

VARIABLE SPEED DRIVES OPERATION







SILCON DRIVE SYSTEM

GENERAL NOMENCLATURE

THE FOLLOWING NOMENCLATURE IS NORMALLY USED. PREFIXES OR SUFFIXES MAY BE ADDED TO DESIGNATE A PARTICULAR UNIT, SECTION OR DRIVE OR MERELY TO DIFFERENTIATE BETWEEN SIMILAR DEVICES.

A	AMMETER	LS	LIMIT SWITCH
BMC	BLOWER MOTOR STARTER	MA	AC LINE CONTACTOR OR STARTER
CAP	CAPACITOR	MD	DC LOOP CONTACTOR
CB	CIRCUIT BREAKER	MRH	MOTOR OPERATED RHEOSTAT
CVT	CONTROL VOLTAGE TRANSFORMER	MTH	MOTOR THERMAL SWITCH
CT	CURRENT TRANSFORMER	OL	OVERLOAD
DBC	DYNAMIC BRAKING CONTACTOR	POT	POTENTIOMETER
DBRES	DYNAMIC BRAKING RESISTOR	PL	PILOT LIGHT
		PB	PUSHBUTTON
		RC OR RR	REVERSE CONTACTOR OR RELAY
ESR	EMERGENCY STOP RELAY	RES	RESISTOR
EXC	(STATIC) EXCITER	SUP	COIL SUPPRESSION
F	SCR MODULE FAULT RELAY	SH	(AMMETER) SHUNT
FTR	FIELD TRIM RESISTOR	SS	SELECTOR SWITCH
FLR	FIELD LOSS RELAY	TI	TACHO INDICATOR
FS	FUSE	TG	TACHO GENERATOR
FC OR FR	FORWARD CONTACTOR OR RELAY	TR	TIMING RELAY
HTH	HEATSINK THERMAL SWITCH	UVR	UNDERVOLTAGE RELAY
IVT	ISOLATION TRANSFORMER	V	VOLTMETER
IOC	INSTANTANEOUS OVER CURRENT RELAY	VR	VOLTAGE SENSING RELAY
IR	INCH RELAY		
IFR	INCH FORWARD RELAY		
IRR	INCH REVERSE RELAY		

SYMBOLS

	- SCREENED LEADS
	- TWISTED LEADS
	- TERMINAL BOARD JUMPER
	- MOUNTED IN MOTOR
	- REMOTE MOUNTED DEVICE
	- DEVICES IN OPERATOR STATION

THE TABLE BELOW LISTS CONNECTIONS THAT HAVE BEEN MADE IN THE DRIVER/REGULATOR TO PROVIDE THE REQUIRED SYSTEM OPERATION. REFER TO THE SYSTEM INSTRUCTION BOOK FOR CIRCUIT AND OPERATING DETAILS OF THE DRIVE REGULATOR.

FOR MULTIPLE DRIVE EQUIPMENTS, DRIVER/REGULATOR OPERATING TABLES ARE ON SHEETS 1A, 2A, 3A ETC.

DRIVER/REGULATOR OPERATING TABLE
(LEFT BLANK FOR MULTIPLE DRIVES)

LINE FREQUENCY	DRIVER CURRENT LIMIT	REGULATING LOOP
60HZ <input checked="" type="checkbox"/> 50HZ <input checked="" type="checkbox"/>	NONE <input type="checkbox"/> 0-75HP <input checked="" type="checkbox"/> 75HP <input type="checkbox"/>	VOLTAGE <input type="checkbox"/> CURRENT <input type="checkbox"/> DC TACH <input type="checkbox"/> AC TACH <input checked="" type="checkbox"/>
SYSTEM REFERENCE	LINEAR TIMING	TACHOMETER VOLTAGE
20V <input checked="" type="checkbox"/> 10V <input type="checkbox"/> 3V <input type="checkbox"/>	0 SEC <input type="checkbox"/> 0.5-3SEC <input checked="" type="checkbox"/> 3-30SEC <input type="checkbox"/> 30- SEC <input type="checkbox"/>	43-62 VDC, 26-48 VAC <input type="checkbox"/> 60-115 VDC, 47-85VAC <input type="checkbox"/> 100-200VDC, 82-152VAC <input type="checkbox"/> 180-380VDC, 151-275VAC <input type="checkbox"/>
AUXILIARY PRESET REFERENCE	AUXILIARY PRESET REF DIRECTION	REGULATOR COMPENSATION
NONE <input type="checkbox"/> TIMED <input type="checkbox"/> UNTIMED <input type="checkbox"/>	FWD <input type="checkbox"/> REV <input type="checkbox"/> EXTERNAL <input type="checkbox"/>	NONE <input type="checkbox"/> LOAD <input type="checkbox"/>
SEE SYSTEM ELEMENTARY FOR ADDITIONAL REGULATOR CIRCUITRY		RESPONSE
		NORMAL <input checked="" type="checkbox"/> LOW <input type="checkbox"/>
DRIVER/REGULATOR INCLUDES INSTRUMENT FUNCTION	DIAGNOSTIC FUNCTION	CURRENT LIMIT
<input type="checkbox"/>	<input type="checkbox"/>	150% <input checked="" type="checkbox"/>
		TOP SPEED/BASE SPEED
		0.9-1.0 <input checked="" type="checkbox"/> 1.0-1.1 <input type="checkbox"/> 1.1-1.2 <input type="checkbox"/> 1.2-1.2 <input type="checkbox"/> 1.3-1.5 <input type="checkbox"/> 1.5-1.6 <input type="checkbox"/> 1.6-1.8 <input type="checkbox"/> 1.8-2.0 <input type="checkbox"/> 2.0-2.2 <input type="checkbox"/> 2.2-2.5 <input type="checkbox"/> 2.5-2.7 <input type="checkbox"/> 2.7-3.0 <input type="checkbox"/> 3.0-3.3 <input type="checkbox"/> 3.3-3.7 <input type="checkbox"/>

