

TRIAC FANUC

OM-C

SERVICE

MANUAL

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INTRODUCTION

THIS SERVICE MANUAL IS TO BE USED AS AN AID TO ANY MAINTENANCE WORK CARRIED OUT ON THE TRIAC FANUC CNC MILLER.

THE MANUAL IS SPLIT INTO FOUR SECTIONS:

1) ROUTINE MAINTENANCE

THIS COVERS THE SCHEDULE OF MAINTENANCE THAT SHOULD BE ADHERED TO FOR TROUBLE FREE USE OF THE TRIAC FANUC CNC MILLER.

2) ELECTRICAL SERVICING

COVERING PLC AND PARAMETER LIST, MACHINE DIAGNOSTICS, LADDER DIAGRAMS AND ELECTRICAL DRAWINGS.

3) TROUBLE SHOOTING

SOME OF THE SMALL PROBLEMS THAT MAY OCCUR OVER THE MACHINES LIFETIME.

4) SPARE PARTS AND ASSEMBLY DRAWINGS

AN AID IN THE LOCATING AND ORDERING OF SPARE PARTS.

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1.1 INTRODUCTION

This section covers the schedule of maintenance that should be adhered to for trouble free use of TRIAC FANUC. The procedures for adjusting the lubrication flow rate and filling TRIAC FANUC with coolant are also contained within this section.

There is also a guide to the necessary lubrication requirements of TRIAC FANUC.

1.2 PLANNING PROCEDURE FOR MAINTENANCE WORK

When carrying out maintenance work, pay special attention to the following items to ensure safe and correct procedures.

- 1) Before starting the maintenance work, understand its contents and obtain preparatory knowledge required for the maintenance work.
- 2) Based on the circumstantial judgement of the maintenance work, secure a work range, tools, workers a work period, spare parts, and so on.
- 3) Be sure to record and store results of preventive maintenance and productive maintenance.
- 4) During a maintenance work period, put up a notice at a place where it can be easily seen to inform other personnel that the machine is under maintenance work.
- 5) Use instruments and tools suitable for the maintenance work.
- 6) Use a work bench and proper lighting in accordance with a work place. Do not carry out the maintenance work under uncertain circumstances.
- 7) When carrying out the maintenance work, removing a safety cover or releasing various interlocks, pay special attention to safety. After finishing the maintenance work, be sure to mount the safety cover and reset the interlocks.
- 8) For electrical maintenance, it should be carried out by a qualified electrician with reference to Sections 2 and 3.
- 9) When carrying out the maintenance work with the power turned off, put up a notice "DO NOT TURN ON POWER" on the isolator.
- 10) Do not touch electric wiring or switches with a wet hands.
- 11) Do not change any set value of the machine unless necessary.
- 12) When replacing a fuse, electric wire, electric bulb, switch, and so on, be sure to use a specified one.
- 13) After finishing the maintenance work, re-check serviced part so that the machine can be properly operated.

1.3 MAINTENANCE SCHEDULE

Routine inspection and maintenance of the machine should be carried out to the following schedule:-

DAILY

- Check oil level in reservoir (See diagram Section 1.5 and lubrication chart).
- Clean out Swarf

WEEKLY

- Clean machine thoroughly.
- Check coolant level (If fitted).

SIX MONTHLY

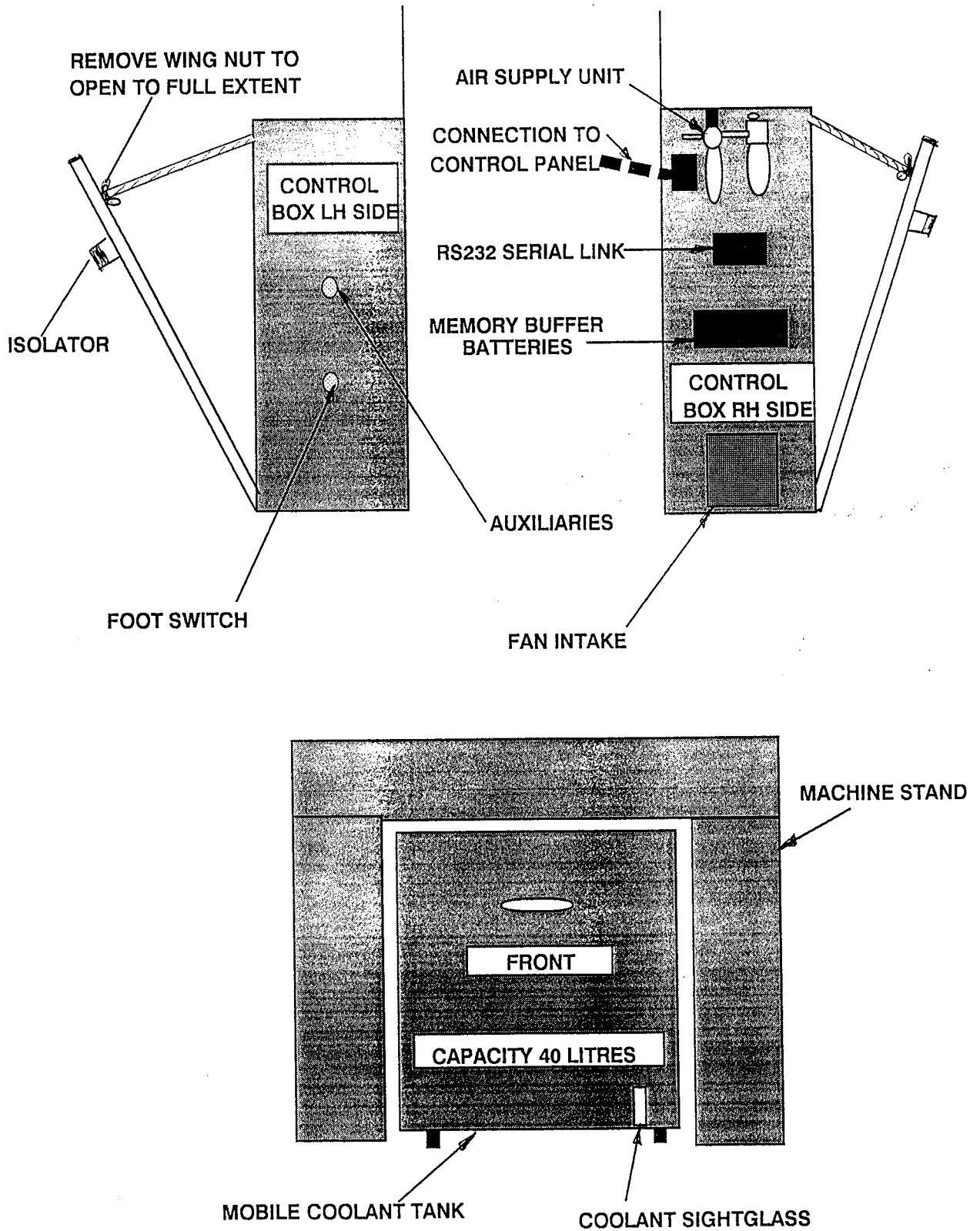
- Check adjustment of head, cross slide and table strips (See Trouble Shooting Procedure 1, Section 3.2)

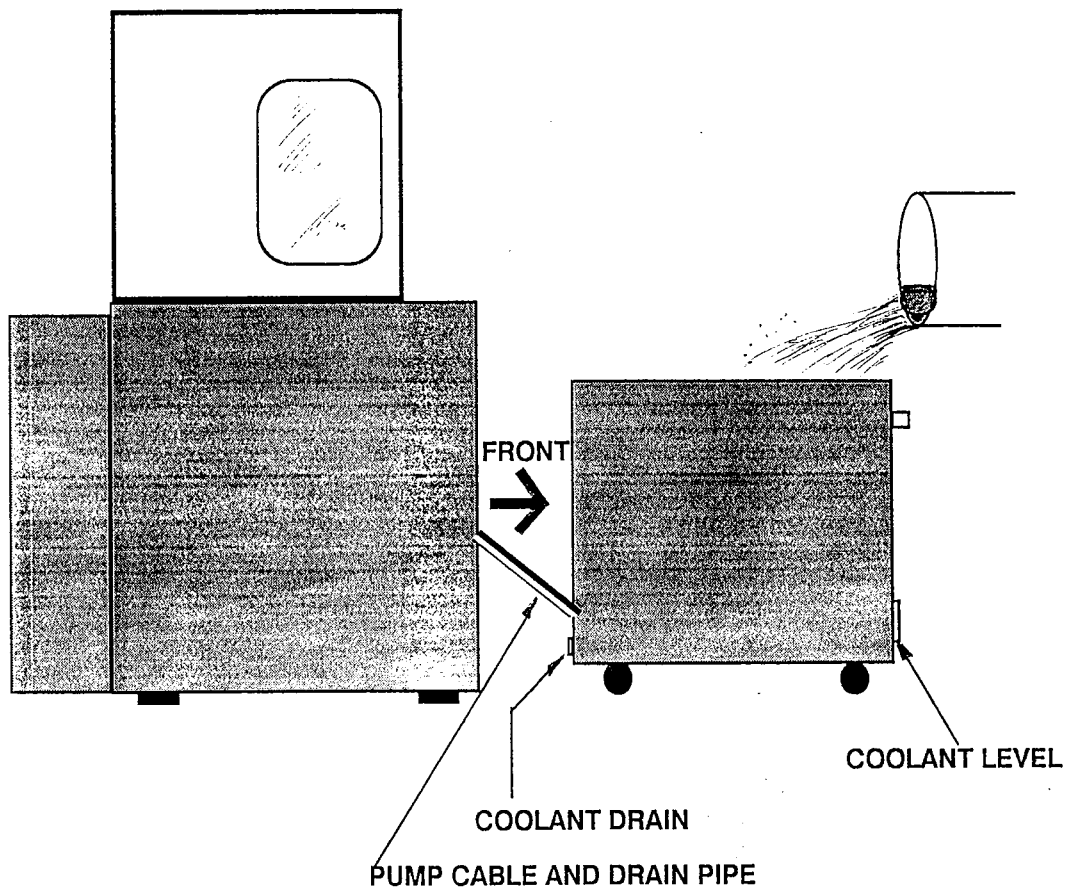
ANNUALLY

- Grease Axis Bearings (See lubrication chart Section 1.5)
- Check machine alignments and accuracy.
- Check spindle bearing adjustment.
- Check spindle drive belt.
- Check Axis Drive Belt for Wear.
- Change air filters. (See Section 1.6).

IF IN DOUBT ABOUT ANY OF ABOVE, CONTACT DENFORD'S FOR ASSISTANCE.

ACCESS POINTS





COOLANT FILLING

To fill the coolant tank, pull out the tank towards the front of the machine. Pour coolant into the tank until the appropriate level is reached - view through the sight glass at the bottom right of the coolant tank. Care must be taken when pulling out the tank for filling, not to over extend the pump cable and drain pipe. Pull out the tank so that the tank just clears the front of the machine.

SWARF REMOVAL

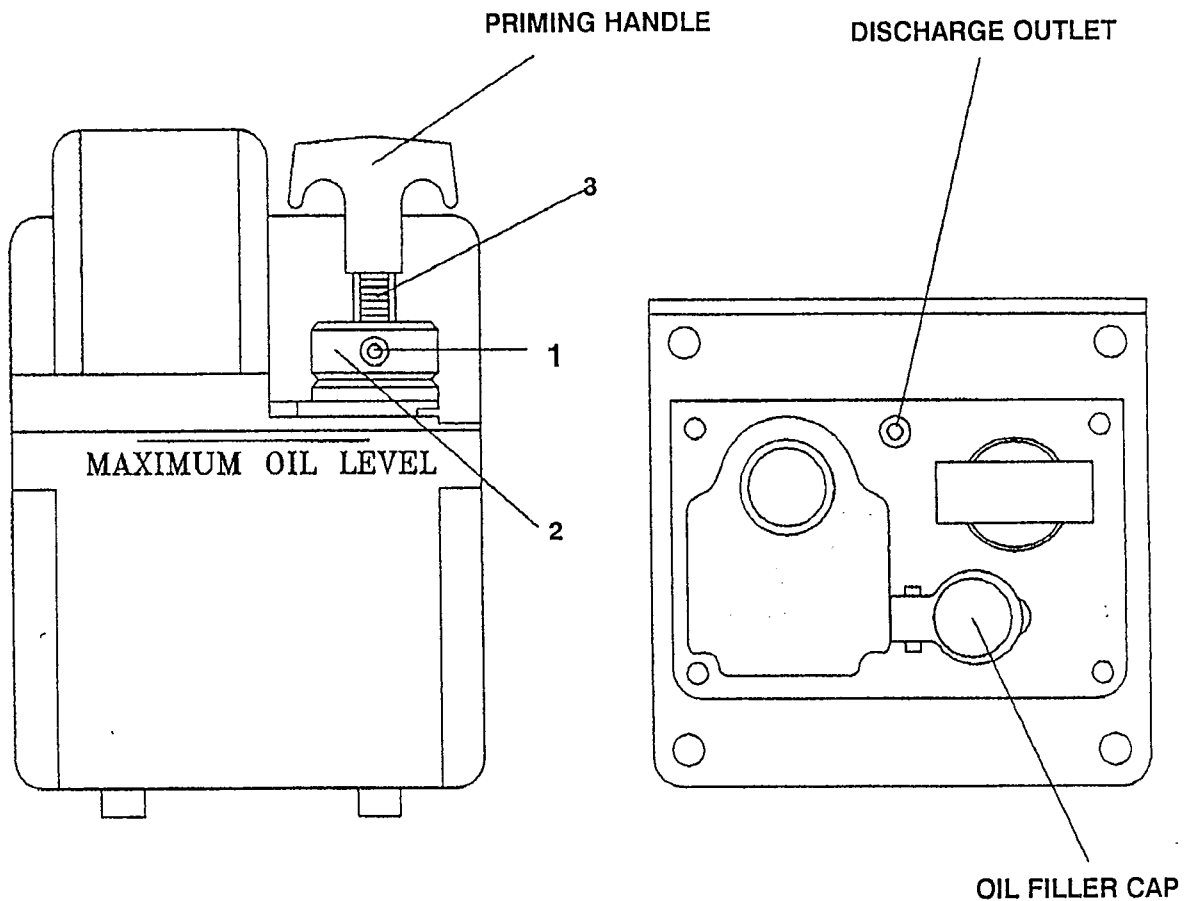
To remove swarf from the coolant tank, pull out the coolant tank towards the front of the machine, just clear of the machine stand, and empty the swarf.

Always switch off coolant before emptying the swarf, and wear protection for the hands. Do not remove swarf whilst the machine is running.

COOLANT DRAIN

To drain the coolant tank, pull out the tank towards the front of the machine. Place receptical beneath the coolant drain, unscrew the drain plug and drain the system. Before refilling do not forget to reseal the coolant drain plug.

1.5 LUBRICATION PUMP



The lubrication reservoir and pump are found on the LH Side of the machine column.

ADJUSTING THE PUMP OUTPUT

To adjust the output of the pump, first release the screw(1) until the adjusting nut turns freely. Adjust the nut (2) for the required output, the shaft 3 is graduated in 0.5ml steps to assist in this setting. After the adjustment, the screw (1) must be carefully re-tightened. NB. Ensure that the screw (1) is always tightened towards the flat graduated part of the shaft(3). DO NOT OVERTIGHTEN.

Your system is now ready for trouble free operation.

To maintain continuity of lubrication do not allow the lubricant level in the reservoir to drop below 18mm (3/4").

It should be noted that the lubrication pump is only active whilst the spindle is running.

1.5 LUBRICATION CHART

LUBRICATION POINT	LUBRICATING SYSTEM	FREQUENCY	RECOMMENDED OIL / GREASE	QTY
SLIDE WAYS AND BALLSCREWS	AUTO PUMP UNIT	ALARM MESSAGE ON CONTROL V.D.U.	BP : CS 68 SHELL : VITREA 68 CASTROL : PERFECTO NN	0,5 litre
MILLING HEAD	GREASE SEAL	ON MAINTENANCE OF MILLING HEAD	KLUBER ISOFLEX NBU 15	4 cc/BEARING
AXIS BEARINGS	GREASE SEAL	ONCE A YEAR	BP : LS 3 SHELL : ALVANIA No.3	2cc/BEARING
COOLANT	ELECTRIC PUMP	AS REQUIRED	CINCINNATI MILLACRON SIMCOOL C60	40 litre

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SECTION 2

ELECTRICAL SERVICING

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SECTION 2.1

- PARAMETER LIST

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PARAMETER LISTING FOR THE TRIAC FANUC

PARAMETER	LIST	N0043	P	00000000	N0127	P	00000000
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VER. 2. _____		N0045	P	00000000	N0129	P	00000000
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N0003	P 00000001	N0048	P	00000000	N0132	P	00000001
N0004	P 00110100	N0049	P	00000000	N0133	P	00000002
N0005	P 00110100	N0050	P	00000000	N0134	P	00000004
N0006	P 00110100	N0051	P	00000000	N0135	P	00000003
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N8232	P	00000000	N8281	P	00000000	N8330	P	00000000
N8233	P	00000000	N8282	P	00000000	N8331	P	00000000
N8234	P	00000000	N8283	P	00000000	N8332	P	00000000
N8235	P	00000000	N8284	P	00000000	N8333	P	00000000
N8236	P	00000000	N8285	P	00000000	N8334	P	00000000
N8237	P	00000000	N8286	P	00000000	N8335	P	00000000
N8238	P	00000000	N8287	P	00000000	N8336	P	00000000
N8239	P	00000000	N8288	P	00000000	N8337	P	00000000
N8240	P	00000322	N8289	P	00000000	N8338	P	00000000
N8241	P-	00001103	N8290	P	00000000	N8339	P	00000000
N8242	P-	00002488	N8291	P	00000000	N8340	P	00000322
N8243	P	00000267	N8292	P	00000000	N8341	P-	00001103
N8244	P-	00001330	N8293	P	00000000	N8342	P-	00002488
N8245	P	00000000	N8294	P	00000000	N8343	P	00000267
N8246	P-	00016471	N8295	P	00000000	N8344	P-	00001330

N8345	P	00000000	N8394	P	00000000
N8346	P-	00016471	N8395	P	00000000
N8347	P	00005709	N8396	P	00000000
N8348	P	00000000	N8397	P	00000000
N8349	P	00000000	N8398	P	00000000
N8350	P	00001677	N8399	P	00000000
N8351	P	00001788			
N8352	P	00000000			
N8353	P	00000026			
N8354	P	00004734			
N8355	P	00000319			
N8356	P	00000000			
N8357	P	00003500			
N8358	P	00000064			
N8359	P	00000000			
N8360	P	00007282			
N8361	P	00032256			
N8362	P	00032507			
N8363	P	00003265			
N8364	P	00000004			
N8365	P	00009713			
N8366	P	00000000			
N8367	P	00000000			
N8368	P	00000000			
N8369	P	00000000			
N8370	P	00000000			
N8371	P	00000000			
N8372	P	00000000			
N8373	P	00000000			
N8374	P	00000000			
N8375	P	00000000			
N8376	P	00000000			
N8377	P	00000000			
N8378	P	00000000			
N8379	P	00000000			
N8380	P	00000000			
N8381	P	00000000			
N8382	P	00000000			
N8383	P	00000000			
N8384	P	00000000			
N8385	P	00000000			
N8386	P	00000000			
N8387	P	00000000			
N8388	P	00000000			
N8389	P	00000000			
N8390	P	00000000			
N8391	P	00000000			
N8392	P	00000000			
N8393	P	00000000			

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SYMBOL & COMMENT LIST

NO.	ADD.	SYM. NAME	COMMENT DATA
0001	X000.0	ORISEN	ORIENTATION SENSOR
0002	X000.5	SPALM	SPINDLE DRIVE ALARM
0003	X000.6	CAOULS	CAROUSEL OUT LS
0004	X002.0	LUFLSW	LUBE FLOAT SWITCH
0005	X002.2	IN.1	AUX INPUT 1
0006	X002.3	CARSEN	CAROUSEL 1 REV SENSOR
0007	X002.6	CAUPLS	CAROUSEL UP LS
0008	X004.0	DVTXTH	DRIVE TRANS. THERMAL SENSOR
0009	X006.0	CADOLS	CAROUSEL DOWN L/S
0010	X006.1	VICEFS	VICE FOOT SWITCH
0011	X006.2	IN.2	INPUT 2
0012	X006.4	CAINLS	CAROUSEL IN LS
0013	X008.5	*RILK	
0014	X008.7	SKIP	SKIP INPUT
0015	X016.5	*DECX	X AXIS REF. LS.
0016	X016.7	DBUCPB	DRAWBAR UNCLAMP P/B
0017	X017.0	CCWPB	CAROUSEL CCW P/B
0018	X017.1	CWP/B	CAROUSEL CW P/B
0019	X017.5	*DECY	Y AXIS REF. LS.
0020	X018.5	*DECZ	Z AXIS REF. LS.
0021	X019.5	*DEC4	4 AXIS REF. LS.
0022	X020.0	KD0	
0023	X020.1	KD1	
0024	X020.2	KD2	
0025	X020.3	KD3	
0026	X020.4	KD4	
0027	X020.5	KD5	
0028	X020.6	KD6	
0029	X020.7	KD7	
0030	X021.0	#OV1	
0031	X021.1	#OV2	
0032	X021.2	#OV4	
0033	X021.3	#OV8	
0034	X021.4	*EMG	EMERGENCY STOP MONITOR
0035	X021.5	RSV1	
0036	X021.7	PROKEY	PROTECT KEY
0037	X022.0	KA0	
0038	X022.1	KA1	
0039	X022.2	KA2	
0040	X022.3	KA3	
0041	X022.4	RSV2	
0042	X022.5	RSV3	
0043	X022.7	KST	

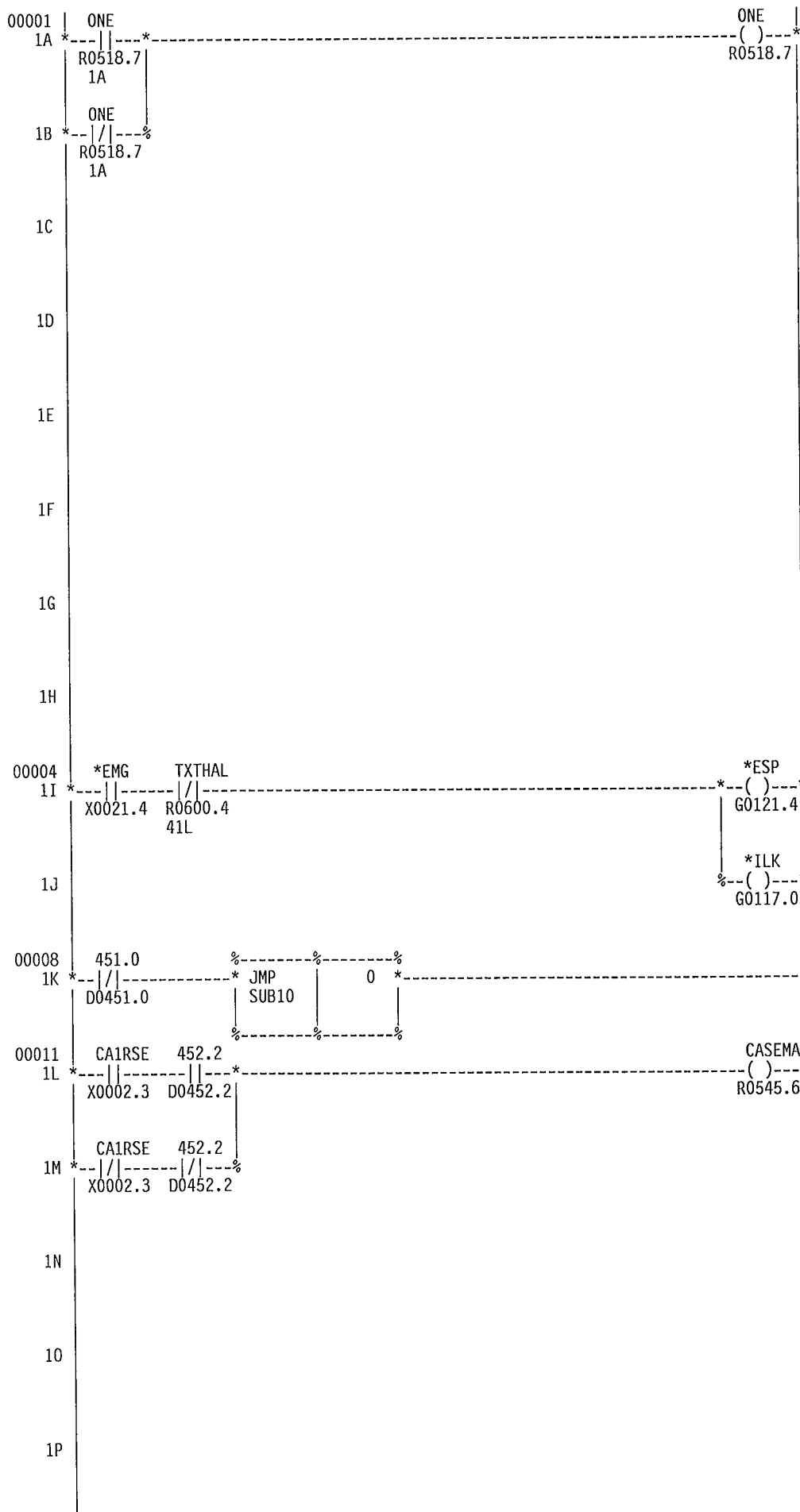
SYMBOL & COMMENT LIST

NO.	ADD.	SYM. NAME	COMMENT DATA
0044	Y048.2	OUT.2	AUX. OUTPUT 2
0045	Y050.0	COONR	COOLANT ON RELAY
0046	Y051.0	LD0	
0047	Y051.1	LD1	
0048	Y051.2	LD2	
0049	Y051.3	LD3	
0050	Y051.4	LD4	
0051	Y051.5	LD5	
0052	Y051.6	LD6	
0053	Y051.7	LD7	
0054	Y052.3	CTRLON	CONTROL ON LAMP
0055	Y052.4	CIR	CAROUSEL IN RELAY
0056	Y052.5	CADOR	CAROUSEL DOWN RELAY
0057	Y052.6	OUT.1	AUX. OUTPUT 1
0058	Y053.1	CARONR	CAROUSEL ON RELAY
0059	Y053.6	DBR	DRAWBAR RELAY
0060	Y053.7	CARCCW	CAROUSEL CCW RELAY
0061	Y080.1	SPRUN	SPINDLE RUN RELAY
0062	Y080.2	SPREV	SPINDLE REVERSE OUTPUT
0063	Y080.4	VIOPR	VICE OPEN RELAY
0064	Y080.5	VICLR	VICE CLOSE RELAY

SECTION 2.3

- LADDER DIAGRAM

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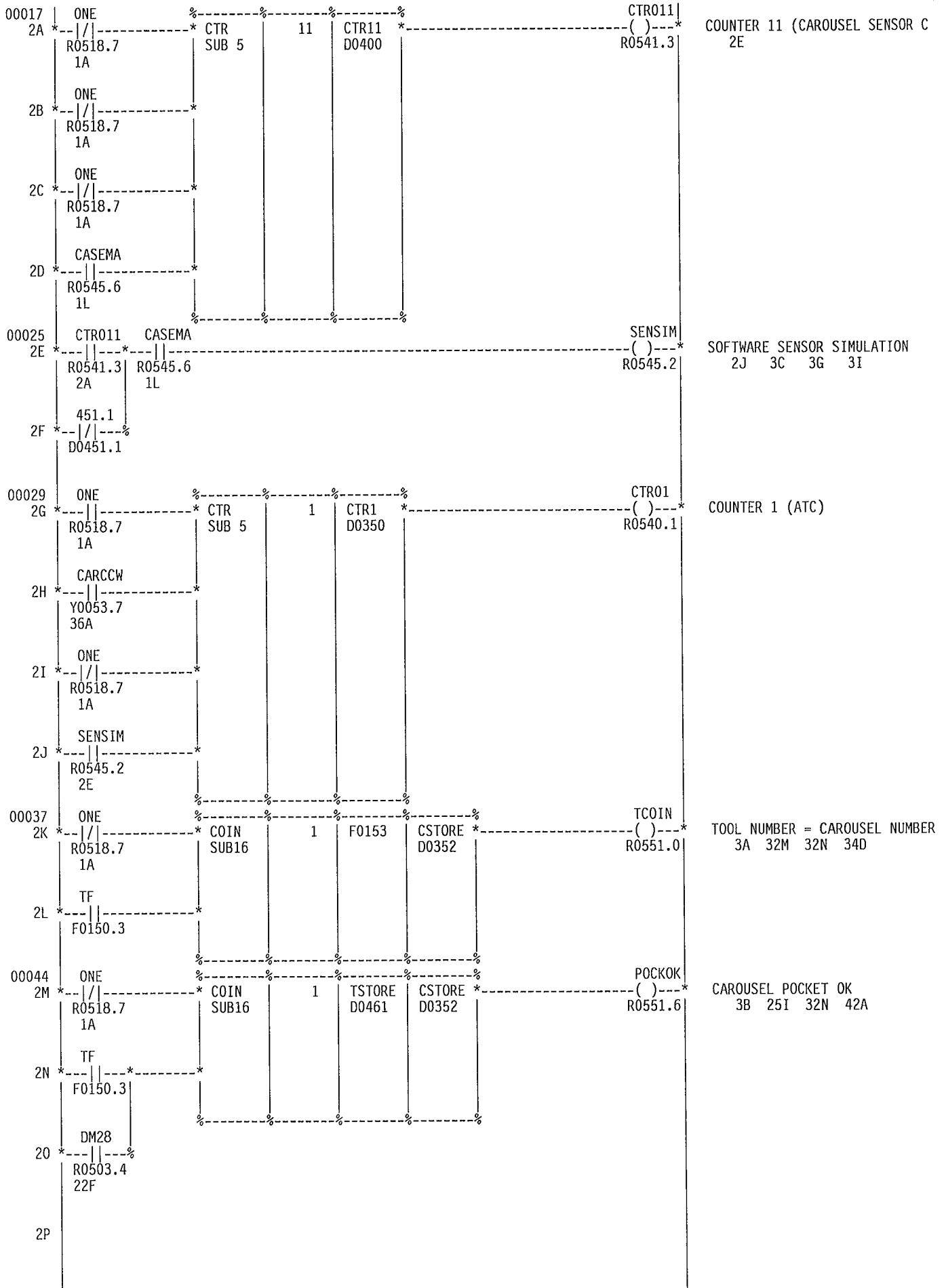
THIS BIT IS ALWAYS ONE !

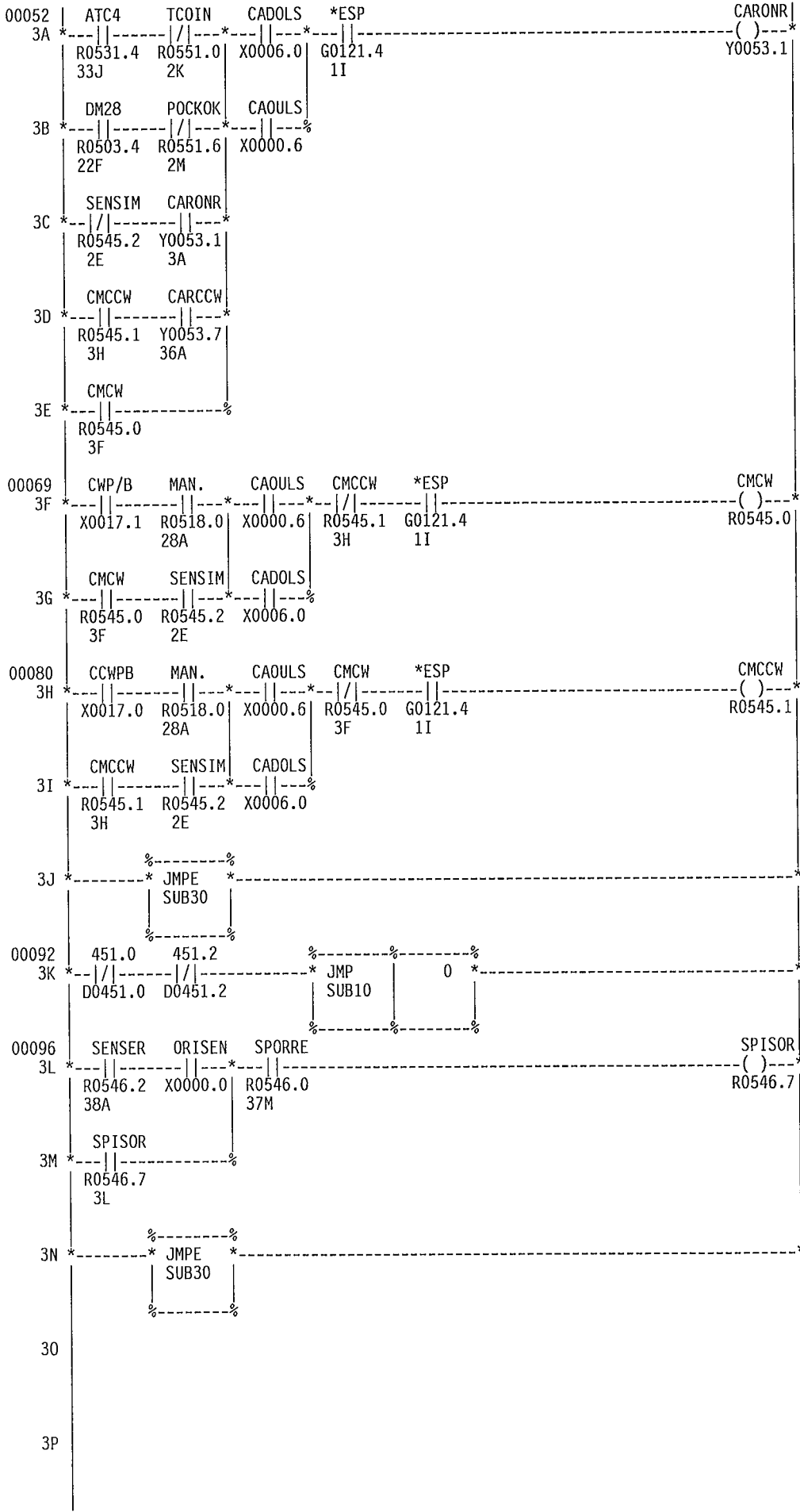
1A	1B	2A	2B	2C
2G	2I	2K	2M	4J
7G	7K	9N	9P	10J
10K	14I	14J	15A	15B
15G	15H	15L	15M	16C
16D	16I	16J	17A	17B
19E	19I	19J	19K	19L
20A	20C	20F	20H	20L
20M	20N	20O	27L	27M
27N	31M	32A	32J	35C
35D	35E	35F	35G	35I
35J	35K	35L	35M	36F
36I	38N	39A	39D	39E
39F	440	45A	45B	45C
45D	45E	45F	45G	45H
45I	45J	45K	45L	45M
45N	45O	45P	46A	46B
46C	46D	46E	46F	46G
46H	46I	46J	46K	46L
46M	46N	46O	46P	47A
47B	47C	47D	47E	47F
47G	47H	47I		

