIN RECEPTACLE AS SEEN IN RACK CLOSED POSITION.

#### SYMBOLS:

● TEST POST



POT ADJUSTMENT



INDICATING LIGHT

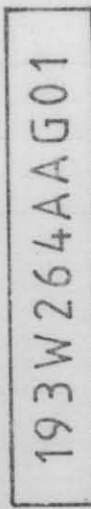
CARD RACK WIRE JUMPER TABLE

|                    |             |               |                |
|--------------------|-------------|---------------|----------------|
| RTB(-20V)-IR02     | 1Q11X-1Q12X | 1S25-1S09     | SP11-1U26      |
| RTB(COM)-IR15      | 1Q12X-1V18X | 1S03-1T25     | SP12-1U15X     |
| RTB(420V)-IR31     | 1V18X-1V28  | 1T30-1T03     | SP13-1Q10X     |
| BUS PINS 02, 1Q-1V | 1V17X-1V21X | 1T10-1V01     | SP14-1U13X     |
| BUS PINS 15, 1Q-1V | 1U12X-1U20  | 1U15-1U13     | REMOVE SP15    |
| BUS PINS 31, 1Q-1V | 1U20X-1S23  | 1U13-1U12     | SP16-1U12X     |
|                    | 1U10X-1U18  | 1U12-1U10     | SP17-1Q22X     |
|                    | 1U18X-1S12  | 1U10-1U09     | SP18-1U10X     |
| 1U26X-1U24         | 1Q22-1Q23X  | 1V15-1V22X    | 1V32-2TB9      |
| 1U24-1V10X         | 1Q22-1U07   |               | MCC(SFB)-1U28  |
| 1V11X-1V12X        | 1U07X-1U05  |               | MCC(SR)-1V21X  |
| 1V12X-1U29         | 1U05-1U04X  |               | IFC(EST)-1R29  |
| 1U29X-1V10         | 1U05X-1V23X |               | MCC(DM1)-1U23  |
| 1U28X-1V08         | 1V26-1V22   |               | MCC(DM2)-1U21  |
|                    | 1V22-1T11   |               | MCC(DM3)-1U20  |
| 1V07-1V11          | 1S19-1S24   |               | MCC(DM4)-1U18  |
| 1V11-1T22          | 1S13-1S14   |               | MCC(DM5)-1U24X |
| 1U15X-1U23         | 1T19-1T24   | REMOVE        | MCC(DM6)-1T22  |
| 1U23X-1R23         | 1T13-1T17   | IFC(EST)-2TB9 | MCC(DM7)-1U04  |
| 1U13X-1U21         | 1R25-1R09   |               | MCC(DM8)-1T11  |
| 1U21X-1R12         | 1R03-1S29   |               |                |

NOTE: RECEPTACLE PINS MAY BE NUMBERED AS SHOWN IN EITHER SKETCH. (PIN 33 CORRESPONDS TO PIN 1X, 34 TO 2X, ETC.)