902HM100AE SHEET 1

DATE

ISSUED

APPROVED

FIRST MADE FOR

714N00

ALLENWEST

VARIABLE SPEED DRIVES
OPERATION
BRIGHTON, ENGLANDCONT. OF SH. NO.
SH. 2 1

902M102XA

ELEMENTARY DIAGRAM NOTES
3062 25HP DRIVE
FOR PALLEUROPE.

902M102XA
SH. NO. 2
CONT. ON 1A

DRIVE NUMBERING SYSTEM

1. TO BREAK THE ELEMENTARY DIAGRAM INTO EASY-TO-USE SECTIONS, A SERIES OF ARBITRARY "DRIVES" HAS BEEN ESTABLISHED, WITH THE ELEMENTARY SHEETS ALPHABETICALLY NUMBERED IN EACH DRIVE. FOR EXAMPLE: SHEETS 3A, 3B AND 3C ARE THE FIRST THREE ELEMENTARY SHEETS IN DRIVE NO.3.
2. THE DRIVE CONCEPT IS ESTABLISHED TO CONVENIENTLY SECTIONALIZE THE ELEMENTARY DIAGRAM, AND NOT NECESSARILY TO DENOTE SEPARATE PHYSICAL EQUIPMENTS. HOWEVER, ALL THE SYSTEM ELEMENTS INCLUDED IN A DRIVE WILL BEAR AN OBVIOUS FUNCTIONAL RELATIONSHIP.

WIRE NUMBERING SYSTEM

1. CONTROL WIRES:

WIRE NUMBERS ARE SHOWN ON EACH SHEET AS TWO-DIGIT NUMBERS (E.G. 01, 02, 10, 42 ETC.) EXCEPT FOR WIRES ORIGINATING ON ANOTHER SHEET, WHICH ARE SHOWN AS 4-DIGIT OR 5-DIGIT NUMBERS. IN ALL CASES, THE COMPLETE WIRE NUMBER (WHICH APPEARS ON THE ACTUAL WIRES IN THE EQUIPMENT AND ON THE TERMINAL BOARDS) IS A 4-DIGIT OR 5-DIGIT NUMBER. THE FIRST TWO OR THREE DIGITS INDICATE THE NUMBER OF THE ELEMENTARY DIAGRAM SHEET ON WHICH THE WIRE ORIGINATES AND THE LAST TWO DIGITS INDICATE THE WIRE ON THAT SHEET. THUS 2A04 INDICATES WIRE NUMBER 04 ORIGINATING ON SHEET 2A OF THE DIAGRAM; AND 15C34 INDICATES WIRE NUMBER 34 ORIGINATING ON SHEET 15C.

2. POWER WIRES:

DC POWER WIRES ARE HANDLED IN THE SAME WAY AS CONTROL WIRES EXCEPT THAT THE LETTER "P" IS INSERTED; ie. 1AP1, 3EP9. AC POWER WIRES USE LETTERS SUCH AS L,K,T & AC WITHOUT THE SHEET NUMBER; ie. L1, L2, L3, L13, L14, L15, AC1, AC2.

LOCATING MAPPING SYSTEM

4 OR 5 DIGIT NUMBERS WITHIN BRACKETS, SUCH AS (15C35), ALWAYS INDICATE A LOCATION WITHIN THE ELEMENTARY DIAGRAMS. THE LAST TWO DIGITS OF THE BRACKETED NUMBER INDICATE THE LINE NUMBER ON A SHEET AND THE FIRST TWO OR THREE DIGITS INDICATE WHICH SHEET; THUS (15C35) INDICATES LINE 35 ON SHEET 15C.

RELAY MAPPING SYSTEM

1. UNDER EACH CONTACT (EXCEPT MAIN CONTACTS OF CONTACTORS AND STARTERS) A LOCATION MAPPING NUMBER INDICATES WHERE THE OPERATING COIL IS TO BE FOUND IN THE ELEMENTARY DIAGRAMS.
2. IN THE DIAGRAM MARGIN BESIDE EACH OPERATING COIL, LOCATION NUMBERS GIVE THE LOCATION OF DEVICE CONTACTS THAT ARE USED. LOCATION NUMBERS AT OPERATING COILS DIFFER FROM THE USUAL LOCATION NUMBERING SYSTEM IN THAT;
 - A) THE BRACKETS ARE ELIMINATED, AND
 - B) UNDERSCORING INDICATES A NORMALLY CLOSED CONTACT AND LACK OF UNDERSCORING INDICATES A NORMALLY OPEN CONTACT.

THUS 3B56 INDICATES A NORMALLY OPEN CONTACT LOCATED ON LINE 56 OF SHEET 3B OF THE ELEMENTARY DIAGRAM, AND 13B48 INDICATES A NORMALLY CLOSED CONTACT LOCATED ON SHEET 13B, LINE 48.

AGAIN MAIN CONTACTS OF CONTACTORS AND STARTERS ARE NOT "MAPPED".

CONTACTS FOR PURCHASER'S USE

CONTACTS FOR PURCHASER'S USE WILL BE SHOWN ISOLATED, IN THE BODY OF THE DIAGRAM, AS NEAR AS CONVENIENT TO THE ASSOCIATED OPERATING COIL.