EMERGENCY STOP SIGNAL
3A 3F 3H

INTERLOCK SIGNAL

CAROUSEL SENSOR MARKER
2D 2E



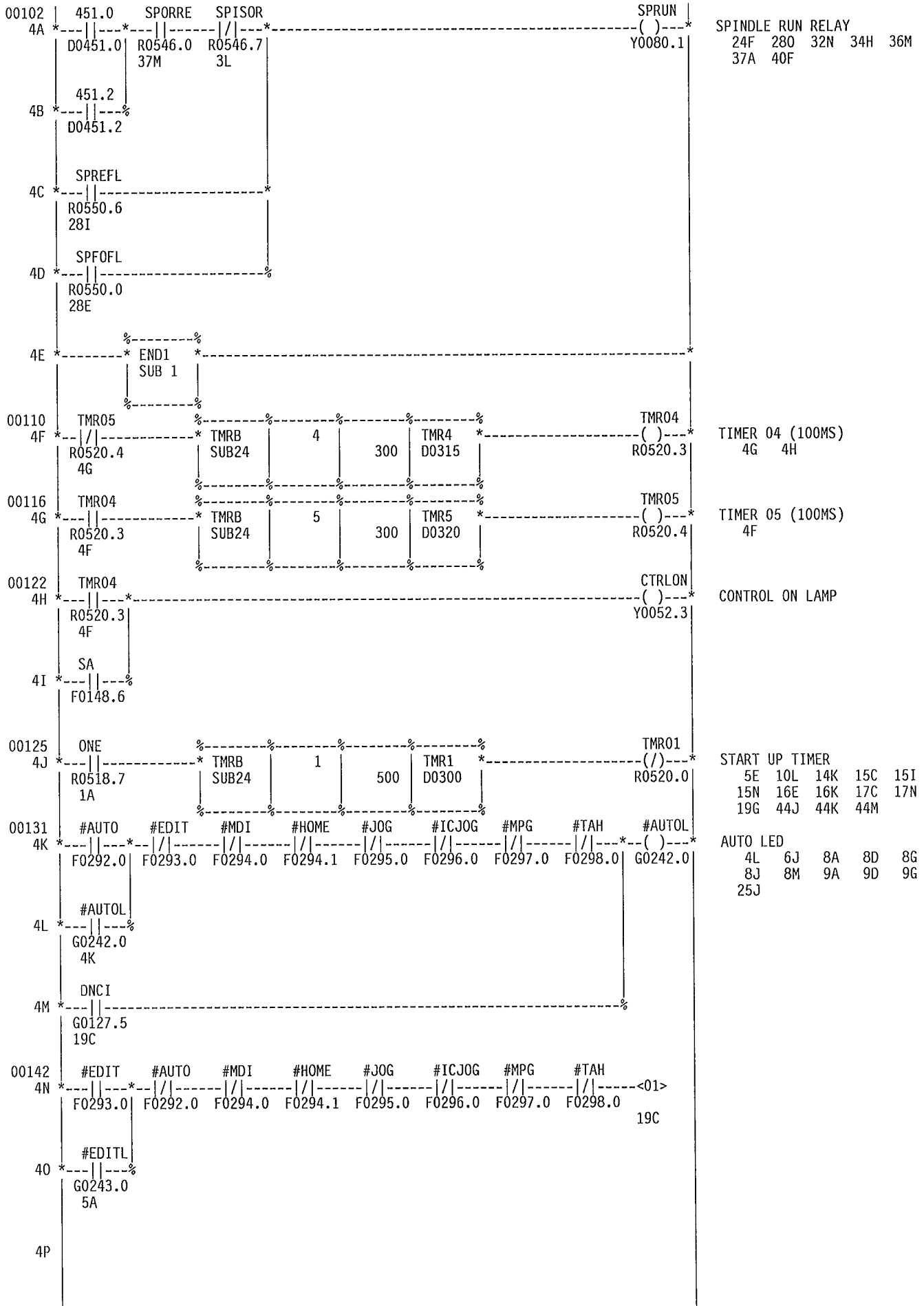


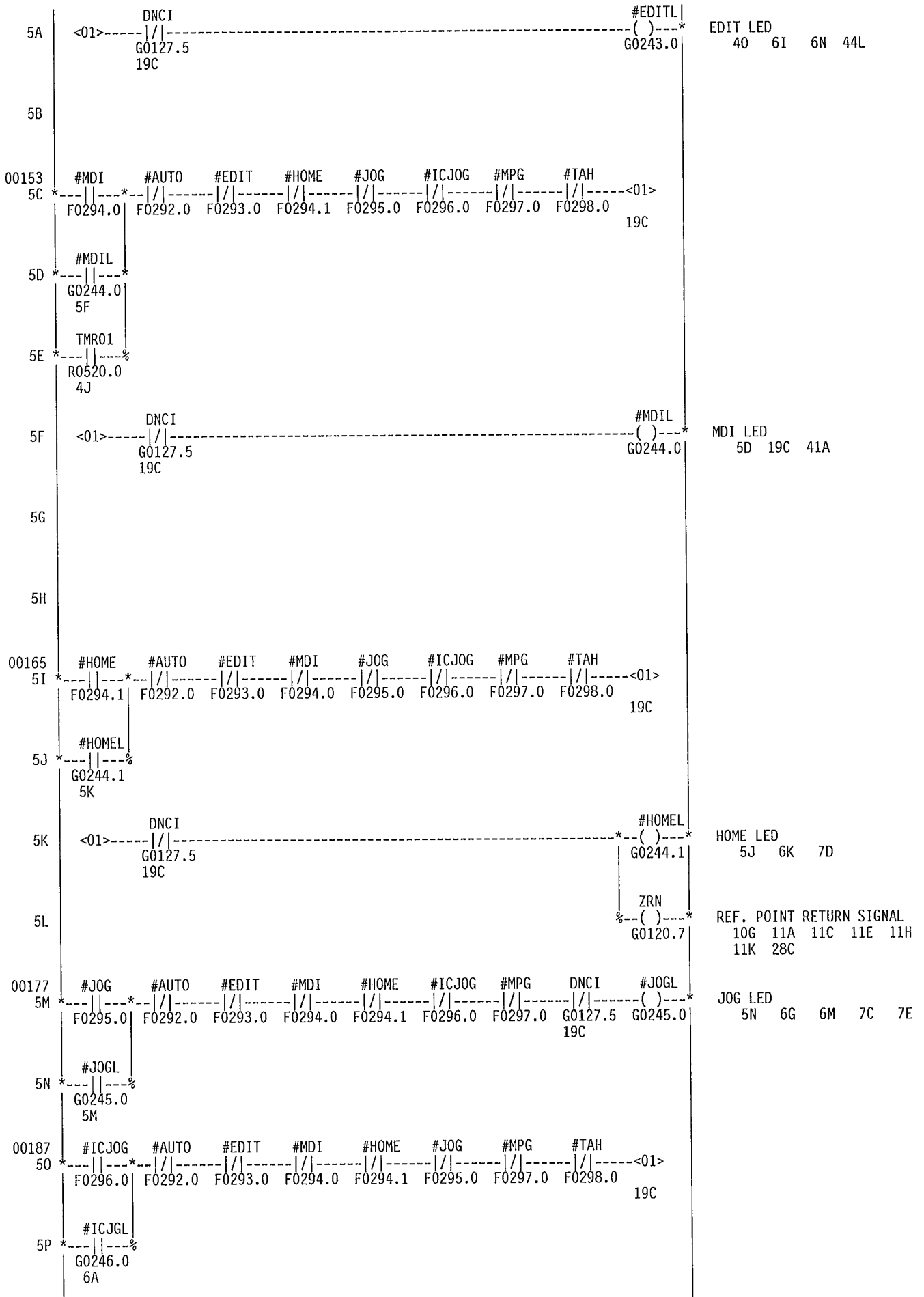
CAROUSEL ON RELAY
3C 36A

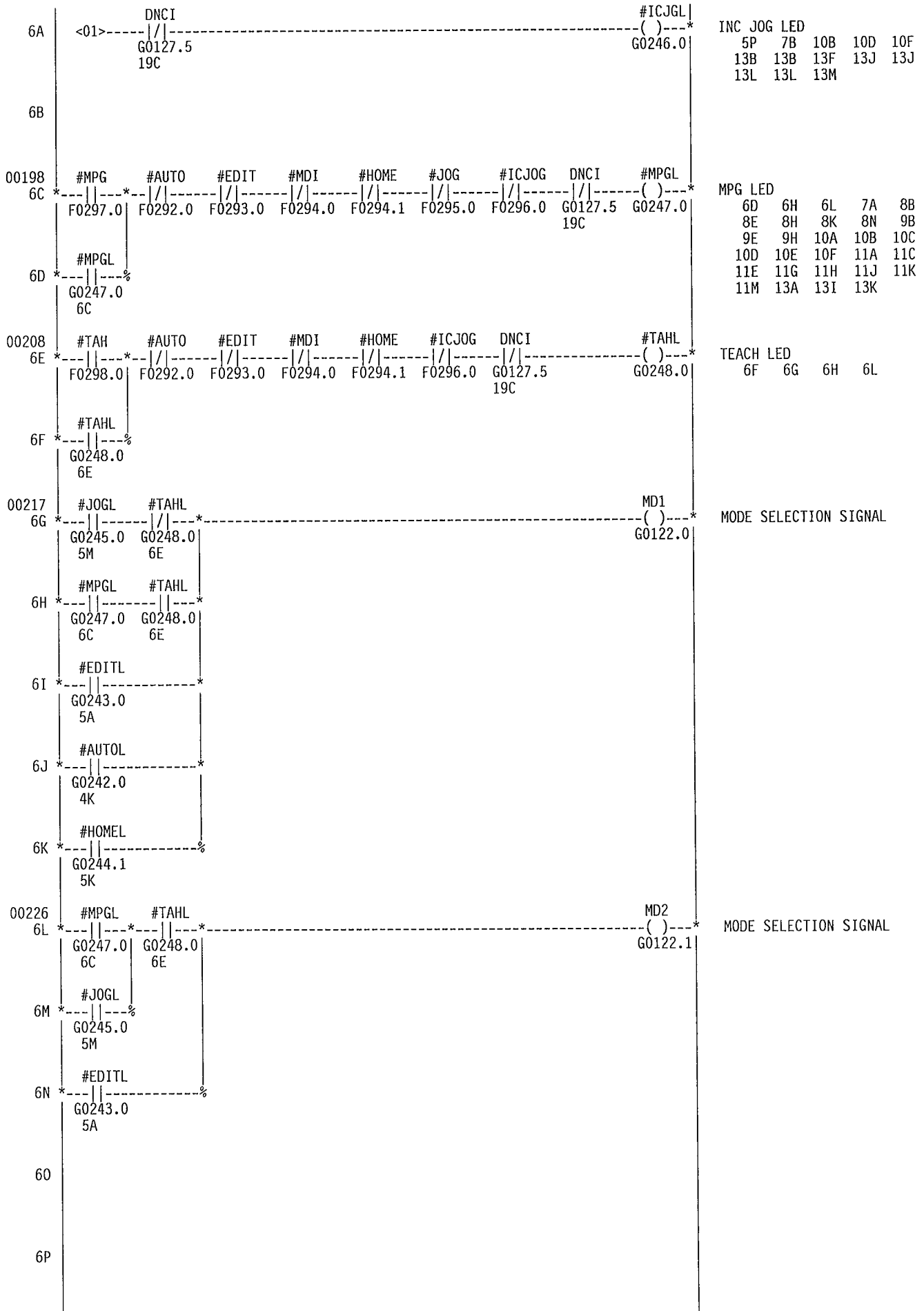
CAROUSEL MANUAL CW SELCET
3E 3G 3H

CAROUSEL MANUAL CCW SELECT
3D 3F 3I 36B

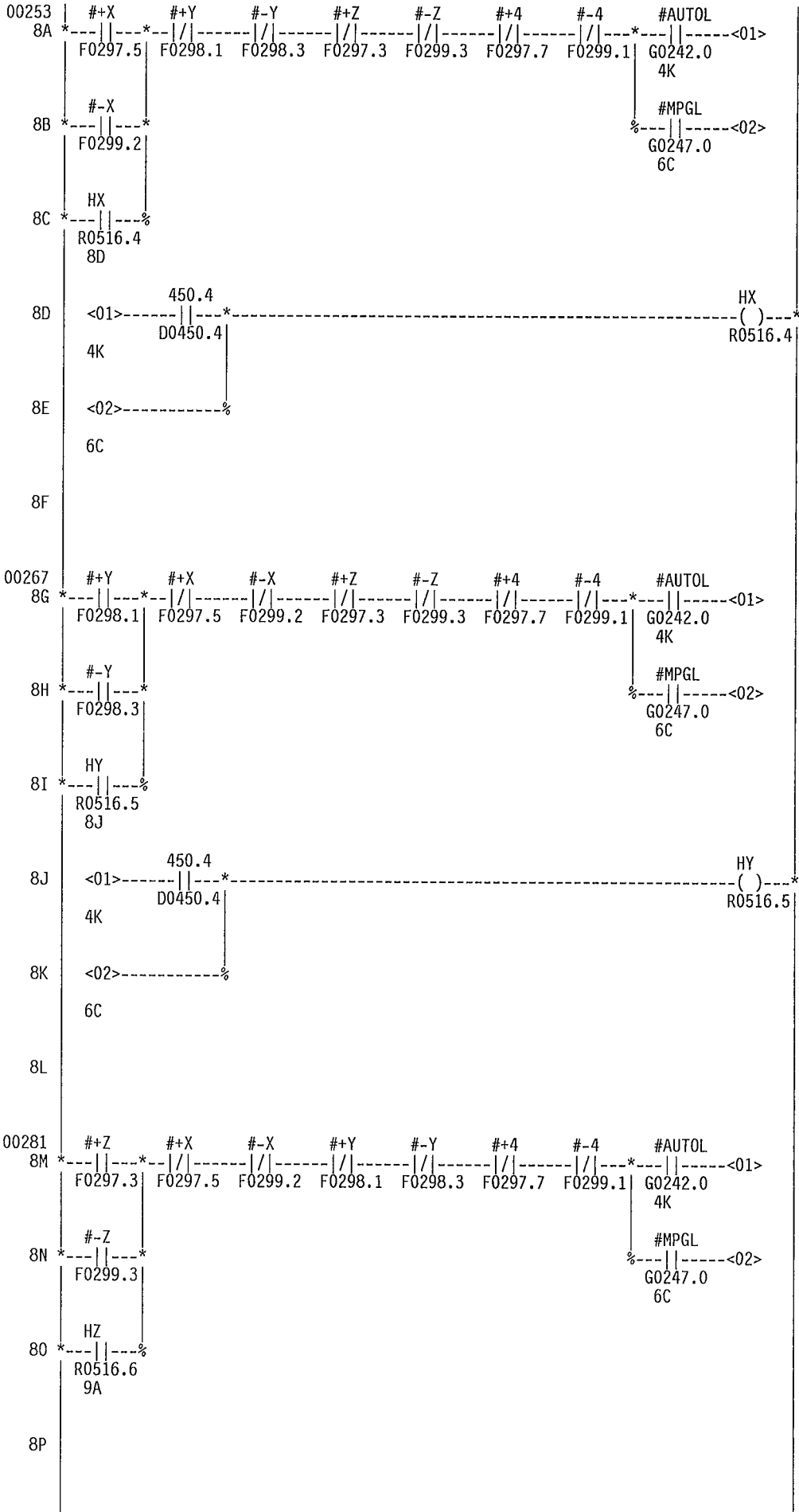
SPINDLE IS ORIENTATED
3M 4A 24P 33D





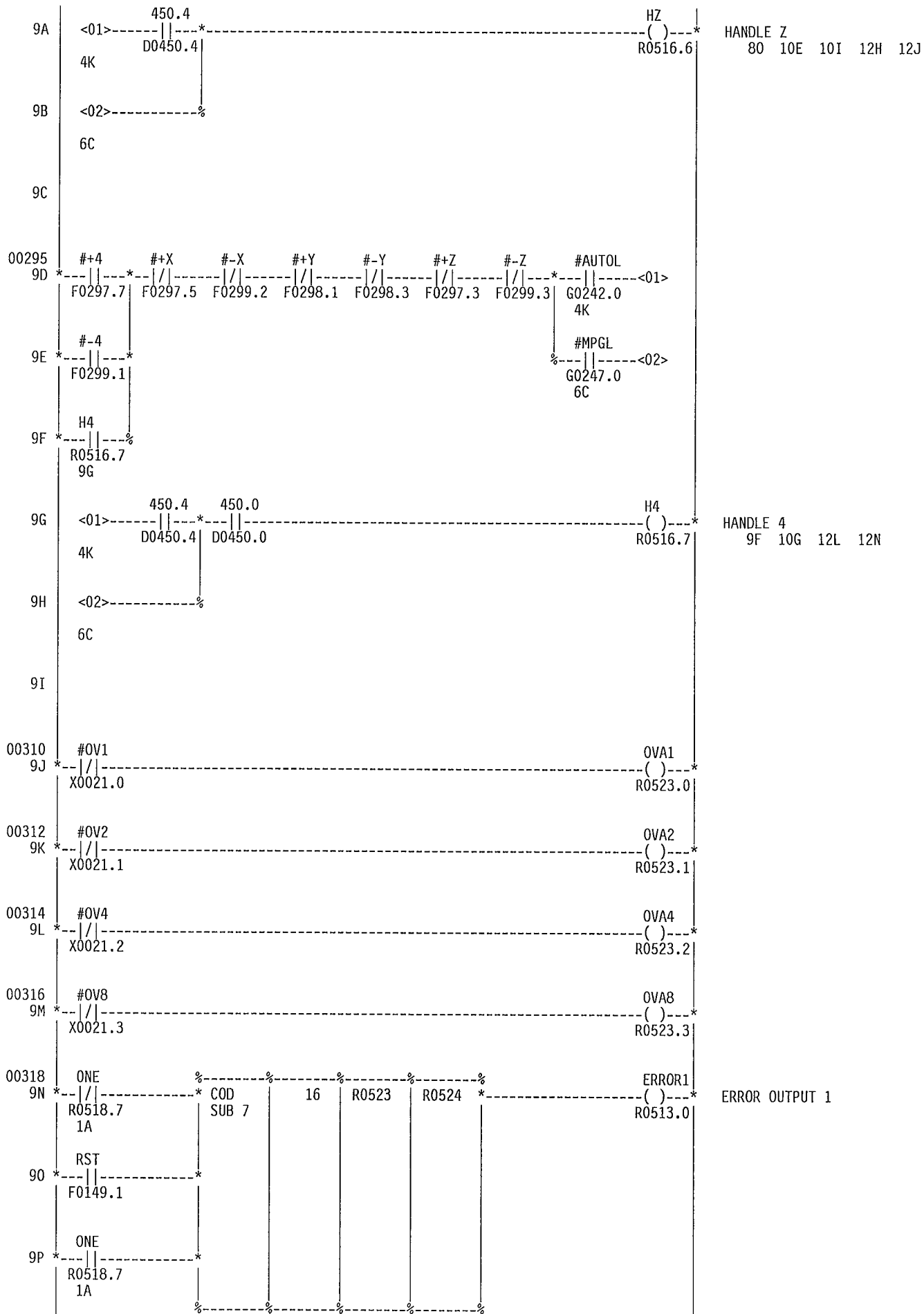


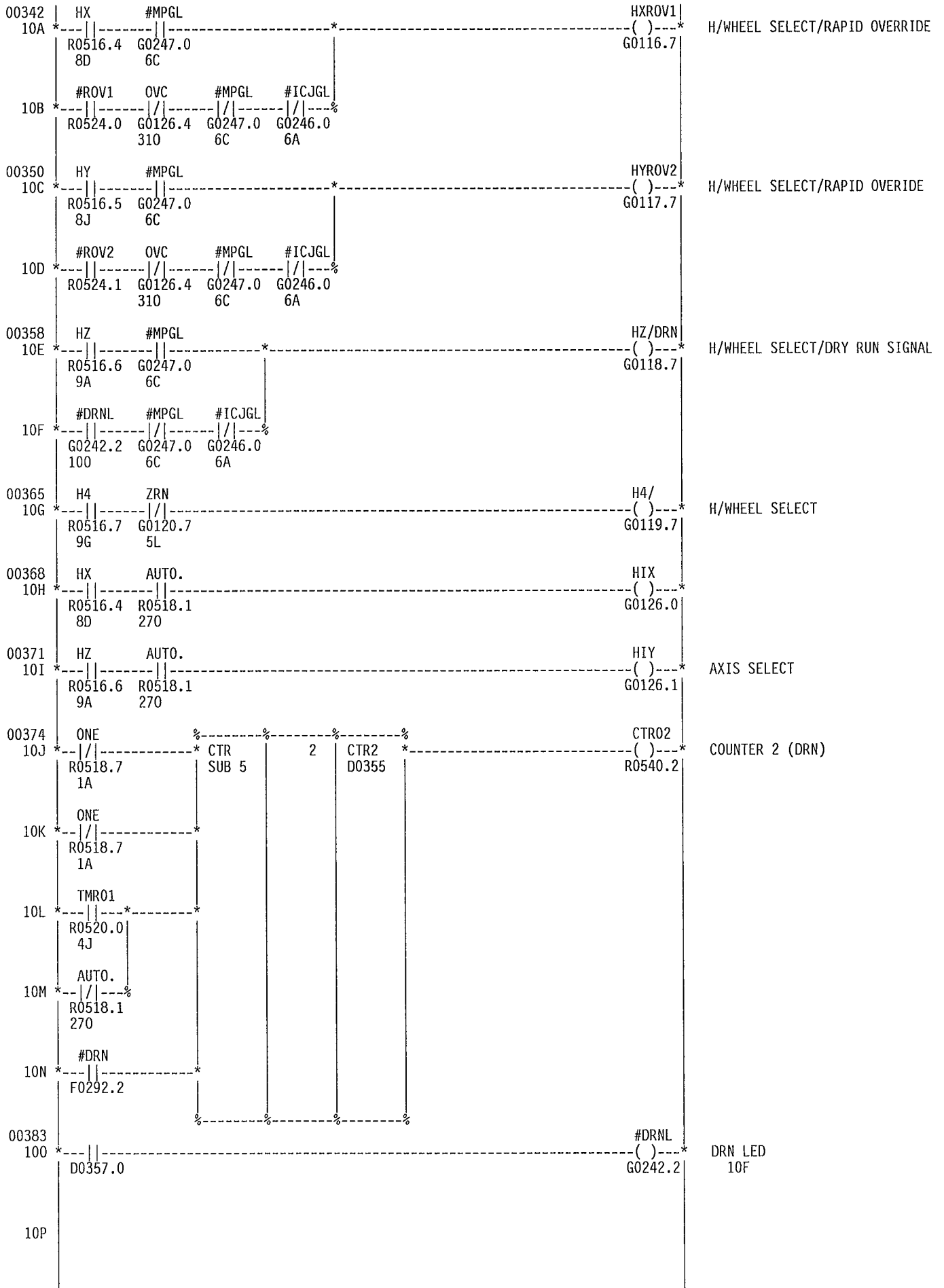
00231	#MPGL		MD4		
7A	* * G0247.0 6C		() G0122.2		MODE SELECTION SIGNAL
	#ICJGL				
7B	* * G0246.0 6A				
	#JUGL				
7C	* * G0245.0 5M				
	#HOMEL				
7D	* % G0244.1 5K				
00236	#JUGL	#TRVRS	#TRVSL		
7E	* * G0245.0 5M	F0298.2	() G0248.2		TRVRS LED
	#DRN		RT		
7F	* % F0292.2		%--()--* G0121.6		MANUAL RAPID TRAVERSE SELECT 28B
00241	ONE		SVFX		
7G	* * R0518.7 1A		() G0105.0		SERVO OFF SIGNAL
			SVFY		
7H			() G0105.1		SERVO OFF SIGNAL
			SVFZ		
7I			() G0105.2		SERVO OFF SIGNAL
			SVF4		
7J			%--()--* G0105.3		SERVO OFF SIGNAL
00246	ONE		*ITX		
7K	* * R0518.7 1A		() G0128.0		AXIS INTERLOCK SIGNAL
			*ITY		
7L			() G0128.1		AXIS INTERLOCK SIGNAL
			*IT4		
7M			%--()--* G0128.3		AXIS INTERLOCK SIGNAL
00250	CAOULS		*ITZ		
7N	* * X0000.6		() G0128.2		AXIS INTERLOCK SIGNAL
	451.0				
7O	* % D0451.0				
7P					



HANDLE X
8C 10A 10H 110 12B

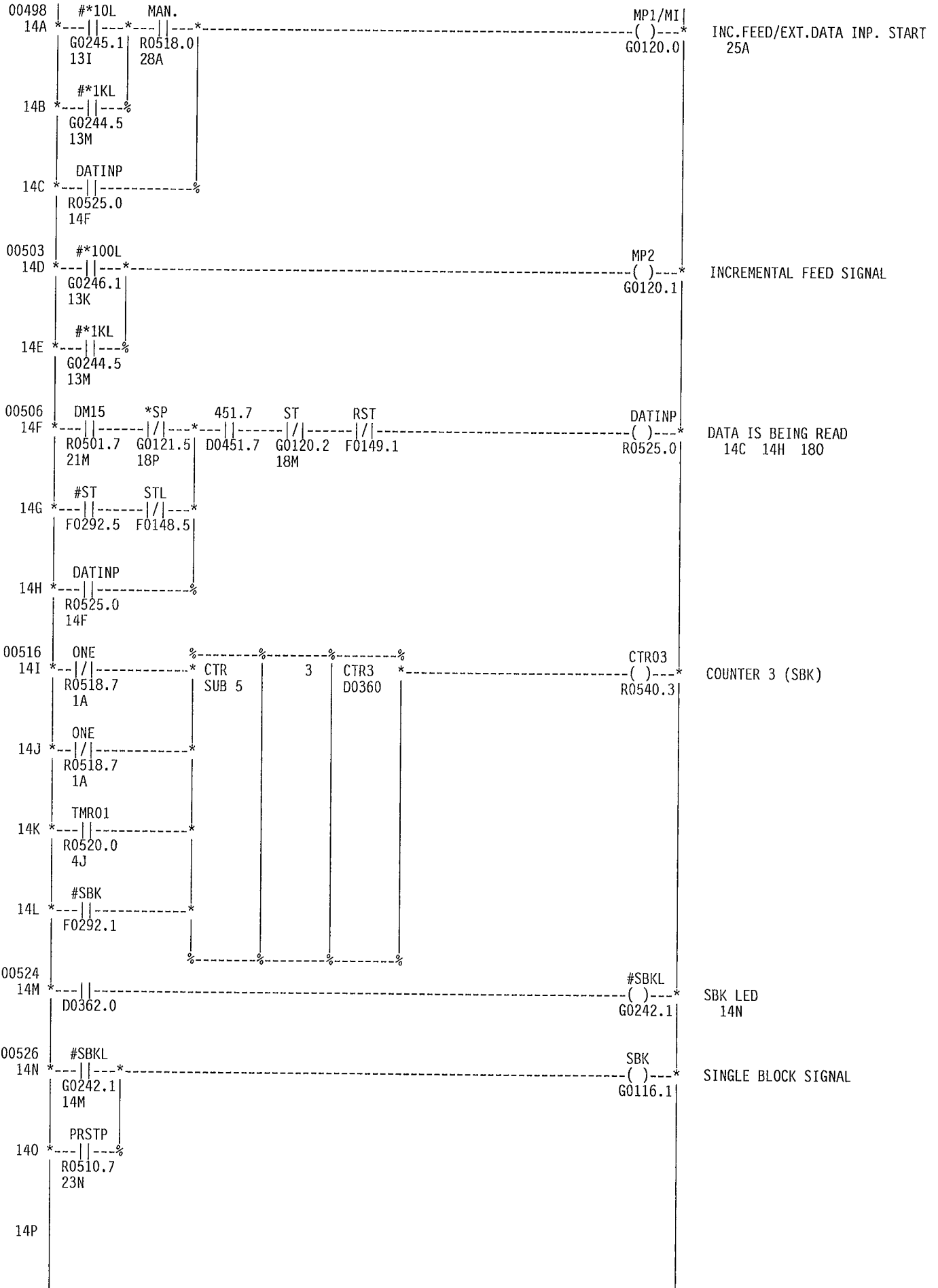
HANDLE Y
8I 10C 12D 12F

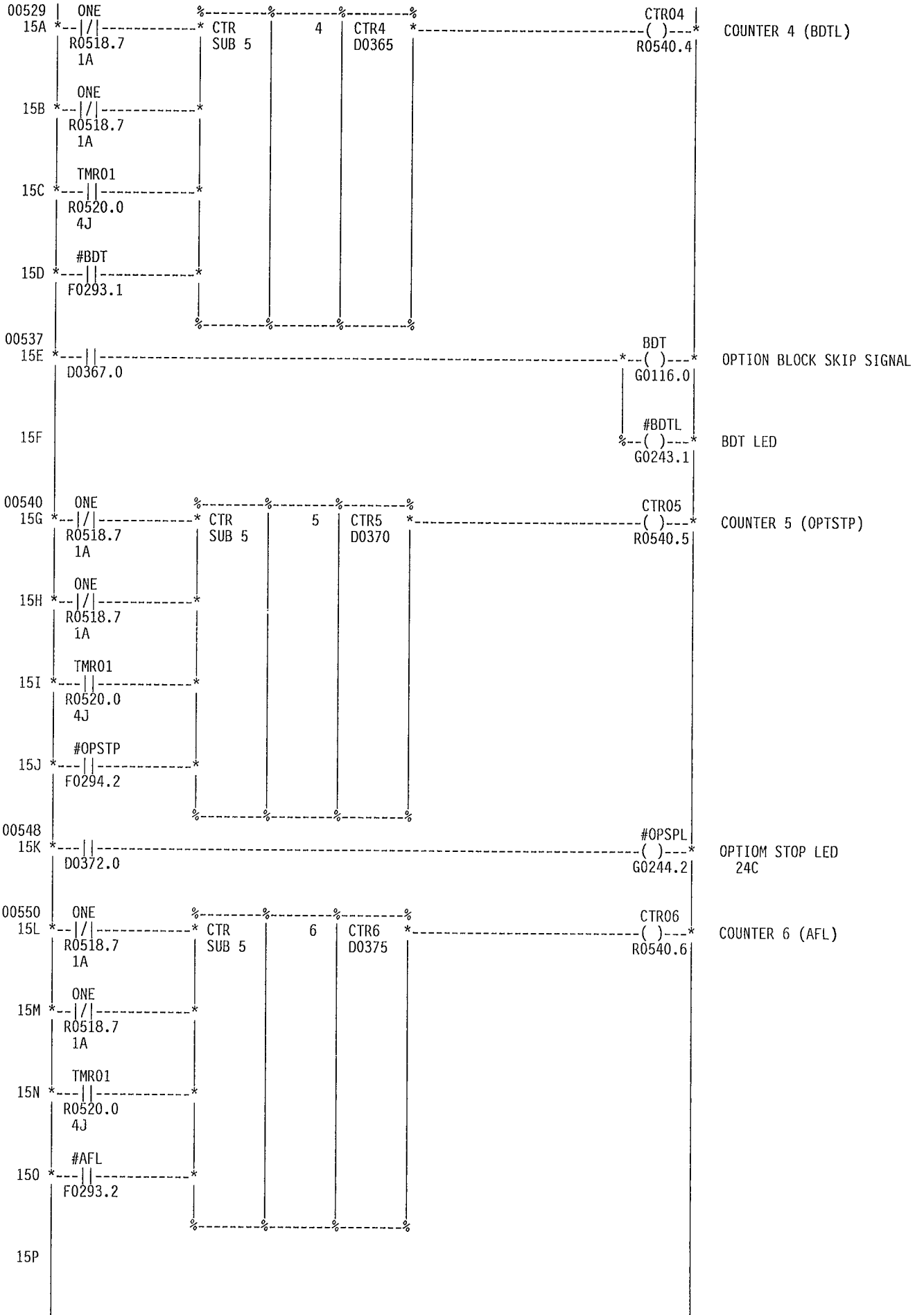


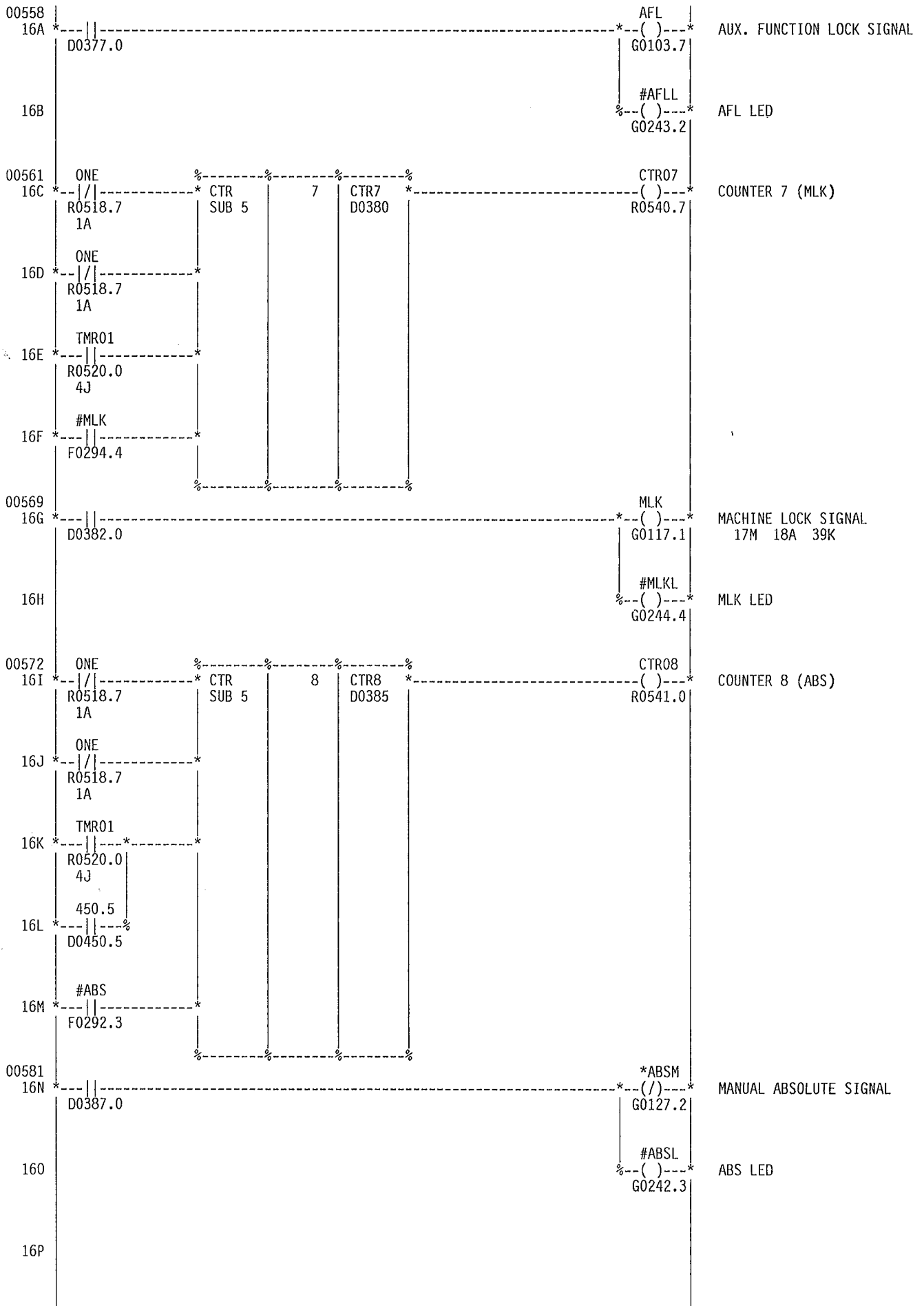


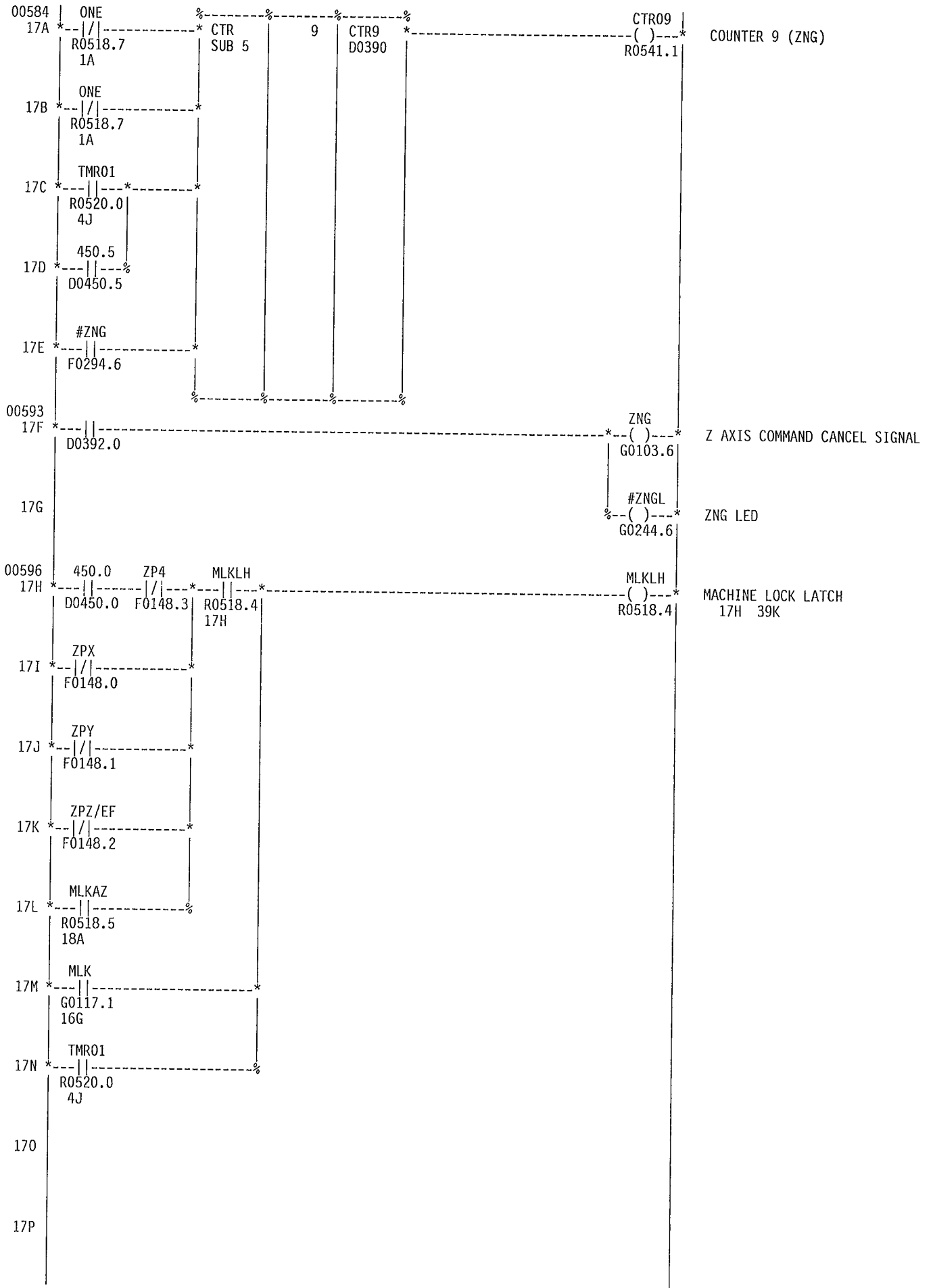
00385	+X	ZRN	ZPX	451.6	#MPGL	+X	
11A	G0116.2 11A	G0120.7 5L	F0148.0	D0451.6	G0247.0 6C	()	FEED AXIS SELECT SIGNAL 11A 11N
11B	#+X						
	F0297.5						
00392	-X	ZRN	ZPX	451.6	#MPGL	-X	
11C	G0116.3 11C	G0120.7 5L	F0148.0	D0451.6	G0247.0 6C	()	FEED AXIS SELECT SIGNAL 11C 12A
11D	#-X						
	F0299.2						
00399	+Y	ZRN	ZPY	#MPGL	+Y		
11E	G0117.2 11E	G0120.7 5L	F0148.1	G0247.0 6C	G0117.2	()	FEED AXIS SELECT SIGNAL 11E 12C
11F	#+Y						
	F0298.1						
00405	#-Y	#MPGL				-Y	
11G	F0298.3	G0247.0 6C			G0117.3	()	FEED AXIS SELECT SIGNAL 12E
00408	+Z	ZRN	ZPZ/EF	#MPGL	+Z		
11H	G0118.2 11H	G0120.7 5L	F0148.2	G0247.0 6C	G0118.2	()	FEED AXIS SELECT SIGNAL 11H 12G
11I	#+Z						
	F0297.3						
00414	#-Z	#MPGL				-Z	
11J	F0299.3	G0247.0 6C			G0118.3	()	FEED AXIS SELECT SIGNAL 12I
00417	+4	ZRN	ZP4	#MPGL	450.0	+4	
11K	G0119.2 11K	G0120.7 5L	F0148.3	G0247.0 6C	D0450.0	()	FEED AXIS SELECT SIGNAL 11K 12K
11L	#+4						
	F0297.7						
00424	#-4	#MPGL	450.0			-4	
11M	F0299.1	G0247.0 6C	D0450.0		G0119.3	()	FEED AXIS SELECT SIGNAL 12M
00428	+X					#+X.L	
11N	G0116.2 11A				G0247.5	()	+X LED
110	HX						
	R0516.4 8D						
11P							

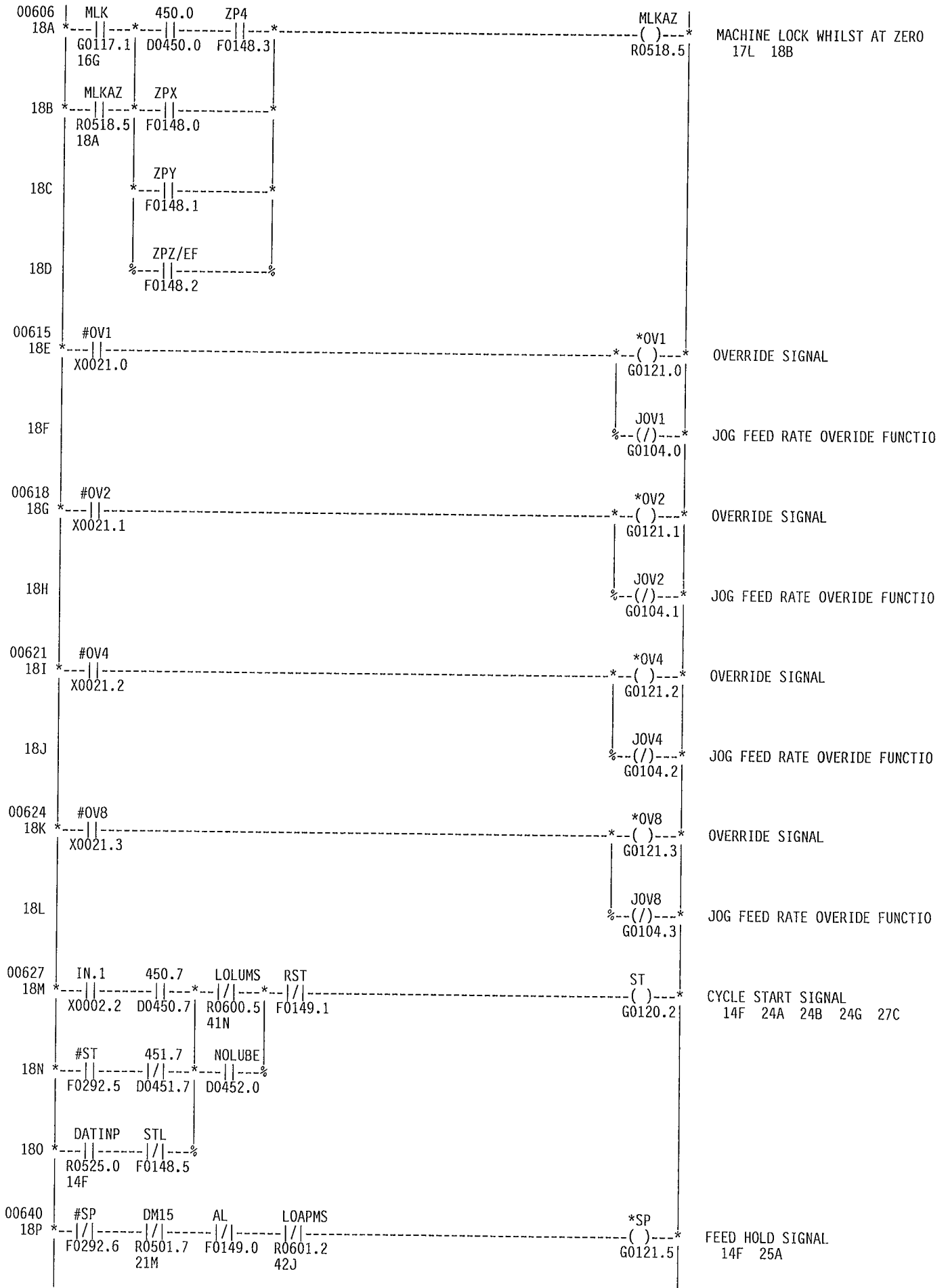
00431	-X	#-X.L	
12A	* * G0116.3 11C	()---* G0249.2	-X LED
12B	* % HX R0516.4 8D		
00434	+Y	#+Y.L	
12C	* * G0117.2 11E	()---* G0248.1	+Y LED
12D	* % HY R0516.5 8J		
00437	-Y	#-Y.L	
12E	* * G0117.3 11G	()---* G0248.3	-Y LED
12F	* % HY R0516.5 8J		
00440	+Z	#+Z.L	
12G	* * G0118.2 11H	()---* G0247.3	+Z LED
12H	* % HZ R0516.6 9A		
00443	-Z	#-Z.L	
12I	* * G0118.3 11J	()---* G0249.3	-Z LED
12J	* % HZ R0516.6 9A		
00446	+4	#+4.L	
12K	* * G0119.2 11K	()---* G0247.7	+4 LED
12L	* % H4 R0516.7 9G		
00449	-4	#-4.L	
12M	* * G0119.3 11M	()---* G0249.1	-4 LED
12N	* % H4 R0516.7 9G		
12O			
12P			

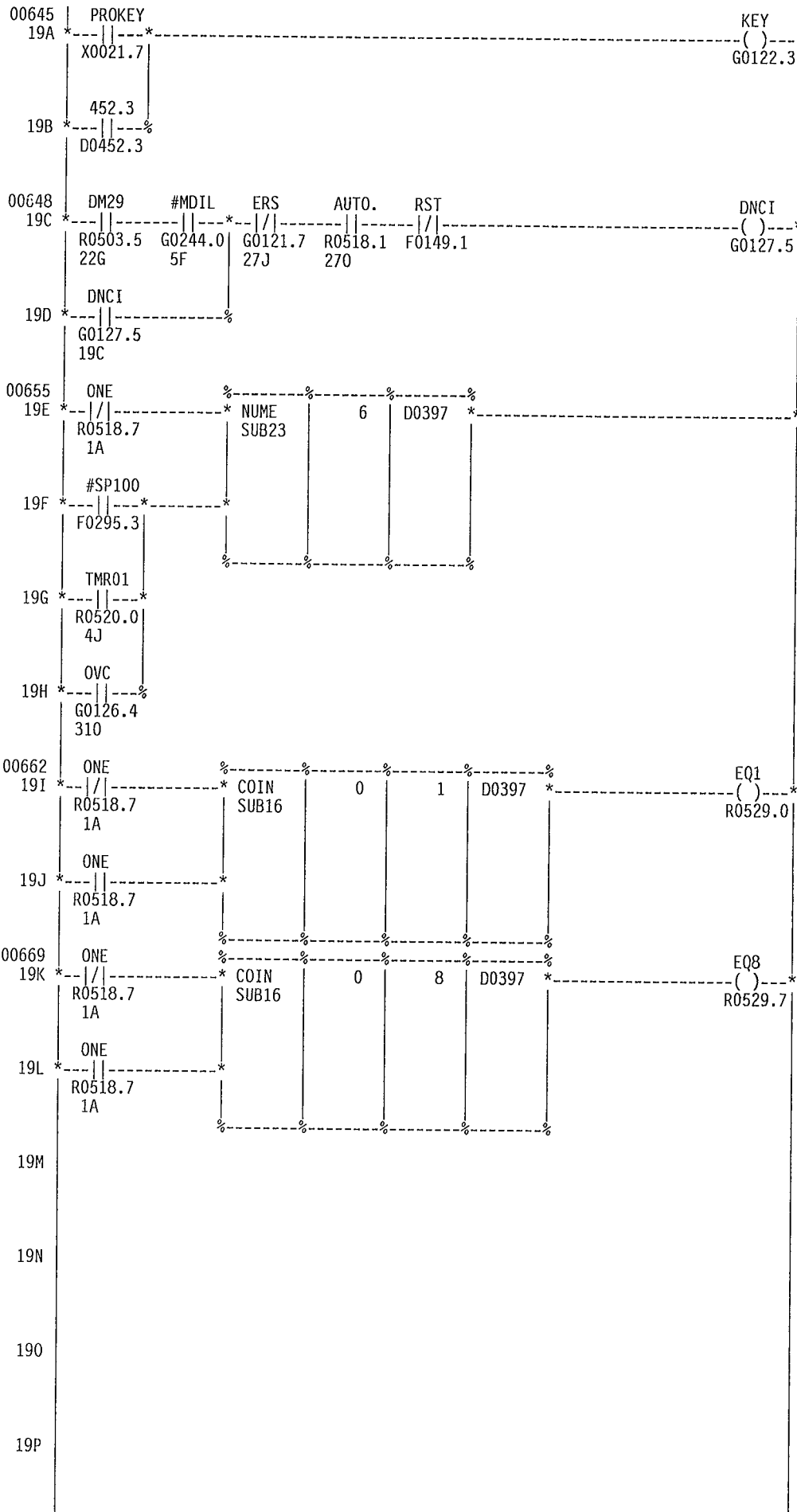










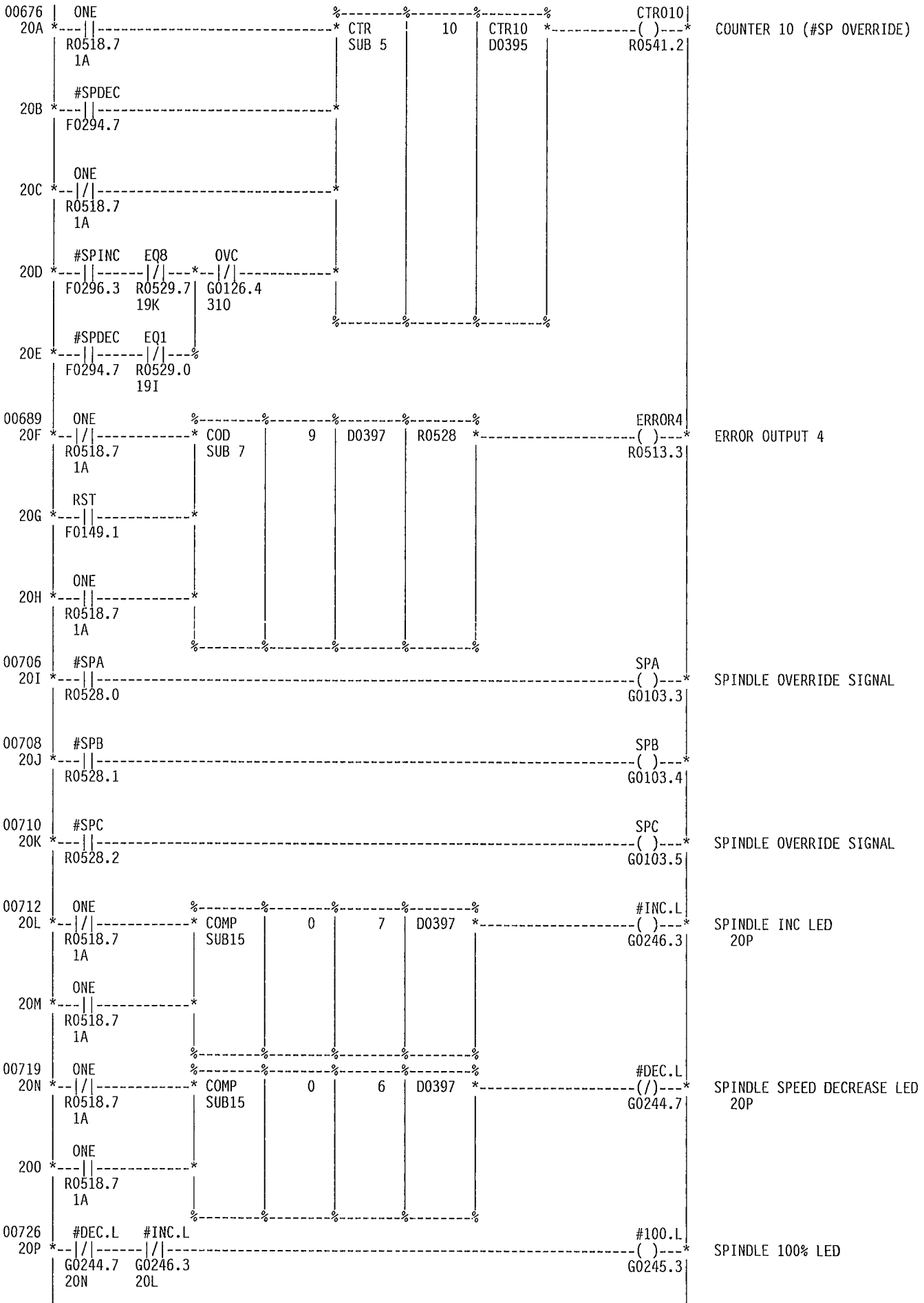


PROGRAM PROTECT SIGNAL

TAPE OPERATION BY TAPE
 4M 4N 5A 5C 5F
 5I 5K 5M 5O 6A
 6C 6E 19D 25J 44C

SPINDLE OVERRIDE =50%
 20E

SPINDLE OVERRIDE = 120%
 20D



00729	STL				#STL				
21A	*	----		----	()	----	*	STL LED	
	F0148.5				G0242.5				
00731	SPL				#SPL				
21B	*	----		----	()	----	*	SPL LED	
	F0148.4				G0242.6				
00733	MF	%	----	%	DM03				
21C	*	----	* DEC	F0151	311	----	*	SPINDLE CW	
	F0150.0				R0500.3			24D 28F 30A 41G 43E	
00737	MF	%	----	%	DM04				
21D	*	----	* DEC	F0151	411	----	*	SPINDLE CCW	
	F0150.0				R0500.4			24E 28J 30B 41I 43B	
00741	MF	%	----	%	DM05				
21E	*	----	* DEC	F0151	511	----	*	SPINDLE STOP	
	F0150.0				R0500.5	DEN	F0149.3	24F 29D	
00746	MF	%	----	%	DM06				
21F	*	----	* DEC	F0151	611	----	*	AUTO TOOL CHANGE	
	F0150.0				R0500.6			24G 29G 32N 44H	
00750	MF	%	----	%	DM08				
21G	*	----	* DEC	F0151	811	----	*	COOLANT 'A' ON	
	F0150.0				R0501.0			24J 30F	
00754	MF	%	----	%	DM09				
21H	*	----	* DEC	F0151	911	----	*	COOLANT OFF	
	F0150.0				R0501.1	DEN	F0149.3	24K 30F	
00759	MF	%	----	%	DM10				
21I	*	----	* DEC	F0151	1011	----	*	VICE OPEN	
	F0150.0				R0501.2			24L 38I 38P	
00763	MF	%	----	%	DM11				
21J	*	----	* DEC	F0151	1111	----	*	VICE CLOSE	
	F0150.0				R0501.3			24M 38J 39C	
00767	MF	%	----	%	DM13				
21K	*	----	* DEC	F0151	1311	----	*	SPINDLE CW & COOLANT ON	
	F0150.0				R0501.5			24N 28G 30C 30G 41H 43F	
00771	MF	%	----	%	DM14				
21L	*	----	* DEC	F0151	1411	----	*	SPINDLE CCW & COOLANT ON	
	F0150.0				R0501.6			24O 28K 30D 30H 41J	
00775	MF	%	----	%	DM15				
21M	*	----	* DEC	F0151	1511	----	*	DATA INPUT USING MINP	
	F0150.0				R0501.7			14F 18P 25A 43C	
00779	MF	%	----	%	DM19				
21N	*	----	* DEC	F0151	1911	----	*	SPINDLE ORIENTATE	
	F0150.0				R0502.3			24P 29C 37N	
00783	MF	%	----	%	DM20				
21O	*	----	* DEC	F0151	2011	----	*	MANUAL ARM IN	
	F0150.0				R0502.4			25B 34I	
00787	MF	%	----	%	DM21				
21P	*	----	* DEC	F0151	2111	----	*	MANUAL ARM OUT	
	F0150.0				R0502.5			25C 34H	

