

***TRIAC 200***

***INSTALLATION***

***MANUAL***

***Heidenhain 360***



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### 1. STANDARD EQUIPMENT

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## **I. STANDARD EQUIPMENT**

### **STANDARD EQUIPMENT SUPPLIED - TRIAC 200**

TRIAC 200 CNC MACHINE

HEIDENHAIN CONTROL

3D GRAPHIC SIMULATION

RS232 SERIAL LINK

INSTALLATION MANUAL

HEIDENHAIN CONTROL MANUAL

AUTOMATIC LUBRICATION SYSTEM

SET OF METRIC ALLEN KEYS

SET OF KEYS FOR EMERGENCY STOP AND TRANSFORMER BOX

SET OF REPLACEMENT FUSES

TEST CERTIFICATE



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## **2. SPECIFICATION**

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### **MACHINE SPECIFICATION - TRIAC 200**

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#### **(a) GENERAL**

Length	1805mm (71")
Width	1140mm(45")
Height	2030mm (80")

#### **(b) CAPACITY**

Maximum Cross Travel	150mm (6.0")
Maximum longitudinal Travel	320mm (12.5")
Maximum Head Travel	320mm (12.5")
Spindle to Table	390mm (15.25")
Spindle to Column	200mm (8.0")
Spindle Taper for ATC	ISO 30
Working Table Surface	600mm x 200mm(23.5" x 8.0")
3Tee Slots	10mm Width x 50 mm Centres)
Z Axis Ballscrew	16mm Dia x 4mm Pitch
X Axis Ballscrew	16 mm Dia x 4mm Pitch
Y Axis Ballscrew	16mm Dia x4mm Pitch

<b>Machine Resolution</b>	<b>0.01 mm(0.0004")</b>
<b>Weight (net)</b>	<b>600 kilos</b>

**(c) OPTIONAL FEATURES**

**IBM or 100% Compatible Micro Computer**

**Full Range of Work Holding Accessories including 4th Axis Rotary Table  
or Dividing Head.**

**Desk Top Tutors**

**Printers**

**Plotters**

**Digitisers and Mice**

**CAD/CAM**

**Offline Programming- Stand Alone or Networked**

**Machine Capability to be Linked to Robots**

**Pneumatic Vice for Integration into DENFORD FMS, FMC or CIM Systems**



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### **3. SAFETY FEATURES**

#### **SAFETY FEATURES ON TRIAC 200**

- KEY OPERATED EMERGENCY STOP BUTTON
- "POWER ON" INDICATOR
- AXES LIMIT SWITCHES - ADJUSTABLE ON Z AXIS
- ELECTRONIC SHEAR KEY BUILT INTO SPINDLE CONTROLLER AND AXIS CONTROLS
- DIAGNOSTIC FAULT FINDER
- OPTION TO CHECK PROGRAMS PRIOR TO MACHINING

#### **NOTES :**

<b>Power Supply :</b>	<b>Three Phase + Neutral AC</b>
<b>Temperature:</b>	<b>0 - 45 degrees C</b>
<b>Relative Humidity:</b>	<b>Less than 75%</b>

### **WARNING**

**DO NOT POWER DOWN WITH THE GUARD DOORS OPEN**

## **SAFETY PRECAUTIONS**

This machine has safety devices fitted to protect the machine and operator from unexpected accidents.

### **1. TIDYNESS**

Do not place objects on or around the machine so that it interferes with the guards or the operation of the machine.

### **2. POWER SOURCE**

Ensure the correct cable for the power source is used ( see page 4.5)

When power fails turn off the isolator (found at the rear of machine on electric box) immediately.

When leaving at the end of a shift ensure the power is switched off.

Ensure that the machine is switched off before any maintenance is carried out.

### **3. LUBRICATION**

For lubrication please refer to chart on page 4.10.

Check oil reservoir daily.

Check state of slideway lubrication each day. The machine is fitted with an auto - lubrication system, ensure the reservoir is topped up regularly.