WIRE NUMBERS WILL BE SHOWN ON THE WIRES COMING OUT OF THE CONTACT WITH THE LABEL "FOR PURCHASER'S USE" OR SIMILAR WORDING.

THESE CONTACTS WILL ALSO BE "MAPPED" AT THE COIL LOCATION.

IN THE ACTUAL EQUIPMENT, THESE WIRES WILL BE RUN TO THE TERMINAL BOARD, WHICH WILL BE MARKED WITH THE WIRE NUMBERS.

WHEN KNOWN, PURCHASERS WIRE NUMBERS WILL BE USED.

CONTINUATION OF WIRES ON OTHER SHEETS

WHERE A WIRE IS CONTINUED FROM ONE SHEET TO ANOTHER, THE POINT OF ITS CONTINUATION IS INDICATED BY A BRACKETED LOCATION MAPPING NUMBER. THE FULL WIRE NUMBER MAY ALSO BE SHOWN.

902HM100AE SHEET 2

DATE 30-6-77

ISSUED

APPR.

FIRST MADE FOR 714N00

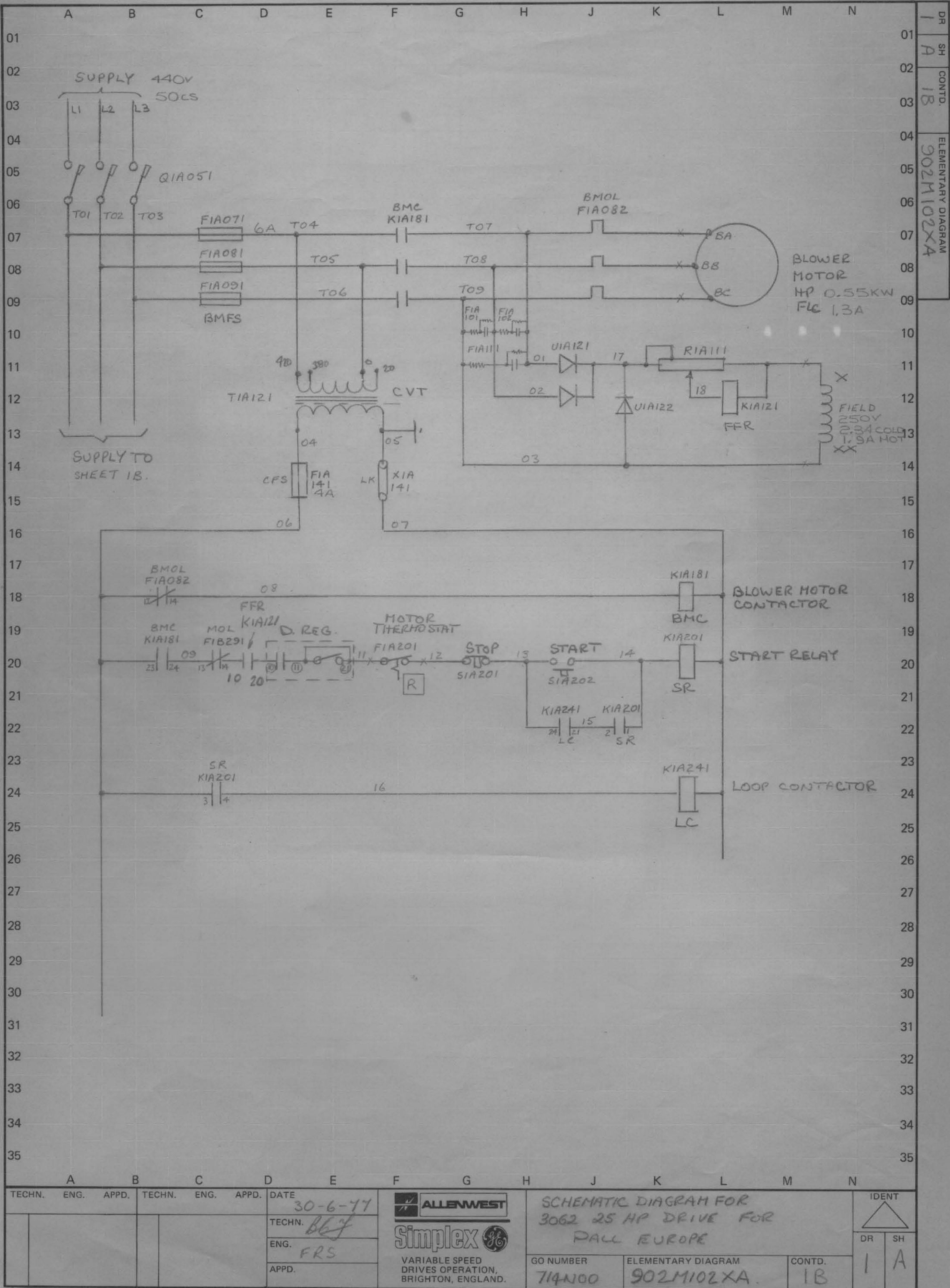
VARIABLE SPEED DRIVES
OPERATION
BRIGHTON, ENGLAND

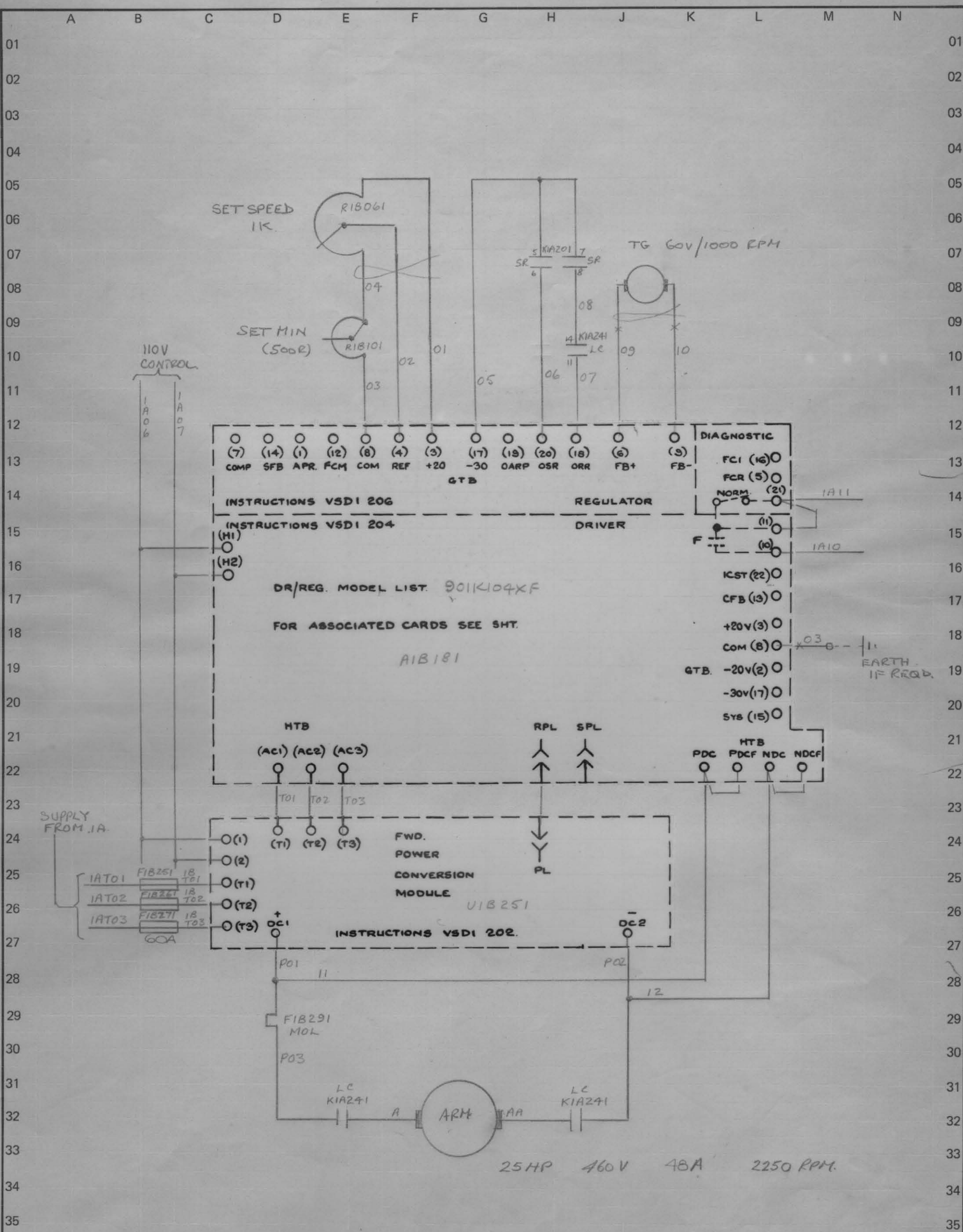
CONT. ON
SH 1A

SH. NO.
2

902M102XA

ELEMENTARY DIAGRAM NOTES
TYPE '3062' 25HP THYRISTOR DRIVE
FOR PALL EUROPE





TECHN.	ENG.	APPD.	TECHN.	ENG.	APPD.	DATE	TECHN.	ENG.	APPD.	GO NUMBER	ELEMENTARY DIAGRAM	CONTD.	IDENT
						26.5.77				714N00	902M102XA	1C	DR SH
													1 B