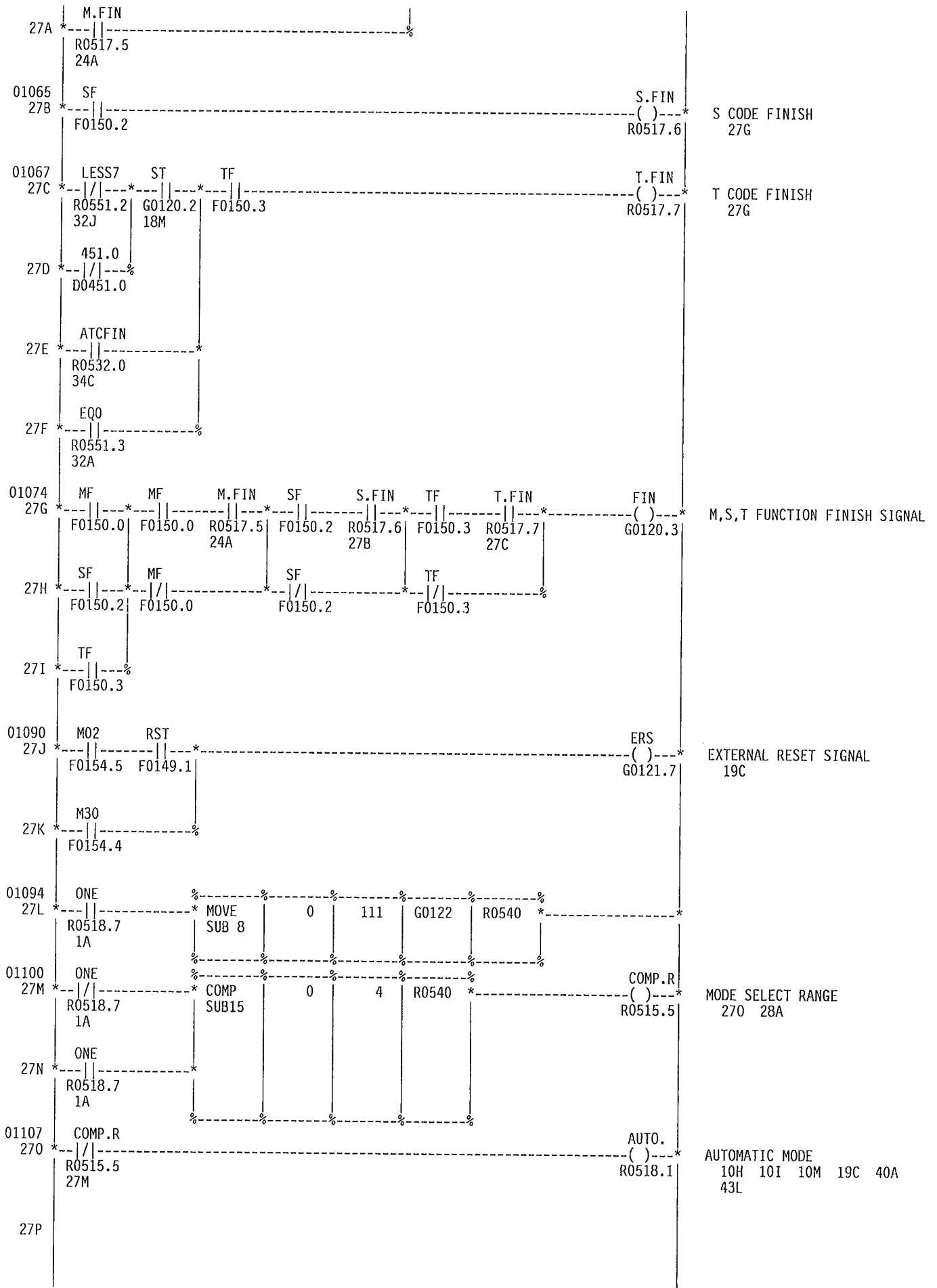
00791 22A	MF F0150.0	* DEC	F0151	2211	* DM22 () R0502.6	MANUAL ARM DOWN 25D 34L
00795 22B	MF F0150.0	* DEC	F0151	2311	* DM23 () R0502.7	MANUAL ARM UP 25E 34K
00799 22C	MF F0150.0	* DEC	F0151	2411	* DM24 () R0503.0	MANUAL DRAWBAR RELEASE 25F 36N
00803 22D	MF F0150.0	* DEC	F0151	2511	* DM25 () R0503.1	MANUAL DRAWBAR CLAMP 25G 36M
00807 22E	MF F0150.0	* DEC	F0151	2711	* DM27 () R0503.3	CAROUSEL COUNTERS = 0 25H 36G 36J
00811 22F	MF F0150.0	* DEC	F0151	2811	* DM28 () R0503.4	CAROUSEL POCKET RESET 20 3B 25I 35H
00815 22G	MF F0150.0	* DEC	F0151	2911	* DM29 () R0503.5	SELECT DNC MODE 19C 25J
00819 22H	MF F0150.0	* DEC	F0151	3111	* DM31 () R0503.6	INCREMENT PARTS COUNTER 25K
00823 22I	MF F0150.0	* DEC	F0151	4811	* DM48 () R0505.7	VERRIDE IS INEFFECTIVE 25L 31O
00827 22J	MF F0150.0	* DEC	F0151	4911	* DM49 () R0506.0	VERRIDE IS EFFECTIVE 25M 31P
00831 22K	MF F0150.0	* DEC	F0151	6211	* DM62 () R0507.6	AUX. 1 ON 25N 31A 43H
00835 22L	MF F0150.0	* DEC	F0151	6311	* DM63 () R0507.7	AUX. 2 ON 25O 31B
00839 22M	MF F0150.0	* DEC	F0151	6411	* DM64 () R0508.0	AUX. 1 OFF 25P 31A 43I
00843 22N	MF F0150.0	* DEC	F0151	6511	* DM65 () R0508.1	AUX. 2 OFF 26A 31D
00847 22O	MF F0150.0	* DEC	F0151	6611	* DM66 () R0508.2	WAIT FOR INPUT 1 26B 43J
00851 22P	MF F0150.0	* DEC	F0151	6711	* DM67 () R0508.3	WAIT FOR INPUT 2 26C

00855 23A	MF F0150.0	* DEC	F0151	6811	* DM68 () R0508.4	TOOL CHANGE WITH Z HOME 26D 32D
00859 23B	MF F0150.0	* DEC	F0151	6911	* DM69 () R0508.5	TOOL CHANGE WITH X Y & Z HOME 26E 32D
00863 23C	MF F0150.0	* DEC	F0151	7011	* DM70 () R0508.6	MIRROR IN X ON 26F 31H
00867 23D	MF F0150.0	* DEC	F0151	7111	* DM71 () R0508.7	MIRROR IN Y ON 26G 31J
00871 23E	MF F0150.0	* DEC	F0151	7311	* DM73 () R0509.1	MIRROR IN IV ON 26H 31L
00875 23F	MF F0150.0	* DEC	F0151	7611	* DM76 () R0509.4	WAIT FOR INPUT 1 TO GO LOW 26I
00879 23G	MF F0150.0	* DEC	F0151	7711	* DM77 () R0509.5	WAIT FOR INPUT 2 TO GO LOW 26J
00883 23H	MF F0150.0	* DEC	F0151	8011	* DM80 () R0510.0	MIRROR IN X OFF 26K 31G
00887 23I	MF F0150.0	* DEC	F0151	8111	* DM81 () R0510.1	MIRROR IN Y OFF 26L 31I
00891 23J	MF F0150.0	* DEC	F0151	8311	* DM83 () R0510.3	MIRROR IN IV OFF 26M 31K
00895 23K	MF F0150.0	* DEC	F0151	8411	* DM84 () R0510.4	FORCE INDEX CW 26N 32F 32H
00899 23L	MF F0150.0	* DEC	F0151	8511	* DM85 () R0510.5	FORCE INDEX CCW 26O 32F 32H
00903 23M	MF F0150.0	* DEC	F0151	8611	* DM86 () R0510.6	FORCE INDEX SHORTEST PATH 26P 32F 32H
00907 23N	#PGSTP F0292.7	#ST F0292.5	RST F0149.1		* PRSTP () R0510.7	PROGRAM STOP 140 230
230	PRSTP R0510.7 23N				* #PGSPL () G0242.7	PROGRAM STOP LED
23P						

00913	M00	ST	MF	M.FIN	
24A	F0154.7	G0120.2 18M	F0150.0	()	M CODE FINISH 27A 27G
24B	ST	M01			
	G0120.2 18M	F0154.6			
24C	#OPSPL				
	G0244.2 15K				
24D	DM03	SPREV	#SSTPL	SUTS	
	R0500.3 21C	Y0080.2 28M	G0245.5 280	R0550.1 30A	
24E	DM04	SPREV			
	R0500.4 21D	Y0080.2 28M			
24F	DM05	SPRUN			
	R0500.5 21E	Y0080.1 4A			
24G	ST	451.0	DM06		
	G0120.2 18M	D0451.0	R0500.6 21F		
24H	ATCFIN				
	R0532.0 34C				
24I	452.4				
	D0452.4				
24J	DM08	M08LH			
	R0501.0 21G	R0551.5 30F			
24K	DM09	M08LH			
	R0501.1 21H	R0551.5 30F			
24L	DM10	VIOPR			
	R0501.2 21I	Y0080.4 39H			
24M	DM11	VICLR			
	R0501.3 21J	Y0080.5 39I			
24N	DM13	SPREV	#SSTPL	M08LH	SUTS
	R0501.5 21K	Y0080.2 28M	G0245.5 280	R0551.5 30F	R0550.1 30A
24O	DM14	SPREV			
	R0501.6 21L	Y0080.2 28M			
24P	SPISOR	DM19			
	R0546.7 3L	R0502.3 21N			

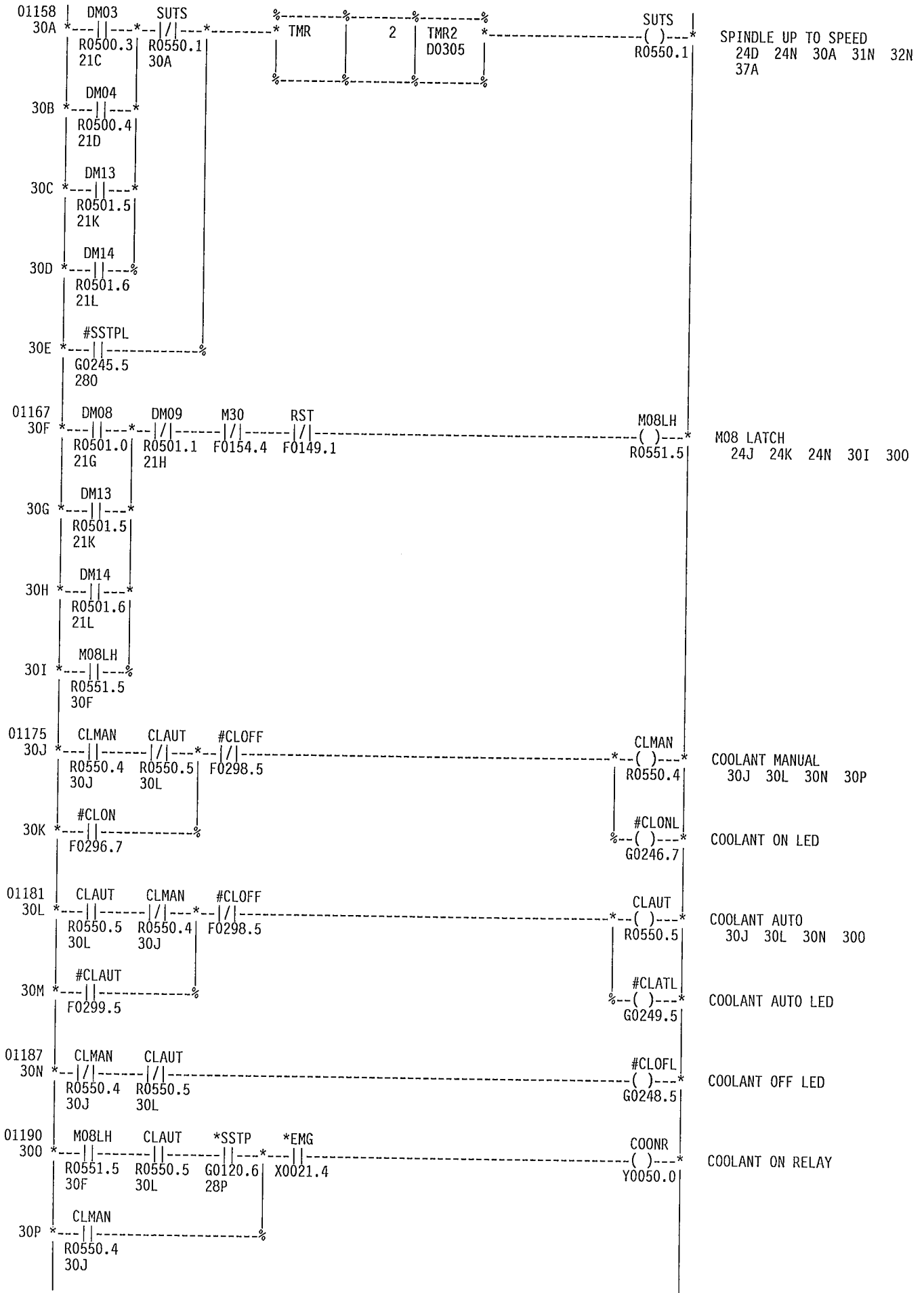
25A	DM15	*SP	MP1/MI
	R0501.7	G0121.5	G0120.0
	21M	18P	14A
25B	DM20	CAINLS	
	R0502.4	X0006.4	
	210		
25C	DM21	CAOULS	
	R0502.5	X0000.6	
	21P		
25D	DM22	CADOLS	
	R0502.6	X0006.0	
	22A		
25E	DM23	CAUPLS	
	R0502.7	X0002.6	
	22B		
25F	DM24	DBISUC	
	R0503.0	R0553.5	
	22C	37G	
25G	DM25	DBISCL	
	R0503.1	R0554.0	
	22D	37I	
25H	DM27		
	R0503.3		
	22E		
25I	DM28	POCKOK	
	R0503.4	R0551.6	
	22F	2M	
25J	DM29	DNCI	#AUTOL
	R0503.5	G0127.5	G0242.0
	22G	19C	4K
25K	DM31		
	R0503.6		
	22H		
25L	DM48	OVC	
	R0505.7	G0126.4	
	22I	310	
25M	DM49	OVC	
	R0506.0	G0126.4	
	22J	310	
25N	DM62	OUT.1	450.7
	R0507.6	Y0052.6	D0450.7
	22K	31A	
25O	DM63	OUT.2	
	R0507.7	Y0048.2	
	22L	31D	
25P	DM64	OUT.1	450.7
	R0508.0	Y0052.6	D0450.7
	22M	31A	

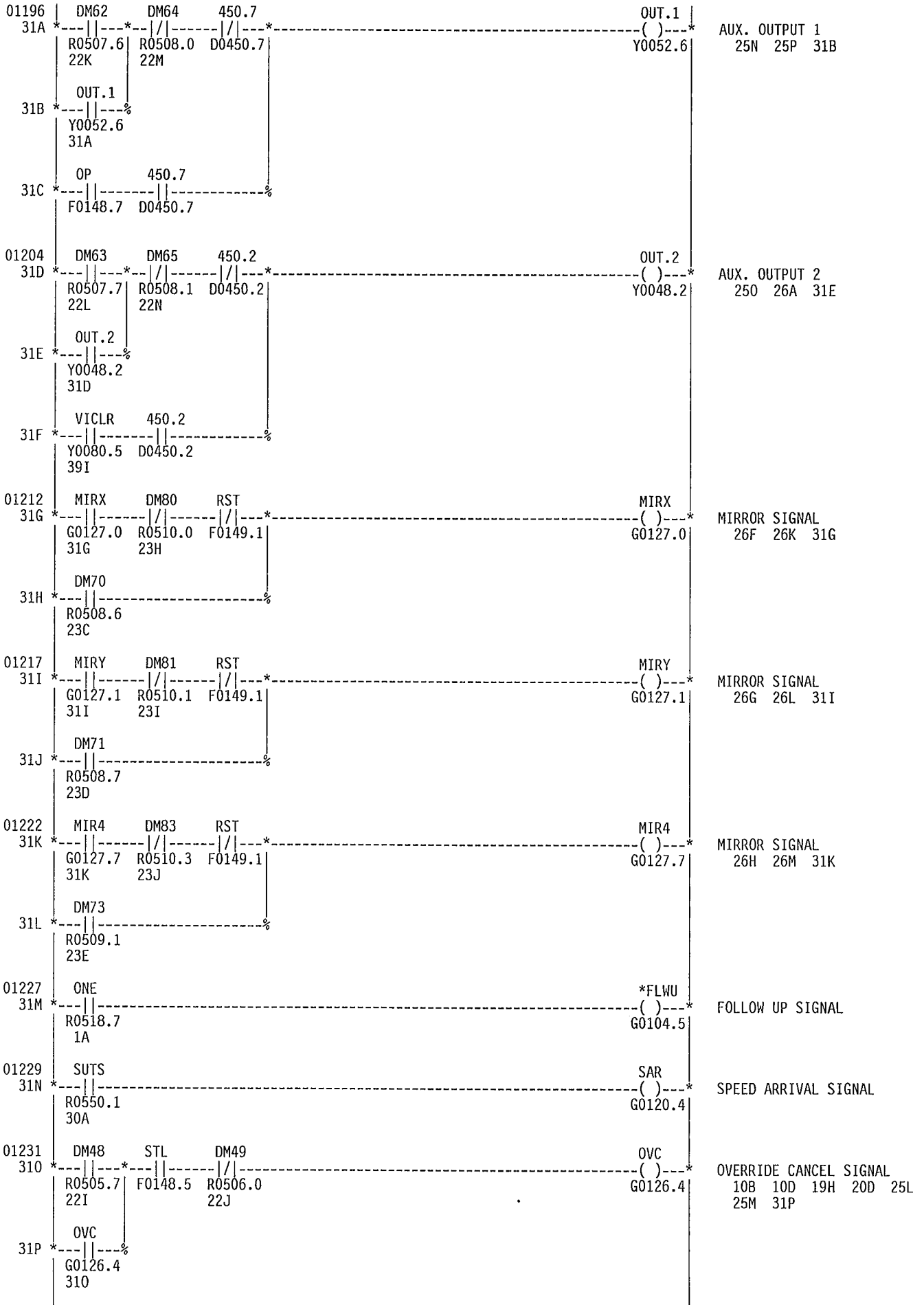
26A	DM65	OUT.2		
	R0508.1	Y0048.2		
	22N	31D		
26B	DM66	IN.1	450.7	
	R0508.2	X0002.2	D0450.7	
	22O			
26C	DM67	IN.2		
	R0508.3	X0006.2		
	22P			
26D	DM68	INATHO		
	R0508.4	D0460.2		
	23A	32D		
26E	DM69	INATHO		
	R0508.5	D0460.2		
	23B	32D		
26F	DM70	MIRX		
	R0508.6	G0127.0		
	23C	31G		
26G	DM71	MIRY		
	R0508.7	G0127.1		
	23D	31I		
26H	DM73	MIR4		
	R0509.1	G0127.7		
	23E	31K		
26I	DM76	IN.1	450.7	
	R0509.4	X0002.2	D0450.7	
	23F			
26J	DM77	IN.2		
	R0509.5	X0006.2		
	23G			
26K	DM80	MIRX		
	R0510.0	G0127.0		
	23H	31G		
26L	DM81	MIRY		
	R0510.1	G0127.1		
	23I	31I		
26M	DM83	MIR4		
	R0510.3	G0127.7		
	23J	31K		
26N	DM84	FOICW	451.0	
	R0510.4	R0544.0	D0451.0	
	23K	32F		
26O	DM85	FOICCW		
	R0510.5	R0544.1		
	23L	32H		
26P	DM86	FOICW	FOICCW	
	R0510.6	R0544.0	R0544.1	
	23M	32F	32H	

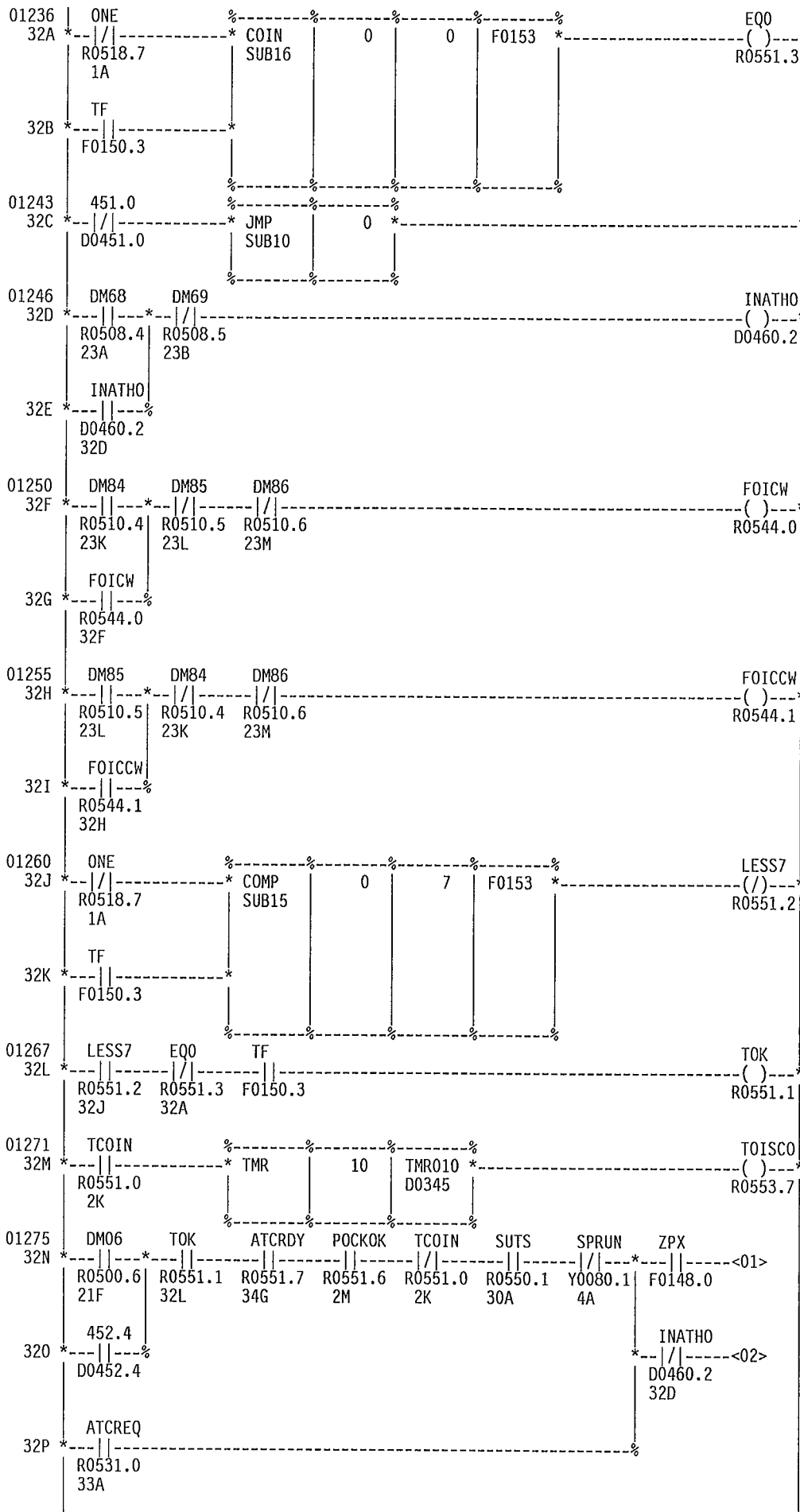


01109	COMP.R	MAN.	
28A	*-- ---* R0515.5 27M	()---* R0518.0	MANUAL MODE 3F 3H 14A 37A 40C 43A 43D 44A
28B	*-- ---* RT G0121.6 7F		
28C	*-- ---% ZRN G0120.7 5L		
01113	451.4	GUISOP	
28D	*-- --- --- --- --- ---* D0451.4 X0008.6	()---* R0519.4	GUARD IS OPEN 29L 40A
01116	#MSCW STL SSTP SPREFL	SPFOFL	
28E	*-- --- --- --- --- ---* F0293.7 F0148.5 R0550.3 R0550.6	()---* R0550.0	SPINDLE FORWARD FLAG 4D 28H 28I 28M 43A
28F	*-- ---* DM03 R0500.3 21C	#CWL %--()---* G0243.7	SPINDLE CW LED
28G	*-- ---* DM13 R0501.5 21K		
28H	*-- ---% SPFOFL R0550.0 28E		
01125	#MSCCW STL SPFOFL SSTP	SPREFL	
28I	*-- --- --- --- --- ---* F0295.6 F0148.5 R0550.0 R0550.3	()---* R0550.6	SPINDLE REVERSE FLAG 4C 28E 28L 28M
28J	*-- ---* DM04 R0500.4 21D	#CCW.L %--()---* G0245.6	SPINDLE CCW LED
28K	*-- ---* DM14 R0501.6 21L		
28L	*-- ---% SPREFL R0550.6 28I		
01134	SPREFL SPFOFL SPORRE	SPREV	
28M	*-- --- --- --- --- ---* R0550.6 R0550.0 R0546.0	()---* Y0080.2	SPINDLE REVERSE OUTPUT 24D 24E 24N 24O 28N 43D
28N	*-- ---% SPREV Y0080.2 28M		
01139	SPRUN	#SSTPL	
28O	*-- --- --- --- --- ---* Y0080.1 4A	()---* G0245.5	SPINDLE STOP LED 24D 24N 30E 38H
28P		*SSTP %--(/)---* G0120.6	SPINDLE STOP SIGNAL 300

01142	#MSSTP	STL			SSTP	
29A	F0295.5	F0148.5			()	SPINDLE STOP FLAG
					R0550.3	28E 28I
	ATCRDY	451.0				
29B	R0551.7	D0451.0				
	34G					
	DM19					
29C	R0502.3					
	21N					
	DM05					
29D	R0500.5					
	21E					
	M00					
29E	F0154.7					
	M02					
29F	F0154.5					
	DM06					
29G	R0500.6					
	21F					
	M30					
29H	F0154.4					
	*EMG					
29I	X0021.4					
	RST					
29J	F0149.1					
	AL					
29K	F0149.0					
	GUISOP					
29L	R0519.4					
	28D					
29M						
29N						
29O						
29P						