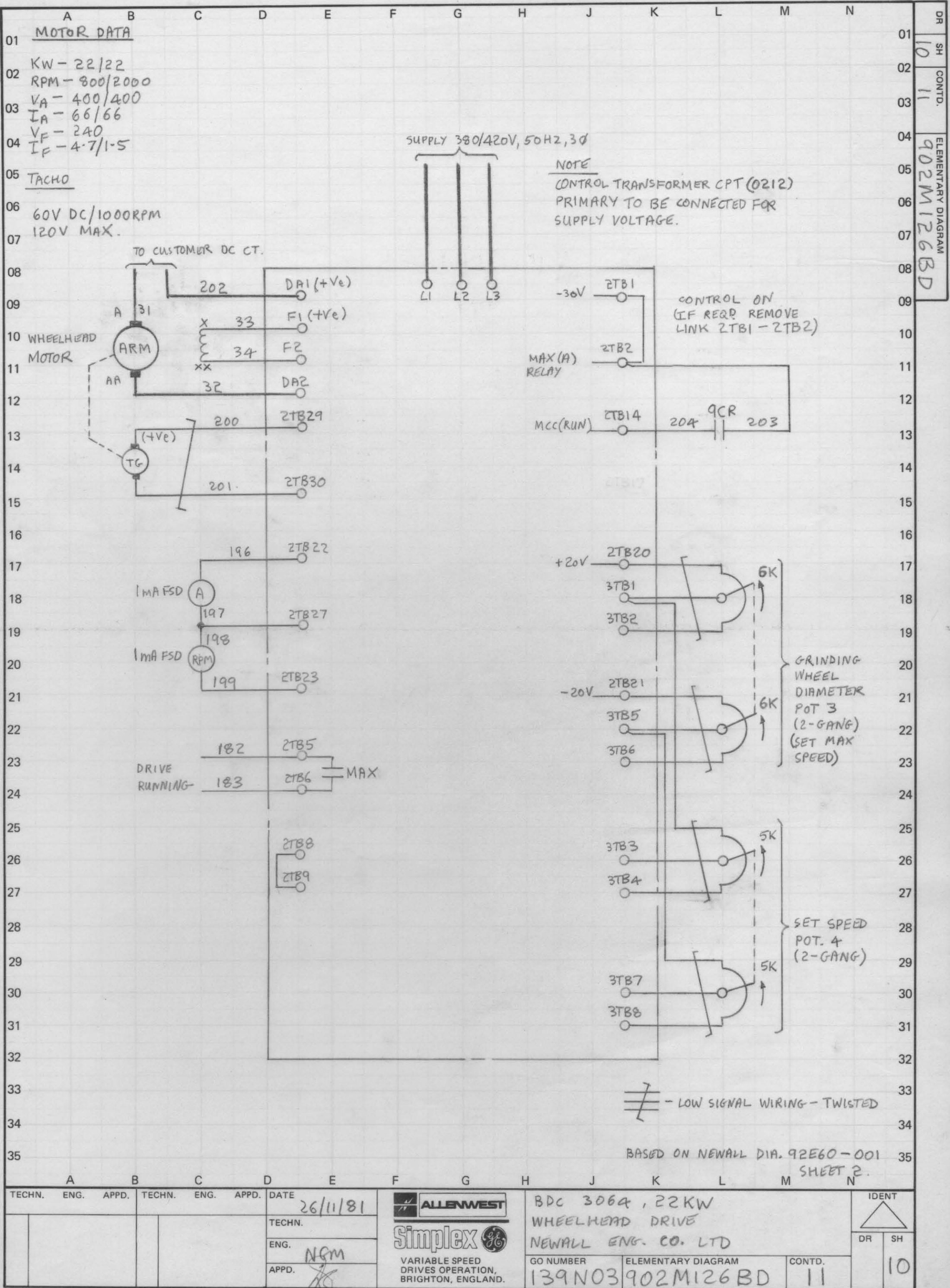
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|--------|------|-------|--------|------|-------|----------|----------------------------|--|--|-------|--|
| TECHN. | ENG. | APPD. | TECHN. | ENG. | APPD. | DATE     | BDC 3064, 22KW             |  |  | IDENT |  |
|        |      |       |        | NGM  |       | 23/10/81 | NEWALL ENGINEERING CO. LTD |  |  | DR SH |  |
|        |      |       | 2      |      |       | TECHN.   | GO NUMBER                  |  |  | 08    |  |
|        |      |       |        |      |       | ENG. NGM | ELEMENTARY DIAGRAM         |  |  | 09    |  |
|        |      |       |        |      |       | APPD.    | 139N03902M126BD            |  |  |       |  |





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

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DR SH CONTD. ELEMENTARY DIAGRAM 902M126BD

|        |      |       |        |      |       |        |          |                    |                     |                    |        |    |
|--------|------|-------|--------|------|-------|--------|----------|--------------------|---------------------|--------------------|--------|----|
| TECHN. | ENG. | APPD. | TECHN. | ENG. | APPD. | DATE   | 26/11/81 | ALLENWEST          | BDC 3064, 22KW      | IDENT              | DR     | SH |
|        |      |       |        |      |       | TECHN. |          | Simplex            | WHEELHEAD DRIVE     |                    |        |    |
|        |      |       |        |      |       | ENG.   | NGM      | VARIABLE SPEED     | NEWALL ENG. CO. LTD |                    |        |    |
|        |      |       |        |      |       | APPD.  |          | DRIVES OPERATION,  | GO NUMBER           | ELEMENTARY DIAGRAM | CONTD. |    |
|        |      |       |        |      |       |        |          | BRIGHTON, ENGLAND. | 139N03              | 902M126BD          | 11     | 10 |