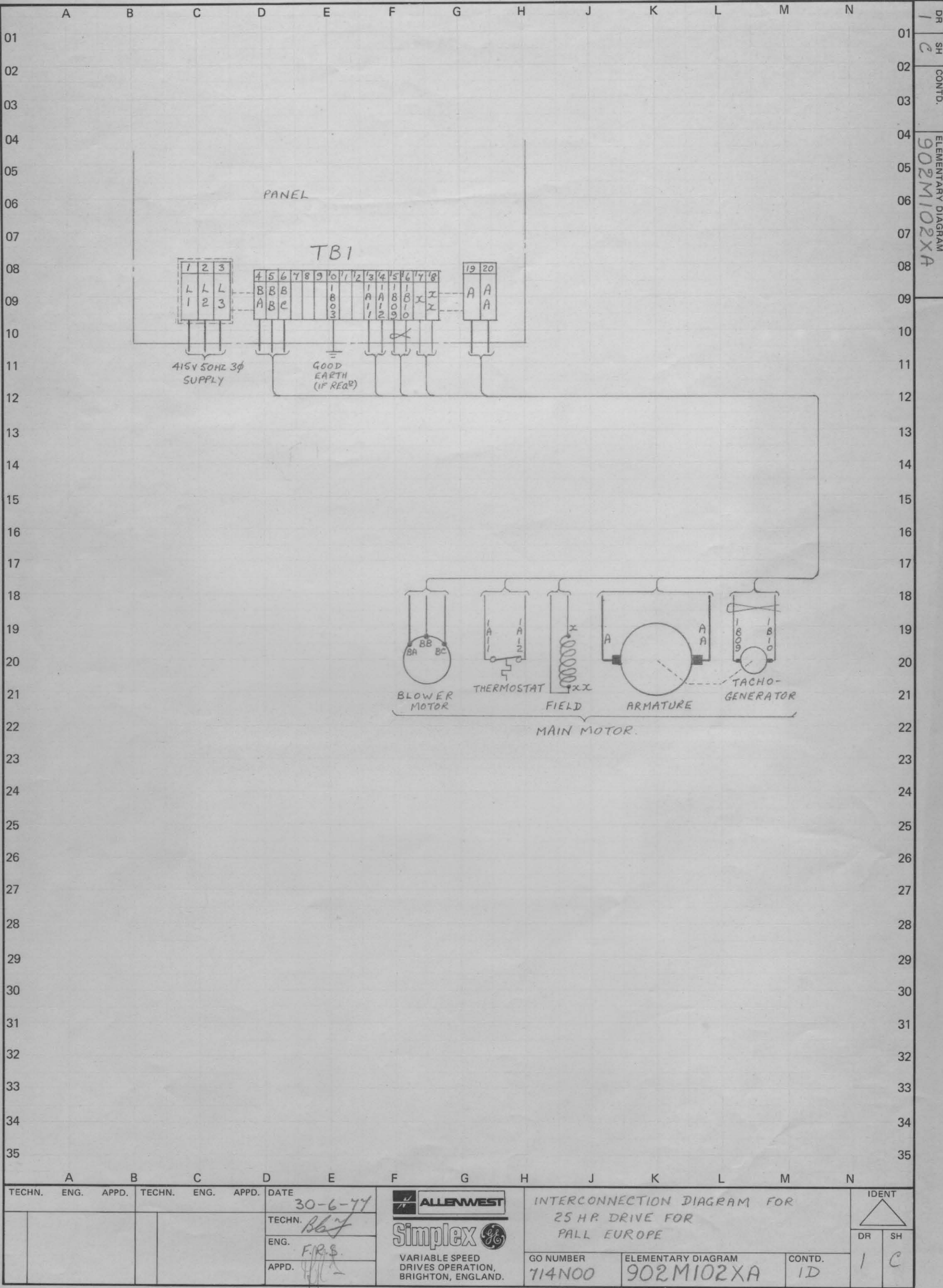
ALLENWEST

Simplex

VARIABLE SPEED DRIVES OPERATION, BRIGHTON, ENGLAND.

SCHEMATIC DIAGRAM FOR 3062 25HP DRIVE FOR PALL EUROPE.

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902M102XA

ID
902M102XA1 NO
902M102XA

SKETCH A

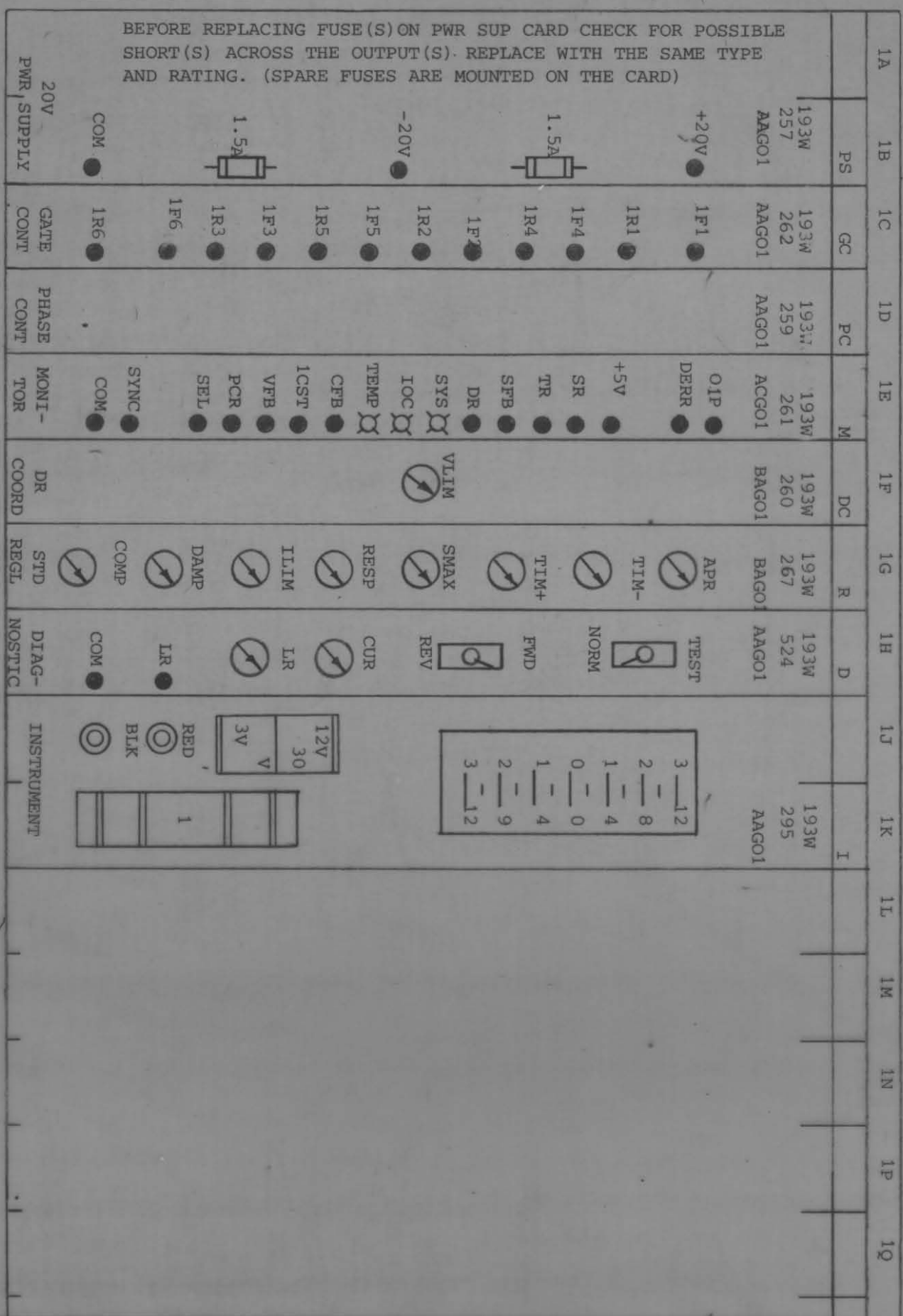
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57