TOOL NUMBER = 0
27F 32L

INDEX AT HOME MARKER
26D 26E 32E 32O 33B
42F

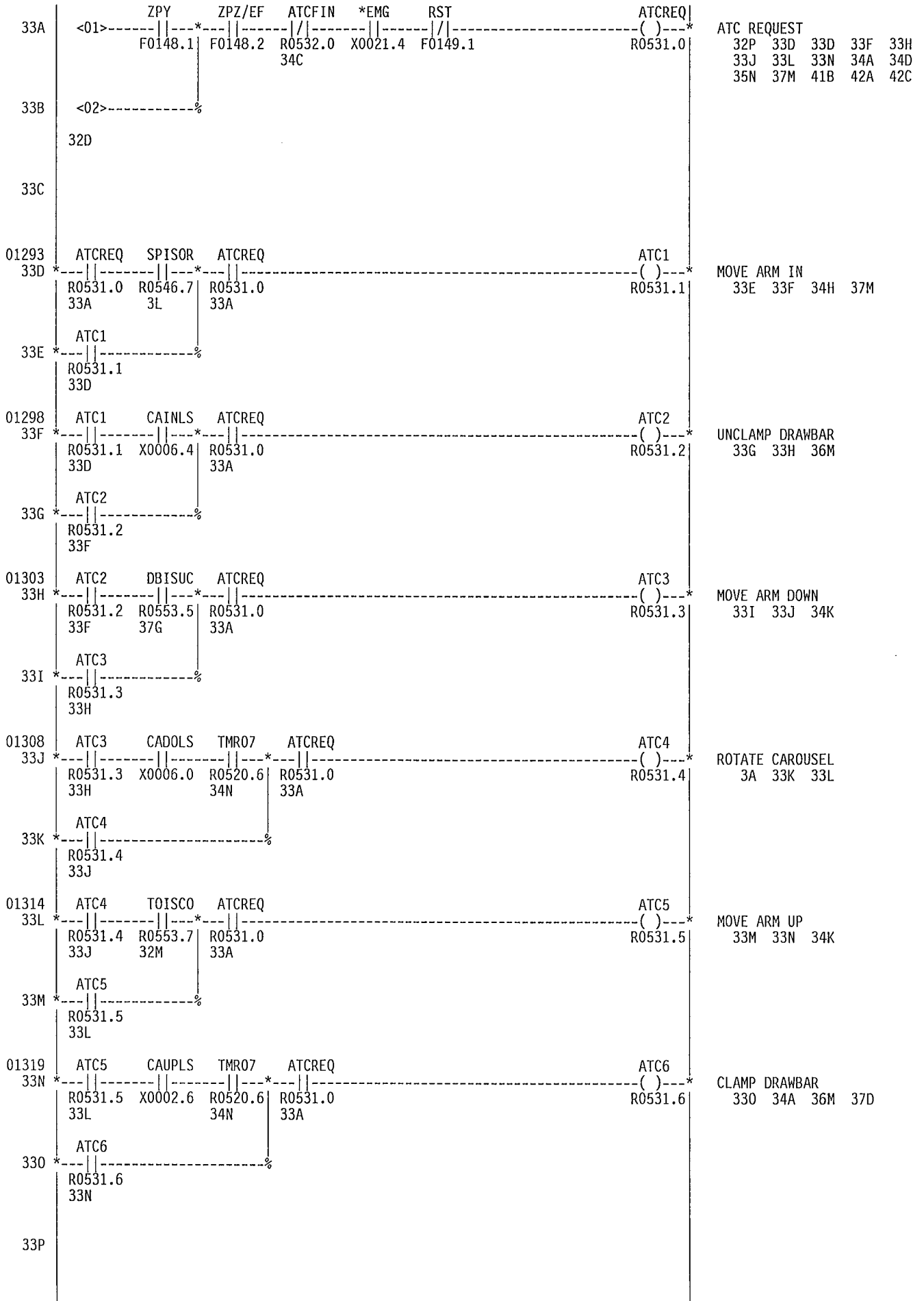
FORCE INDEX CW
26N 26P 32G 36E

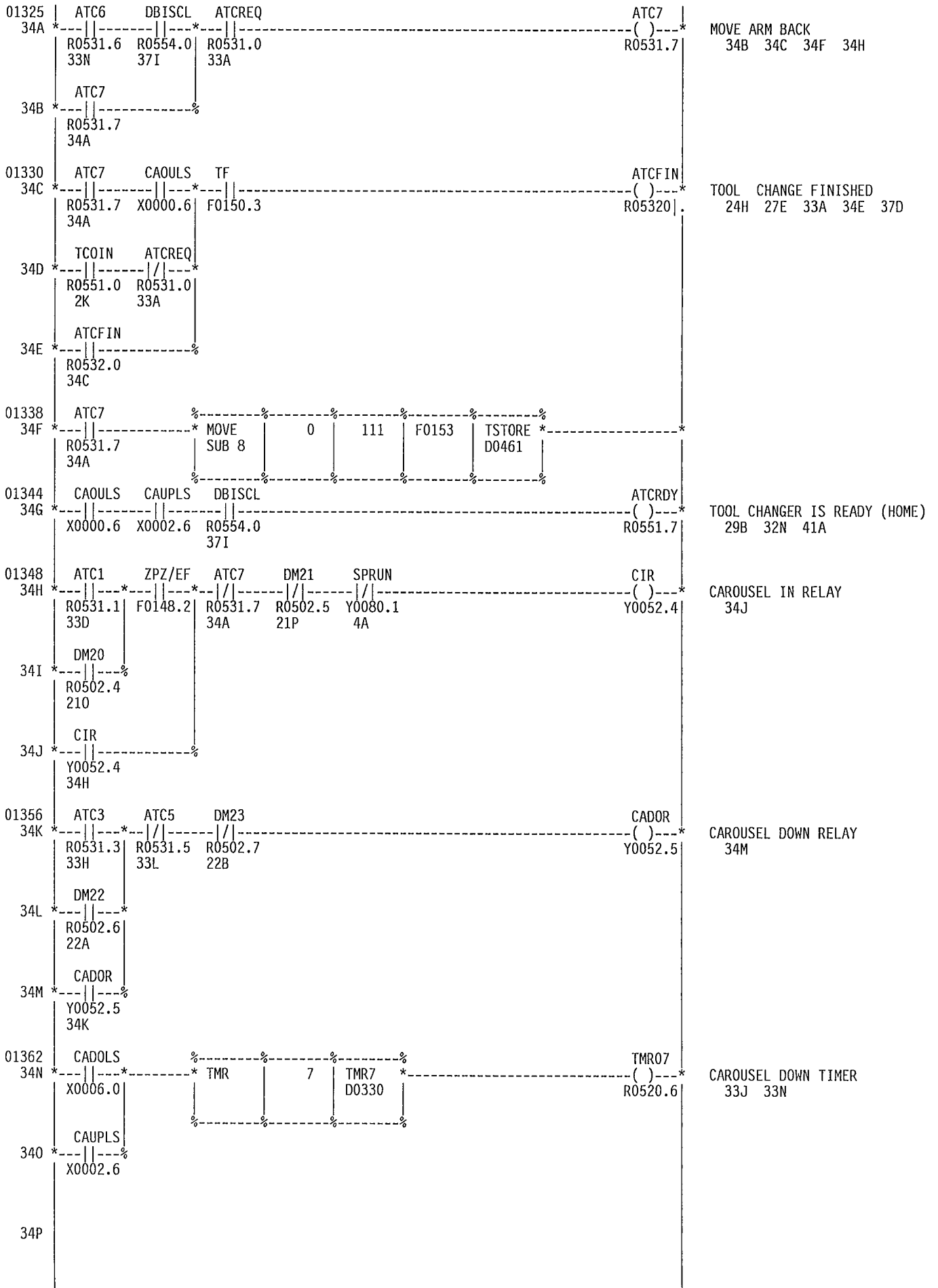
FORCE INDEX CCW
26O 26P 32I 36A

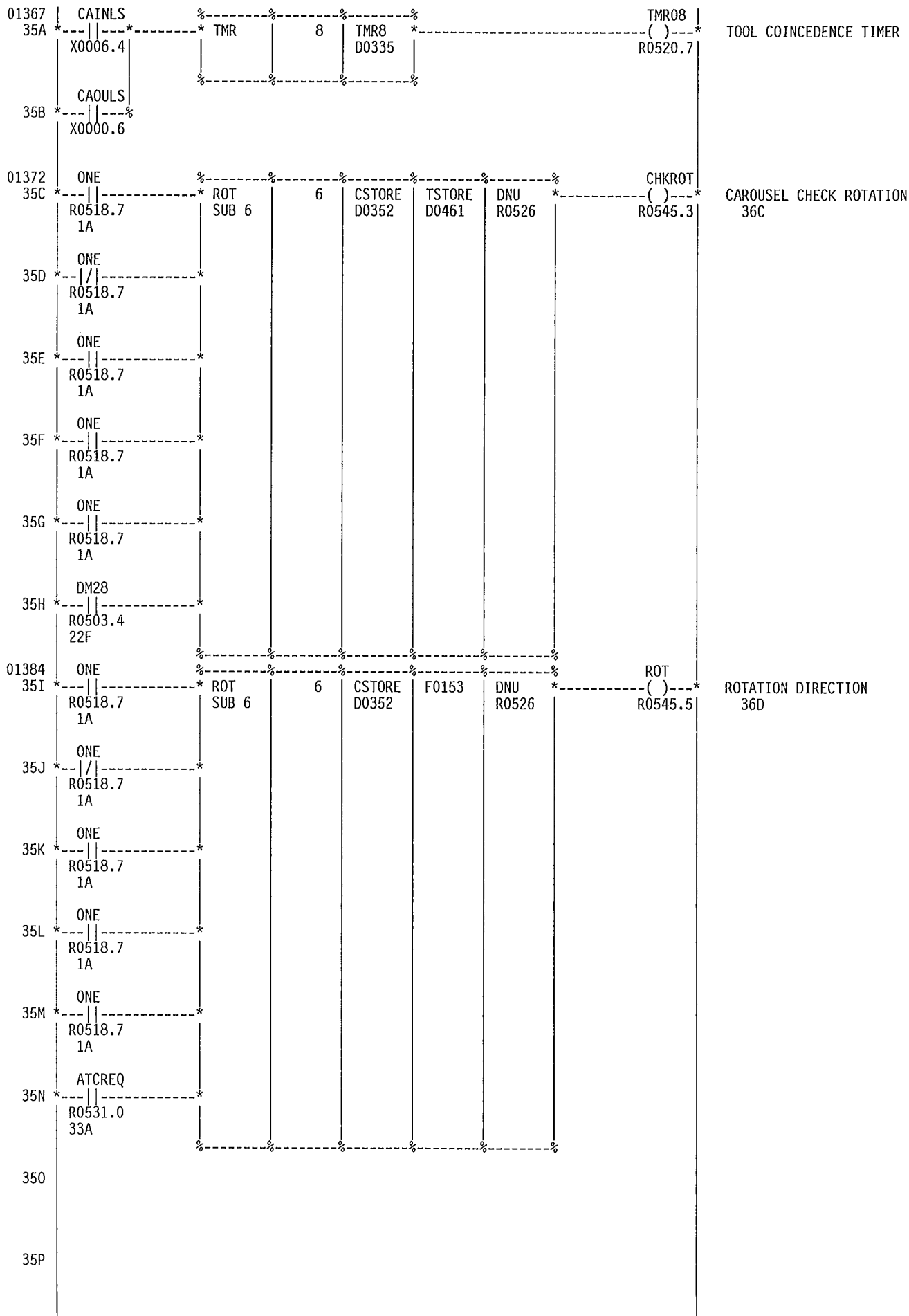
TOOL NUMBER < 7
27C 32L

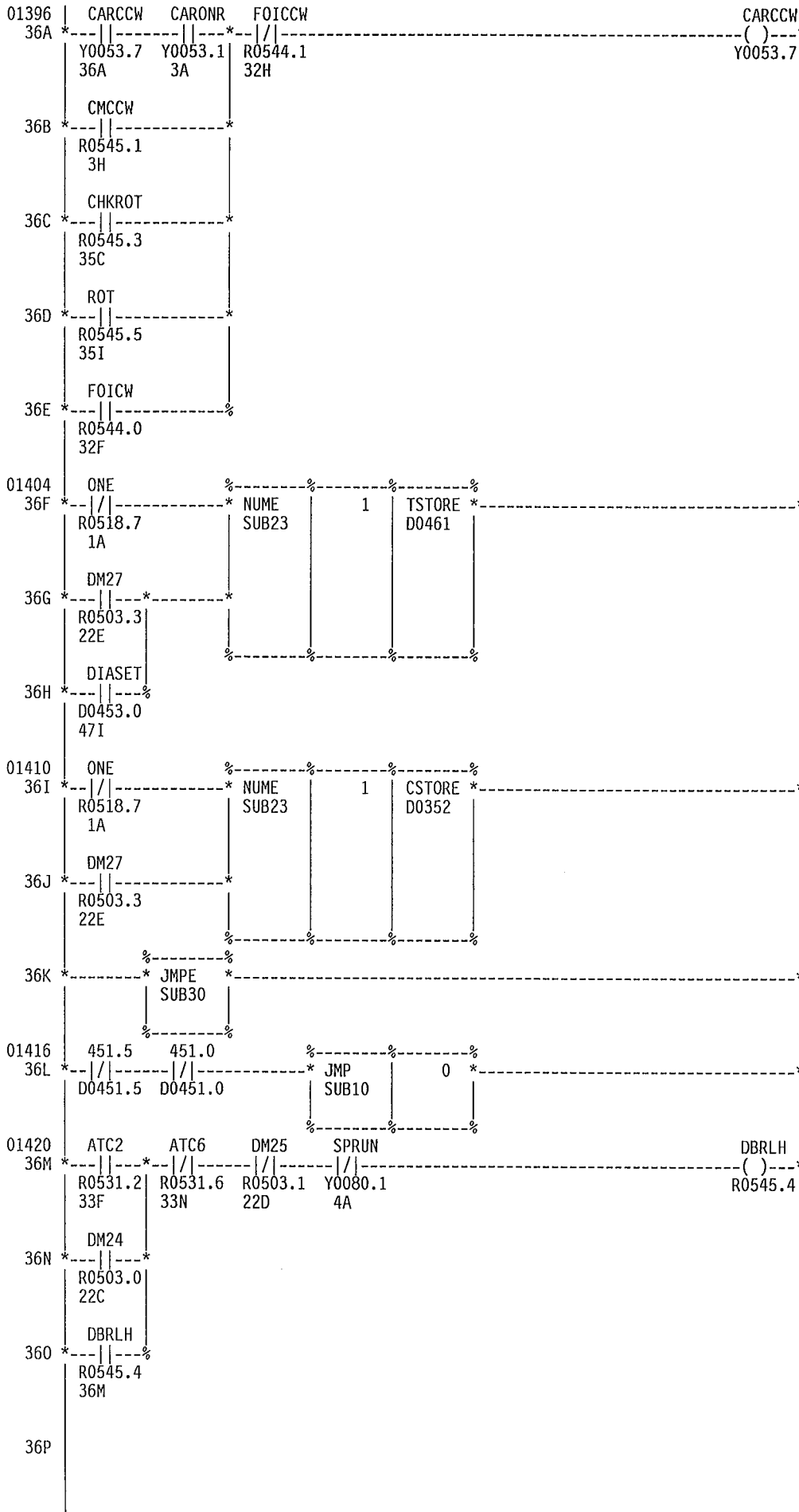
TOOL NUMBER IS OK
32N 41B 42A 42F 44H

TOOL IS COINCEDENCE
33L



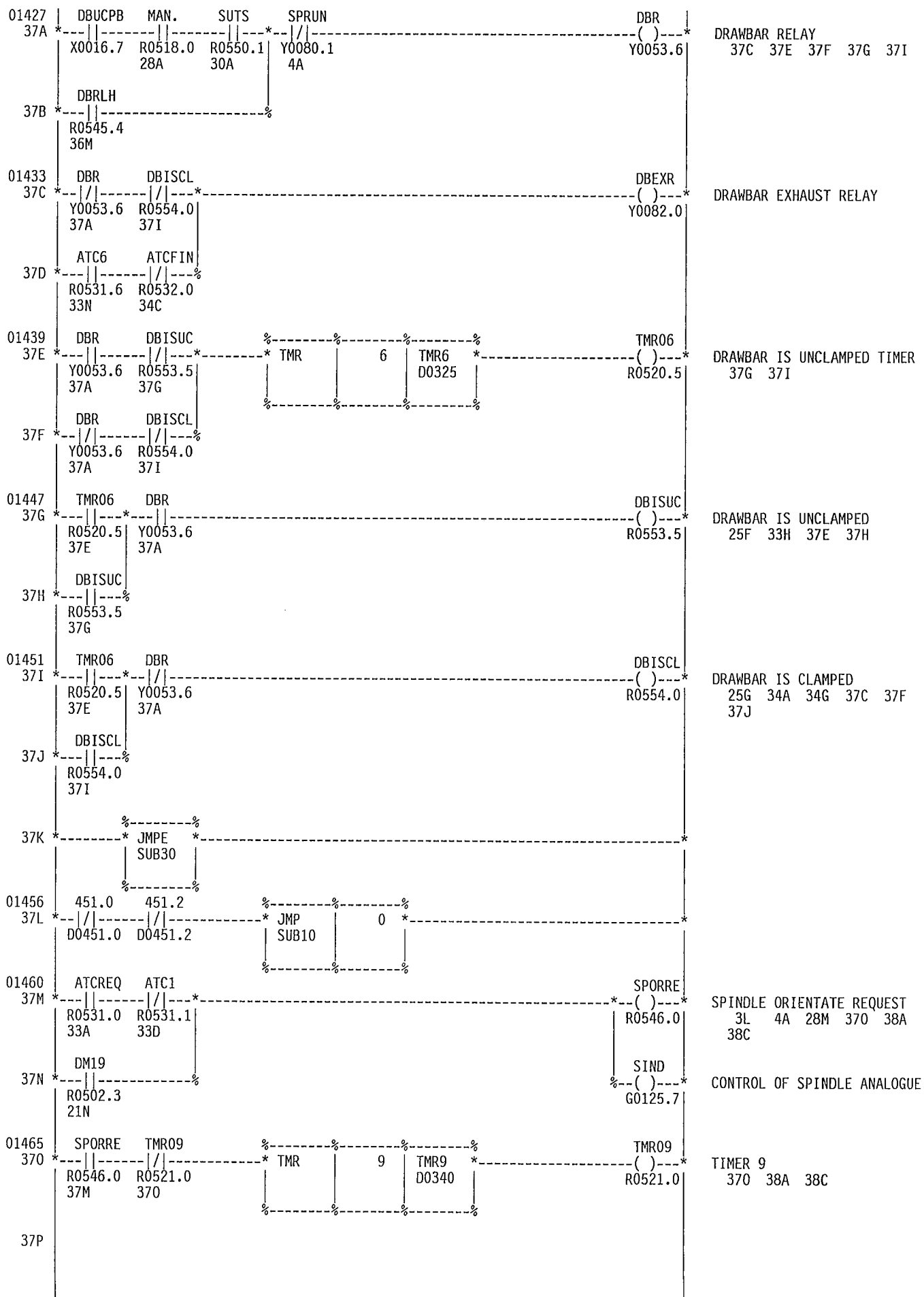


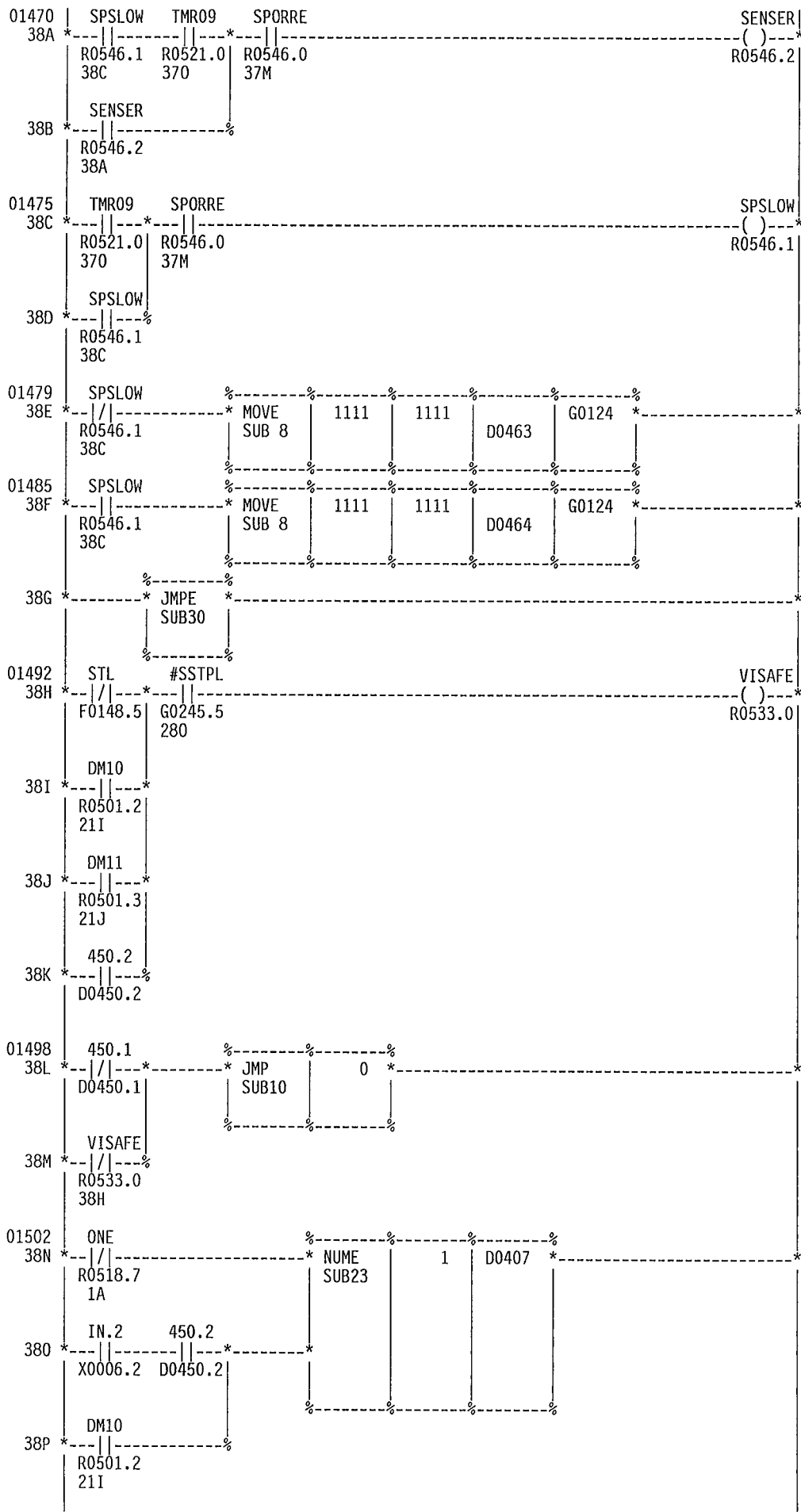




CAROUSEL CCW RELAY
2H 3D 36A

DRAWBAR LATCH
36O 37B

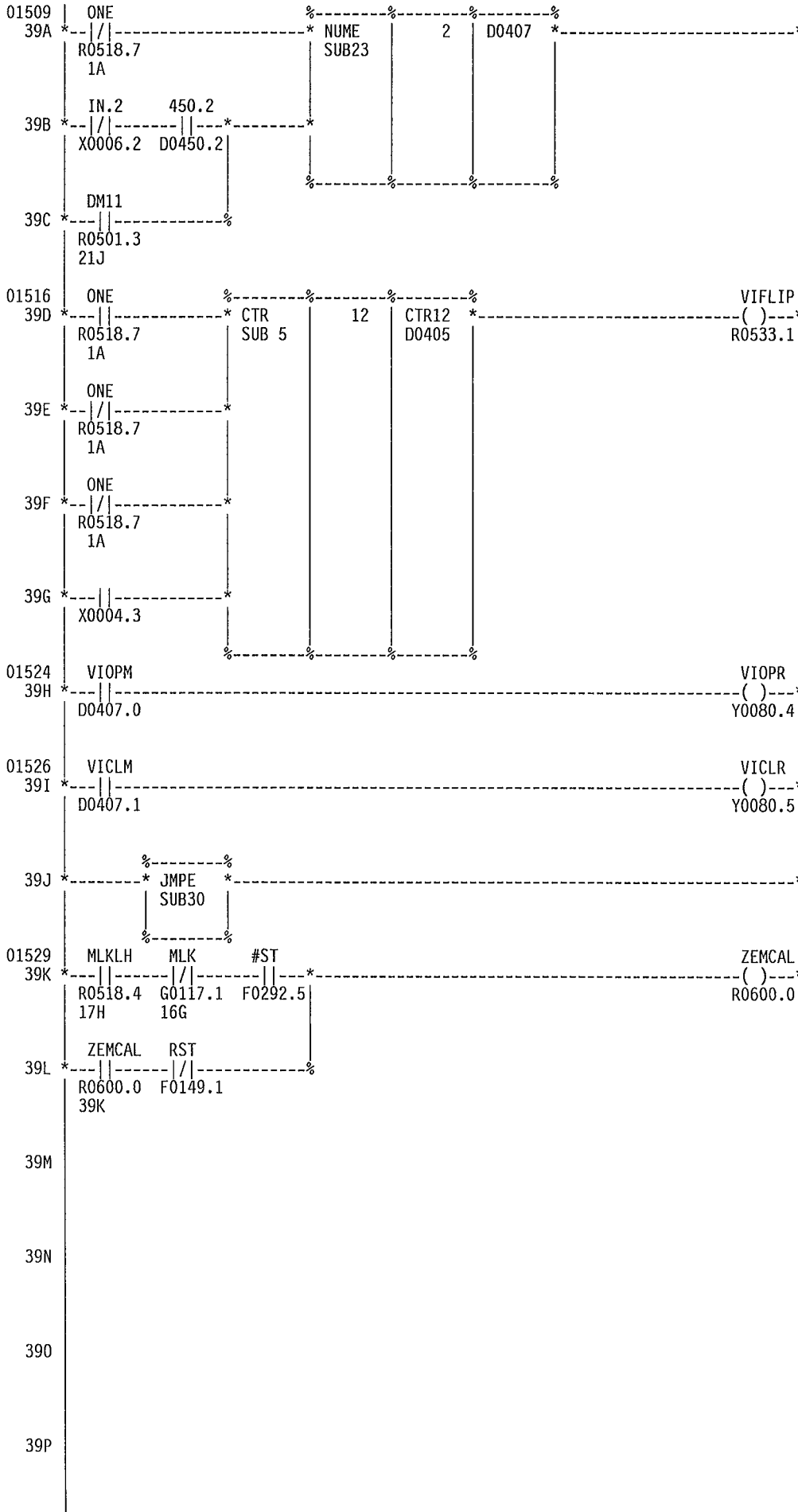




SENSOR SEARCH SIGNAL
3L 38B

SPINDLE ORIENTATE SLOW
38A 38D 38E 38F

SAFE TO OPERATE VICE
38M

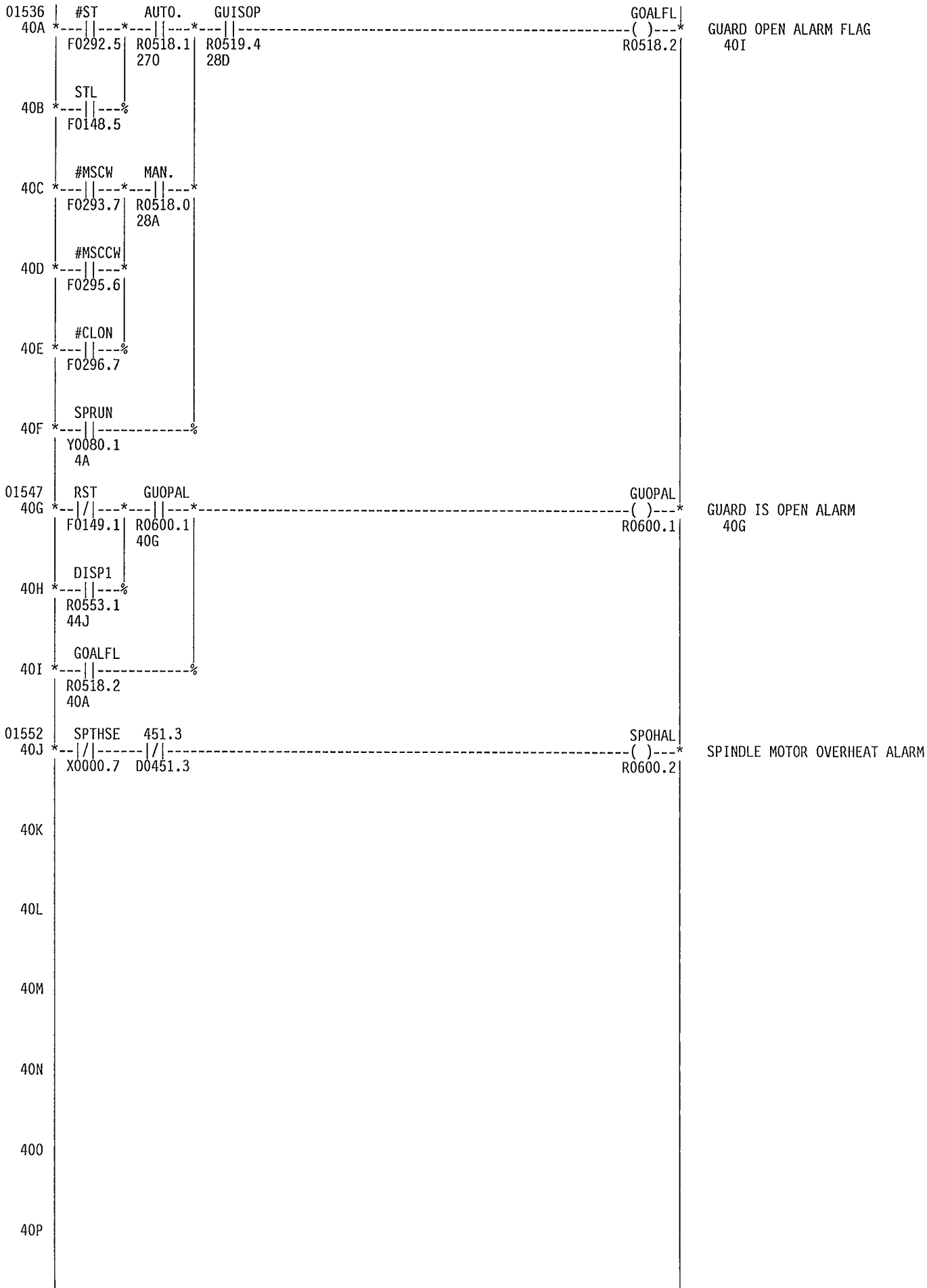


VICE FOOT SWITCH FLIP FLOP

VICE OPEN RELAY
24L

VICE CLOSE RELAY
24M 31F

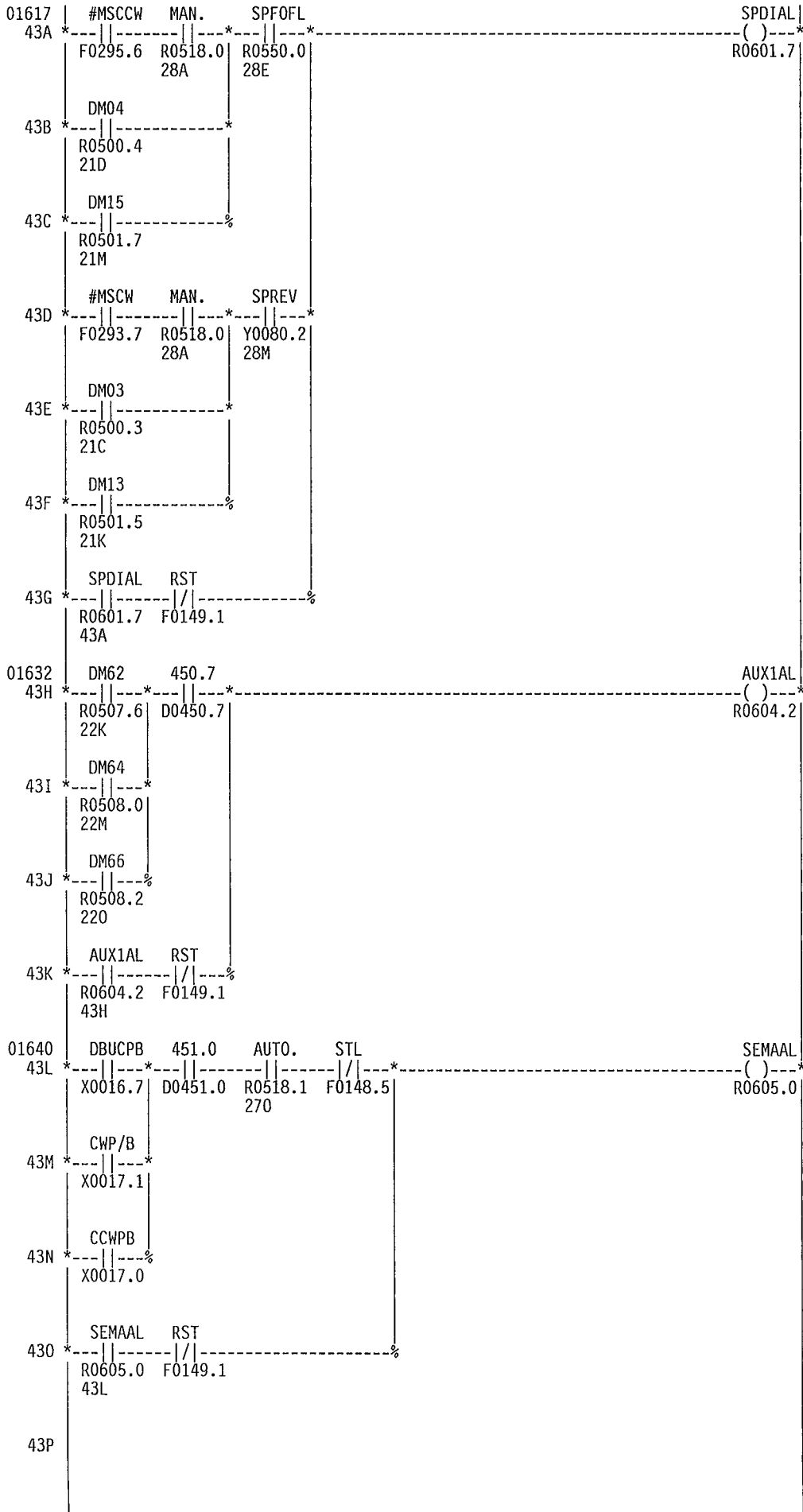
ZERO MACHINE ALARM
39L



01555	#ST	#MDIL	ATCRDY	451.0	TCNRAL	
41A	*-- / ----- / -----*	*-- / ----- / -----*	*-- / ----- / -----*	*-- / ----- / -----*	()----	TOOL CHANGER NOT READY ALARM
	F0292.5	G0244.0	R0551.7	D0451.0	R0600.3	41K
		5F	34G			
	TOK	ATCREQ				
41B	*-- / ----- / -----*	*-- / ----- / -----*				
	R0551.1	R0531.0				
	32L	33A				
	#+Z					
41C	*-- / ----- / -----*					
	F0297.3					
	#-Z					
41D	*-- / ----- / -----*					
	F0299.3					
	#MSCW					
41E	*-- / ----- / -----*					
	F0293.7					
	#MSCCW					
41F	*-- / ----- / -----*					
	F0295.6					
	DM03					
41G	*-- / ----- / -----*					
	R0500.3					
	21C					
	DM13					
41H	*-- / ----- / -----*					
	R0501.5					
	21K					
	DM04					
41I	*-- / ----- / -----*					
	R0500.4					
	21D					
	DM14					
41J	*-- / ----- / -----*					
	R0501.6					
	21L					
	TCNRAL	RST				
41K	*-- / ----- / -----*	*-- / ----- / -----*				
	R0600.3	F0149.1				
	41A					
01574	450.6	DVTXTH			TXTHAL	
41L	*-- / ----- / -----*	*-- / ----- / -----*			()----	DRIVE TRANSFORMER THERMAL ALA
	D0450.6	X0004.0			R0600.4	1I 41M
	TXTHAL	RST				
41M	*-- / ----- / -----*	*-- / ----- / -----*				
	R0600.4	F0149.1				
	41L					
01580	LUFLSW	452.1	NOLUBE		LOLUMS	
41N	*-- / ----- / -----*	*-- / ----- / -----*	*-- / ----- / -----*		()----	LOW LUBE MESSAGE
	X0002.0	D0452.1	D0452.0		R0600.5	18M
	LUFLSW	452.1				
41O	*-- / ----- / -----*	*-- / ----- / -----*				
	X0002.0	D0452.1				
41P						

01587 42A	TOK R0551.1 32L	POCKOK R0551.6 2M	ATCREQ R0531.0 33A	CACOAL () R0600.6	CAROUSEL CONFLICT ALARM 42B
42B	CACOAL R0600.6 42A	RST F0149.1			
01594 42C	ATCREQ R0531.0 33A	TMRB SUB24	3 30000	TMR3 D0310	TCFAAL () R0600.7
01600 42D	SPDVAL R0601.0 42D	RST F0149.1			SPDVAL () R0601.0
42E	SPALM X0000.5				
01604 42F	ZPX F0148.0	INATHO D0460.2 32D	TOK R0551.1 32L	451.0 D0451.0	INAHAL () R0601.1
42G	ZPY F0148.1				
42H	ZPZ/EF F0148.2				
42I	INAHAL R0601.1 42F	RST F0149.1			
01614 42J	AIRPS X0004.5	452.5 D0452.5			LOAPMS () R0601.2
42K					
42L					
42M					
42N					
42O					
42P					

LOW AIR PRESSURE MESSAGE
18P



SPINDLE DIRECTION ALARM
43G

AUX.1 USED FOR FMS ALARM
43K

SELECT MANUAL ALARM
43O

01650	#ST	MAN.					SEAUAL	
44A	*							
	F0292.5	R0518.0					R0605.1	
		28A						
44B	SEAUAL	RST						
	R0605.1	F0149.1						
	44A							
01656	DNCI						DNCIMS	
44C	*							
	G0127.5						R0605.3	
	19C							
01658	RST	#ST	PARTMS				PARTMS	
44D	*							
	F0149.1	F0292.5	R0605.4				R0605.4	
			44D					
44E	DISP2							
	R0553.2							
	44K							
44F	PRTSF							
	F0164.7							
01664	BAL						BATTMS	
44G	*							
	F0149.2						R0605.5	
01666	TOK	DM06	452.4				NOM6AL	
44H	*							
	R0551.1	R0500.6	D0452.4				R0605.6	
	32L	21F						
44I	NOM6AL	RST						
	R0605.6	F0149.1						
	44H							
01673	TMR01	DISP3					DISP1	
44J	*							
	R0520.0	R0553.3	DISP	272	17	R0600	R0553.1	
	4J	440	SUB49					
01952	TMR01	DISP3					DISP2	
44K	*							
	R0520.0	R0553.3	DISP	255	17	R0604	R0553.2	
	4J	440	SUB49					
02214	#INFO	#EDITL	RST				STUPMS	
44L	*							
	F0293.3	G0243.0	F0149.1				R0608.0	
		5A						
44M	TMR01							
	R0520.0							
	4J							
44N	STUPMS							
	R0608.0							
	44L							
02220	ONE						DISP3	
440	*							
	R0518.7		DISP	101	100	R0608	R0553.3	
	1A		SUB49					
02327	DIASET							
44P	*							
	D0453.0		JMP	0	*			
	47I		SUB10					

SELECT AUTO ALARM
44B

DNC MODE SELECTED MESSAGE

PARTS COUNTER REACHED PRESET
44D

REPLACE BATTERY MESSAGE

NO M06 PROGRAMMED ALARM
44I

DISPLAY INSTRUCTION 1
40H

DISPLAY INSTRUCTION 2
44E

START UP MESSAGE DISPLAYED
44N

DISPLAY INSTRUCTION START UP
44J 44K

02330	ONE	%-----%	%-----%	%-----%	%-----%
45A	*-- / -----*	NUME	40	TMR2	*-----*
	R0518.7	SUB23		D0305	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45B	*-- / -----*				
	R0518.7				
	1A				
02335	ONE	%-----%	%-----%	%-----%	%-----%
45C	*-- / -----*	NUME	10	TMR6	*-----*
	R0518.7	SUB23		D0325	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45D	*-- / -----*				
	R0518.7				
	1A				
02340	ONE	%-----%	%-----%	%-----%	%-----%
45E	*-- / -----*	NUME	6	TMR7	*-----*
	R0518.7	SUB23		D0330	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45F	*-- / -----*				
	R0518.7				
	1A				
02345	ONE	%-----%	%-----%	%-----%	%-----%
45G	*-- / -----*	NUME	6	TMR8	*-----*
	R0518.7	SUB23		D0335	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45H	*-- / -----*				
	R0518.7				
	1A				
02350	ONE	%-----%	%-----%	%-----%	%-----%
45I	*-- / -----*	NUME	30	TMR9	*-----*
	R0518.7	SUB23		D0340	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45J	*-- / -----*				
	R0518.7				
	1A				
02355	ONE	%-----%	%-----%	%-----%	%-----%
45K	*-- / -----*	NUME	6	TMR010	*-----*
	R0518.7	SUB23		D0345	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45L	*-- / -----*				
	R0518.7				
	1A				
02360	ONE	%-----%	%-----%	%-----%	%-----%
45M	*-- / -----*	NUME	6	CTR1	*-----*
	R0518.7	SUB23		D0350	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45N	*-- / -----*				
	R0518.7				
	1A				
02365	ONE	%-----%	%-----%	%-----%	%-----%
45O	*-- / -----*	NUME	1	CTR2	*-----*
	R0518.7	SUB23		D0355	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
45P	*-- / -----*				
	R0518.7				
	1A				
		%-----%	%-----%	%-----%	%-----%

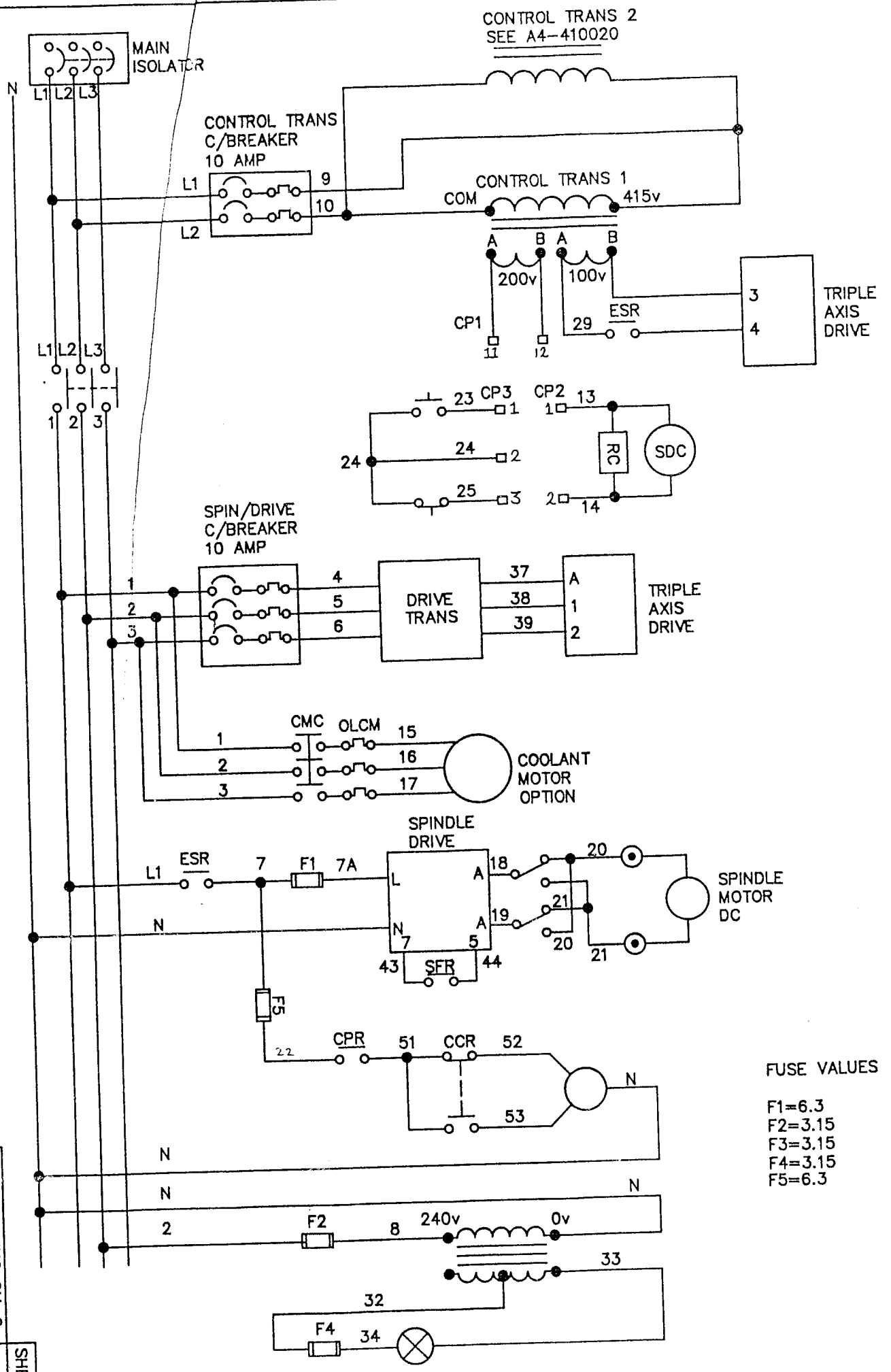
02370	ONE	%	%	%	%
46A	R0518.7 1A	NUME SUB23	1	CTR3 D0360	*
46B	ONE R0518.7 1A	*			*
02375	ONE	%	%	%	%
46C	R0518.7 1A	NUME SUB23	1	CTR4 D0365	*
46D	ONE R0518.7 1A	*			*
02380	ONE	%	%	%	%
46E	R0518.7 1A	NUME SUB23	1	CTR5 D0370	*
46F	ONE R0518.7 1A	*			*
02385	ONE	%	%	%	%
46G	R0518.7 1A	NUME SUB23	1	CTR6 D0375	*
46H	ONE R0518.7 1A	*			*
02390	ONE	%	%	%	%
46I	R0518.7 1A	NUME SUB23	1	CTR7 D0380	*
46J	ONE R0518.7 1A	*			*
02395	ONE	%	%	%	%
46K	R0518.7 1A	NUME SUB23	1	CTR8 D0385	*
46L	ONE R0518.7 1A	*			*
02400	ONE	%	%	%	%
46M	R0518.7 1A	NUME SUB23	1	CTR9 D0390	*
46N	ONE R0518.7 1A	*			*
02405	ONE	%	%	%	%
46O	R0518.7 1A	NUME SUB23	9	CTR10 D0395	*
46P	ONE R0518.7 1A	*			*

02410	ONE	%-----%	%-----%	%-----%	%-----%
47A	*-- / -----*	* NUME	1	CTR11	*-----*
	R0518.7	SUB23		D0400	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
47B	*-- / -----*				
	R0518.7				
	1A				
02415	ONE	%-----%	%-----%	%-----%	%-----%
47C	*-- / -----*	* NUME	2	CTR12	*-----*
	R0518.7	SUB23		D0405	
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
47D	*-- / -----*				
	R0518.7				
	1A				
02420	ONE	%-----%	%-----%	%-----%	%-----%
47E	*-- / -----*	* NUME	80	D0463	*-----*
	R0518.7	SUB23			
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
47F	*-- / -----*				
	R0518.7				
	1A				
02425	ONE	%-----%	%-----%	%-----%	%-----%
47G	*-- / -----*	* NUME	40	D0464	*-----*
	R0518.7	SUB23			
	1A				
	ONE	%-----%	%-----%	%-----%	%-----%
47H	*-- / -----*				
	R0518.7				
	1A				
02430	ONE	%-----%	%-----%	%-----%	DIASET
47I	*-- / -----*				()-----*
	R0518.7				D0453.0
	1A				
	%-----%	%-----%	%-----%	%-----%	%-----%
47J	*-- / -----*	* JMPE			*-----*
		SUB30			
	%-----%	%-----%	%-----%	%-----%	%-----%
47K	*-- / -----*	* END2			*-----*
		SUB 2			
	%-----%	%-----%	%-----%	%-----%	%-----%
47L					
47M					
47N					
47O					
47P					

DIAGNOSTIC SETUP MARKER
36H 44P

SECTION 2.4

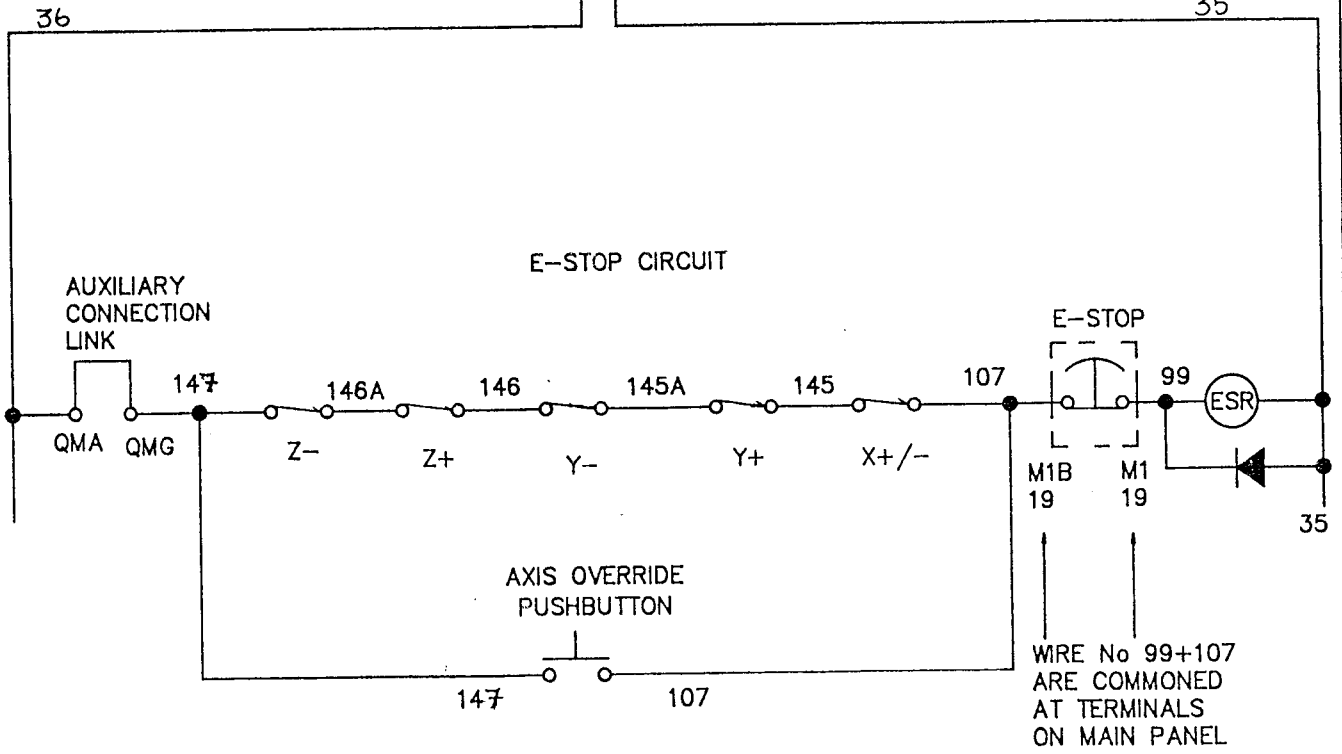
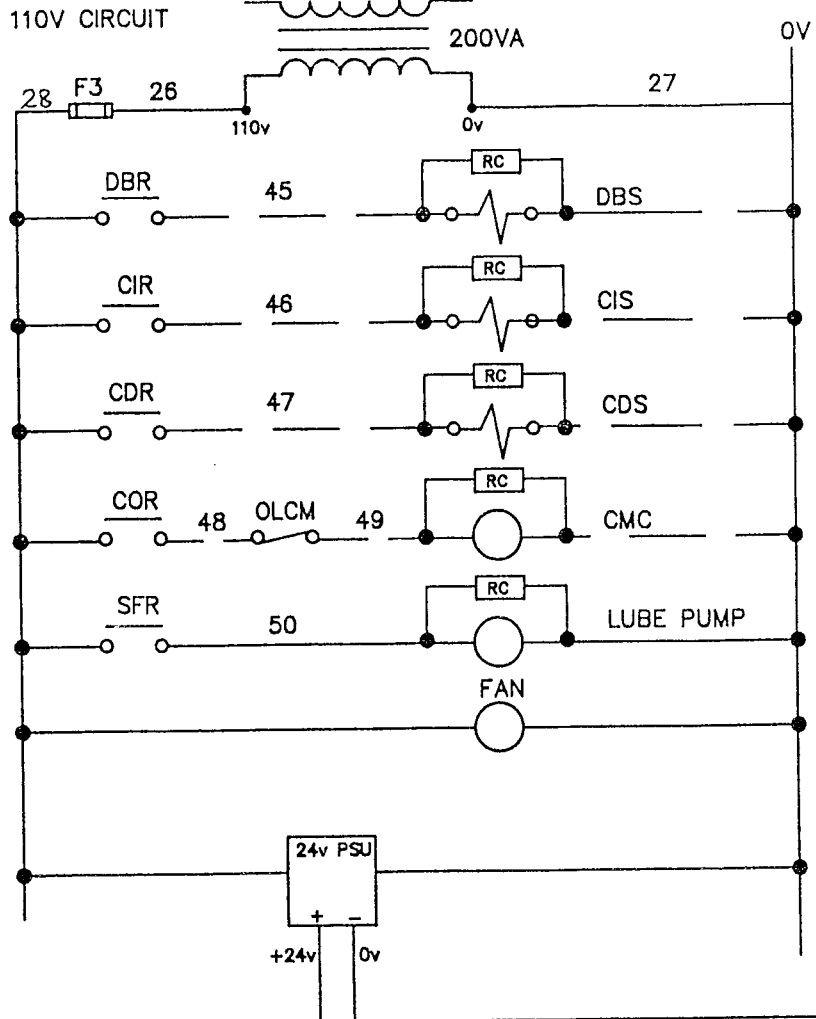
- ELECTRICAL DRAWINGS



FUSE VALUES
 F1=6.3
 F2=3.15
 F3=3.15
 F4=3.15
 F5=6.3

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A. NEWSOME DATE 12-7-90 A3-410051

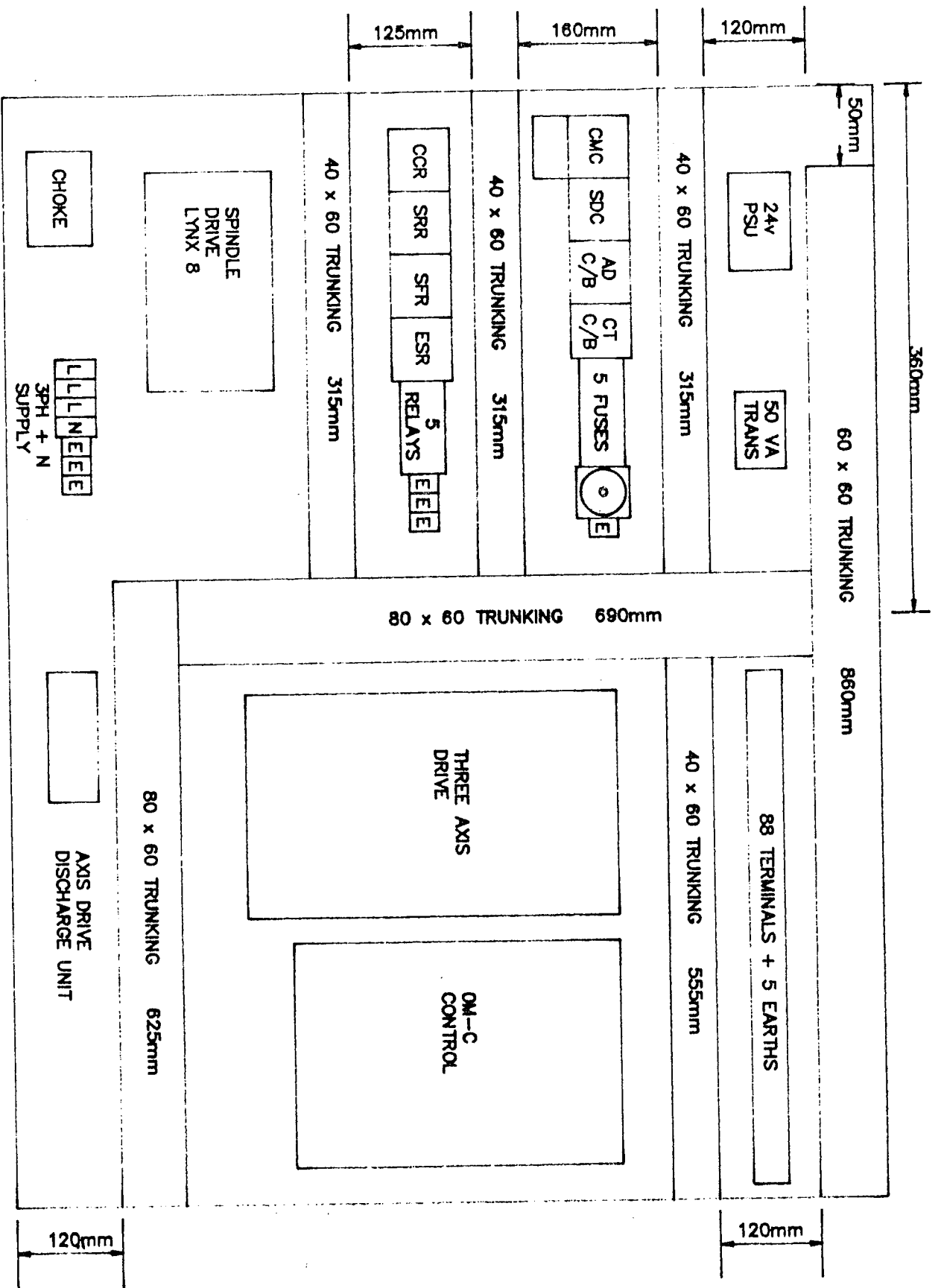
SEE A4-410020
CONTROL TRANSFORMER 2



DBR= DRAW BAR RELAY
CIR= CAROUSEL IN RELAY
CDR= CAROUSEL DOWN RELAY
COR= COOLANT ON RELAY
SFR= SPINDLE FORWARD RELAY
DBS= DRAW BAR SOLENOID

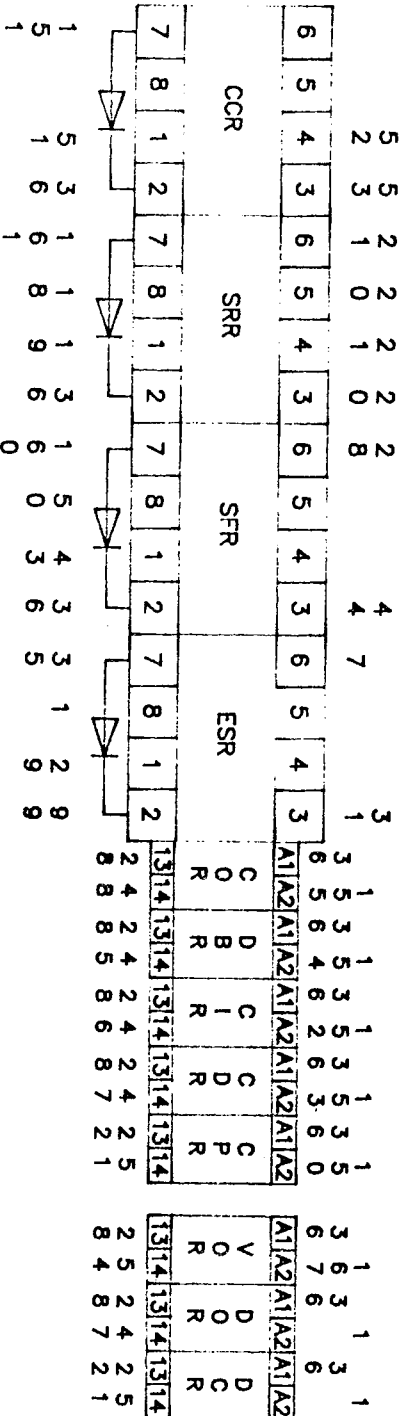
CIS= CAROUSEL IN SOLENOID
CDS= CAROUSEL DOWN SOLENOID
CMC= COOLANT MOTOR CONTACTOR
QM= 8 WAY ROUND QM SOCKET
ESR= EMERGENCY STOP RELAY

110V SCHEMATIC
AND E-STOP CIRCUIT
SHEET No 2

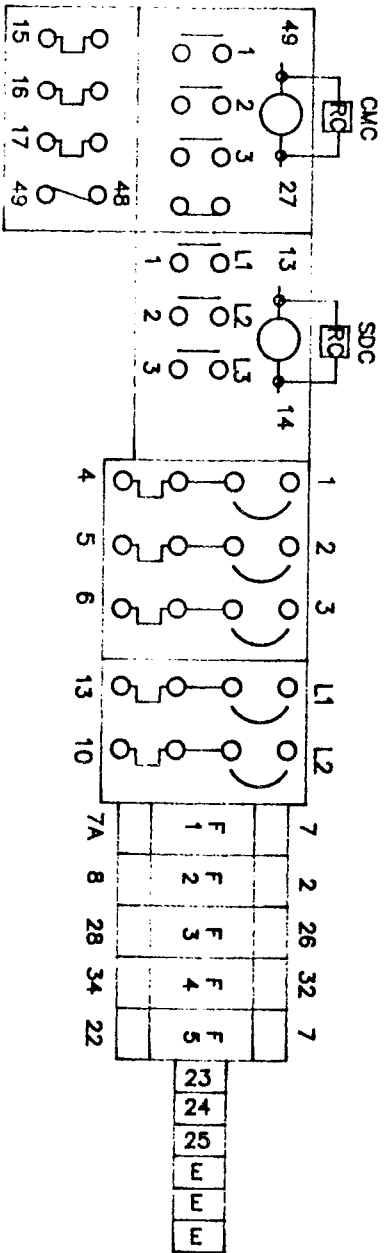


STANDARD RELAYS

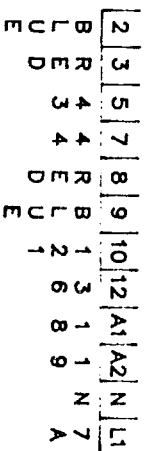
RELAYS FOR OPTIONS



SDC SERVO DRIVES CONTACTOR
 CMC COOLANT MOTOR CONTACTOR
 COR COOLANT ON RELAY
 SFR SPINDLE FORWARD RELAY
 SRR SPINDLE REVERSE RELAY
 ALR AXIS LUBE RELAY
 ESR EMERGENCY STOP RELAY