### **4. RECOMENDATIONS ON SAFETY OF OPERATION.**

Always wear clothing that is suitable for operating the machine.

Secure workpiece securely on table or in fixture or vice.

Only operate the machine with the safety guards closed.

Do NOT open the safety guards during operation.

It is very dangerous to touch any rotating part of the machine, NEVER attempt to remove swarf whilst the machine is in motion.

**After setting tools , perform trial cut using manual operation.**

**Remember to use tool offsets to avoid machining errors.**

**Never clean the machine or its attachments when the machine is running.**

**Do not operate the machine with the electrical control box open.**

**Turn the isolator to OFF before opening the electrical cabinet.**

**When an emergency stop is required press the EMERGENCY STOP red keyswitch on the operators panel, this will cut power to the spindle and the axis drives, reset by inserting key and turning power on.**

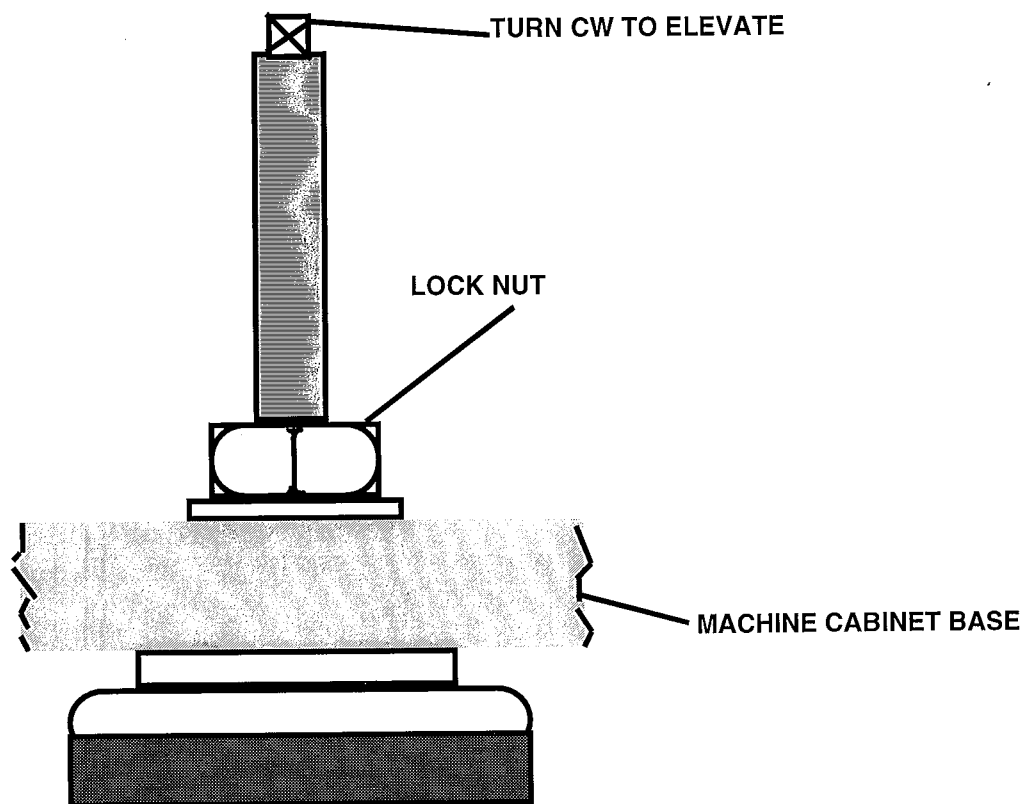


## 4. INSTALLATION

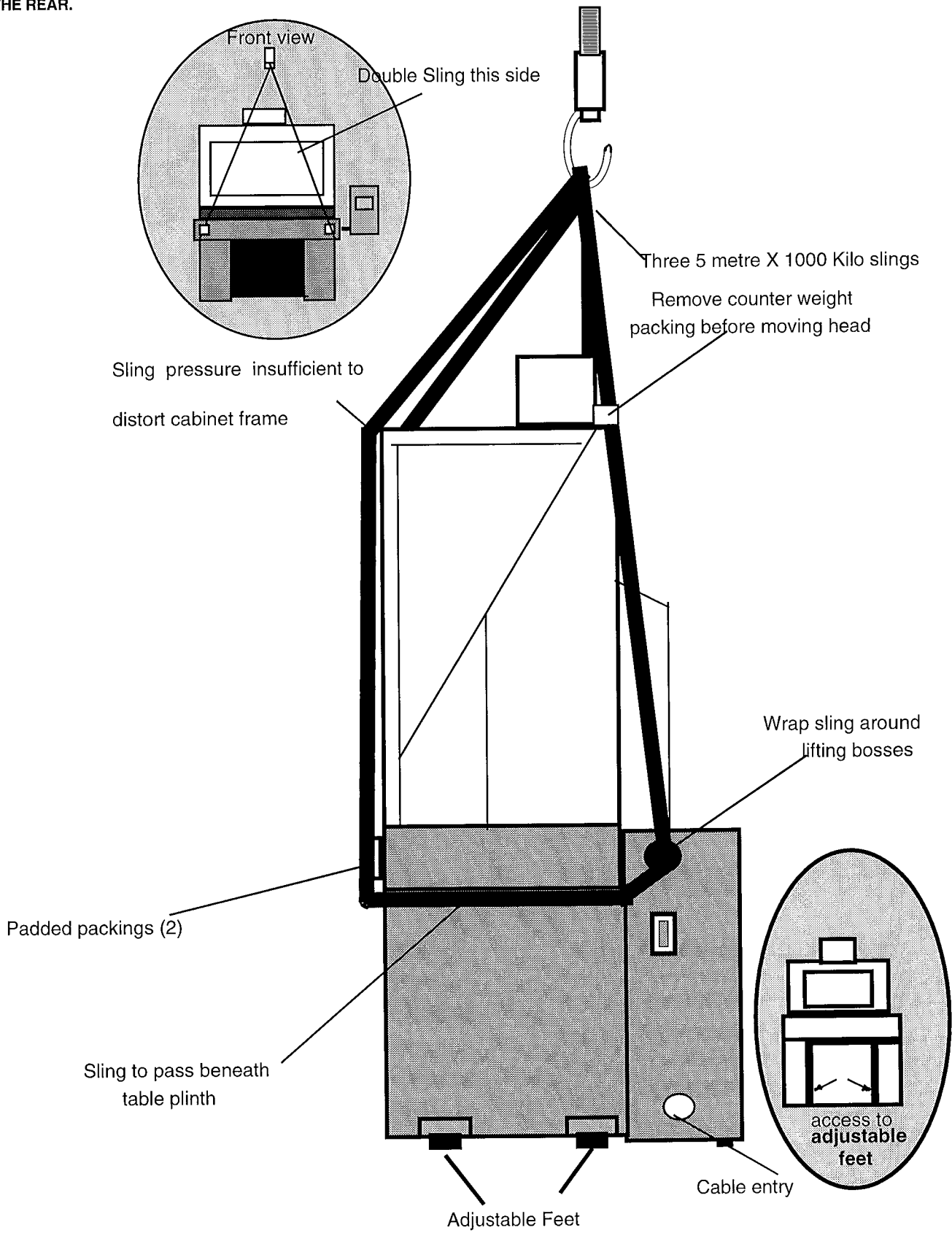
### LIFTING

The lifting of the machine is effected by three 5 metre slings passing under the bench plinth and round the hooks on the electrical cabinet - see diagram overleaf.