FRONT VIEW OF 64 PIN
RECEPTACLE AS SEEN
IN RACK CLOSED POSITIONFront view
From plug side

ON PRINTED CIRCUIT CARDS USED IN THIS RACK THE LETTERS "AA"
AFTER THE BASIC CARD 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 CARDS SHOULD ALWAYS BE REMOVED WITH THE CARD
EXTRACTOR WHICH IS ATTACHED ON TOP OF THE CARD RACK. SOME CARDS
CONTAIN PARTS WHICH WILL BE HOT AFTER BEING IN OPERATION. CARE
SHOULD BE EXERCISED IN HANDLING ALL CARDS AFTER REMOVAL UNTIL
THESE PARTS HAVE COOLED.

(FRONT VIEW OF RACK IN CLOSED POSITION)



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

VOLTAGE POLARITIES SHOWN ARE FOR MOTORING DA1(+)

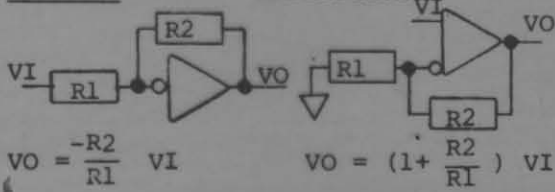
SIGNAL DEFINITIONS AND LOCATIONS

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



$$VO = \frac{-R2}{R1} VI$$

$$VO = (1 + \frac{R2}{R1}) VI$$

CASE GROUND

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

STAB ON TERMINAL

 TERMINAL AT 2TB, 3TB, 4TB, RTB.
 EX: 9 [2] - 2TB9; X2 [R] - RTBX2

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	✓		(NONE)
IOC-400%	✓		(NONE)
-500%		IFC	I-IHI
-300%		IFC	I-ILO
SR5 - 9v			(NONE)
9 - 20v	✓	MCC	SRH - COM
JOGR 10v			(NONE)
20v		MCC	JH - COM
LT. 3-7sec.	✓		(NONE)
2 - 60sec		MCC	332 FROM LT1 TO COM
VREG		IFC	NT-CMEF, CC-COM
DC TACHO	✓		(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-NT3, PT-PT3
110-300vdc		IFC	NT-NT3, PT-PT3
120-300vac		IFC	NT-NT3, PT-PT3
G134 G256		MF	MFC OR MFE
1.8T 1.7		MF	NONE
1.3 2.8		MF	YB - YD
2.4 5.0		MF	YA - YB
4.0 8.0	✗	MF	YA-YB, YC-YD
7.0 13		MF	YA - YC
13 25		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		MCC	CF-CFN, CFP-COM
		MFC	CHA COM

* CEMF COUNTER EMF (3-16)
 * CFB CURRENT FEEDBACK (3-16)
 CMFA ABSOLUTE VALUE CEMF (3-08)
 CRM CROSSOVER MODIFY (9-11)
 DFP DELAYED FIRING POWER (3-25)
 * DR DRIVER REFERENCE (3-33)
 * EAO ERROR AMP OUTPUT (3-33)
 EST EXTERNAL FLT STOP INPUT (3-14)
 FALT FAULT (3-14)
 * FC FIELD CURRENT (NS26)
 FDR FIELD DIAGNOSTIC REFERENCE (9-08)
 FEA FIELD ECONOMY ADJUST (3-25)
 FF FIELD FAULT (3-28)
 IABS MOTOR CURRENT ABSOLUTE (3-09)
 ILA CURRENT LIMIT ADJUST (3-23)
 IMET CURRENT SIGNAL FOR METER (3-10)
 * IPU INITIAL PULSE (3-20)
 * LR LOCAL REF. FROM DGC (3-33)
 * JOGR JOG SWITCH INPUT (3-23)
 * JOGR JOG REFERENCE INPUT (3-31)
 * MAC MAX/MA CONTROL SIGNAL (3-20)
 MSW MODE SWITCH (3-30)
 * OSC OSCILLATOR (3-17)
 * PCR PHASE CONTROL REF. (3-26)
 * PRE DRIVE PRECONDITION (3-21)
 ØSEQ PHASE SEQUENCE (3-14)
 RERR REGULATOR ERROR (3-27)
 RIJ INTEGRATOR SUMMING JUNCTION (3-27)
 RJ REGULATOR SUMMING JUNCTION (3-31)
 RRA REGULATOR RESPONSE ADJUST (3-30)
 RSET RESET (3-16)
 * RTR READY TO RUN (3-16)
 * RUN RUN SWITCH INPUT (3-21)
 * SA-C PHASE SYN OUTPUT (3-16)
 * SFB SPEED FEEDBACK (3-20)
 SMET SPEED SIGNAL FOR METER (3-12)
 * SR SYSTEM REFERENCE INPUT (3-29)
 * SYS SYSTEM FAULT TRIP (3-13)
 * TA OUTPUT FOR TACHO TRIP ADJUST (3-20)
 TF TACHO FAULT (NS28)
 * TFB TACHOMETER FEEDBACK (3-20)
 TFR AC TACHO FREQUENCY OUTPUT (3-13)
 * TR TIMED REFERENCE (3-33)
 * VFB VOLTAGE FEEDBACK (3-19)
 * WFR WEAK FIELD REFERENCE (3-20)