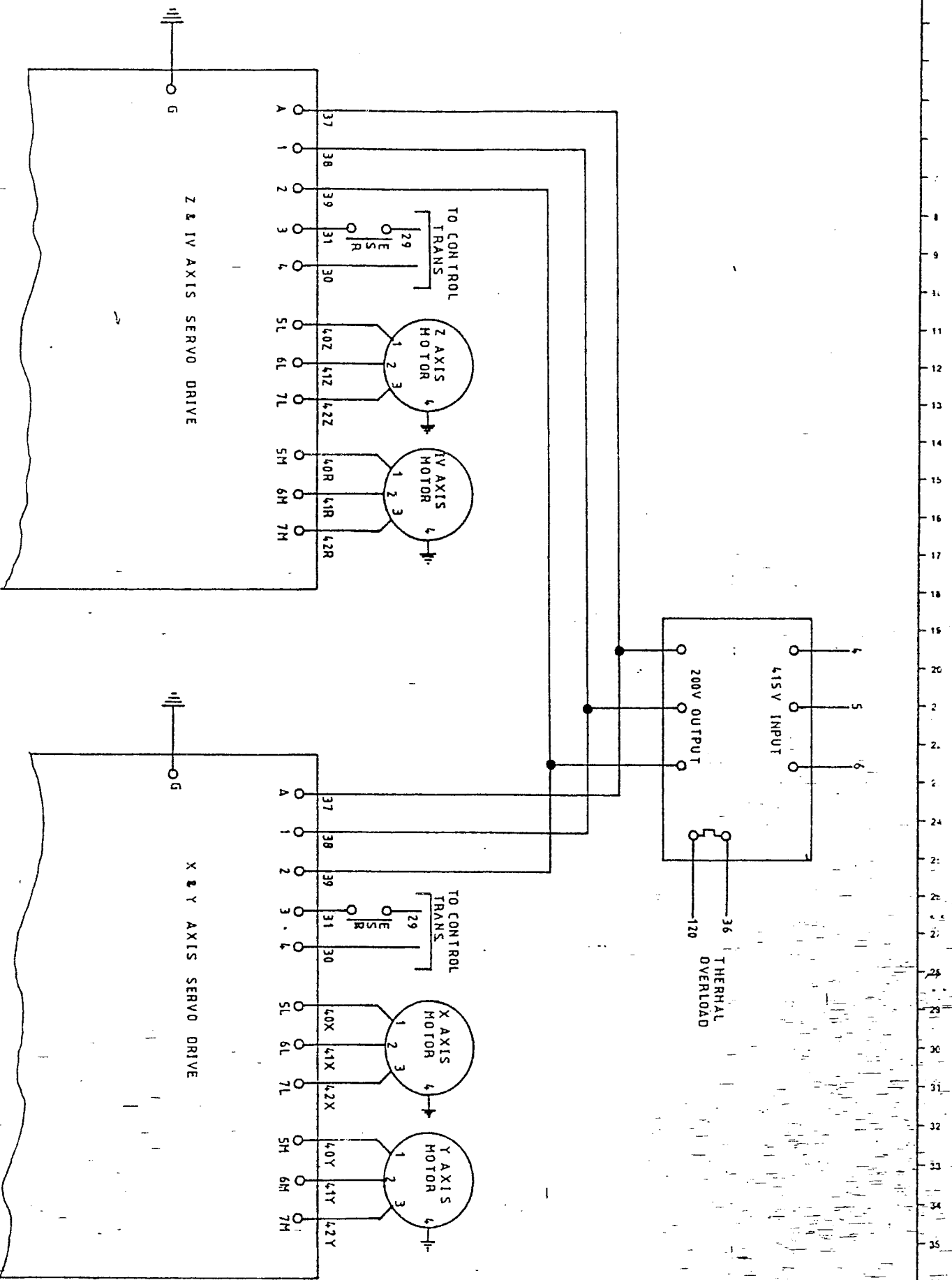


LYNX SPINDLE DRIVE CONNECTIONS



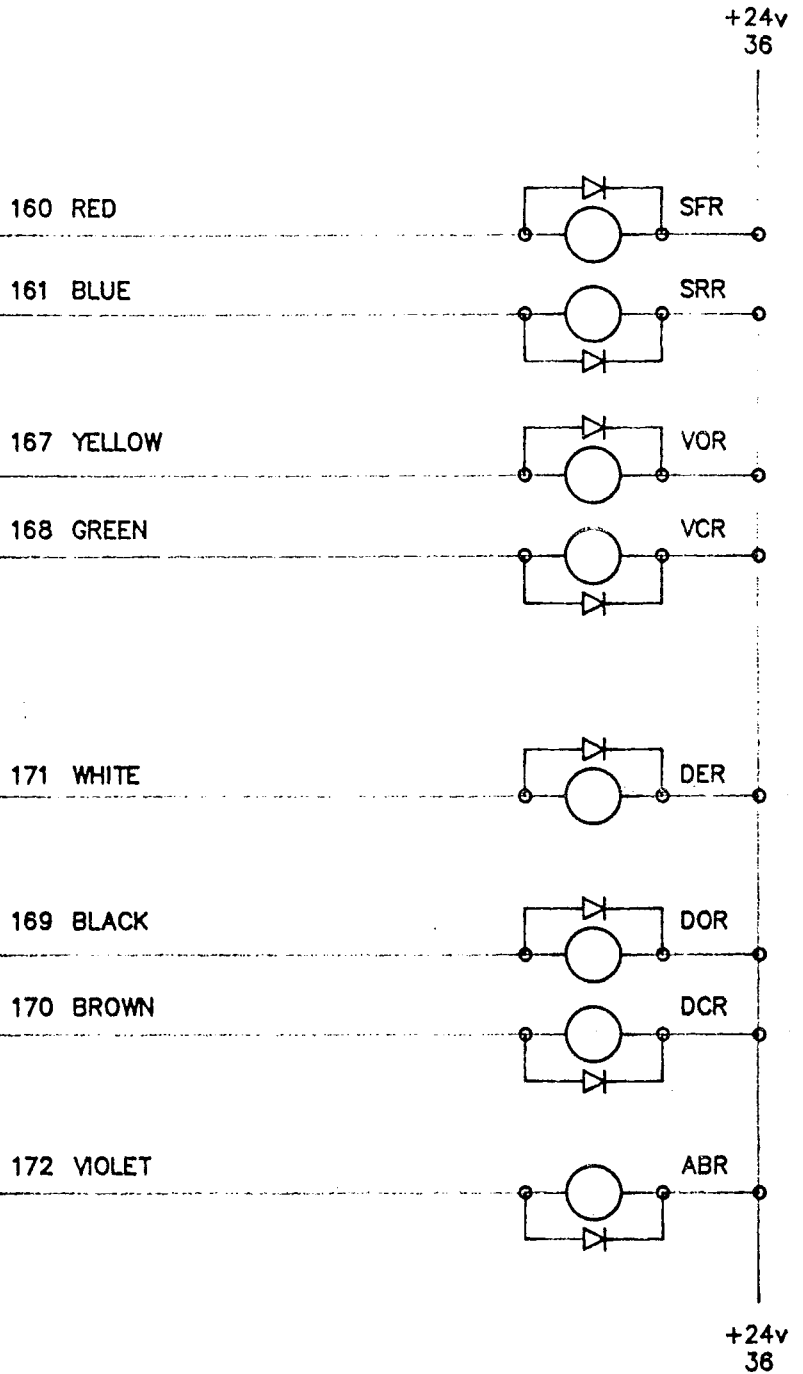
F	13	17	21	25	29	33	37	41	45	49
F	14	18	22	26	30	34	38	42	46	50
F	15	19	23	27	31	35	39	43	47	51
F	16	20	24	28	32	36	40	44	48	52
F	17	21	25	29	33	37	41	45	49	53
F	18	22	26	30	34	38	42	46	50	54
F	19	23	27	31	35	39	43	47	51	55
F	20	24	28	32	36	40	44	48	52	99
F	21	25	29	33	37	41	45	49	107	111
F	22	26	30	34	38	42	46	50	110	114
F	23	27	31	35	39	43	47	51	112	116
F	24	28	32	36	40	44	48	52	115	119
F	25	29	33	37	41	45	49	53	117	121
F	26	30	34	38	42	46	50	54	118	122
F	27	31	35	39	43	47	51	55	119	123
F	28	32	36	40	44	48	52	99	120	124
F	29	33	37	41	45	49	53	107	121	125
F	30	34	38	42	46	50	54	110	122	126
F	31	35	39	43	47	51	55	112	123	127
F	32	36	40	44	48	52	99	115	124	128
F	33	37	41	45	49	53	107	117	125	129
F	34	38	42	46	50	54	110	118	126	145
F	35	39	43	47	51	55	112	119	127	146A
F	36	40	44	48	52	99	115	120	128	147
F	37	41	45	49	53	107	117	121	129	148
F	38	42	46	50	54	110	118	122	130	148A
F	39	43	47	51	55	112	119	123	131	149
F	40	44	48	52	99	115	120	124	132	150
F	41	45	49	53	107	117	121	125	133	151
F	42	46	50	54	110	118	122	126	134	152
F	43	47	51	55	112	119	123	127	135	153
F	44	48	52	99	115	120	124	128	136	154
F	45	49	53	107	117	121	125	129	137	155
F	46	50	54	110	118	122	126	130	138	156
F	47	51	55	112	119	123	127	131	139	157
F	48	52	99	115	120	124	128	132	140	158
F	49	53	107	117	121	125	129	133	141	159
F	50	54	110	118	122	126	130	134	142	160
F	51	55	112	119	123	127	131	135	143	161
F	52	99	115	120	124	128	132	136	144	162
F	53	107	117	121	125	129	133	137	145	163
F	54	110	118	122	126	130	134	138	146	164
F	55	112	119	123	127	131	135	139	147	165
F	99	115	120	124	128	132	136	140	148	166
F	107	117	121	125	129	133	137	141	149	167
F	110	118	122	126	130	134	138	142	150	168
F	111	119	123	127	131	135	139	143	151	169
F	112	120	124	128	132	136	140	144	152	170
F	114	122	126	130	134	138	142	146	153	171
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F	116	124	128	132	136	140	144	148	155	
F	117	125	129	133	137	141	145	149	156	
F	118	126	130	134	138	142	146	150	157	
F	119	127	131	135	139	143	147	151	158	
F	120	128	132	136	140	144	148	152	159	
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F	122	130	134	138	142	146	150	154	161	
F	123	131	135	139	143	147	151	155	162	
F	124	132	136	140	144	148	152	156	163	
F	125	133	137	141	145	149	153	157	164	
F	126	134	138	142	146	150	154	158	165	
F	128	135	139	143	147	151	155	159	166	
F	129	136	140	144	148	152	156	160	167	
F	135	139	143	147	151	155	159	163	168	
F	136	140	144	148	152	156	160	164	169	
F	137	141	145	149	153	157	161	165	170	
F	138	142	146	150	154	158	162	166	171	
F	139	143	147	151	155	159	163	167		
F	140	144	148	152	156	160	164			
F	141	145	149	153	157	161				
F	142	146	150	154	158					
F	143	147	151	155						
F	144	148	152							
F	145	149								
F	146A									
F	146									
F	148A									
F	148									
F	149									
F	150									
F	151									
F	152									
F	153									
F	154									
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F	161									
F	162									
F	163									
F	164									
F	165									
F	166									
F	167									
F	168									
F	169									
F	170									
F	171									

45	13	17	21	25	29	33	37	41	45	49
46	14	18	22	26	30	34	38	42	46	50
47	15	19	23	27	31	35	39	43	47	51
50	16	20	24	28	32	36	40	44	48	52
52	17	21	25	29	33	37	41	45	49	53
53	18	22	26	30	34	38	42	46	50	54
54	19	23	27	31	35	39	43	47	51	55
55	20	24	28	32	36	40	44	48	52	99
99	21	25	29	33	37	41	45	49	107	111
107	22	26	30	34	38	42	46	50	110	114
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114	26	30	34	38	42	46	50	54	118	122
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117	29	33	37	41	45	49	53	107	121	125
118	30	34	38	42	46	50	54	110	122	126
119	31	35	39	43	47	51	55	112	123	127
120	32	36	40	44	48	52	99	115	124	128
121	33	37	41	45	49	53	107	117	125	129
122	34	38	42	46	50	54	110	118	126	145
123	35	39	43	47	51	55	112	119	127	146A
124	36	40	44	48	52	99	115	120	128	146
125	37	41	45	49	53	107	117	121	129	147
126	38	42	46	50	54	110	118	122	130	148
127	39	43	47	51	55	112	119	123	131	148A
128	40	44	48	52	99	115	120	124	132	147
128	41	45	49	53	107	117	121	125	133	148
145	42	46	50	54	110	118	122	126	134	145A
146A	43	47	51	55	112	119	123	127	135	146
146	44	48	52	99	115	120	124	128	136	146A
147	45	49	53	107	117	121	125	129	137	147
148	46	50	54	110	118	122	126	130	138	147A
148A	47	51	55	112	119	123	127	131	139	148
149	48	52	99	115	120	124	128	132	140	148A
149	49	53	107	117	121	125	129	133	141	149
150	50	54	110	118	122	126	130	134	142	150
151	51	55	112	119	123	127	131	135	143	151
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153	53	107	117	121	125	129	133	137	145	153
154	54	110	118	122	126	130	134	138	146	154
155	55	112	119	123	127	131	135	139	147	155
156	99	115	120	124	128	132	136	140	148	156
157	107	117	121	125	129	133	137			



M19 20 WAY FEMALE
HONDA
CONNECTOR

DESCRIPTION	BIT No	PIN No
	Y80.0	1
SPINDLE FORWARD	Y80.1	2
SPINDLE REVERSE	Y80.2	3
	Y80.3	4
VICE OPEN RELAY	Y80.4	5
VICE CLOSE RELAY	Y80.5	6
	Y80.6	7
	Y80.7	8
DRAWBAR EXHAUST RELAY	Y82.0	9
	Y82.1	10
DOOR OPEN RELAY	Y82.2	11
DOOR CLOSE RELAY	Y82.3	12
	Y82.4	13
AIR BLAST RELAY	Y82.5	14
	Y82.6	15
	Y82.7	16
		17
	0v	18
	0v	19
		20



8 CORE SCREEN

TRIAC FANUC OM-C
M19 OUTPUTS

SHEET No 20

OF

M18 CONTROL INPUTS

50 WAY
FEMALE
HONDA
CONNECTOR

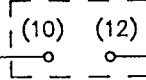
DESCRIPTION	BIT	PIN
	0v	1
	0v	2
	0v	3
	COM1	4
SPINDLE ALARM	X00.5	5
LUBE FLOAT SWITCH	X02.0	6
CAROUSEL 1 REV SENSOR	X02.3	7
CAROUSEL UP SWITCH	X02.6	8
	X04.1	9
	X04.4	10
	X04.7	11
AUXILIARY INPUT 1	X06.2	12
CAROUSEL IN SWITCH	X06.4	13
	X06.6	14
XAE	X08.0	15
+MITX	X08.2	16
+MITZ	X08.4	17
GUARD CLOSED SWITCH	X08.6	18
	X00.1	19
	X00.3	20
CAROUSEL OUT SWITCH	X00.6	21
	X02.1	22
	X02.4	23
	X02.7	24
	X04.2	25

LINK TO PINS
28 + 29

36
+24v

SPINDLE DRIVE
TERMINALS

121 VIOLET



123 WHITE



114 BLACK



117 ORANGE



35
0v

125 WHITE/BLUE

QM1 (D)

115 BROWN



148A YELLOW/RED



116 RED



36
+24v

20 CORE SCREEN TO TERMINALS
CUT OUT
RED/BROWN
GREEN/RED
TURQUOISE

QM1 8 WAY SOCKET (AUXILIARIES)

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A McHENRY DATE 16-10-91 A3- 410025 A

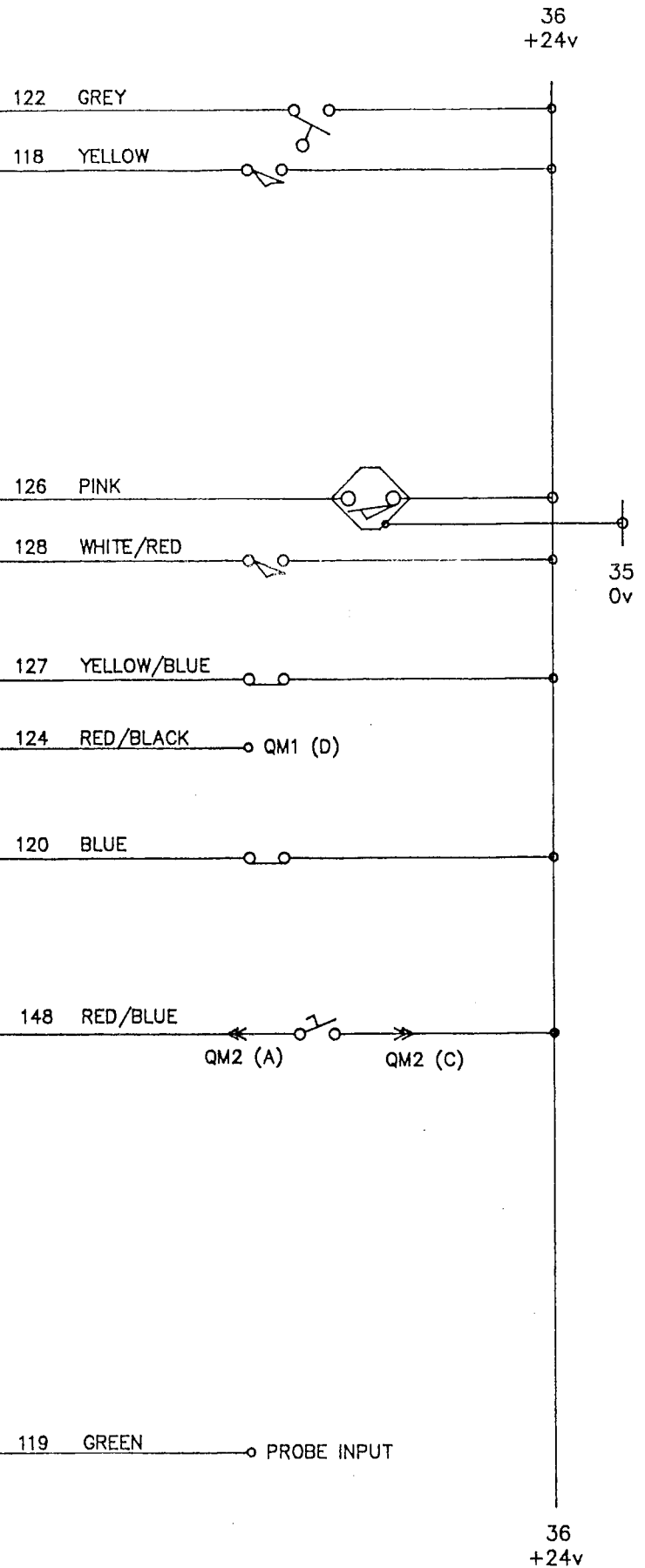
TRAC FANUC OM-C
M18
CONTROL INPUTS

SHEET 18

M18 CONTROL INPUTS

50 WAY FEMALE HONDA CONNECTOR

DESCRIPTION	BIT	PIN
AIR PRESSURE SWITCH	X04.5	26
CAROUSEL DOWN SWITCH	X06.0	27
	COM2	28
	COM3	29
		30
		31
		32
SPINDLE ORIENTATION SENSOR	X00.0	33
GUARD FULLY OPEN SWITCH	X00.2	34
	X00.4	35
SPINDLE MOTOR THERMAL	X00.7	36
AUX INPUT 1	X02.2	37
	X02.5	38
DRIVE TRANS THERMAL	X04.0	39
	X04.3	40
	X04.6	41
VICE OPEN FOOT SWITCH	X06.1	42
	X06.3	43
	X06.5	44
	X06.7	45
ZAE	X08.1	46
-MITX	X08.3	47
-MITZ	X08.5	48
SKIP	X08.7	49
		50



20 CORE SCREEN TO TERMINALS
CUT OUT
RED/BROWN
GREEN/RED
TURQUOISE

QM1 8 WAY SOCKET (AUXILIARIES)
QM2 8 WAY SOCKET (FOOT SWITCH)

TRIAC FANUC OM-C
M18
CONTROL INPUTS

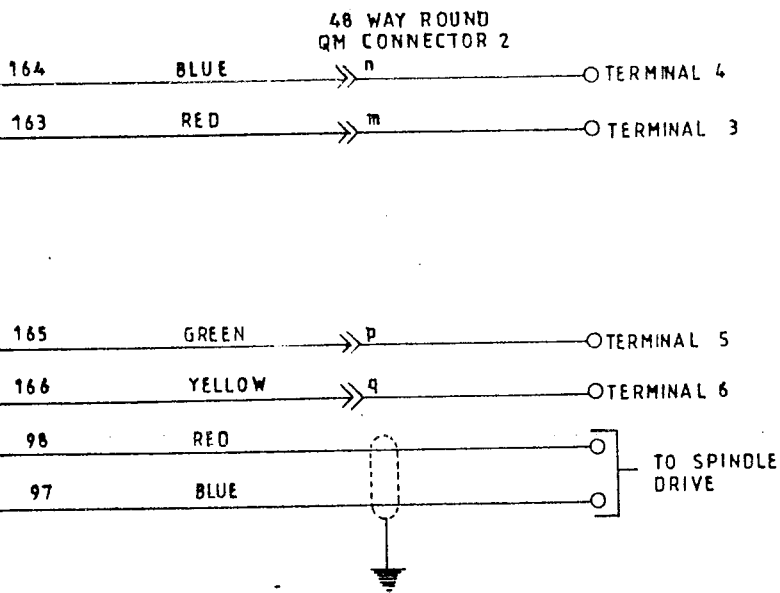
SHEET 19
OF

CNC TO MANUAL PULSE GEN.
AND SPINDLE DRIVE M12
TRIAC-FANUC 0M-B

SHEET No. 17

CONNECTOR M12 (MANUAL PULSE GENERATOR CONNECTIONS)

SIGNAL	PIN N°
0v	1 <<
0v	2 <<
0v	3 <<
+ 5v	4 <<
+ 5v	5 <<
+5v	6 <<
	7 <<
HA1	8 <<
HB1	9 <<
SVC	10 <<
0v	11 <<
	12 <<
	13 <<
	14 <<
	15 <<
	16 <<
	17 <<
	18 <<
	19 <<
	20 <<

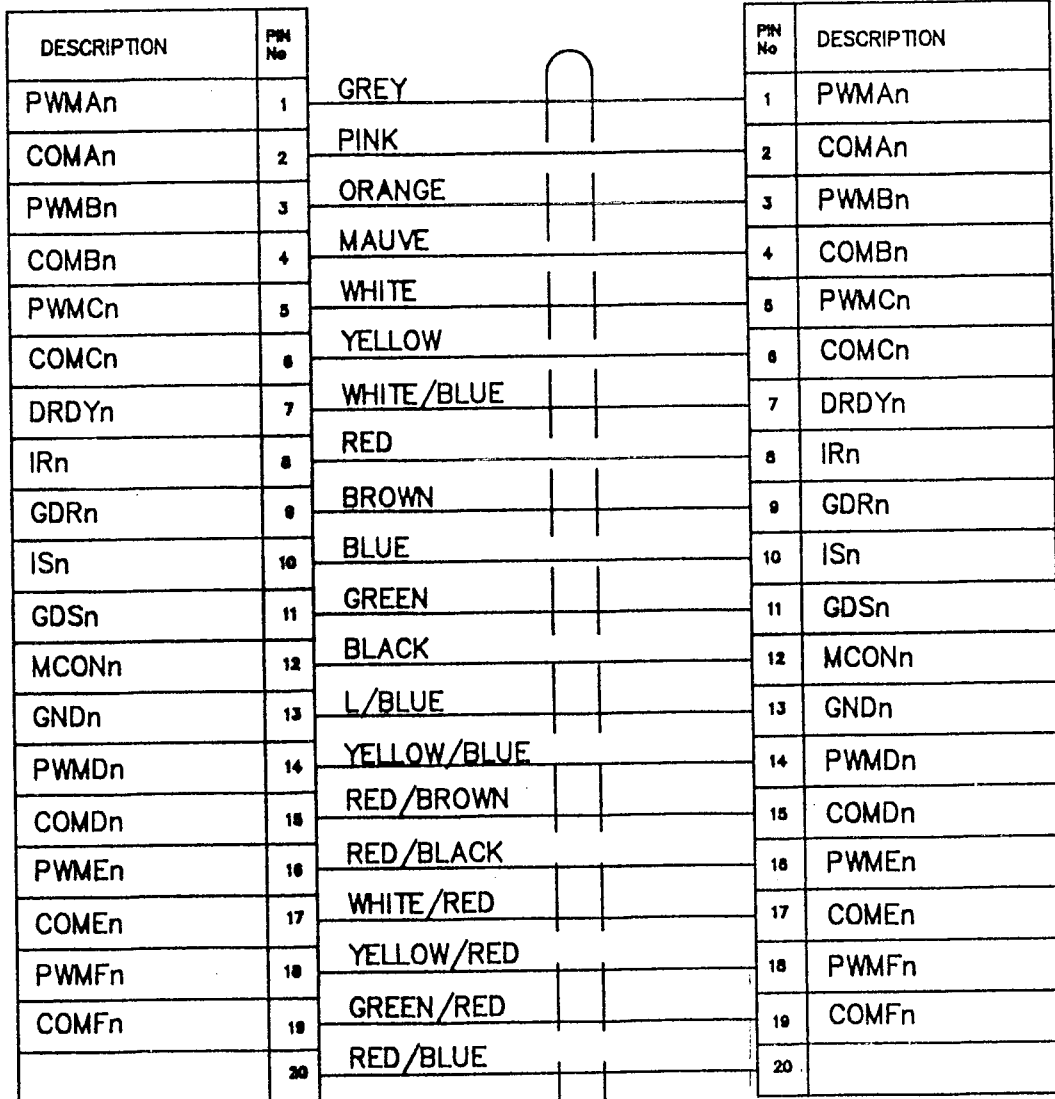


CONTROL TO AXIS DRIVES

X AXIS M34 TO CN1L
 Z AXIS M44 TO CN1N
 Y AXIS M37 TO CN1M
 IV AXIS M47 TO CN1

20 WAY MALE
 HONDA CONNECTOR

20 WAY FEMALE
 HONDA CONNECTOR



CONTROL TO
 AXIS DRIVE SIGNALS
 (MILLER)

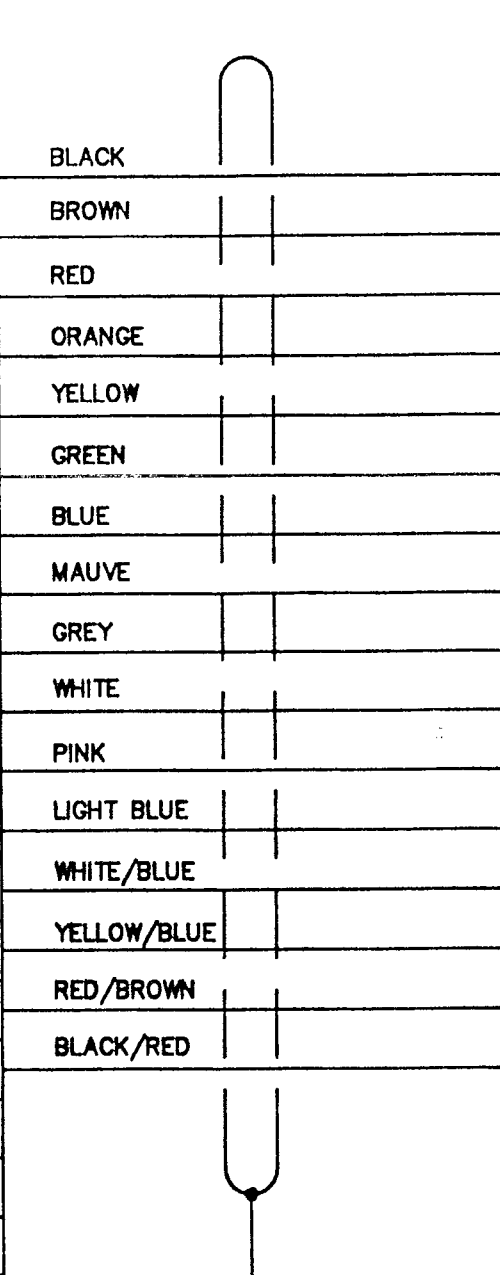
SHEET No 2!

OF

20 WAY FEMALE
M3 CONNECTOR ON MAIN PCB
CONNECTOR M3

20 WAY MALE
KM1 CONNECTOR ON VDU
CONNECTOR KM1

DESCRIPTION	PIN No
	1
KCM0-0	2
KCM0-1	3
SW0-6	4
SW0-4	5
SW0-2	6
SW0-0	7
KCM0-2	8
KCM0-3	9
SW0-7	10
SW0-5	11
SW0-3	12
SW0-1	13
KCM0-4	14
KCM0-5	15
KCM0-6	16
KCM0-7	17
	18
	19
	20



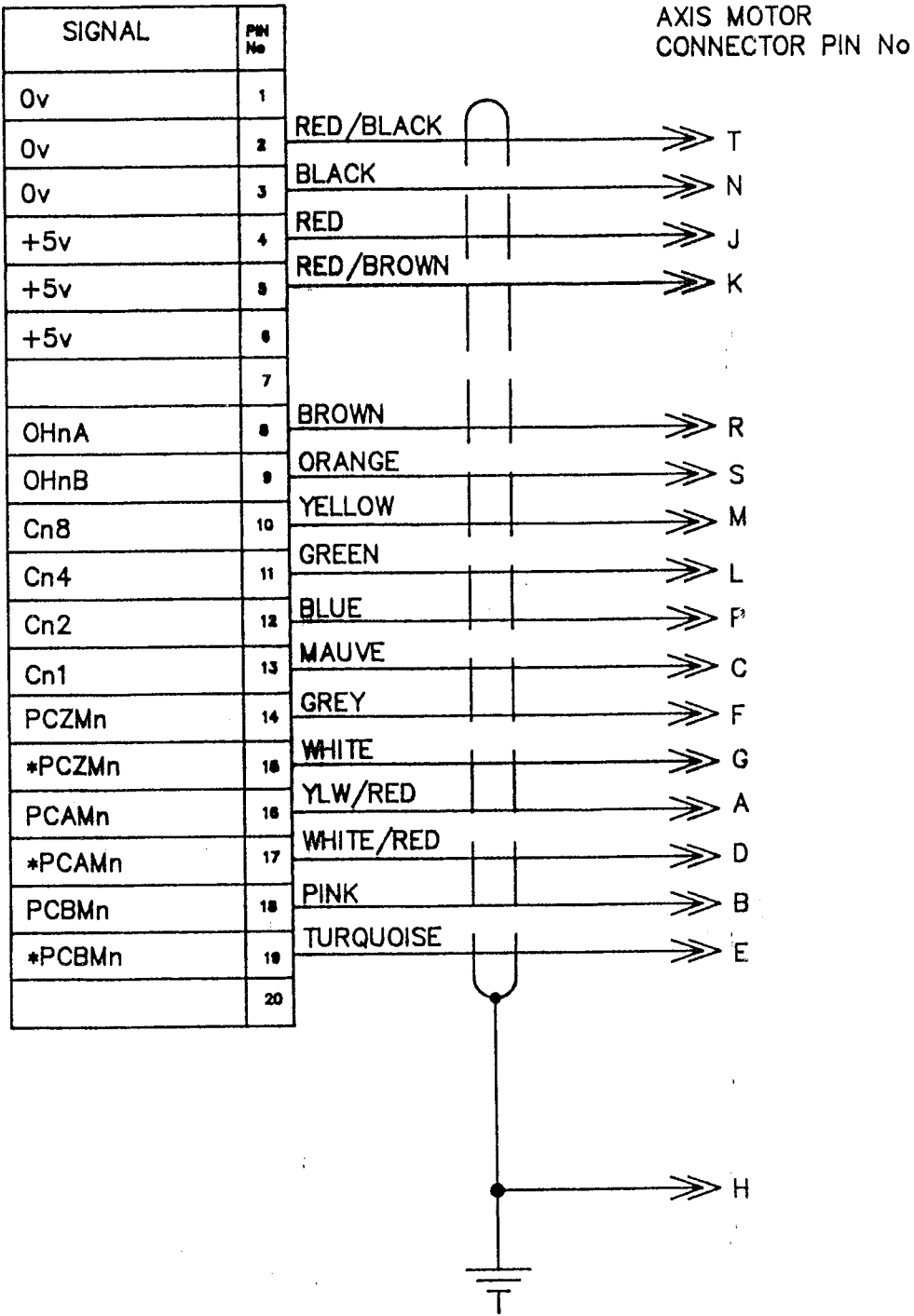
PIN No	DESCRIPTION
1	
2	KCM0-0
3	KCM0-1
4	SW0-6
5	SW0-4
6	SW0-2
7	SW0-0
8	KCM0-2
9	KCM0-3
10	SW0-7
11	SW0-5
12	SW0-3
13	SW0-1
14	KCM0-4
15	KCM0-5
16	KCM0-6
17	KCM0-7
18	
19	
20	

USE 20 CORE SCREENED
CABLE SCREEN TO MAIN PCB

M3-KM1
CONTRACT TO MUI
SIGNALS
OF
SHEET No 16
50001

MAIN PCB TO AXIS MOTORS

- M35 X AXIS
- M38 Y AXIS
- M45 Z AXIS
- M48 IV AXIS



AXIS MOTOR TO CONTROL SIGNALS
M35, 28/95

SHEET No 22

OF

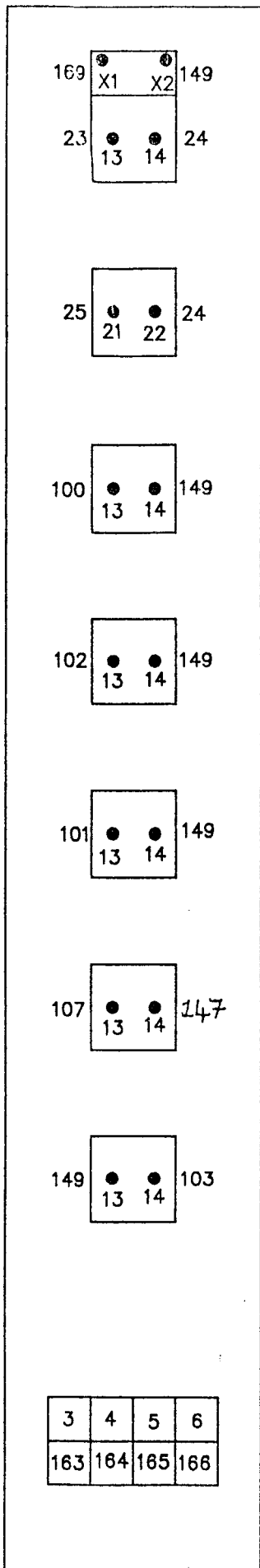
SECTION 2.2

- MACHINE DIAGNOSTICS
- INPUTS & OUTPUTS

TRIAC FANUC
OMB-OMC P/BUTTON
WIRING DIAGRAM

OF

SHEET No 9



CONTROL
ON P/BUTTON
(GREEN LENS)

CONTROL
OFF P/BUTTON
(RED LENS AND SHIELD)

SPINDLE
RELEASE
P/BUTTON
(RED LENS AND SHIELD)

CAROUSEL
COUNTERCLOCKWISE
P/BUTTON
(ORANGE LENS)

CAROUSEL
CLOCKWISE P/BUTTON
(ORANGE LENS)

AXIS OVERRIDE
P/BUTTON
(WHITE LENS)

GUARD
OVERRIDE
(WHITE LENS)

HANDWHEEL

HANDWHEEL 4 CORE SCREEN
CONTROL/ON OFF 4 CORE SCREEN
SEPERATE GREEN 107
SEPERATE BLUE ~~33~~ 147
ALL WIRES TO 12 WAY QM PLUG

NOTE

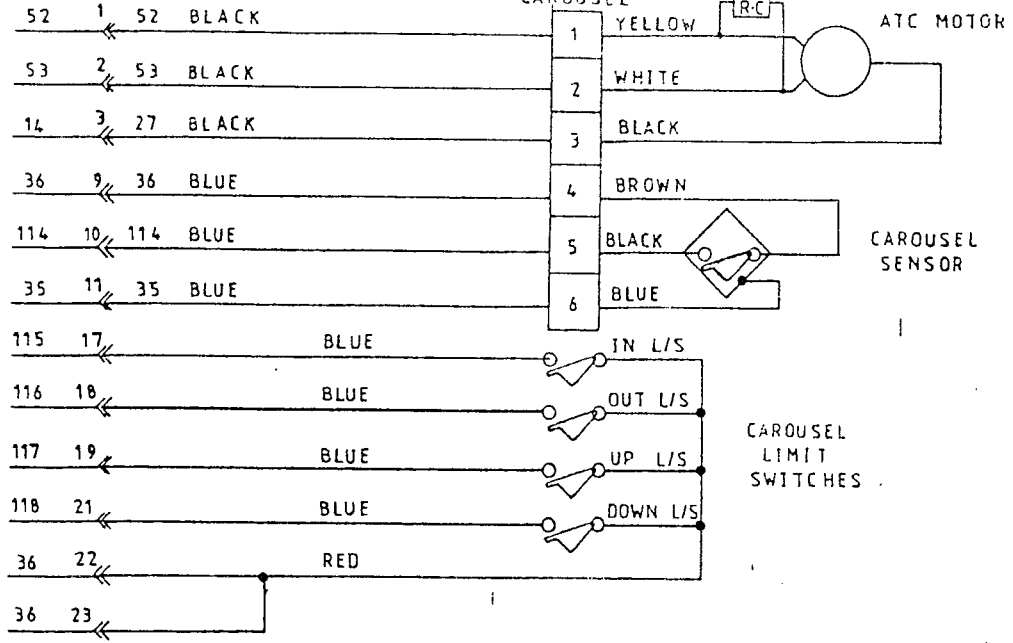
THE PUSHBUTTONS ARE
ALL MOMENTARY, REMOVE
THE SPRING CLIP FROM
EACH SWITCH

GENEFORM MACHINE TOOL & TR

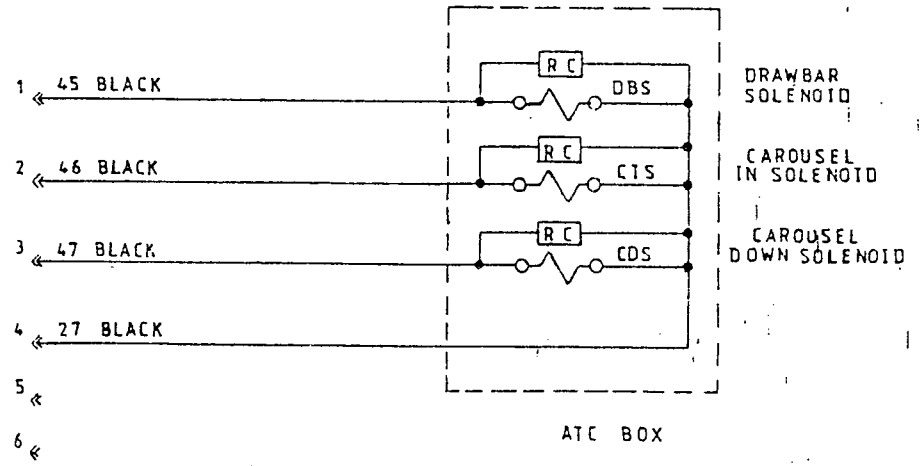
BRIDGE UNIT

WIRE WOUND

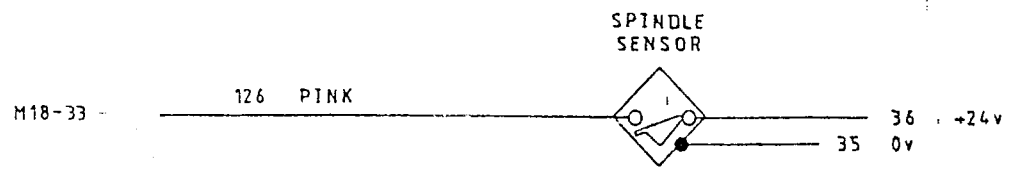
6 WAY TERMINAL BLOCK ON ATC CAROUSEL



24 WAY QM CONNECTOR ON ATC SUPPORT BRACKET



6 WAY QM CONNECTOR ON ATC BOX

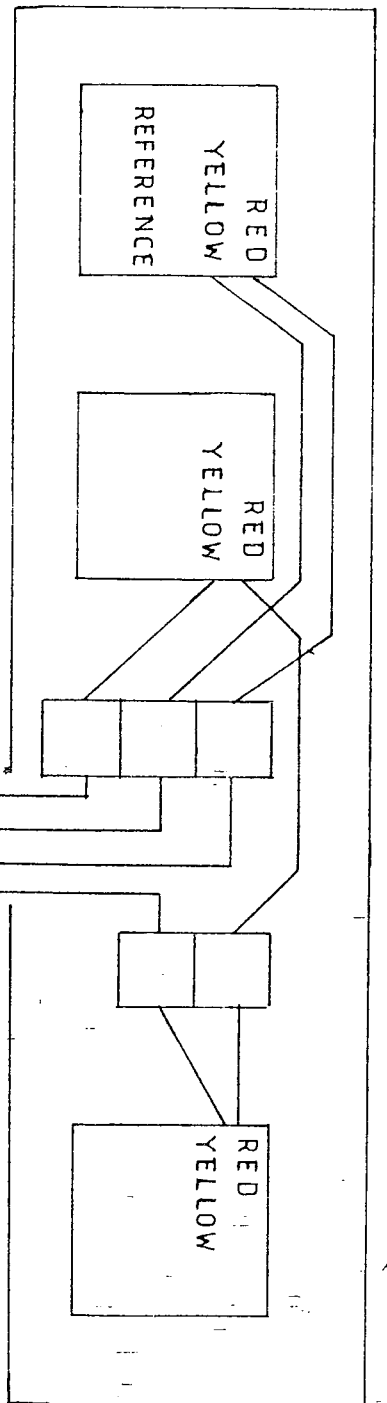


TRIAC FANUC OM-B ATC WIRING SCHEMATIC

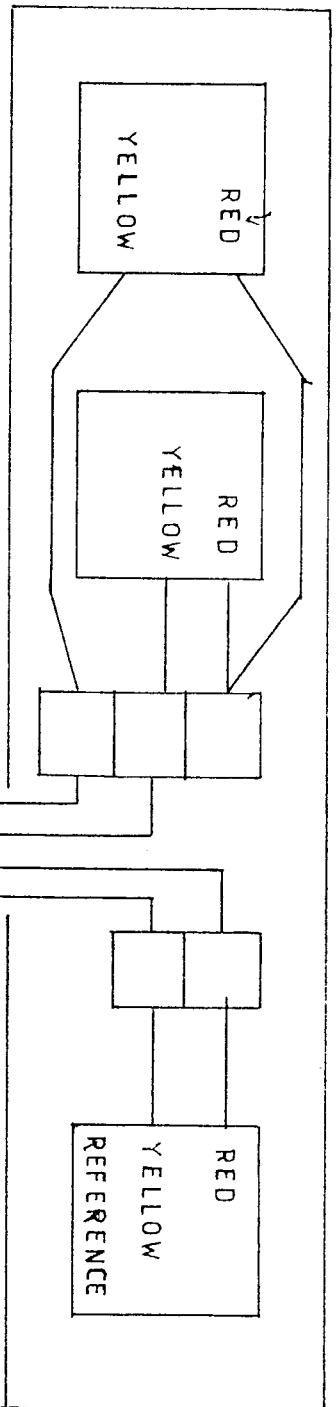
SHEET NO. 8

CONT. ON SHEET NO.

7
8
9
10
11
12
13
14
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16
17
18
19
20
21
22
23
24
25
26
27
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39



TRIAC FANUC
X AXIS O/T
WIRING



TRIAC FANUC ATC
X AXIS O/T
WIRING

G B R Y
R L E L
N E D W
4 CORE

A4-410038

S 7

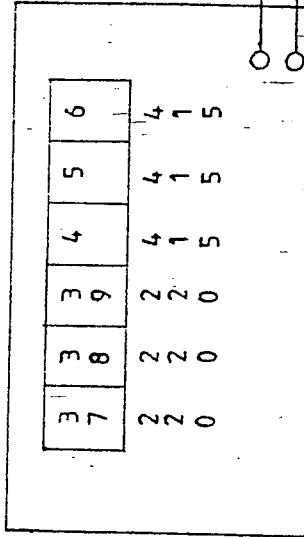
IRIAC FANUC TRANSFORMER PLATE WIRING

PLATE DRILLED
TO TR2/507

16 WIRES FROM TRANSFORMER PLATE
TO
SAREL BOX

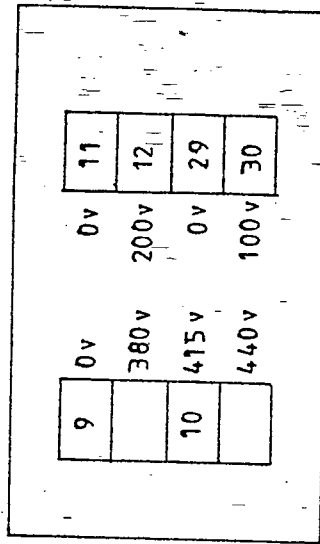
36 & 120 BLUE 0.5mm.
REST BLACK 1.5mm

SERVO
DRIVE
T.RANS.

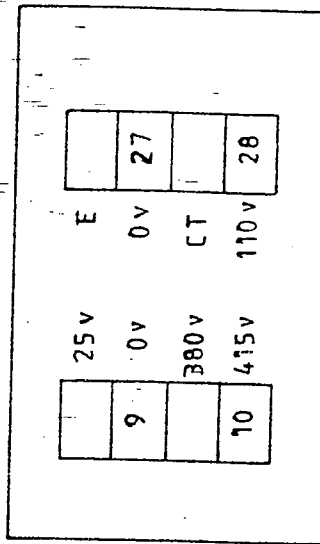


36 THERMAL (IF ...)
120 SENSOR (FITTED)

CONTROL
TRANS.
(1)



CONTROL
TRANS.
(2)



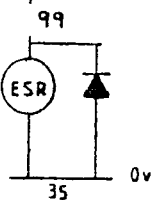
A3-410041

MAIN PCB
CONNECTOR M1

48 WAY ROUND
QM CONNECTOR
1

FANUC OPERATORS PANEL
CONNECTOR M1A

PC DESCRIPTION	ADDRESS & BIT No.	PIN No.		PIN No
	0v	1	BLACK	1
	0v	2	RED	2
	0v	3	YELLOW	3
	0v	4		4
KD 5	X 20-5	5	BLACK	5
	X 16-7	6	BROWN	6
	X 17-7	7	RED	7
	X 18-7	8	ORANGE	8
	X 17-1	9	YELLOW	9
	X 17-0	10	GREEN	10
	X 16-1	11	BLUE	11
	X 16-0	12	VIOLET	12
KD 7	X 20-7	13	GREY	13
KD 4	X 20-4	14	WHITE	14
KD 3	X 20-3	15	PINK	15
KD 2	X 20-2	16	TURQUOISE	16
KD 1	X 20-1	17	RED/BLUE	17
KD 0	X 20-0	18	GREEN/RED	18
EMERGENCY STOP MONITOR	X 21-4	19	RED/BLACK	19
	X 16-3	20	WHITE/RED	20
GUARD OVERRIDES / B	X 16-2	21	YELLOW/BROWN	21
	X 17-3	22		22
	X 17-2	23		23
	X 18-3	24		24
	X 18-2	25		25



0v AND 24v	6 CORE SCREEN
X, Y & Z REFERENCE	4 CORE SCREEN
REST	8 CORE SCREEN

DENFORD MACHINE TOOLS LTD
BRIGHOUSE
WEST YORKSHIRE
DRN. BY ALPHENRY DATE 12-2-88
TRCD BY:
DATE:
TRIAC FANUC OM-B CONTROL TO OPERATORS PANEL
SHEET No. 10
OF CONT ON SHEET 14
A3-410021

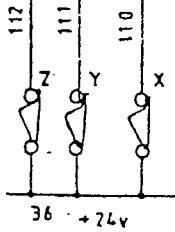
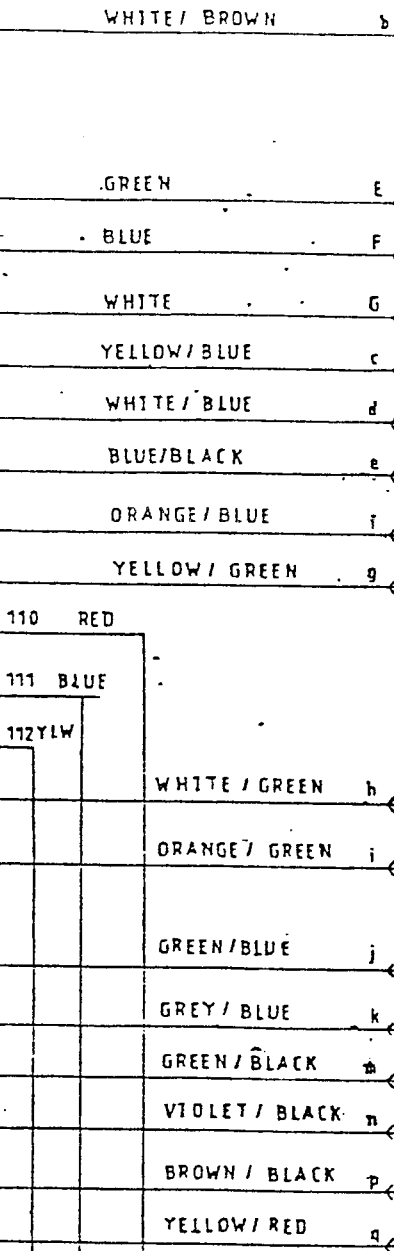
MAIN PCB CONNECTOR M1

FANUC OPERATORS PANEL CONNECTOR M1A

PC DESCRIPTION	ADDRESS & BIT No.	PIN No.
	X 21-6	26 O
RSV 1	X 21-5	27 O
		28 O
	+24v	29 O
	+24v	30 O
	+24v	31 O
	+24v	32 O
*OV B	X 21-3	33 O
*OV 4	X 21-2	34 O
*OV 2	X 21-1	35 O
*OV 1	X 21-0	36 O
KD 6	X 20-6	37 O
X REFERENCE L/S	X 16-5	38 O
Y REFERENCE L/S	X 17-5	39 O
Z REFERENCE L/S	X 18-5	40 O
KEY	X 21-7	41 O
KST	X 22-7	42 O
	X 22-6	43 O
RSV 3	X 22-5	44 O
RSV 2	X 22-4	45 O
KA 3	X 22-3	46 O
KA 2	X 22-2	47 O
KA 1	X 22-1	48 O
KA 0	X 22-0	49 O
		50 O

48 WAY ROUND QM CONNECTOR
1

PIN No.	
O 26	
O 27	
O 28	
O 29	
O 30	
O 31	
O 32	
O 33	
O 34	
O 35	
O 36	
O 37	
O 38	
O 39	
O 40	
O 41	
O 42	
O 43	
O 44	
O 45	
O 46	
O 47	
O 48	
O 49	
O 50	



6. CORE SCREEN

TRIA/C FANUC ON-B CONTROL TO OPERATORS PANEL

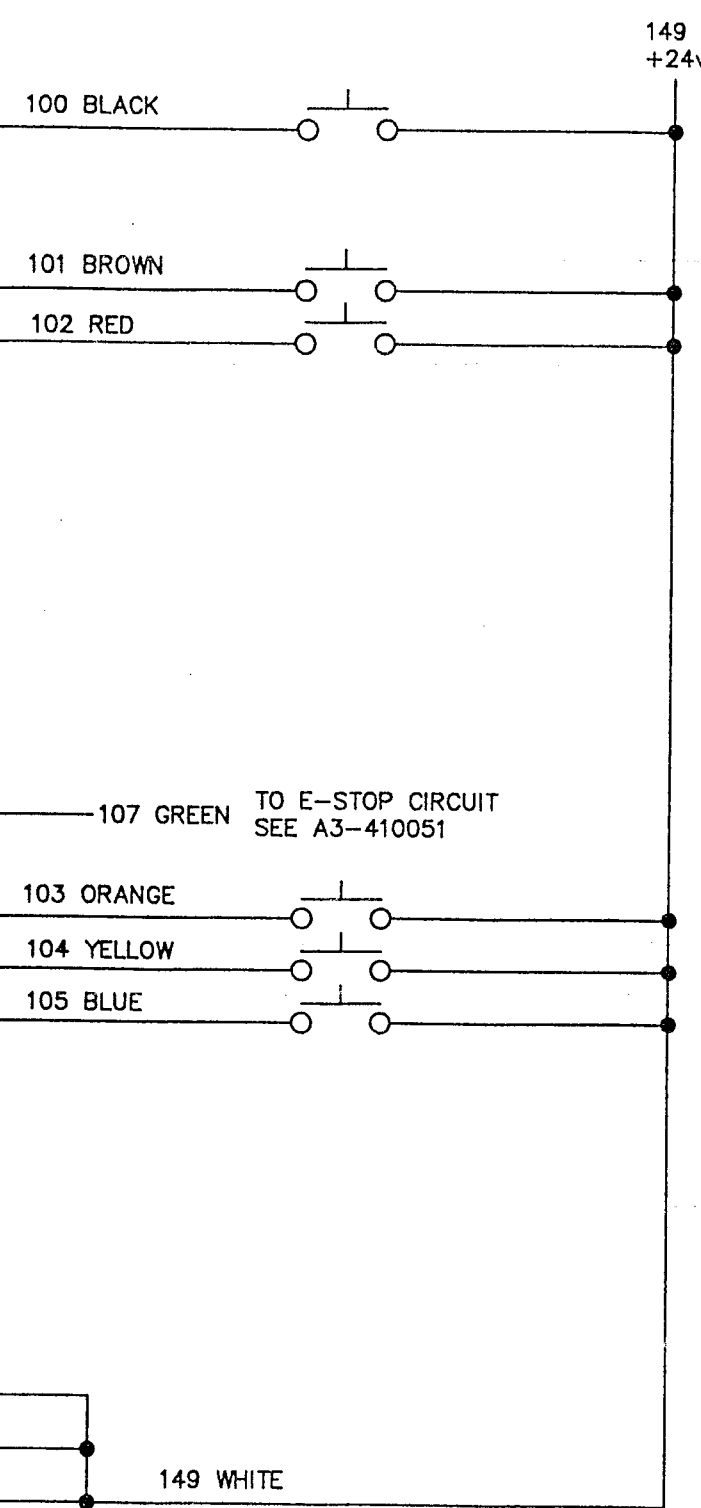
SHEET No. 1

OF COM. ON SHEET No.

FANUC OPERATORS PANEL
TO PUSHBUTTONS

M1B 50 WAY HONDA PLUG

PC DESCRIPTION	ADDRESS + BIT No	PIN No
	0v	1
	0v	2
	0v	3
	0v	4
KD 5	X20.5	5
TOOL UNCLAMP P/B	X16.7	6
	X17.7	7
	X18.7	8
CAROUSEL CLOCKWISE P/B	X17.1	9
C/ANTICLOCKWISE P/B	X17.0	10
	X16.1	11
	X16.0	12
KD 7	X20.7	13
KD 4	X20.4	14
KD 3	X20.3	15
KD 2	X20.2	16
KD 1	X20.1	17
KD 0	X20.0	18
E-STOP MONITOR	X21.4	19
	X16.3	20
GUARD O/RIDE	X16.2	21
	X17.3	22
	X17.2	23
	X18.3	24
	X18.2	25
		26
		27
		28
		29
	+24v	30
	+24v	31
	+24v	32



DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A. NEWSOME DATE 16-7-90 A3-410052

SPARES

TRIAC FANUC OM-C
M1B TO P/BUTTONS

SHEET No 12
OF

MAIN PCB

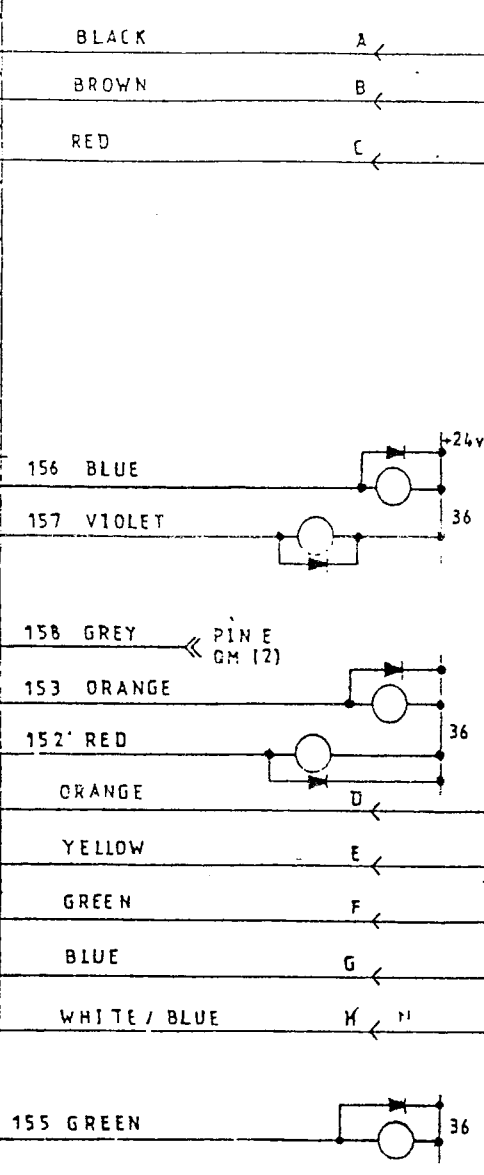
FANUC OPERATORS PANEL

CONNECTOR M2 (FEMALE)

48 WAY ROUND QM
CONNECTOR 2

CONNECTOR M2 A (MALE)

PC DESCRIPTION	ADDRESS & BIT No.	PIN No.
	0v	1
	0v	2
	0v	3
	0v	4
	Y 48-7	5
	Y 48-6	6
	Y 48-5	7
	Y 48-4	8
SPARE 1	Y 49-7	9
SPARE 2	Y 50-5	10
	Y 52-7	11
AUX. OUTPUT 1	Y 52-6	12
CAROUSEL DOWN RELAY	Y 52-5	13
CAROUSEL IN RELAY	Y 52-4	14
CONTROL ON LAMP	Y 52-3	15
X AT DATUM LAMP	Y 52-2	16
Y AT DATUM LAMP	Y 52-1	17
Z AT DATUM LAMP	Y 52-0	18
IV AT DATUM LAMP	Y 50-2	19
	Y 50-3	20
COOLANT ON RELAY	Y 50-0	21
	Y 49-3	22
	Y 49-1	23
	Y 49-0	24
	Y 48-0	25



PIN No.	
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	

QM(2) IS THE 8WAY QM
SOCKET FOR AUXILIARIES

TRIAC FANUC OUTPUTS CONTROLS TO OPERATORS PANEL

SHEET No. 13

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE

CONNECTOR M2 (FEMALE)

CONNECTOR M2 A (MALE)

PC DESCRIPTION	ADDRESS & BIT No.	PIN No.
	Y 48-1	26
AUX. OUTPUT 2	Y 48-2	27
		28
		29
		30
		31
		32
LD 7	Y 51-7	33
LD 6	Y 51-6	34
LD 5	Y 51-5	35
LD 4	Y 51-4	36
LD 3	Y 51-3	37
LD 2	Y 51-2	38
LD 1	Y 51-1	39
LD 0	Y 51-0	40
	Y 49-4	41
CAROUSEL COUNTER-CLOCKWISE RELAY	Y 53-7	42
DRAWBAR RELAY	Y 53-6	43
	Y 53-5	44
	Y 53-4	45
	Y 53-3	46
	Y 53-2	47
CAROUSEL POWER RELAY	Y 53-1	48
	Y 53-0	49
		50

PIN No.	
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	

159 WHITE ← PIN F QM (2)

48 WAY ROUND QM CONNECTOR 2

VIOLET H J

GREY I K

WHITE K L

PINK L M

TURQUOISE M N

WHITE / RED N P

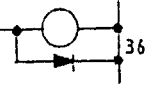
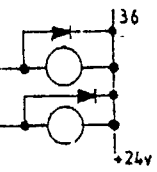
YELLOW / RED P R

RED / BLACK R S

151 BROWN

154 YELLOW

150 BLACK



QM (2) IS THE 8WAY QM SOCKET FOR AUXILIARIES

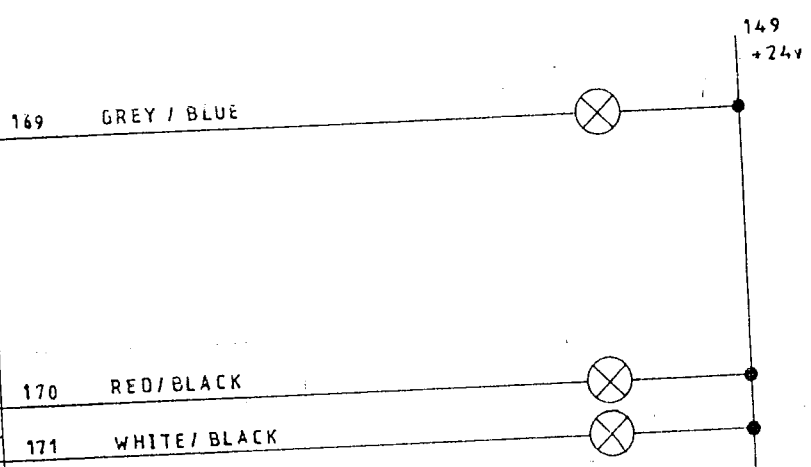
TRIAC FANUC OPERATORS CONTROL PANEL

OF SHEET NO. 1/4

FANUC OPERATORS PANEL TO LAMPS

M2B 50 WAY (FEMALE)

PC DESCRIPTION	ADDRESS & BIT No.	PIN No.
	0v	1 0
	0v	2 0
	0v	3 0
	0v	4 0
	Y 48-7	5 0
	Y 48-6	6 0
	Y 48-5	7 0
	Y 48-4	8 0
	Y 49-7	9 0
	Y 50-5	10 0
	Y 52-7	11 0
	Y 52-6	12 0
	Y 52-5	13 0
	Y 52-4	14 0
CONTROL ON LAMP	Y 52-3	15 0
	Y 52-2	16 0
	Y 52-1	17 0
	Y 52-0	18 0
	Y 50-2	19 0
	Y 50-3	20 0
SPARES	Y 50-0	21 0
	Y 49-3	22 0
	Y 49-1	23 0
	Y 49-0	24 0
	Y 48-0	25 0



PIN NUMBERS
26-50
NOT USED

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN. BY: A. McHENRY DATE: 9-6-88

TRCD. BY:

DATE:

A3-410024

TRIAE FANUC OM-B
M2B TO LAMPS

OF

CONT. ON
SHEET NO.

SHEET NO. 15

20 WAY FEMALE

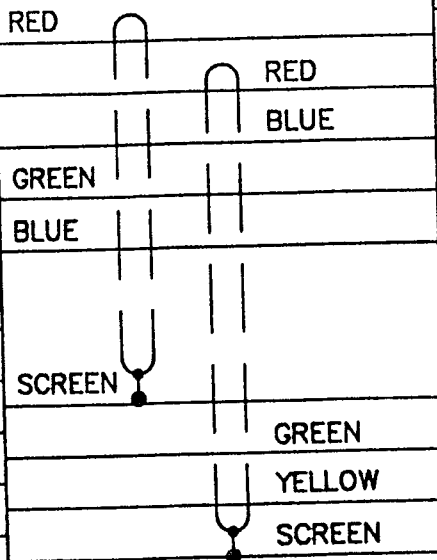
CCX2 ON GRAPHICS BOARD
IF GRAPHICS OPTION FITTED

CCX1 ON MAIN PCB
CCX5 ON OTC

20 WAY FEMALE

CONNECTOR CN1 (CRT/MDI PANEL)

SIGNAL	Pin No
RVDO	1
HSYN	2
VSYN	3
GVDO	4
BVDO	5
	6
	7
OG	8
0v	9
0v	10
OG	11
	12
	13
	14
	15
	16
	17
	18
	19
	20



Pin No	SIGNAL
1	RVDO
2	HSYN
3	VSYN
4	GVDO
5	BVDO
6	
7	
8	OG
9	0v
10	0v
11	OG
12	
13	
14	
15	
16	
17	
18	
19	
20	

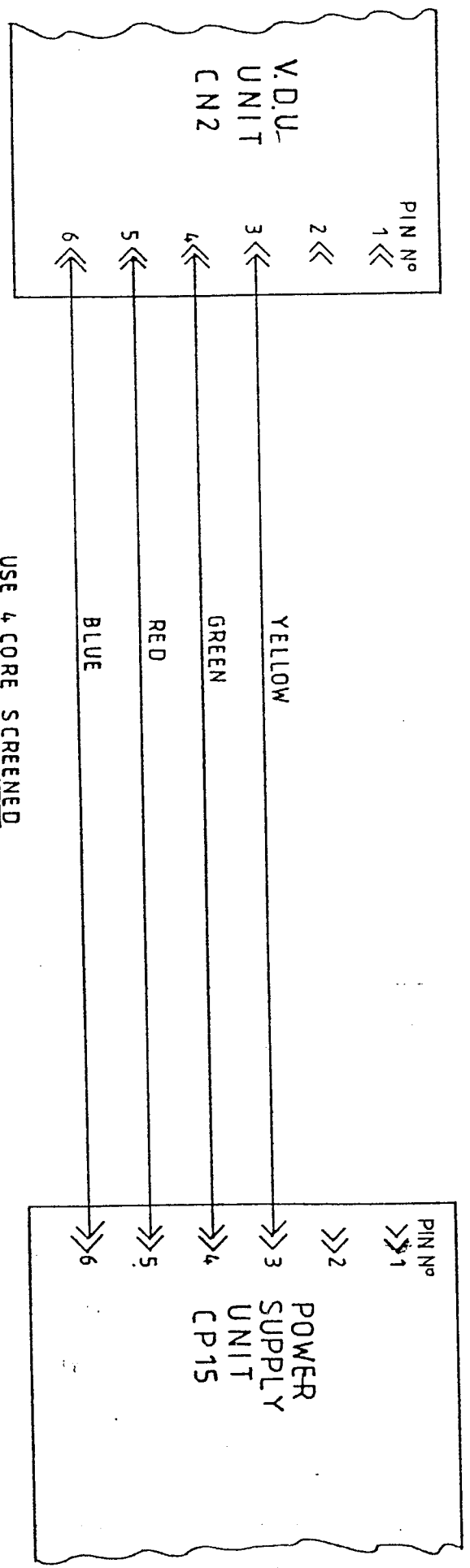
DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A NEWSOME DATE 11-10-90 A3-50000

CONTROL TO VDU
SIGNALS
(CCX1, CCX2, CCX3)

SHEET No 23

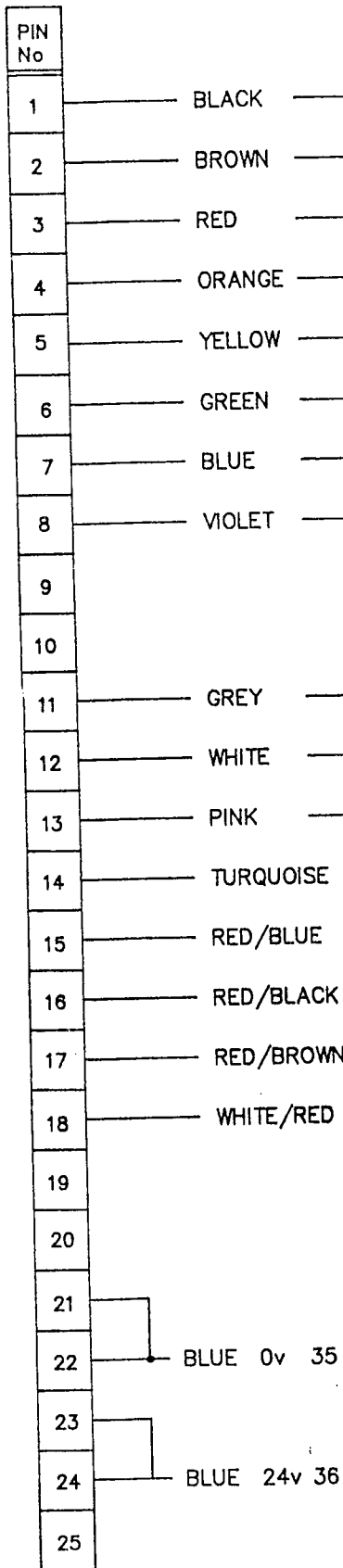
OF

SHEET 24 POWER SUPPLY CONNECTIONS TO V.D.U. A4-310023



25 WAY D TYPE FEMALE

M20 HONDA 50 WAY FEMALE



PIN No	BIT No	DESCRIPTION
27	X12.0	ADDITIONAL INPUT 1
42	X12.1	ADDITIONAL INPUT 2
12	X12.2	ADDITIONAL INPUT 3
43	X12.3	ADDITIONAL INPUT 4
13	X12.4	ADDITIONAL INPUT 5
44	X12.5	ADDITIONAL INPUT 6
14	X12.6	ADDITIONAL INPUT 7
45	X12.7	ADDITIONAL INPUT 8
33	Y84.0	ADDITIONAL OUTPUT 1
19	Y84.1	ADDITIONAL OUTPUT 2
34	Y84.2	ADDITIONAL OUTPUT 2
20	Y84.3	ADDITIONAL OUTPUT 4
35	Y84.4	ADDITIONAL OUTPUT 5
5	Y84.5	ADDITIONAL OUTPUT 6
21	Y84.6	ADDITIONAL OUTPUT 7
36	Y84.7	ADDITIONAL OUTPUT 8
1	0v	
28	COM4	
29	COM5	

LINK

TRIAC-F OM-C
M20 ADDITIONAL
I/O CONNECTOR

OF

SHEET No 25

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A McHENRY DATE 1-7-96 TR4-01A

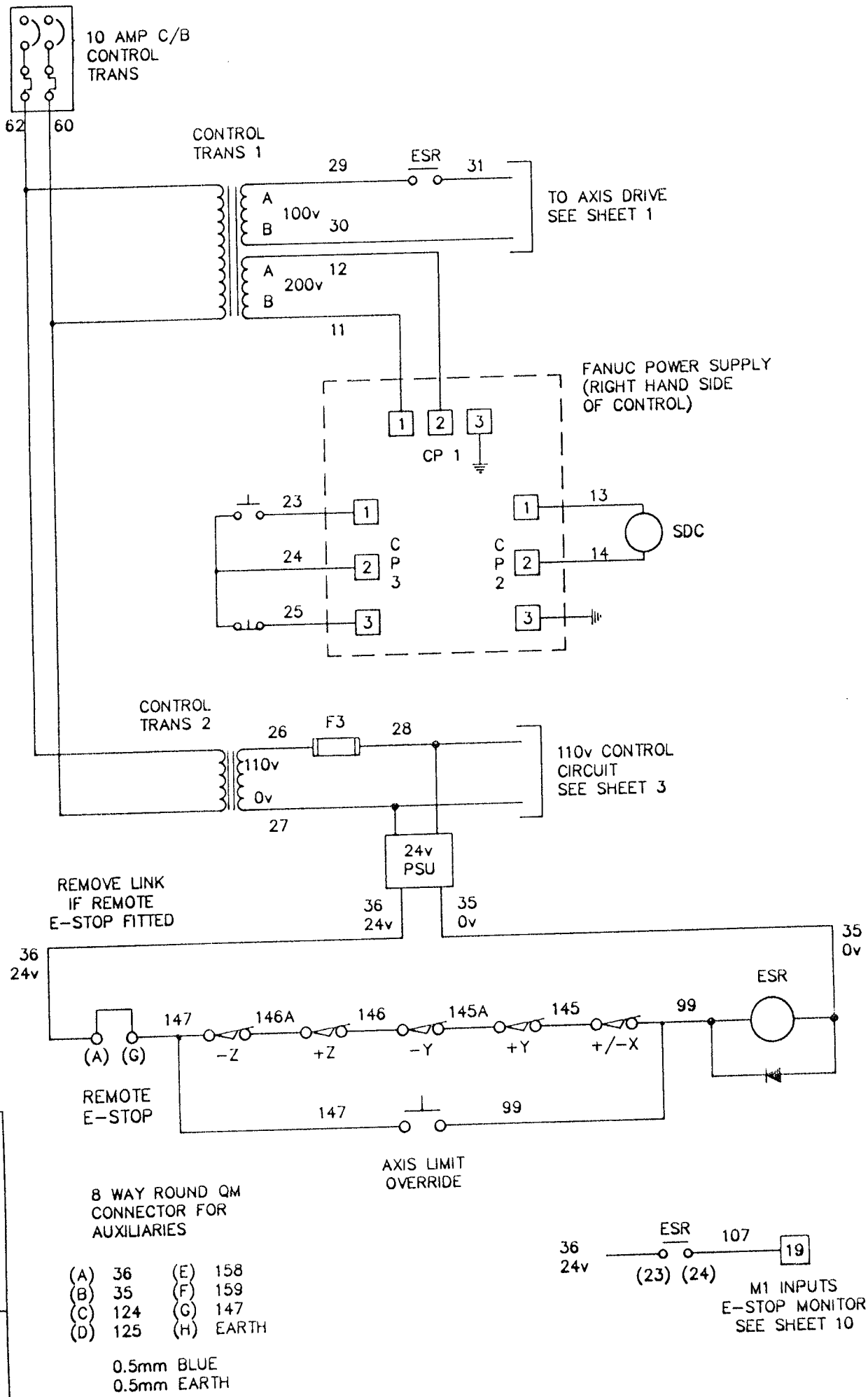


TRAC FANUC
 POWER SCHEMATIC
 [TF]
 SHEET 1

SEE SHEET 7 FOR DETAILS

RC SUPPRESSOR (RS 210-364)

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A MCHENRY DATE 17-7-95 TR4-02
 IF IN DOUBT ASK
 SHEET 2 [TF]

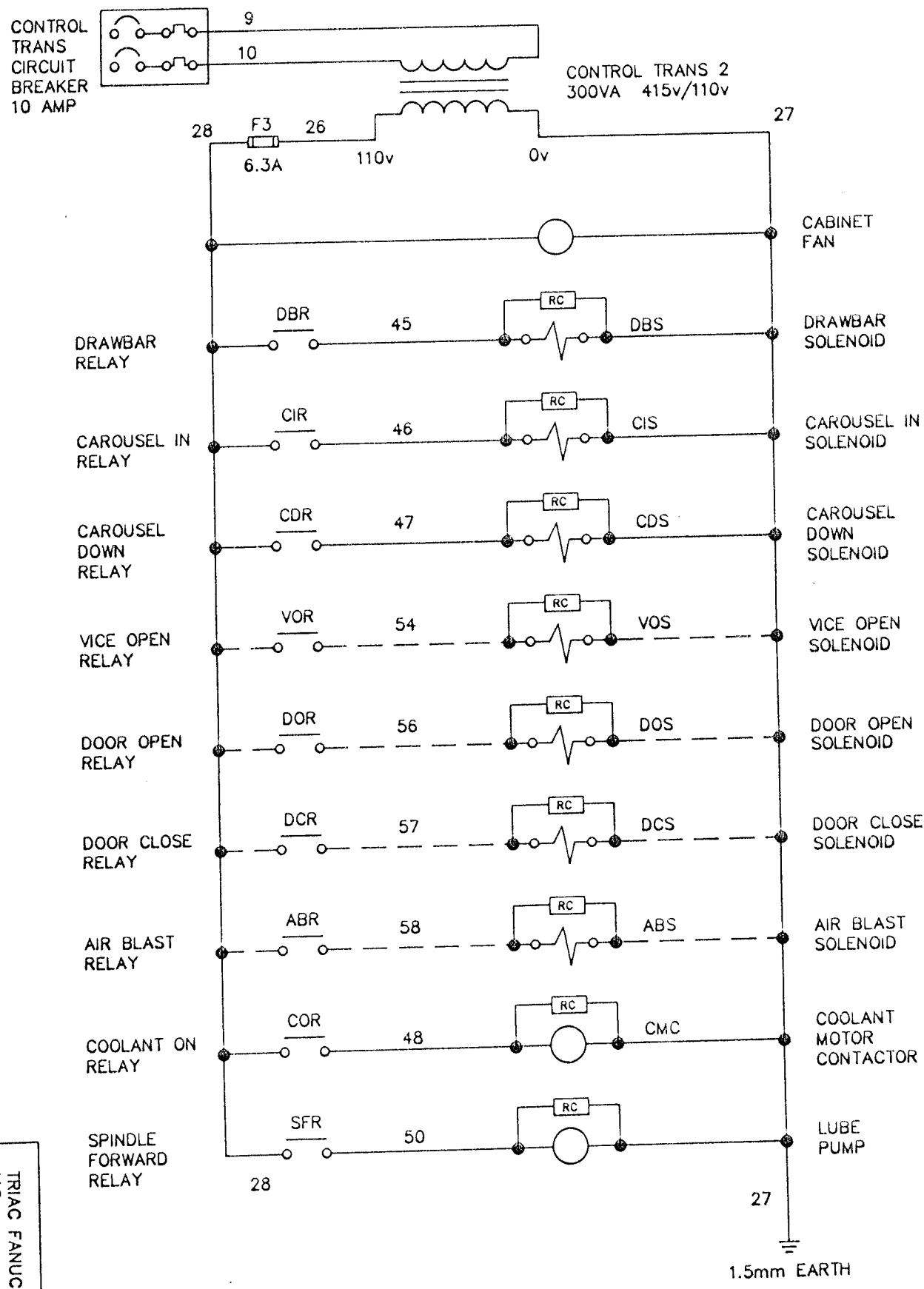


8 WAY ROUND QM CONNECTOR FOR AUXILIARIES

- | | |
|---------|-----------|
| (A) 36 | (E) 158 |
| (B) 35 | (F) 159 |
| (C) 124 | (G) 147 |
| (D) 125 | (H) EARTH |

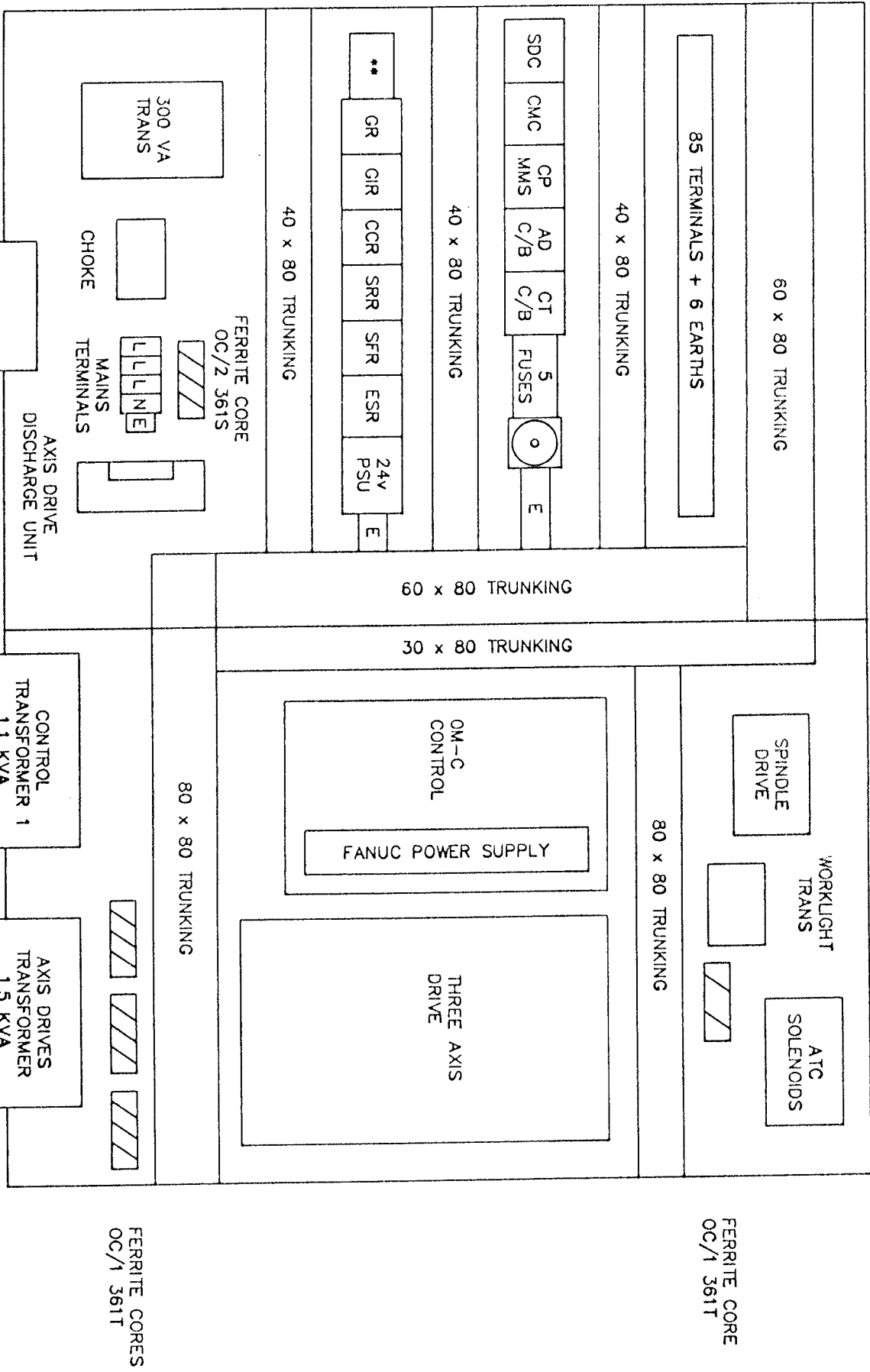
0.5mm BLUE
0.5mm EARTH

IF IN DOUBT ASK



TRAC FANUC
110V
SCHEMATIC

SHEET 3
[TF]



** RELAY MODULES
SEE SHEET 5 FOR DETAILS

FILTER
ON BOTTOM OF CABINET

TRANSFORMERS MOUNTED ON
BOTTOM OF CABINET

TRAC FANUC
MAIN PANEL
LAYOUT

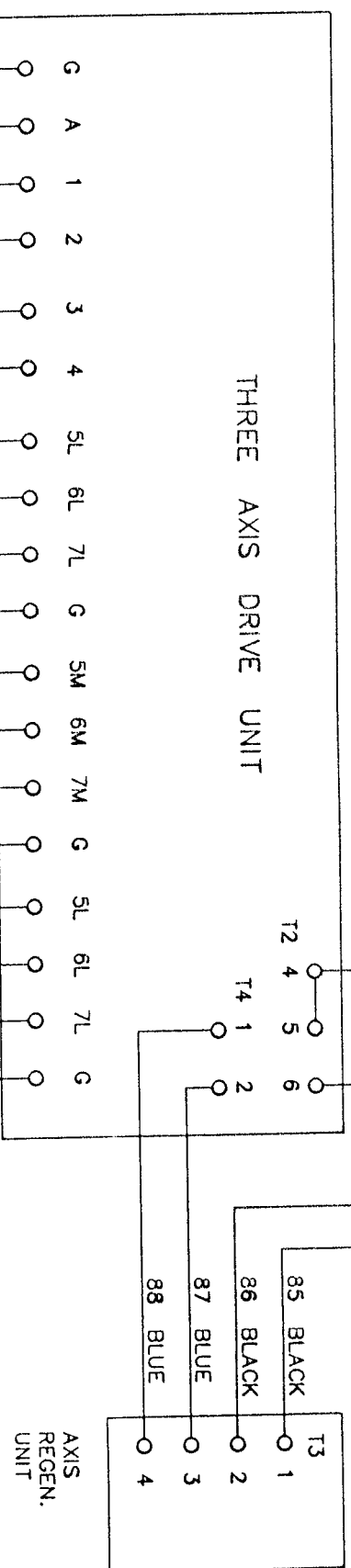
SHEET 4

[TF]

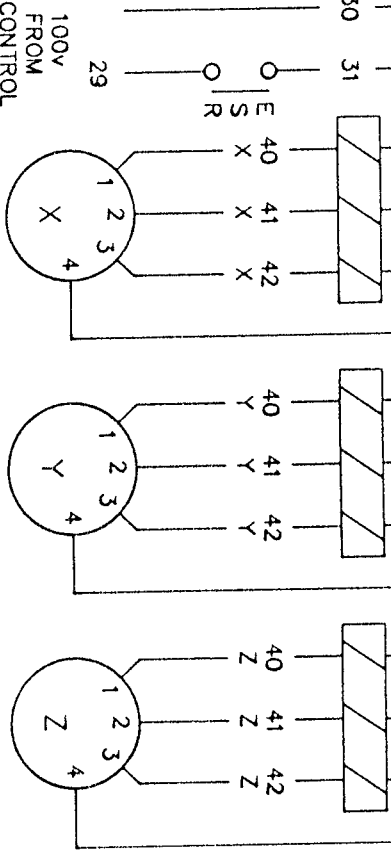
IF IN DOUBT ASK

ENSURE LINK IS FITTED

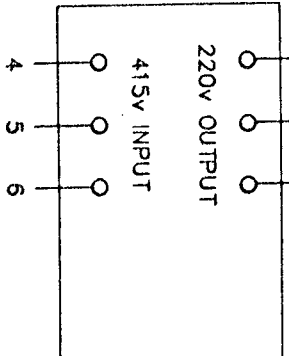
THREE AXIS DRIVE UNIT



FERRITE CORES (BI 003615)



AXIS DRIVES TRANSFORMER 1.5 KVA



TRIAC FANUC AXIS DRIVE CONNECTIONS

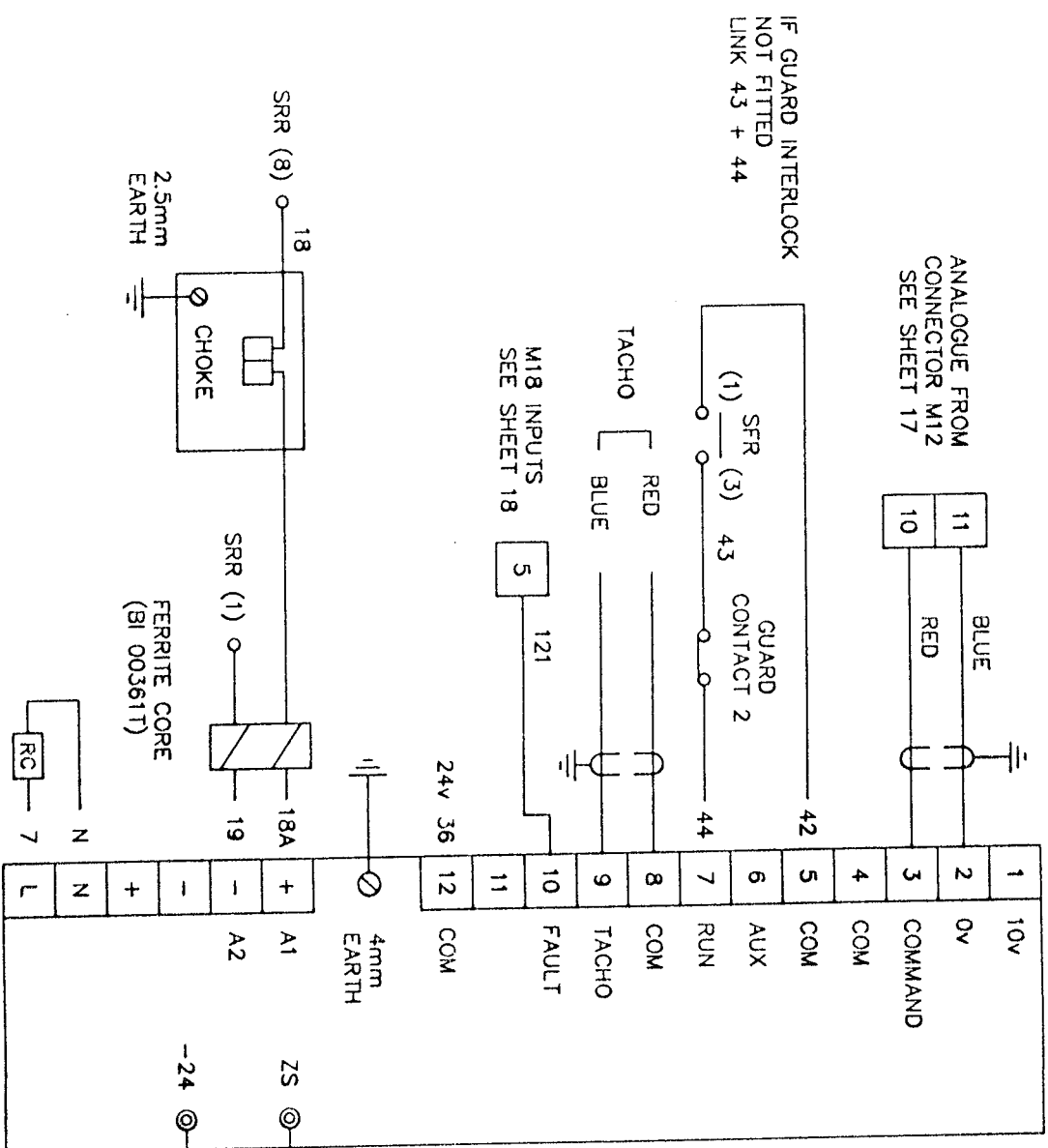
SHEET 6

[TF]

IF IN DOUBT ASK

2 CORE SCREEN
EARTH AT DRIVE END

SPINDLE DRIVE
SPRINT 16001



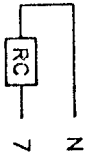
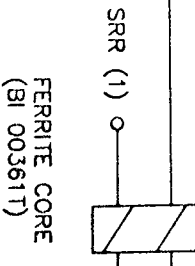
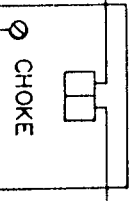
IF GUARD INTERLOCK
NOT FITTED
LINK 43 + 44