(* - TEST POINT ON DOOR FRONT)

MAPPING SYSTEM

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

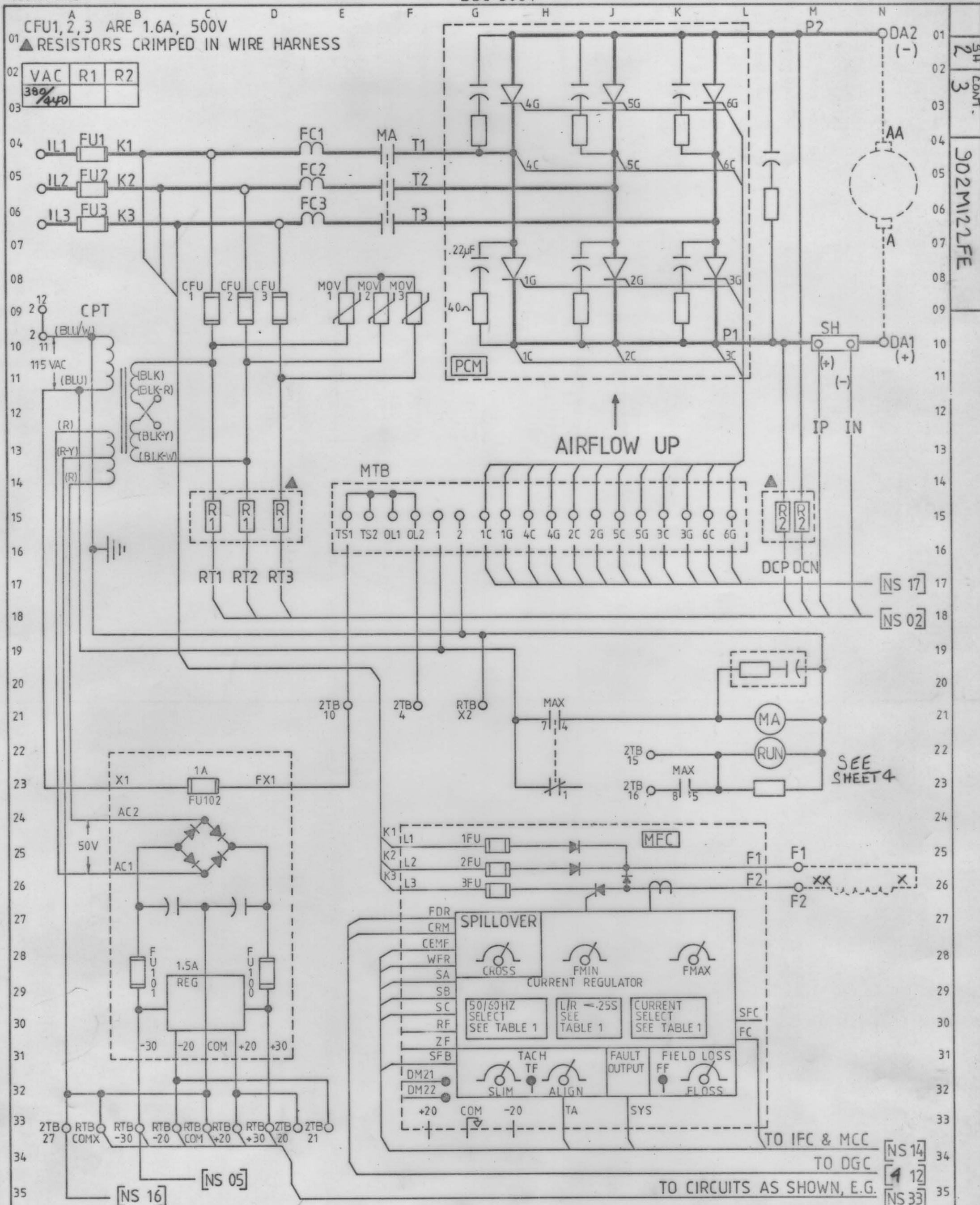
HENCE (PS -12) DENOTES LOCATION ON PAST SHEET LINE 12. OTHER LOCATIONS ARE
 DENOTED BY SHEET NUMBER AND LINE, E.G. (1A16) SIGNIFIES LOCATION ON SHEET
 1A, LINE 16 ETC.