ANALOGUE FROM
CONNECTOR M12
SEE SHEET 17

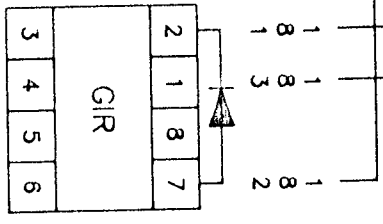
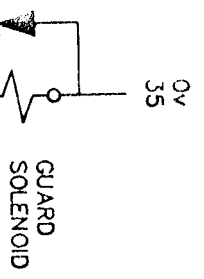
GUARD
CONTACT 2

M18 INPUTS
SEE SHEET 18

2.5mm
EARTH



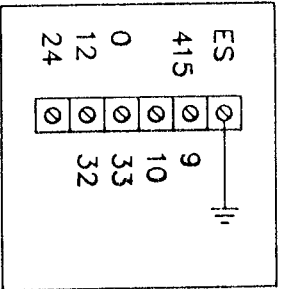
0.5mm BLUE
SOLDER TO
SPINDLE DRIVE



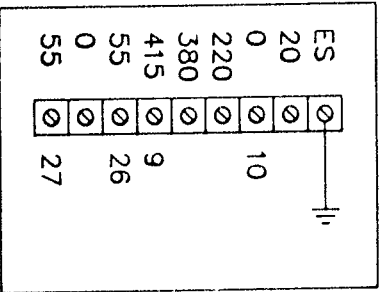
E-STOP
CONTACT 2
SEE SHEET 9

24V
36

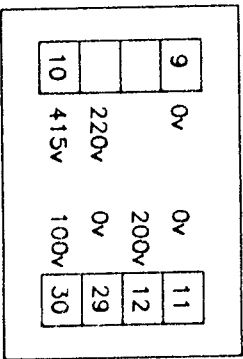
WORKLIGHT
TRANSFORMER
50 VA



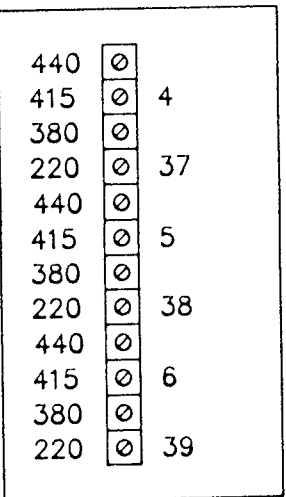
CONTROL
TRANSFORMER 2
300 VA



CONTROL
TRANSFORMER 1
1.1 KVA



AXIS DRIVES TRANSFORMER
1.5 KVA



TRANSFORMERS ON BOTTOM
OF CABINET

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN BY A. NEWSOME

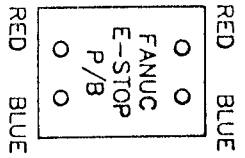
DATE 2-7-96

TR4-08A

TRIAC FANUC
TRANSFORMER
WIRING

SHEET 8
[TF]

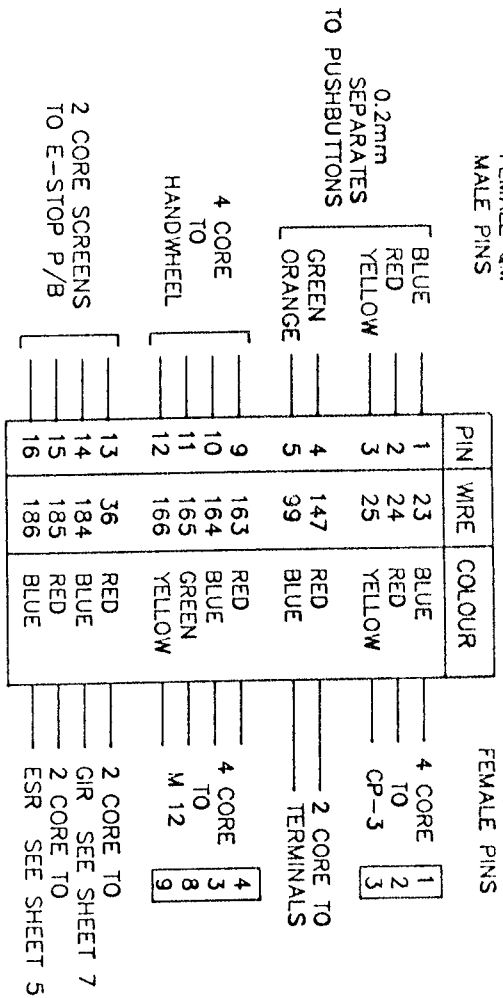
REMOVE AND LINK
ORIGINAL GREY WIRES
FROM E-STOP P/B



PUSHBUTTON SIDE
FEMALE QM
MALE PINS

24 WAY QM

PANEL SIDE
MALE QM
FEMALE PINS



CONTROL
ON P/BUTTON
(GREEN LENS)

CONTROL
OFF P/BUTTON
(RED LENS AND SHIELD)

SPINDLE
RELEASE
P/BUTTON
(RED LENS AND SHIELD)

CAROUSEL
CLOCKWISE P/BUTTON
(ORANGE LENS)

CAROUSEL
COUNTERCLOCKWISE
P/BUTTON
(ORANGE LENS)

AXIS OVERRIDE
P/BUTTON
(WHITE LENS)

GUARD
OVERRIDE
(WHITE LENS)

HANDWHEEL

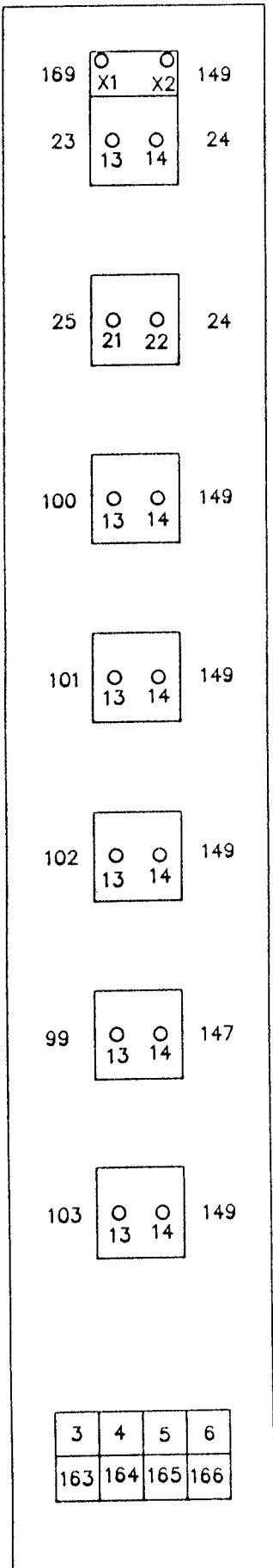


CHART NUMBER
CH 415B

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A. NEWSOME DATE 15-8-95 TR4-09

TRIAC FANUC
OPERATORS PANEL
DIAGRAM

SHEET 9
[TF]

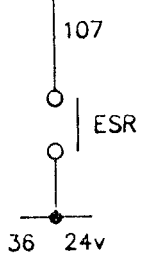
MAIN PCB
M1 50 WAY
HONDA FEMALE

OPERATORS PANEL
M1A 50 WAY
MALE

IF IN DOUBT ASK
DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A MCHENRY DATE 2-7-96 TR4-10A

DESCRIPTION	BIT No	PIN No		PIN No
	0v	1	RED/BROWN	1
	0v	2	RED/BLACK	2
	0v	3	YELLOW/MAUVE	3
	0v	4		4
KD 5	X20.5	5	BLACK	5
	X16.7	6	BROWN	6
	X17.7	7	RED	7
TOOL RELEASE PUSHBUTTON	X18.7	8	ORANGE	8
CAROUSEL CLOCKWISE P/B	X17.1	9	YELLOW	9
CAROUSEL ANTI- CLOCKWISE P/B	X17.0	10	GREEN	10
	X16.1	11	BLUE	11
	X16.0	12	VIOLET	12
KD 7	X20.7	13	GREY	13
KD 4	X20.4	14	WHITE	14
KD 3	X20.3	15	PINK	15
KD 2	X20.2	16	TURQUOISE	16
KD 1	X20.1	17	RED/BLUE	17
KD 0	X20.0	18	GREEN/RED	18
E-STOP MONITOR	X21.4	19	GREEN *	19
	X16.3	20	WHITE/RED	20
GUARD OVERRIDE PUSHBUTTON	X16.2	21	YELLOW/BROWN	21
	X17.3	22		22
	X17.2	23		23
	X18.3	24		24
	X18.2	25		25

GREEN *



36 CORE
ALL CORES USED

* 4 CORE
ALL CORES USED

TRIAC FANUC
M1 TO M1A
INPUTS (1-25)

SHEET 10
[TF]

MAIN PCB
M1 50 WAY
HONDA FEMALE

OPERATORS PANEL
M1A 50 WAY
MALE

DESCRIPTION	BIT No	PIN No	PIN No
	X21.6	26	26
RSV 1	X21.5	27	27
		28	28
	+24v	29	29
	+24v	30	30
	+24v	31	31
	+24v	32	32
* OV 8	X21.3	33	33
* OV 4	X21.2	34	34
* OV 2	X21.1	35	35
* OV 1	X21.0	36	36
KD 6	X20.6	37	37
X DATUM SWITCH	X16.5	38	38
Y DATUM SWITCH	X17.5	39	39
Z DATUM SWITCH	X18.5	40	40
KEY	X21.7	41	41
KST	X22.7	42	42
	X22.6	43	43
RSV 3	X22.5	44	44
RSV 2	X22.4	45	45
KA 3	X22.3	46	46
KA 2	X22.2	47	47
KA 1	X22.1	48	48
KA 0	X22.0	49	49
		50	50

WHITE/BROWN

GREY/GREEN

GREY/BROWN

WHITE/MAUVE

YELLOW/BLUE

WHITE/BLUE

BLUE/BLACK

ORANGE/BLUE

YELLOW/GREEN

110 RED *

111 BLUE *

112 YELLOW *

WHITE/GREEN

ORANGE/GREEN

GREEN/BLUE

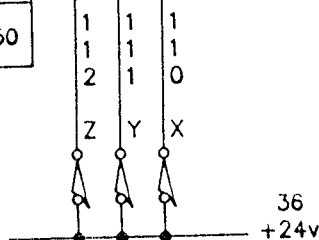
GREY/BLUE

GREEN/BLACK

VIOLET/BLACK

BROWN/BLACK

YELLOW/RED



36 CORE
ALL CORES USED

* 4 CORE
ALL CORES USED

36
+24v

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN BY A MCHENRY

DATE 2-7-96

TR4-11A

TRIAC FANUC
M1 TO M1A
INPUTS (25-50)

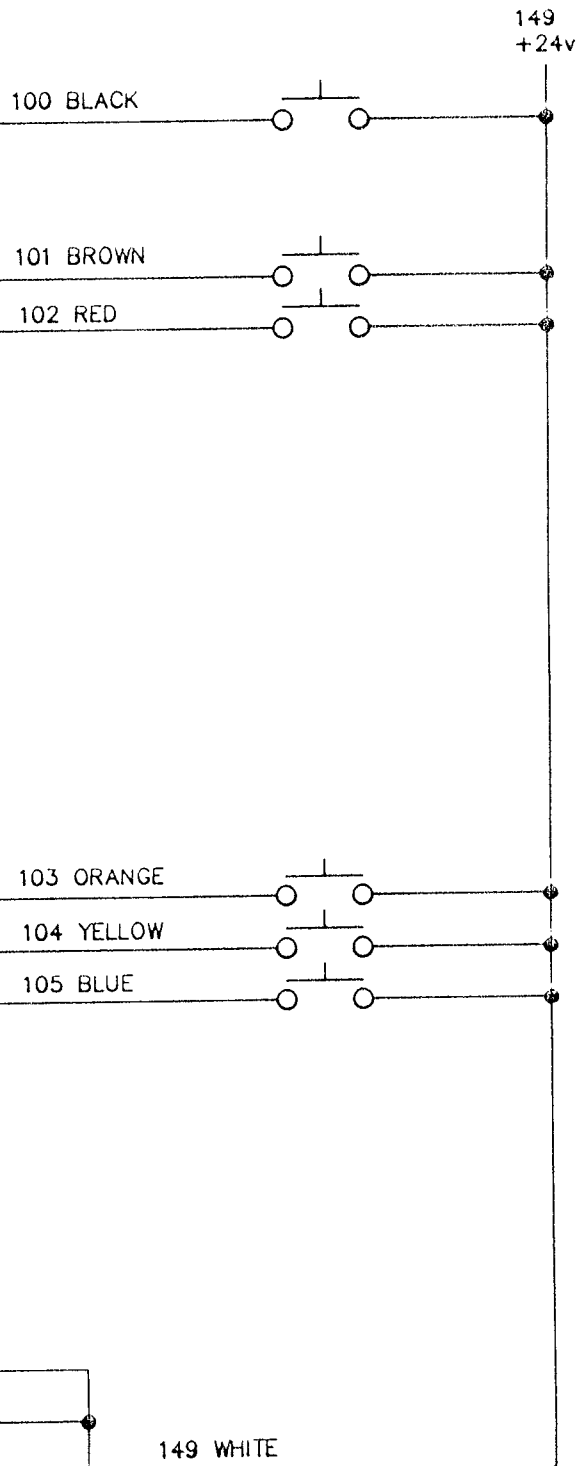
SHEET 11

[TF]

FANUC OPERATORS PANEL
TO PUSHBUTTONS

M1B 50 WAY HONDA FEMALE

PC DESCRIPTION	ADDRESS + BIT No	PIN No
	0v	1
	0v	2
	0v	3
	0v	4
KD 5	X20.5	5
TOOL UNCLAMP P/B	X16.7	6
	X17.7	7
	X18.7	8
CAROUSEL CLOCKWISE P/B	X17.1	9
C/ANTICLOCKWISE P/B	X17.0	10
	X16.1	11
	X16.0	12
KD 7	X20.7	13
KD 4	X20.4	14
KD 3	X20.3	15
KD 2	X20.2	16
KD 1	X20.1	17
KD 0	X20.0	18
E-STOP MONITOR	X21.4	19
	X16.3	20
GUARD O/RIDE	X16.2	21
	X17.3	22
	X17.2	23
	X18.3	24
	X18.2	25
		26
		27
		28
		29
	+24v	30
	+24v	31
	+24v	32



SPARES

PINS 26-29
AND 33-50
ARE NOT USED

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN BY A MCHENRY

DATE 17-8-95

TR4-12

TRIAC FANUC
M1B
PUSHBUTTON
INPUTS

SHEET 12
[TF]

M2 MAIN PCB
50 WAY HONDA FEMALE

M2A OPERATORS PANEL
50 WAY HONDA MALE

DESCRIPTION	BIT No	PIN		PIN
	0v	1	BLACK	1
	0v	2	BROWN	2
	0v	3	RED	3
	0v	4		4
	Y48.7	5		5
	Y48.6	6		6
	Y48.5	7		7
	Y48.4	8		8
SPARE	Y49.7	9	156 BLUE *	9
SPARE	Y50.5	10	157 VIOLET *	10
	Y52.7	11		11
AUXILIARY OUTPUT 1	Y52.6	12	158 GREY * QM2 (E)	12
CAROUSEL DOWN RELAY	Y52.5	13	153 ORANGE * CDR	13
CAROUSEL IN RELAY	Y52.4	14	152 RED * CIR	14
CONTROL ON LAMP	Y52.3	15	ORANGE	15
X AT DATUM LAMP	Y52.2	16	YELLOW	16
Y AT DATUM LAMP	Y52.1	17	GREEN	17
Z AT DATUM LAMP	Y52.0	18	BLUE	18
IV AT DATUM LAMP	Y50.2	19	WHITE/BLUE	19
	Y50.3	20		20
COOLANT ON RELAY	Y50.0	21	155 GREEN * COR	21
	Y49.3	22		22
	Y49.1	23		23
	Y49.0	24		24
	Y48.0	25		25

36
24v

36
24v

20 CORE
TO OPERATORS PANEL

12 CORE *
TO RELAYS

CUT OUT
RED/BLUE
GREEN/RED
RED/BROWN
YELLOW/BLUE

CUT OUT
BLACK
TURQUOISE

1K
RESISTOR
(RS 132-494)

IF IN DOUBT
ASK

DENFORD MACHINE TOOLS BRIGHOUSE WEST YORKSHIRE

DRN BY A McHENRY

DATE 2-7-96

TR4-13A

TRIAC FANUC
M2 TO M2A
OUTPUTS (1-25)

SHEET 13
[TF]

IF IN DOUBT ASK

DENFORD MACHINE TOOLS BRIGHOUSE WEST YORKSHIRE

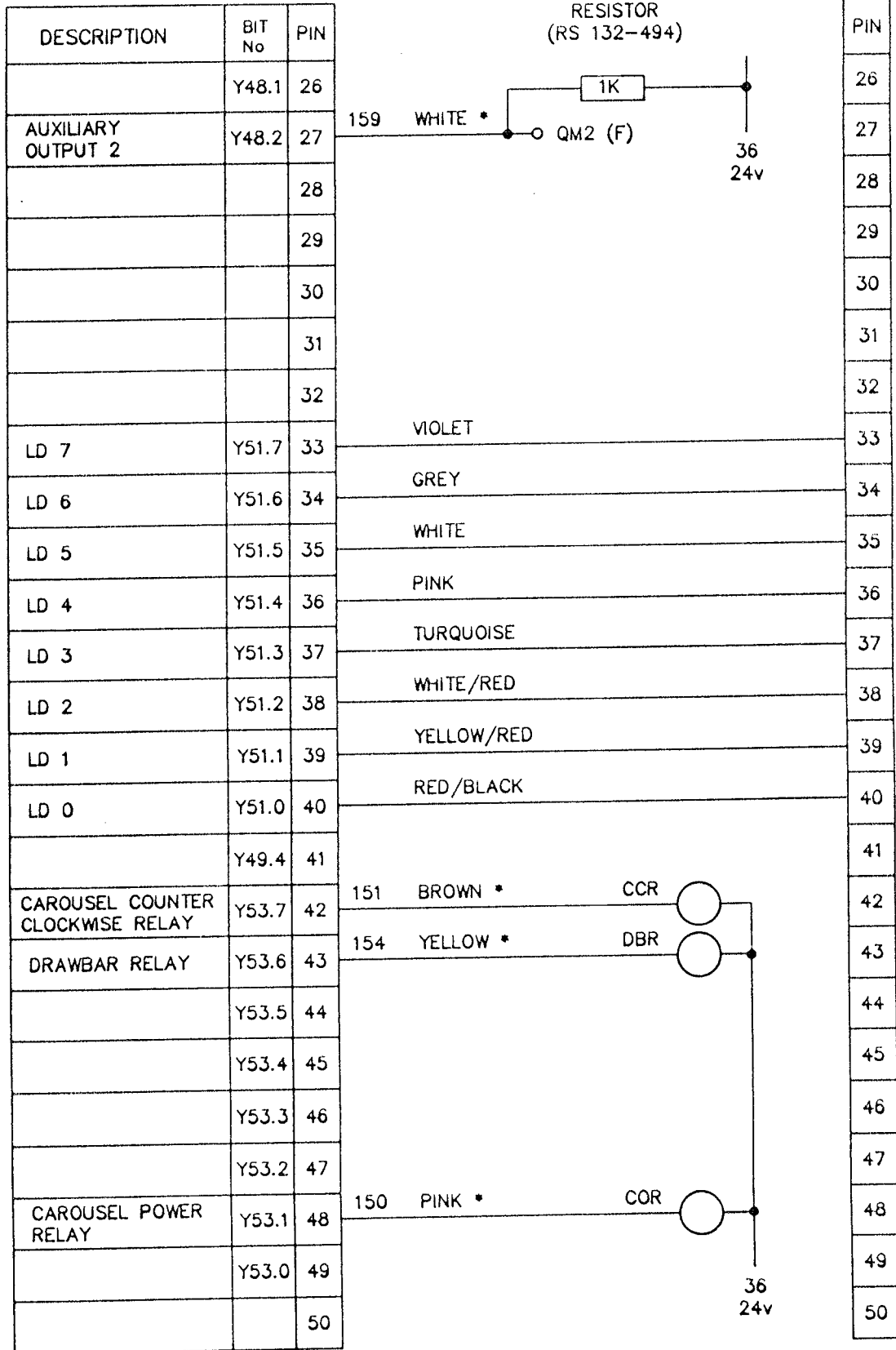
DRN BY A McHENRY

DATE 2-7-96

TR4-14A

M2 MAIN PCB
50 WAY HONDA FEMALE

M2A OPERATORS PANEL
50 WAY HONDA MALE



20 CORE
TO OPERATORS PANEL

12 CORE *
TO RELAYS

CUT OUT
RED/BLUE
GREEN/RED
RED/BROWN
YELLOW/BLUE

CUT OUT
BLACK
TURQUOISE

TRIAC FANUC
M2 TO M2A
OUTPUTS (26-50)

SHEET 14

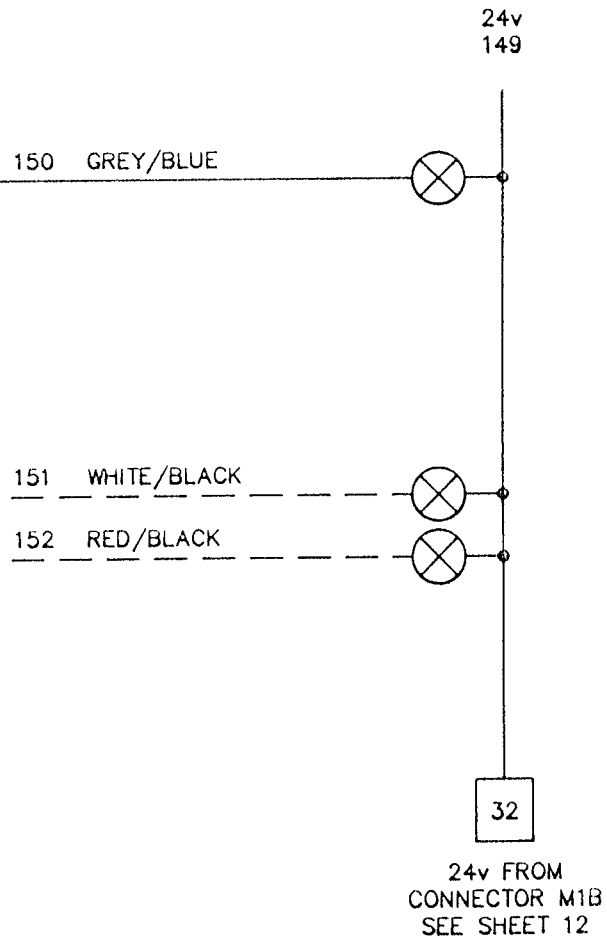
[TF]

M2B OPERATORS PANEL
50 WAY HONDA FEMALE

DESCRIPTION	BIT No	PIN
	0v	1
	0v	2
	0v	3
	0v	4
	Y48.7	5
	Y48.6	6
	Y48.5	7
	Y48.4	8
	Y49.7	9
	Y50.5	10
	Y52.7	11
	Y52.6	12
	Y52.5	13
	Y52.4	14
CONTROL ON LAMP	Y52.3	15
	Y52.2	16
	Y52.1	17
	Y52.0	18
	Y50.2	19
SPARE	Y50.3	20
SPARE	Y50.0	21
	Y49.3	22
	Y49.1	23
	Y49.0	24
	Y48.0	25

PINS 26 TO 50
NOT USED

0.2mm SINGLE WIRES



IF IN DOUBT ASK

DENFORD MACHINE TOOLS BRIGHOUSE WEST YORKSHIRE

DRN BY A McHENRY

DATE 23-8-95

TR4-15

TRIAC FANUC
M2B LAMP
OUTPUTS

SHEET 15

[TF]

IF IN DOUBT ASK

DENFORD MACHINE TOOLS BRIGHOUSE WEST YORKSHIRE

DRN BY A MCHENRY

DATE 23-8-95

TR4-16

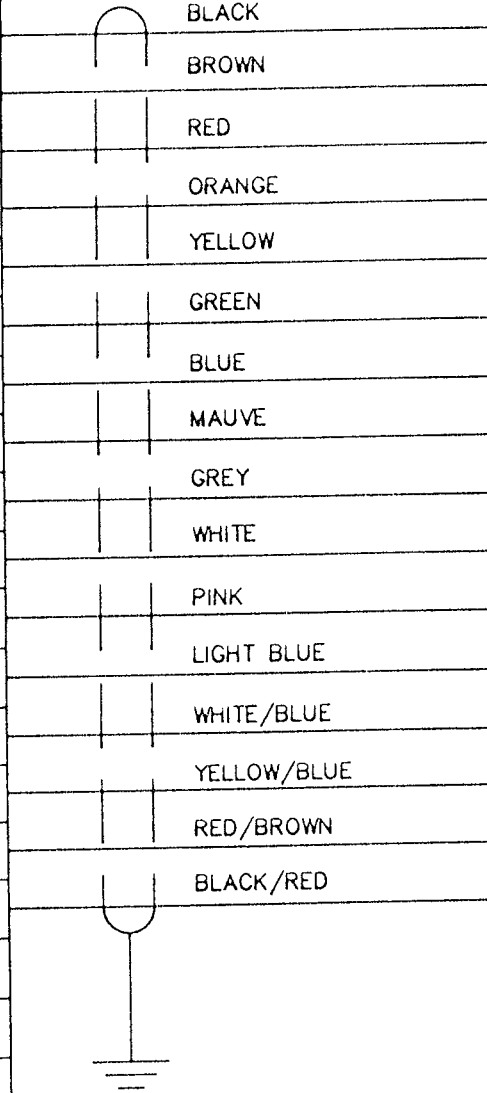
M3

(CONTROL)
20 WAY FEMALE
CONNECTOR

KM1

(MONITOR UNIT)
20 WAY MALE
CONNECTOR

DESCRIPTION	PIN No
	1
KCM0-0	2
KCM0-1	3
SW0-6	4
SW0-4	5
SW0-2	6
SW0-0	7
KCM0-2	8
KCM0-3	9
SW0-7	10
SW0-5	11
SW0-3	12
SW0-1	13
KCM0-4	14
KCM0-5	15
KCM0-6	16
KCM0-7	17
	18
	19
	20



PIN No	DESCRIPTION
1	
2	KCM0-0
3	KCM0-1
4	SW0-6
5	SW0-4
6	SW0-2
7	SW0-0
8	KCM0-2
9	KCM0-3
10	SW0-7
11	SW0-5
12	SW0-3
13	SW0-1
14	KCM0-4
15	KCM0-5
16	KCM0-6
17	KCM0-7
18	
19	
20	

20 CORE SCREEN
CUT OUT
YELLOW/RED
WHITE/RED
RED/BLUE
GREEN/RED

TRIAC FANUC
CONTROL TO KEYPAD
SIGNALS
M3 - KM1

SHEET 16

[TF]

IF IN DOUBT ASK

M12
HANDWHEEL
CONNECTOR
20 WAY FEMALE CONNECTOR

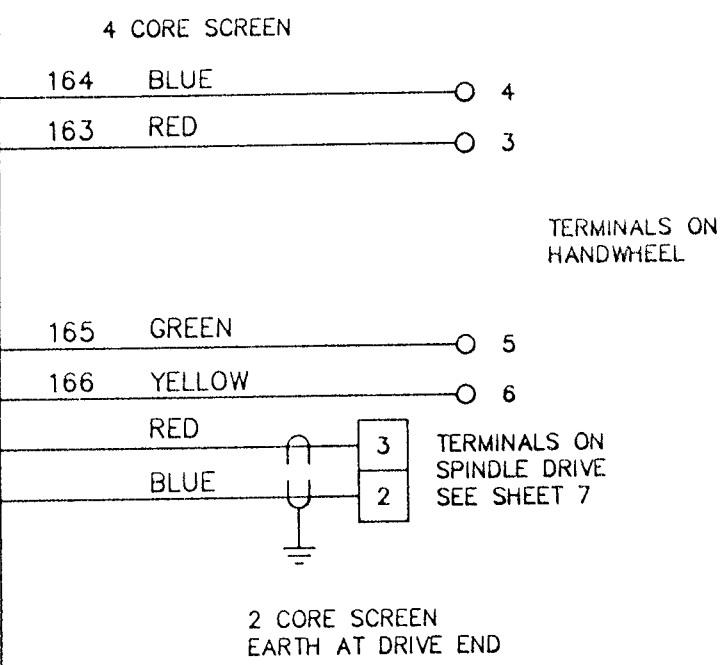
DENFORD MACHINE TOOLS BRIGHOUSE WEST YORKSHIRE

DRN BY A MCHENRY

DATE 23-8-95

TR4-17

DESCRIPTION	PIN
0v	1
0v	2
0v	3
+5v	4
+5v	5
+5v	6
	7
HA1	8
HB1	9
COMMAND	10
0v	11
	12
	13
	14
	15
	16
	17
	18
	19
	20



TRIAC FANUC
M12 HANDWHEEL
CONNECTIONS

SHEET 17
[TF]

M18 CONTROL INPUTS

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN BY A MCHENRY

DATE 24-8-95

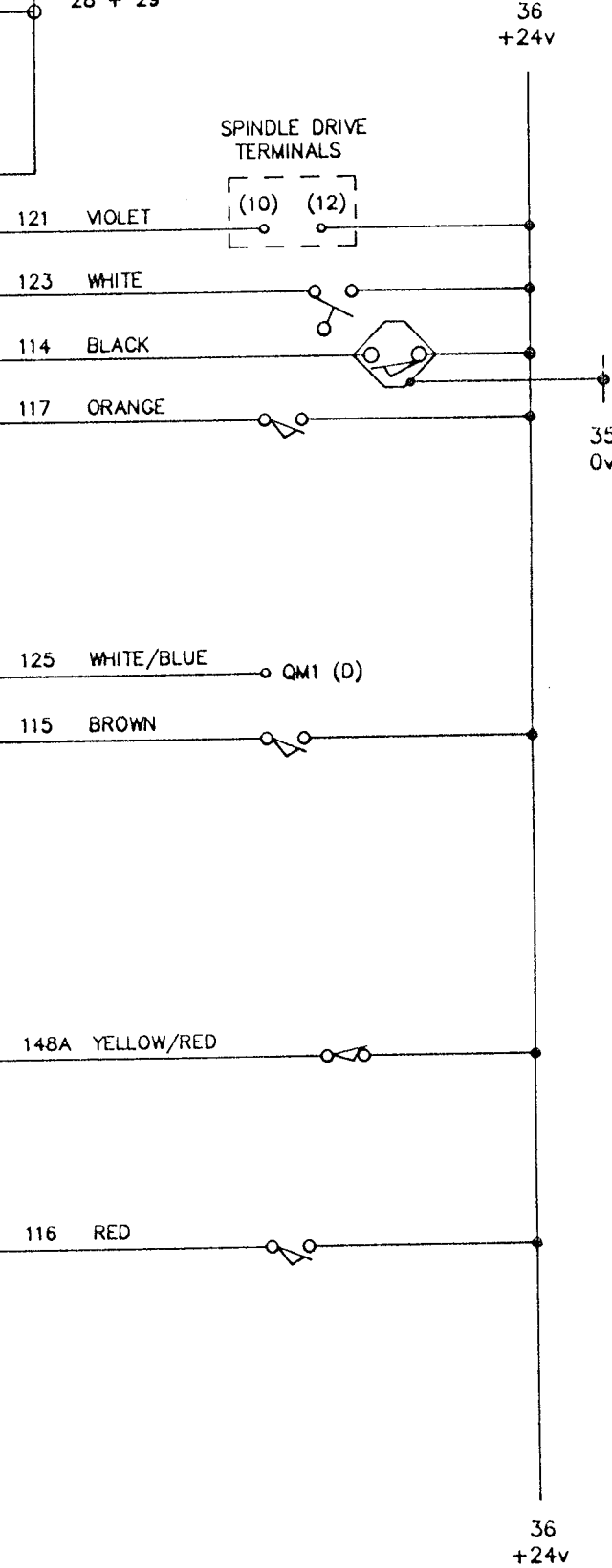
TR4-18

50 WAY FEMALE HONDA CONNECTOR

DESCRIPTION	BIT	PIN
	0v	1
	0v	2
	0v	3
	COM1	4
SPINDLE ALARM	X00.5	5
LUBE FLOAT SWITCH	X02.0	6
CAROUSEL 1 REV SENSOR	X02.3	7
CAROUSEL UP SWITCH	X02.6	8
	X04.1	9
	X04.4	10
	X04.7	11
AUXILIARY INPUT 2	X06.2	12
CAROUSEL IN SWITCH	X06.4	13
	X06.6	14
XAE	X08.0	15
+MITX	X08.2	16
+MITZ	X08.4	17
GUARD CLOSED SWITCH	X08.6	18
	X00.1	19
	X00.3	20
CAROUSEL OUT SWITCH	X00.6	21
	X02.1	22
	X02.4	23
	X02.7	24
	X04.2	25

LINK TO PINS 28 + 29

SPINDLE DRIVE TERMINALS



20 CORE SCREEN TO TERMINALS
CUT OUT
RED/BROWN
GREEN/RED
TURQUOISE

QM1 8 WAY SOCKET (AUXILIARIES)

TRIAC FANUC
M18
INPUTS (1-25)

SHEET 18

[TF]

M18 CONTROL INPUTS

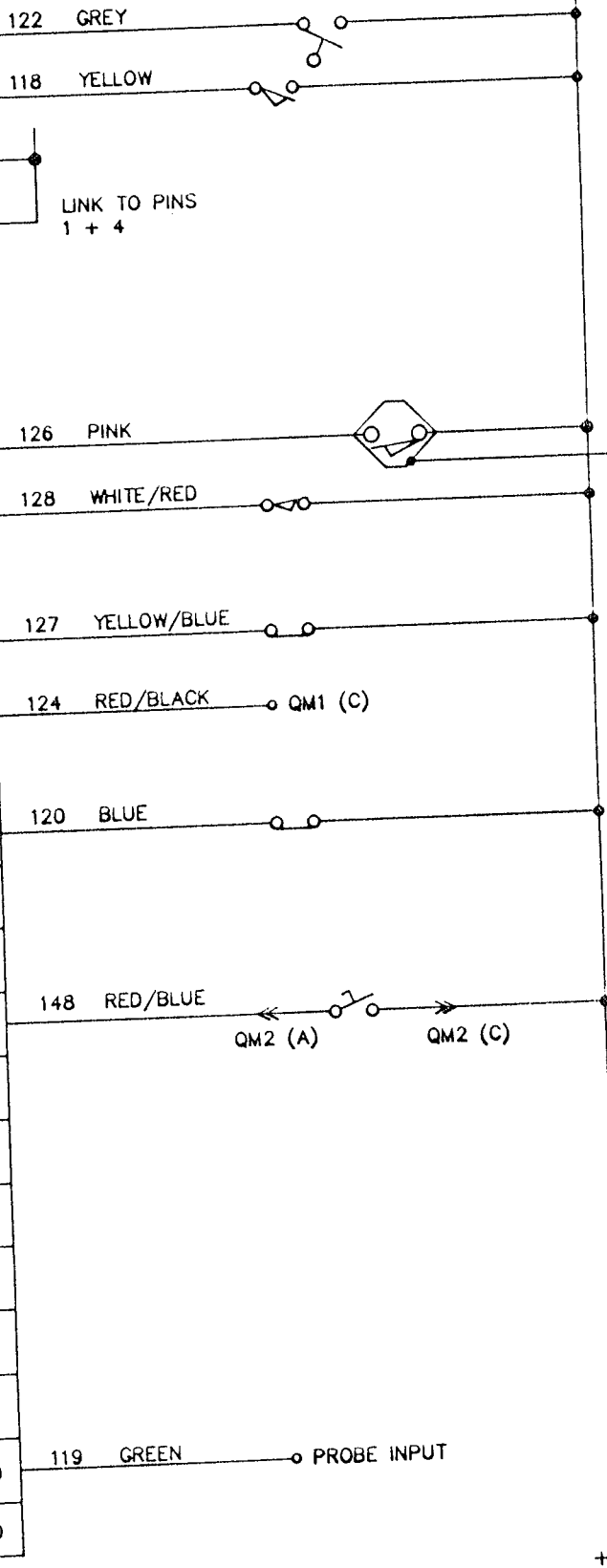
36
+24v

35
0v

36
+24v

50 WAY
FEMALE
HONDA
CONNECTOR

DESCRIPTION	BIT	PIN
AIR PRESSURE SWITCH	X04.5	26
CAROUSEL DOWN SWITCH	X06.0	27
	COM2	28
	COM3	29
		30
		31
		32
SPINDLE ORIENTATION SENSOR	X00.0	33
GUARD FULLY OPEN SWITCH	X00.2	34
	X00.4	35
SPINDLE MOTOR THERMAL	X00.7	36
AUX INPUT 1	X02.2	37
	X02.5	38
DRIVE TRANS THERMAL	X04.0	39
	X04.3	40
	X04.6	41
VICE OPEN FOOT SWITCH	X06.1	42
	X06.3	43
	X06.5	44
	X06.7	45
ZAE	X08.1	46
-MITX	X08.3	47
-MITZ	X08.5	48
SKIP	X08.7	49
		50



20 CORE SCREEN TO TERMINALS
CUT OUT
RED/BROWN
GREEN/RED
TURQUOISE

QM1 8 WAY SOCKET (AUXILIARIES)
QM2 8 WAY SOCKET (FOOT SWITCH)

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN BY A McHENRY

DATE 24-8-95

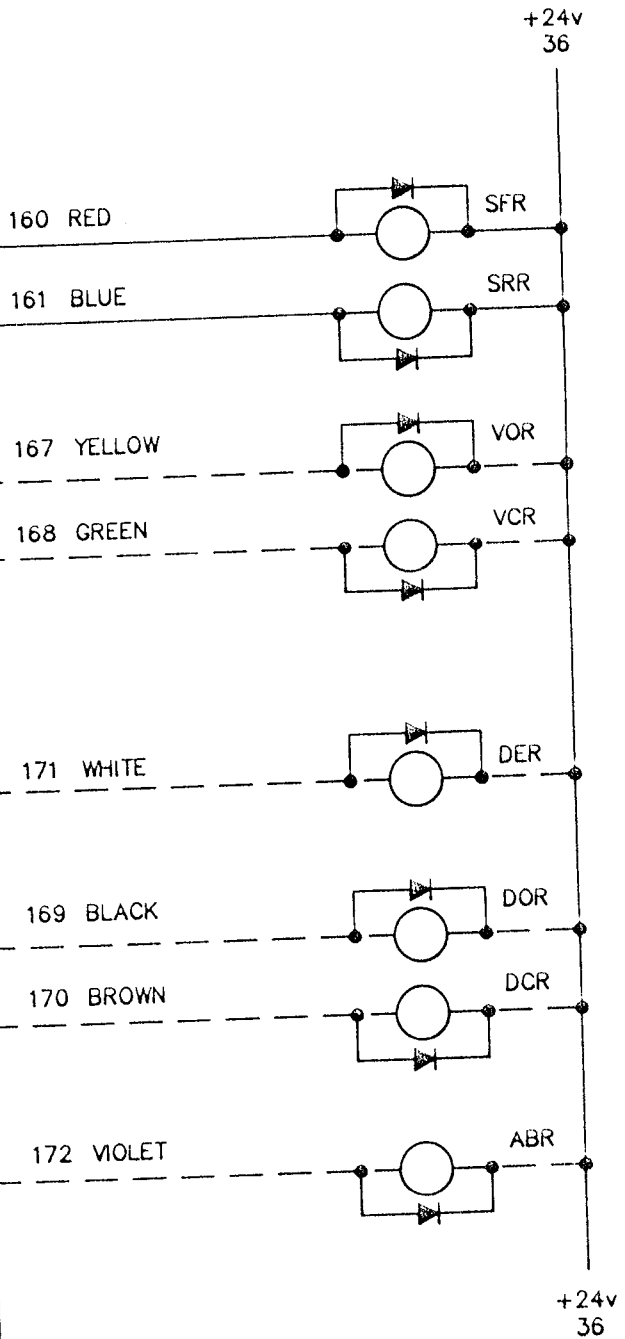
TR4-19

TRIAC FANUC
M18
INPUTS (26-50)

SHEET 19
[TF]

M19 20 WAY FEMALE
HONDA
CONNECTOR

DESCRIPTION	BIT No	PIN No
	Y80.0	1
SPINDLE FORWARD	Y80.1	2
SPINDLE REVERSE	Y80.2	3
	Y80.3	4
VICE OPEN RELAY	Y80.4	5
VICE CLOSE RELAY	Y80.5	6
	Y80.6	7
	Y80.7	8
DRAWBAR EXHAUST RELAY	Y82.0	9
	Y82.1	10
DOOR OPEN RELAY	Y82.2	11
DOOR CLOSE RELAY	Y82.3	12
	Y82.4	13
AIR BLAST RELAY	Y82.5	14
	Y82.6	15
	Y82.7	16
		17
	0v	18
	0v	19
		20



8 CORE SCREEN

IF IN DOUBT ASK

DENFORD MACHINE TOOLS LTD

BRIGHOUSE

WEST YORKSHIRE

DRN BY A MCHENRY

DATE 25-8-95

TR4-20

TRIAC FANUC
M19
OUTPUTS

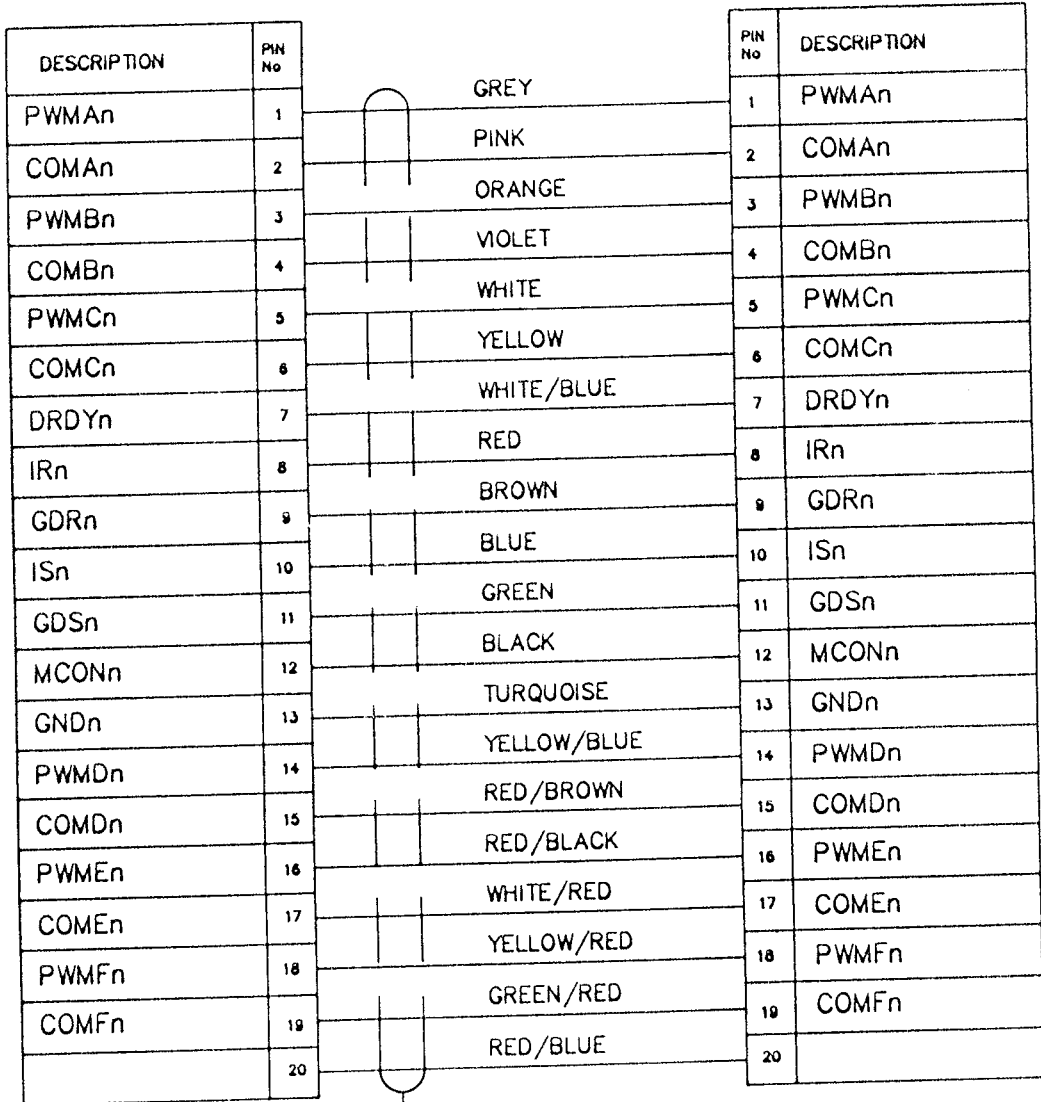
SHEET 20
[TF]