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	5.8.80	75 HP 3064 FOR PALL EUROPE	IDENT	DR	SH
3	SEZ SH 7	2				TECHN.					
						ENG.	F. RS				
						APPD.	ABH				
							VARIABLE SPEED DRIVES OPERATION, BRIGHTON, ENGLAND.				
							GO NUMBER	030N08	ELEMENTARY DIAGRAM	902M122FE	CONTD.
									2	1	

⁰¹▲ RESISTORS CRIMPED IN WIRE HARNESS

VAC	R1	R2
380/440		



TECHN.	ENG.	APPD:	TECHN.	ENG.	APPD:	DATE:	5.8.80
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TECHN:

ENG: *ENL*

APPD:

ALLENWEST
VARIABLE SPEED
DRIVES OPERATION
BRIGHTON ENGLAND

75 HP 3064

G.O. NUMBER

030N08

ELEMENTARY DIAGRAM

902M122FE

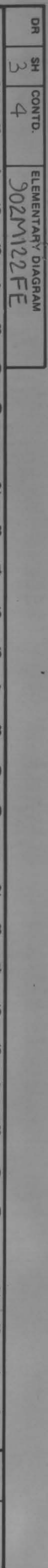
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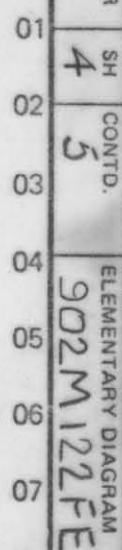
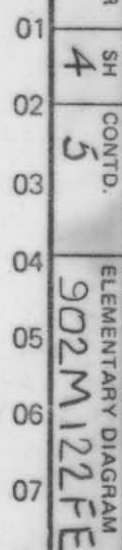
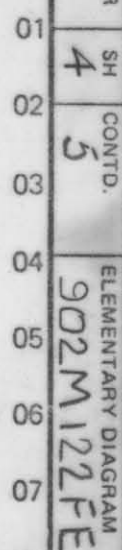
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IDENT

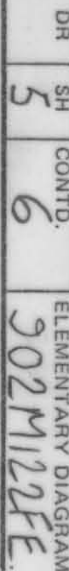
DR	SH
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2





01	SH	4
02	CONTD.	5
03		
04	ELEMENTARY DIAGRAM	
05		902M122FE
06		
07		

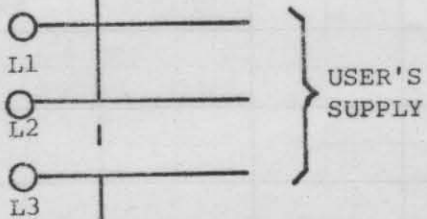


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NOTES

1. SEE INSTRUCTION MANUAL FOR MOTOR INFORMATION
2. INTERCHANGE ANY TWO LINES IF INCORRECT PHASE SEQUENCE.
3. TACHO POLARITY ONLY IMPORTANT ON 4-QUADRANT DRIVES (TG+ MEANS POSITIVE WHEN FORWARD)
4. CHECK CORRECT DIRECTION OF MOTOR BLOWER WHEN COMMISSIONING.

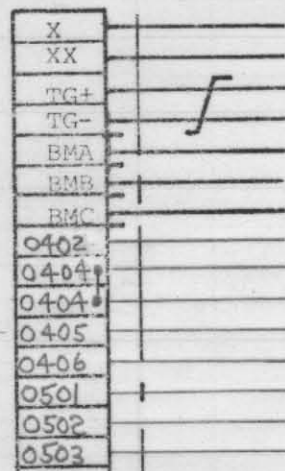
CIRCUIT BREAKER



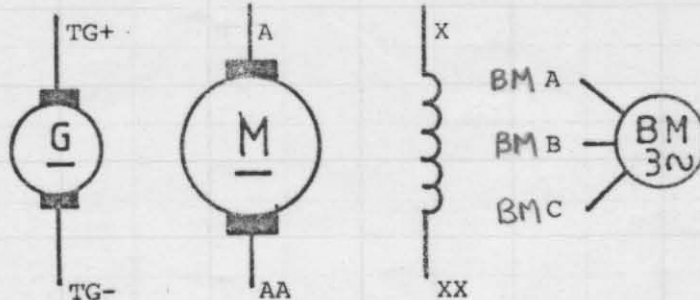
A

AA

CONNECT TO DC MOTOR

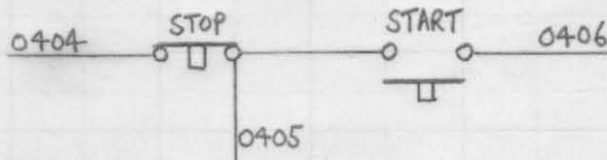


To PB's & POT.

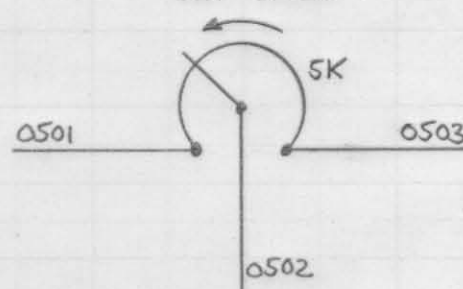


MOTOR THERMOSTAT

0402 0404



SET SPEED



PANEL

TERMINALS

REMOTE DEVICES

(GENERALLY LOWEST TERMINAL NUMBER AT LEFT HAND END OF RAIL)

TECHN.	ENG.	APPD.	TECHN.	ENG.	APPD.	DATE
			C.W.H.			12-8-80
			PB's & POT NOW REMOTE.			
			DATE 1-9-80			
			TECHN. C.W.H.			
			ENG. F.R.S.			
			APPD.			



75HP VALUTROL 3064.
CUSTOMERS CONNECTIONS.

GO NUMBER	ELEMENTARY DIAGRAM	CONTD.
030N08	902M122FE	7

IDENT
DR SH
6