CONTROL TO AXIS DRIVES

X AXIS M34 TO CN1L
 Y AXIS M37 TO CN1M
 Z AXIS M44 TO CN1N

20 WAY MALE
 HONDA CONNECTOR

20 WAY FEMALE
 HONDA CONNECTOR



SCREEN AT
 CONTROL END

20 CORE SCREEN
 ALL COLOURS USED

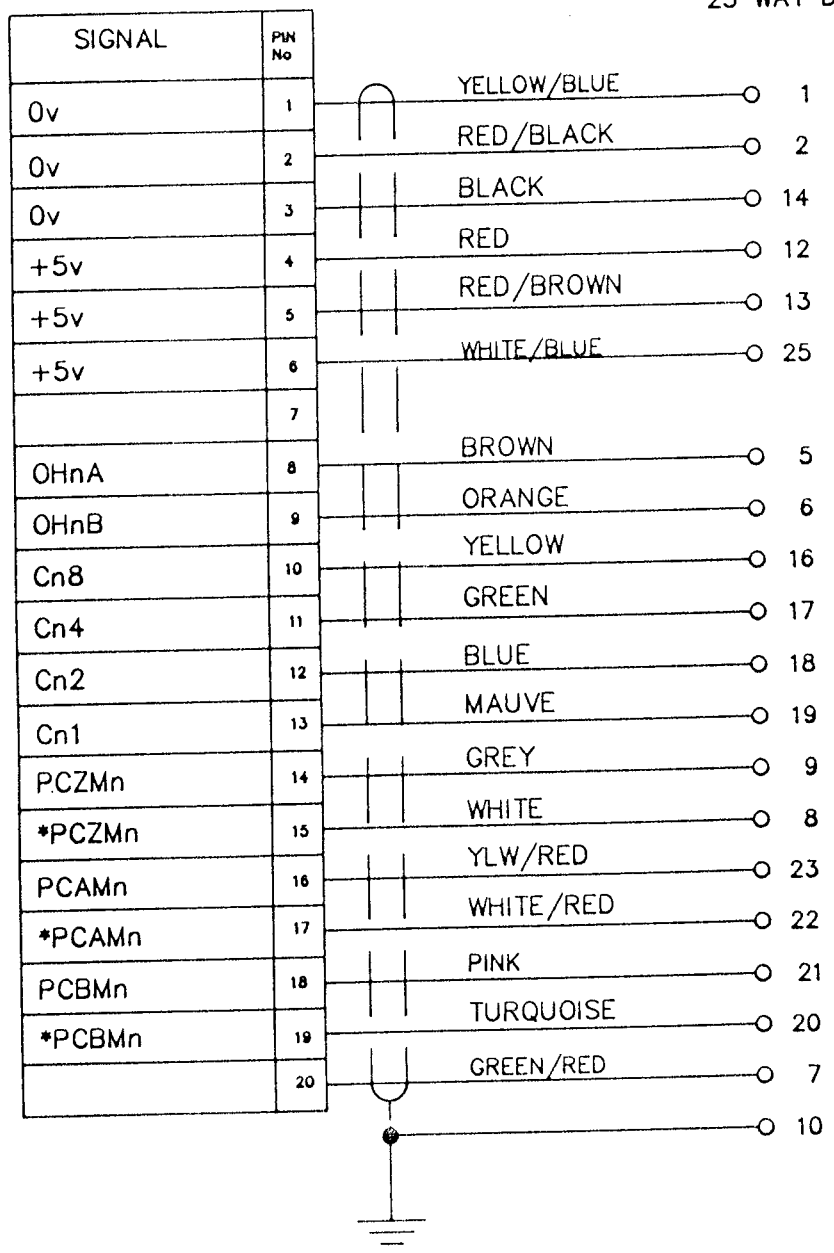
TRIAC FANUC
 CONTROL TO AXIS
 DRIVE SIGNALS
 M34, M37, M44

SHEET 21
 [TF]

MAIN PCB TO AXIS MOTORS

- M35 X AXIS
- M38 Y AXIS
- M45 Z AXIS
- M48 IV AXIS

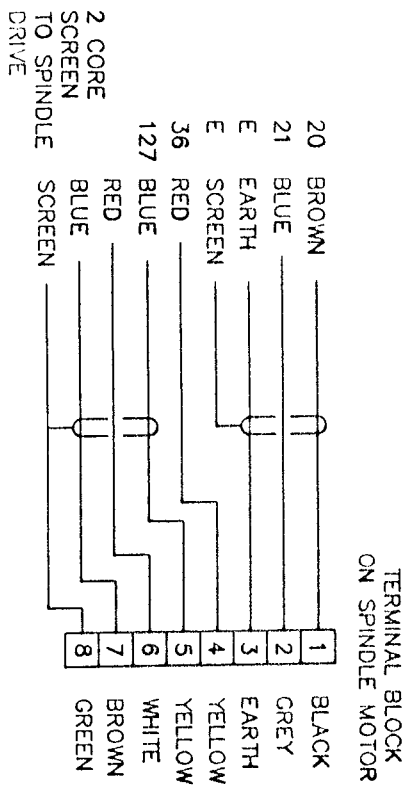
AXIS MOTOR
ENCODER CONNECTOR
25 WAY D TYPE



20 CORE SCREEN
CUT OUT
RED/BLUE

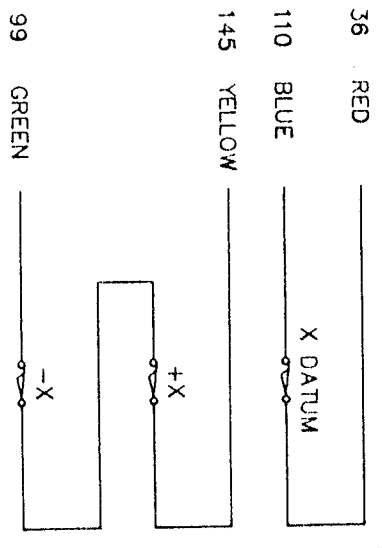
TRAC FANUC
AXIS MOTOR TO
CONTROL SIGNALS
M35, M38, M45

SHEET 22
[TF]

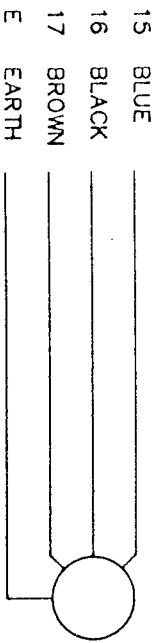


2 CORE SCREEN TO SPINDLE DRIVE

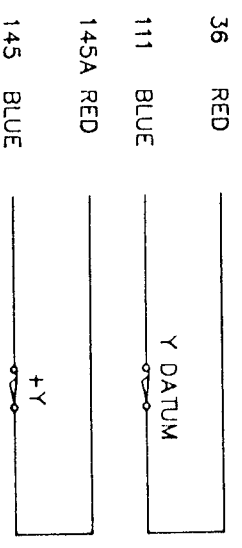
TERMINAL BLOCK ON SPINDLE MOTOR



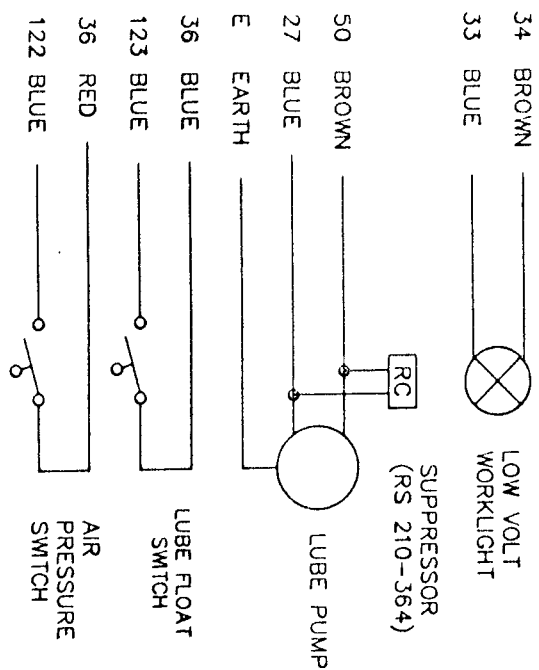
4 CORE FROM X AXIS SWITCH ASSEMBLY



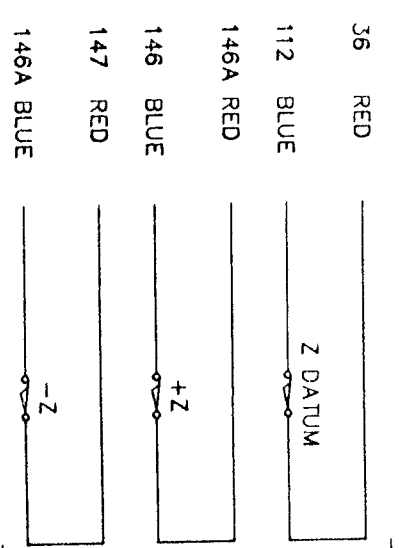
COOLANT PUMP



2 CORE SCREENS FROM Y AXIS SWITCHES



LUBE PUMP

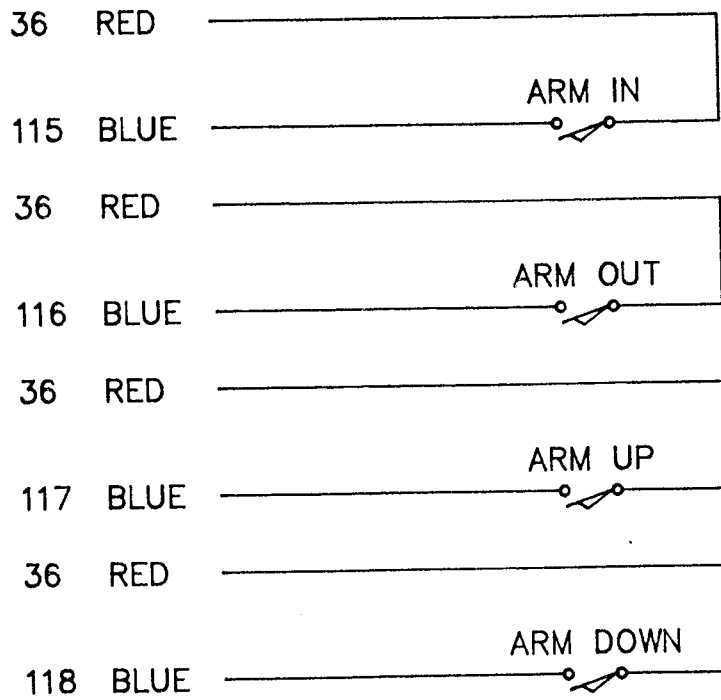
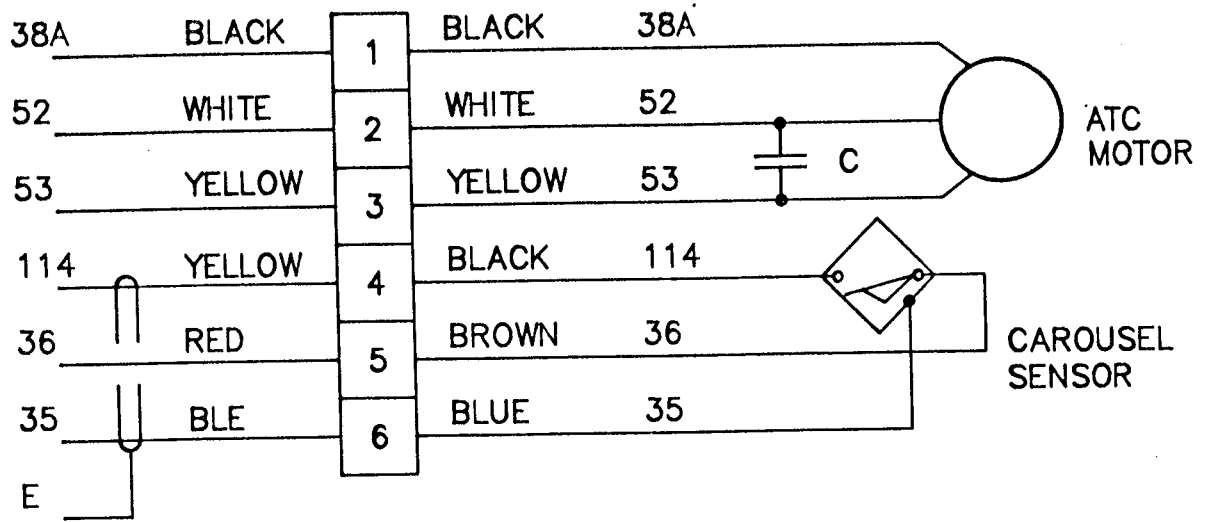


2 CORE SCREENS FROM Z AXIS SWITCHES

IF IN DOUBT ASK

6 WAY TERMINAL BLOCK
MOUNTED ON CAROUSEL

== CAPACITOR



TRIAC FANUC
ATC WIRING

SHEET 24

[TF]

IF IN DOUBT ASK

SECTION 3

TROUBLE SHOOTING

- INTRODUCTION 3.1
- MECHANICAL TROUBLE SHOOTING 3.2
- ELECTRICAL TROUBLE SHOOTING 3.3

3.1 INTRODUCTION

This section is concerned with small problems which may occur on the machine due to normal wear and tear over an extensive period of time. The problems listed are those which can easily be rectified and do not require a service engineer to carry them out. Should any other problem arise or difficulty found in working through the following procedures, then contact Denford's Service Department for further assistance.

The first part of this section covers problems of mechanical nature and is backed up with correction action procedures where required. The second part covers problems that may cause fuses to blow or contact breakers to knock-out. The necessary corrective actions are also listed.

When working in TRIAC FANUC control box great care must be taken to ensure that only the items listed are touched or moved. Ensure no liquid enters the control box.

ALWAYS TURN OFF POWER AT ISOLATOR BEFORE ANY MAINTENANCE WORK IS STARTED.

3.2 MECHANICAL TROUBLE SHOOTING

PROBLEM: Poor Surface Finish is Obtained

Corrective Action:-

- Ensure axis gib strips are correctly adjusted (see procedure 1).

PROBLEM: Coolant Not Flowing

Corrective Action:-

- Ensure M08 is programmed.
- Check all pipes for leakages, replace where necessary.
- Ensure pump is working. Observe flow in delivery pipe.
- Inform Denford's if there is no flow.

PROBLEM: "Not Ready" Message Displayed on Screen

Corrective Action:-

- Ensure no alarm messages on screen. If there are see Diagnostic section to continue.
- Ensure emergency stop is not engaged.
- Check micro switches (see procedure 2).

MECHANICAL CORRECTIVE ACTION PROCEDURES

ISOLATE MACHINE BEFORE WORKING ON IT.

PROCEDURE 1. ADJUSTMENT OF GIB STRIPS

- **Tools required:-** Flat Blade Screw driver, 2.5mm A/F Allen Key, 5mm A/F Allen key.
- Refer to drawing numbers: TR 4/¹/~~4~~00 & TR 2/400 Section 4

- **X Axis**
 - Gib strip screw can be found under the right hand side of table
 - Turn gib strip screw clockwise to tighten gib strip.
 - Move table in + and - X directions to ensure smooth continuous movement.

- **Y Axis**
 - Remove bellows unit at front of table using 2.5 mm allen key.
 - Gib strip screw, TR 1/409, can be found to the right of the bed.
 - Turn gib strip screw clockwise to tighten gib strip.
 - Replace bellows unit.
 - Move table in + and - Y directions to ensure smooth continuous movement.

- **Z Axis**
 - Remove head cover TR 3/108 using 2.5 mm allen key.
 - Release the gib strip lock screw TR 1/110 at the base of head.
 - Adjust gib strip by turning lock screw TR 1/107 which is accessible from the top of the head.
 - Turn screw clockwise to tighten strip. Do not over tighten.
 - Lock strip with lock screw at base of head.
 - Replace head cover
 - Move head up and down column to ensure smooth continuous movement.

PROCEDURE 2. CHECKING LIMIT SWITCH

- Tools Required:- 2.5 mm A/F Allen Key, Thin strip of metal.
- Refer to drawing numbers: TR 1/400 & TR 2/400 Section 4
- X axis limit switches are accessible by sliding a thin strip of metal in beside the slide way to trip the switches.
- Y axis limit switches are accessible by removing the bellows units.
- Z axis limit switches are found to the right of the column.
- Ensure limit switches are clean and dry.
- Check operation:-
 - This is done by calling up diagnostic X0 21 and looking at bit 4. This is the emergency stop monitor, see machine diagnostic inputs and outputs, (section 2.2).
 - When a '0' is displayed then a limit switch is made.
 - If a switch should be found to have failed contact Denford's for further advice.

FAULT FINDING TABLE

PROBLEM	CORRECTIVE ACTION
1. Control will not come on Cabinet fan not running Worklight not on	Re-set Control Transformer circuit breaker
2. Control is on Cabinet fan not running Worklight not on Alarms on screen: 1017 Spindle drive overheat 2032 Drive transformer overheat	Replace Fuse F3 3 Amp Semi-Delay
3. Axis motors will not run Alarms on screen: X axis disconnect Y axis disconnect Z axis disconnect	Reset Servo Drive Circuit breaker
4. Spindle motor will not run Alarm on screen: Spindle Drive Fault.	Replace Spindle Drive Fuse F1

PROBLEM	CORRECTIVE ACTION
5. Working light not on but everything else O.K.	Check Fuses F2 & F4
6. (Optional) Coolant pump does not run	Reset Coolant Overload OLCM

If the problem still persists, after the correcting action has been taken, contact DENFORD MACHINE TOOLS LIMITED, for more information.

3.3 ELECTRICAL TROUBLE SHOOTING

WHERE TO FIND FUSES AND CIRCUIT BREAKERS ETC.

In the main electrical cabinet there are the following components:-

F1 13 amp Mains Fuse

F2 3.15 amp Semi Delay Fuse

F3 3.15 amp Semi Delay Fuse

F4 3.15 amp Semi Delay Fuse

C/B2 10 amp 3 Pole Circuit-Breaker for Axis Drive

C/B4 10 amp 3 Pole Circuit-Breaker for Control Transformer

In the main electrical cabinet are two overload relay:-

OLCM 0.28-0.42 amp overload for Coolant Motor (Optional)

See Drawing Number:-

A3-41029/A Main Panel Layout

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SECTION 4

SPARE PARTS LIST AND ASSEMBLY DRAWING

- INTRODUCTION 4.1
- PARTS LIST AND ASSEMBLY DRAWING 4.2

4.1 INTRODUCTION AND ORDERING

The parts list are arranged in numerical order. The area of the machine covered by a certain number is given by looking at the parts illustration list on the next page.

When ordering any part state the part number, it's description and the quantity required.

i.e.

55500102A BEARING SKF: 7201 BEP 2 OFF

AC 2/310 GIB STRIP 1 OFF

4.2 TRIAC FANUC PARTS ILLUSTRATIONS

● MILLING HEAD ASSEMBLY	TR 4/100
● BASE AND CROSS SLIDE DRIVE	TR 2/200
● COLUMN & HEAD DRIVE	TR 2/300
● TABLE & CROSS SLIDE ARRANGEMENT	TR 2/400
● CABINET	TR 2/500
● LUBRICATION SYSTEM	TR 1/600
● TOOLCHANGER ASSEMBLY	TR 3/700A

TR4/100 TRIAC FANUC ATC HEAD ASSEMBLY

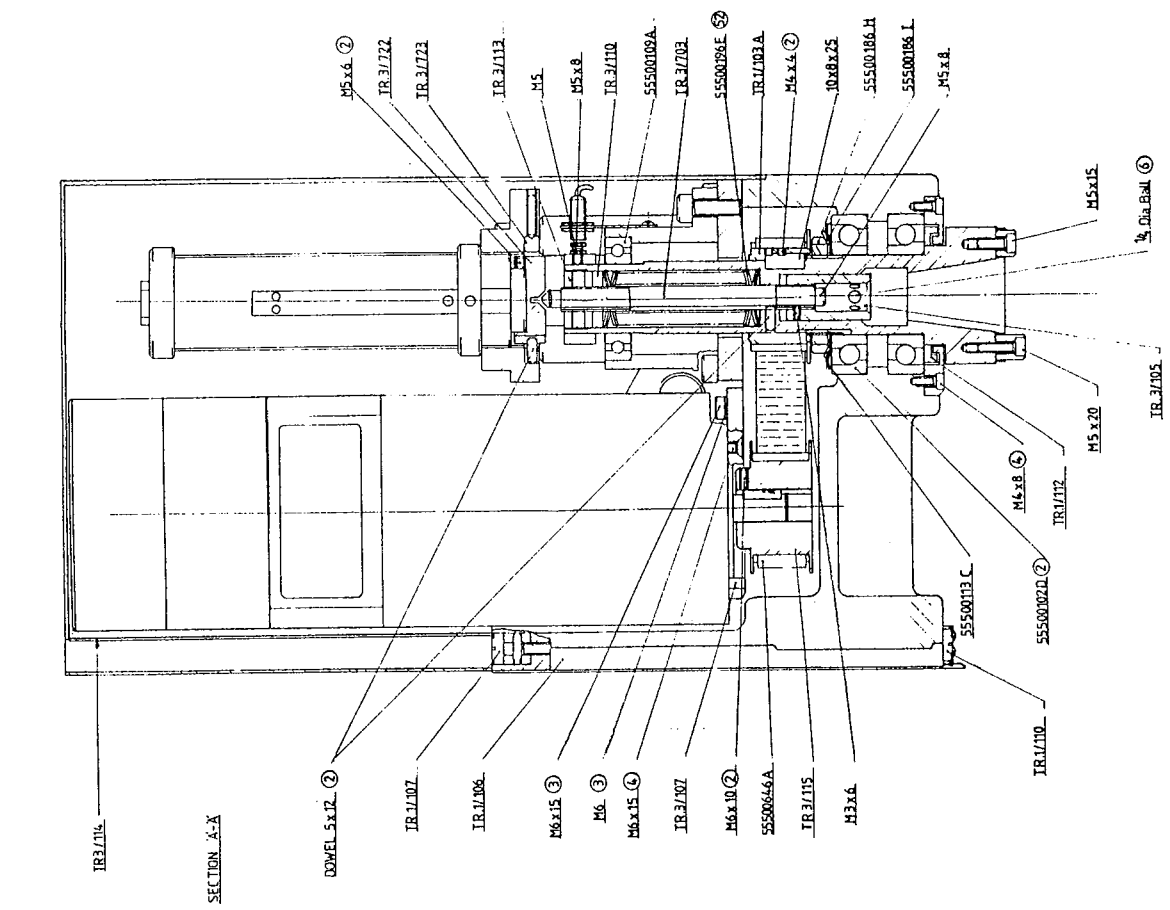
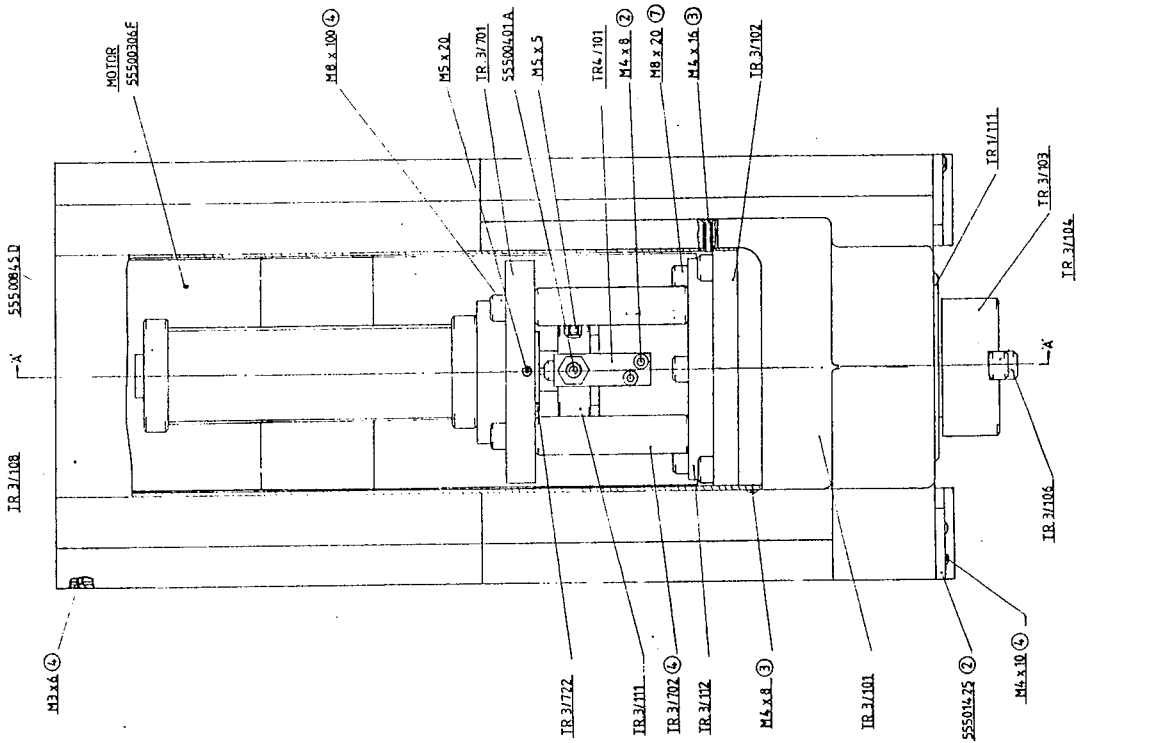
PARTS NO.	DESCRIPTION	QTY	
TR3/102	BASE PLATE	1	
TR3/103	SPINDLE NO 35 INTERNAL	1	
TR3/104	SPINDLE TENON (SHORT)	1	
TR3/105	DRAW BAR COLLET	1	
TR3/106	SPINDLE TENON (LONG)	1	
TR3/107	SPINDLE MOTOR PLATE	1	
TR3/108C	HEAD COVER	1	
TR3/110	PRE LOAD NUT	1	
TR3/111	SPINDLE END CAP	1	
TR3/112	SPINDLE SUPPORT BUSH	1	
TR3/113	LIMIT NUT	1	
TR3/114	HEAD COVER PLATE	1	
TR3/115	MOTOR PULLEY	1	
TR4/101	SENSOR BRACKET	1	
TR1/103A	PULLEY 18L100 TRIAC	1	
TR1/107	JIB STRIP SCREW	1	
TR1/11-	JIB STRIP LOCK	1	
DESCRIPTION	MANUF AND REF.	COMP NO.	QTY
MOTOR DC	P/MAG .75KW	BI 003067G	1
BEARING	7208B	BI 00102D	2
BEARING	6007 2RS	BI 00109A	1
NYLOS RING	6208 AV	BI 00113C	1

TR4/100 TRIAC FANUC ATC HEAD ASSEMBLY cont.

DESCRIPTION	MANUF AND REF.	COMP NO.	QTY
LOCKNUT	KM8	BI 00186H	1
LOCKWASHER	MB8	BI 001861	1
PROXIMITY SENSORS RS 633-422		RS 633-442	1
TIMING BELT	150L100	BI 00646A	1
A2 SLIDEWAY WIPER		BI 01425	1
DISC SPRING 28.0 O/D		BI 00196E	52

IF IN DOUBT ASK.

DRG. No.

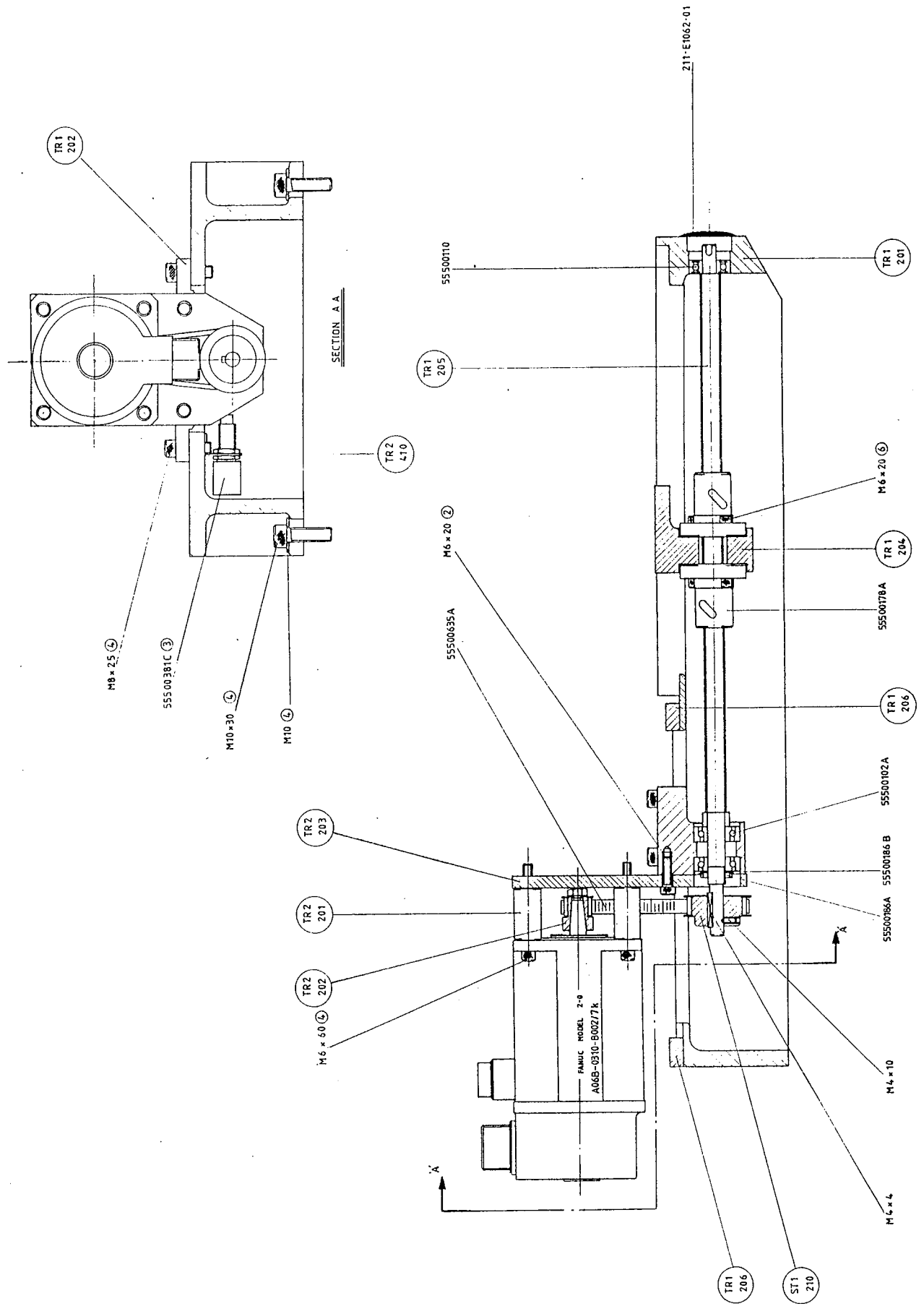


DATE	29.9.87	SCALE	1:1
APPROVED		CHECKED	
DRAWN	A.M.	TRACED	
MAIL		LIMITS ON DIMENSIONS UNLESS OTHERWISE STATED	
MAIL SIZE	A4	ANGULAR 1°	3 PLACE DECIMAL 1/1001
NO. REVISIONS		FRACTIONAL 1/16"	4 PLACE DECIMAL 1/1000
DRAWING NO. TR.4/100		CONTRACT NO.	
DENFORD MACHINE TOOLS LTD. BRIGHOUSE, YORKSHIRE.			
FANUC - TRIAC A.T.C.			
MILLING HEAD ASSEMBLY			
ALTERATIONS			

TR2/200, BASE & X SLIDE DRIVE

PART NO.	DESCRIPTION	QTY
211-E10620-01	HOLE PLUG	1
BI 00110	BEARING 6200 2RS	1
BI 00102A	BEARING 7201B	2
BI 00178A	BALLNUT 1605UF	2
BI 00186A	KM1 LOCKNUT	1
BI 00186B	MB1 TABWASHER	1
BI 00635A	TIMINBELT 110XL037	1
BI 00381C	MICROSWITCH 4CRQR	3
BI 01229A	HINGE E6-10-30-20	2
AO6B-0310- B002/7K	AXIS MOTOR	1
ST1/210	PULLEY 24XL037	1
TR1/205	BALLSCREW X SLIDE	1
TR1/207B	BELLOW FRONT SUPPORT	1
TR1/208	BASE WASHER	4
TR1/209	BASE FILLER PLATE	1
TR2/201	MOTOR SPACER	4
TR2/202	MOTOR PULLEY 12T	1
TR2/203	MOTOR PLATE	1
TR1/210	FRONT BELLOW HNG PLT	2

IF IN DOUBT ASK.



NO.	DESCRIPTION	DATE	BY	CHKD	APPROVED	SCALE
1	ALTERATIONS					
	IRIAC					
	FANUC					
	BASE & CROSS SLIDE DRIVE					
	DENFORD MACHINE TOOLS LTD. BRIGHOUSE, YORKSHIRE.					
	LIMIT OF DIMENSIONS UNLESS OTHERWISE STATED					
	ANGULAR 1° 3 PLACE DECIMAL 1 00'					
	FRACTIONS 1/16" 3 PLACE DECIMAL 1 00'					
	DECIMAL 0.001					
	UNIT					
	SCALE					
	DATE					
	BY					
	CHKD					
	APPROVED					
	DRAWN					
	TRACED					
	G.A.					
	DATE					
	SCALE					

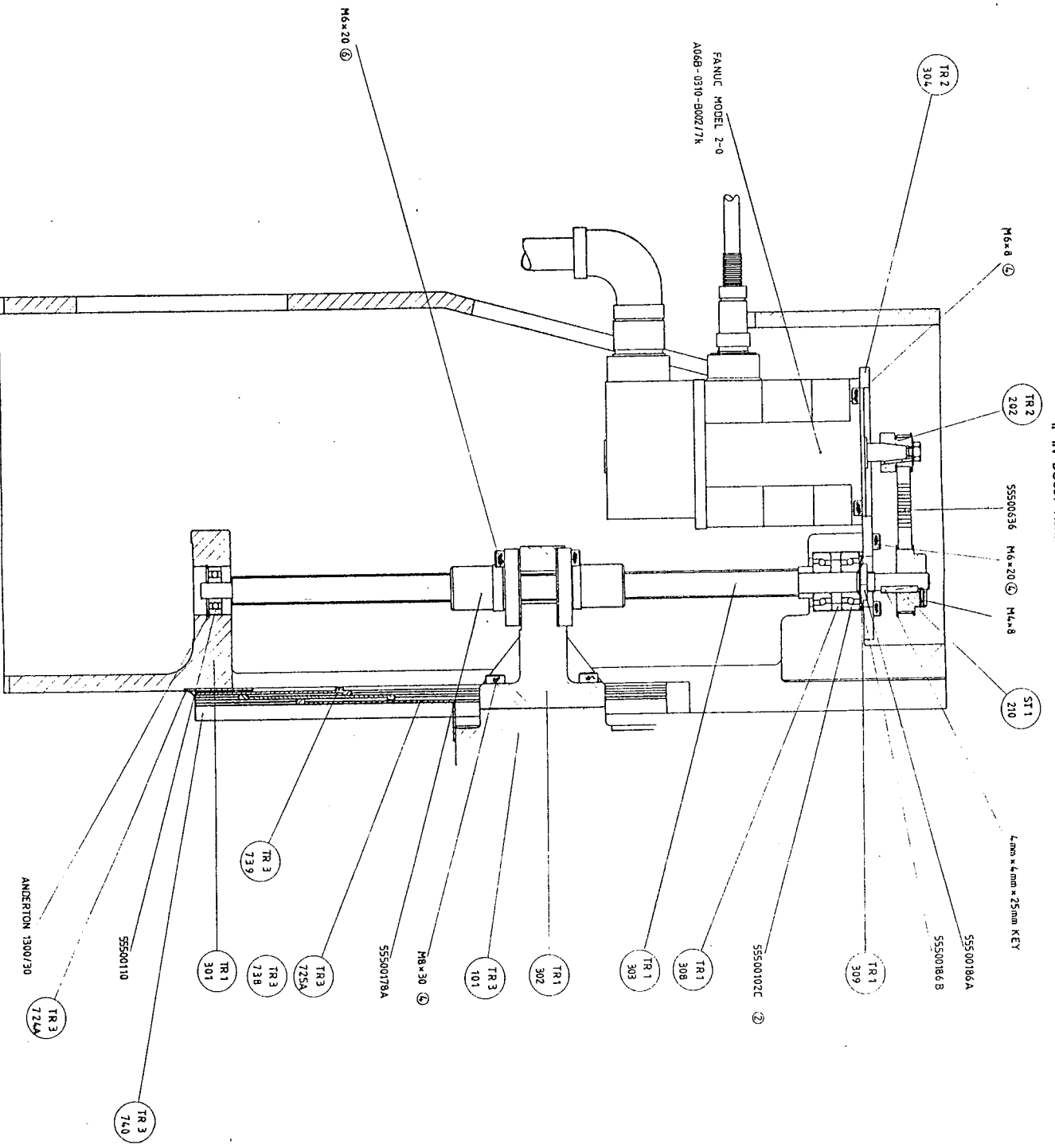
DRAWING No. TR2 / 200

TR2/300, COLUMN & HEAD DRIVE

PARTS NO.	DESCRIPTION	QTY
A06B-310-B002/7k	AXIS MOTOR	1
BI 00102C	BEARING FAG 7301B	2
BI 00110	BEARING 6200 2RS	1
B1 00178A	BALLNUT 1605UF	2
BI 00186A	KMI LOCKNUT	1
BI 00186B	MB1 TABWASHER	1
B1 00636	TIMING BELT 100XL037	1
C/CLIP 1300/30	CIRCLIP 1300/30	1
BVS160/80	LIFTING BRACKETS	2
ST1/210	PULLEY 24XL037	1
TR1/303	BALLSCREW HEAD	1
TR1/308	BEARING SPACER	1
TR1/309	PRE-LOAD RING	1
TR1/313	BEARING CAP	1
TR1/314	BRKT CONNECTOR 24WAY	1
TR2/202	MOTOR PULLEY 12T	1
TR2/304	MOTOR PLATE TRI/FAN	1
TR2/323	PENDANT ARM BRKT	1
TR2/724A	COLUMN FILLER PLATE	1
TR3/725A	COLUMN WIPER PLATE	1
TR3/738	COLUMN COVER	1
TR3/739	COLUMN COVER	1

TR3/740	COLUMN COVER GUIDE	2
TR3/741	COLUMN COVER STOP	1

IF IN DOUBT ASK.



DATE	
BY	
CHECKED	
APPROVED	
REVISION	

TRAC - FANUC

DENFORD MACHINE TOOLS LTD. BRIDGEHOUSE, YORKSHIRE

COLUMN & HEAD DRIVE

UNIT FOR DIRECTIONAL CONTROL
 APPROX 1" 3 PART SECTION 1 000
 MACHINED & DR. & F. M. S. 1 000
 CHAM. A. C.

DATE: 10-7-89
 SCALE: 1:1
DRAWING NO. TR2/300

DRG. No.

TR2/400, TABLE 7 X SLIDE ASSY

PART NO.	DESCRIPTION	QTY
A06B-310-B002/7K	AXIS MOTOR	1
211-E10620-01	HOLE PLUG	1
B1 00102A	BEARING 7201B	2
B1 00110	BEARING 6200 2RS	1
B1 00178A	BALLNUT 1605UF	2
B1 00186A	KM1 LOCKNUT	1
B1 00186B	MB1 TABWASHER	1
B1 00631	TIMING BELT 70XL037	1
B1 01427B	CONC.COVER TR.XSLIDE	2
ST1/210	PULLEY 24XL037	1
TR1/404	BALLSCREW TABLE	1
TR1/409	JIB STRIP SCREW	1
TR1/418	LIMIT TRIP	2
TR1/420	T NUT M8	4
TR2/202	MOTOR PULLEY 12T	1
TR2/406	MOTOR PLATE	1
TR2/408	SENSOR MOUNTING BRKT	1
TR2/409	MICRO SWITCH PLATE	1
TR2/410	CROSS SLIDE M/SW BRK	1
TR2/411	ADAPTOFLEX BRACKET	1
TR2/412	CONDUIT BRACKET	1

TR 2/500 CABINET

PARTS NO.	DESCRIPTION	QTY.
TR2/501B	CABINET	1
502A	CABINET PANEL	1
504A	PENDANT OM-B	1
505A	PENDENT REAR COVER	1
507B	TRIAC TRANS CHASIS	1
510	PUMP BOX	1
512	ADAPTAFLEX PLATE	1
513	COLUMN BACK COVER	1
514	ADAPTAFLEX BACK PLATE	1
TR1 /210	FRONT BELLOWS HNG PLT	4
SP 195	MAINS CONNECTION BOX	1

DESCRIPTION	MANUF&REF	COMP NO.	QTY.
BALL CATCH	TRIAC-E/M	BI 01228A	2
HINGE	E6-10-301-20	BI 01229A	6
DRAWER HANDLE	102/5'	BI 01212	1
ANTI-VIB PAD NO.1		BI 01428	6
DRAIN PLUG	BVS 100/205	BVS100/205	2
LIFTING BRACKETS	BVS160/80	BVS160/80	4
DRAIN FILTER		ML100/219A	2
ENCLOSUR	18-10-10-03	BI 0420T	1

TR2/600 LUBRICATION SYSTEM

DESCRIPTION	MANU&REF.	COMP NO.	QTY
ELECTRIC OIL PUMP		B1 01120	1
METER UNIT	IM 53462	BI 01123F	5
ELBOW ADAPT	LE 90587	BI 01123G	4
PIPE(COPPER)	4MM DIA	B1 01123J	1
JUNCTION 3 WAY	114830	BI 01123T	1
JUNCTION 4 WAY	114815	B1 01123U	2
METER UNIT	1M 605000	BI 01124	1
PIPE CLIP	SINGLE	BI 01125	7
PIPE CLIP	2 WAY	BI 01125A	4
PIPE NYLON	135131	B1 01126F	5
PIPE CLIP	CLIP RC34 COPPER	CLIP RC34	4
PIPE CLIP	CLIP RC54 COPPER	CLIP RC54	6
CONES	36-0501-02	BI 01123I	5
SLEEVE NUT	36050002	BI 01123R	5
COMPRESS CAP	105570	BI 01124A	6

TR3/700A, TRIAC A.T.C. TOOLCHANGER ASS.

STOCK NUMBER	DESCRIPTION	QTY
B1 00106A	BEARING 6002 2RS	1
B1 00102A	BEARING 7201B	1
B1 00145	BEARING NTA 815	1
B1 00146	TRA815 WASHER	2
B1 00186A	KM1 LOCKNUT	1
B1 00186B	MB1 TABWASHER	1
B1 00194J	O/BUSH 1X7/8X1	2
B1 00195D	O/BUSH 16X12X20	1
B1 00195G	O/BUSH 10X6X10	1
B1 00306J	MOTOR INDEXING AC	1
B1 00306K	MOTOR GEAR BOX	1
B1 00425	MICROSWITCH V3S-1009	4
B1 00425A	MICROSWITCH ACTUATOR	4
B1 01435A	COVER TRIM FOR ATC	1
B1 01461	WHEEL W2X	4
B1 01461A	TRACK T2 260MM	2
B1 01461B	BUSH ADJUSTABLE BMX2	2
B1 01461C	STATIONARY BUSH BM2	2
B1 00401A	PROXIMITY DETECTOR	1
TR3/701	PISTON FLANGE	1
TR3/702	MOUNTING PILLAR	4

TR3/703	DRAW BAR	1
TR3/704A	SUPPORT BRKT	1
TR3/705	HORIZONTAL SLIDE	1
TR3/707	MICRO SWITCH PLATE	4
TR3/708A	STOP ROD	1
TR3/709A	TURRET BEARING HOUSE	1
TR3/710A	VERTICAL SUPPORT	1
TR3/712	VERTICAL SLIDE	1
TR3/714A	TURRET	1
TR3/715	TOOLHOLDER	6
TR3/717A	TURRET SPINDLE	1
TR3/719	TRIAC A.T.C. COVER	1
TR3/721A	SENSOR BRKT	1
TR3/722A	PISTON VEE BLOCK	1
TR3/723	GUIDE COLLAR	1
TR3/726A	CYLINDER BRACKET	1
TR3/728	TOOL HOLDER SPRING	6
TR3/729	TOOL HOLDER ROLLER	12
TR3/730	TOOL HOLDER TENON	1
TR3/731	TRIAC ATC BACKPLATE	1
TR3/732	MICRO SWITCH BLOCK	2
TR3/737	TRIAC PERSPEX GUARD	1
TR3/742	STOP ROD BUSH	1

TR3/743	STOP ROD PLATE	1
TR3/744A	SHOCK ABSORBER BRKT	1
TR3/745	TOP TRIP	1
TR3/746	BOTTOM TRIP	1
TR3/747	LOCKNUT-ATC T/CHANGE	1
TR3/750	INDEX PLATE	1
TR3/751	INDEX DISC	1
TR3/752	INDEX ROLLER	1
TR3/753	COLUMN BACK COVER	1
TR3/754	DRIVE COVER	1
TR3/755	FILLING PLATE	1
TR3/756	24 WAY CONN BRACKET	1
TR3/757	ATC COVER SUPPORT	1
TR3/724A	COLUMN FILLER PLATE	1
TR3/725A	COLUMN WIPER PLATE	1
TR3/738	COLUMN COVER	1
TR3/739	COLUMN COVER	1
TR3/740	COLUMN COVER GUIDE	2
TR3/741	COLUMN COVER STOP	1

PNEUMATIC CONTROL SYSTEM