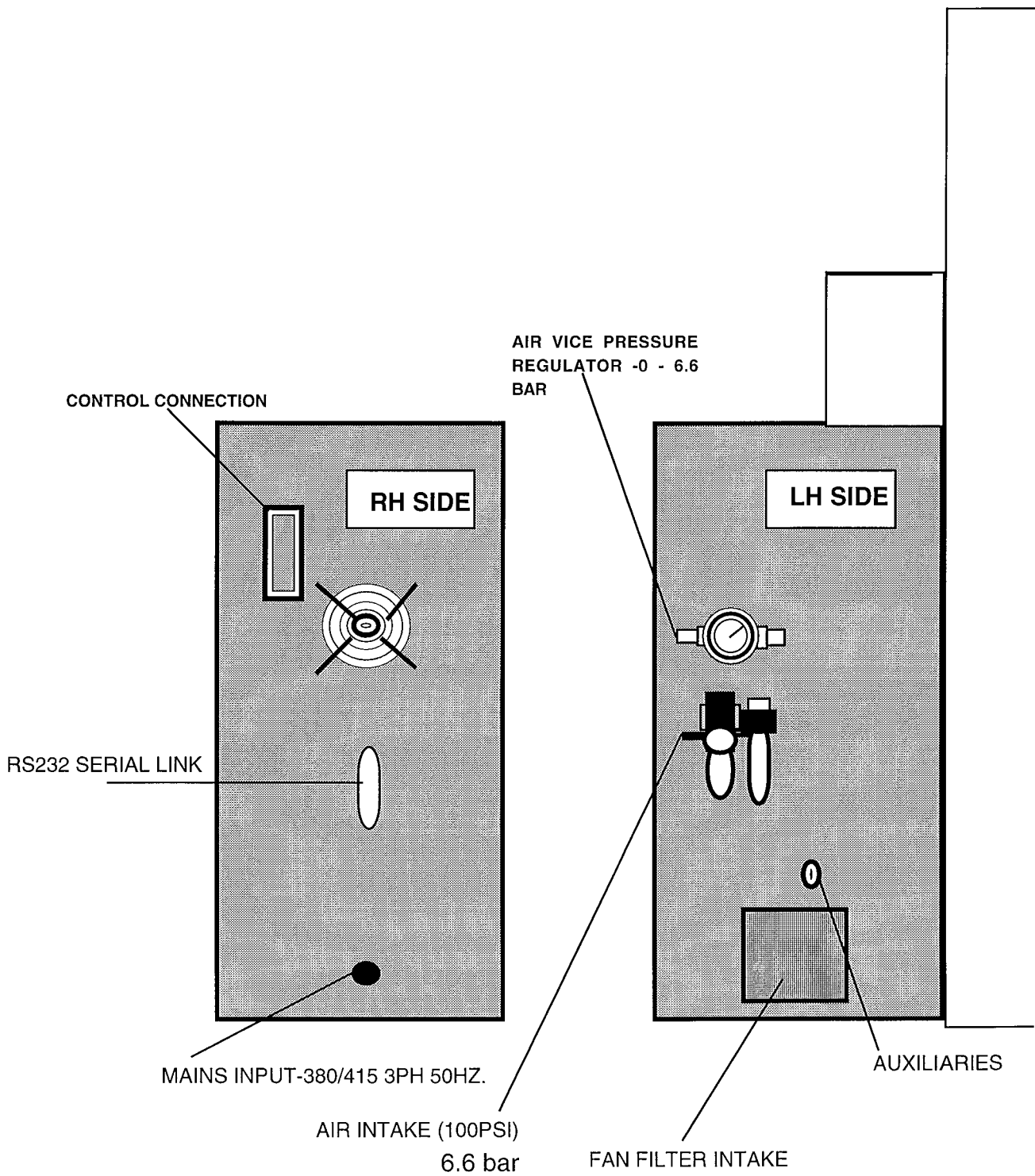
### LEVELLING



**NOTE:- WHEN THE SLINGS ARE SET CORRECTLY THE FRONT OF THE MACHINE SHOULD BEGIN TO LIFT SLIGHTLY BEFORE THE REAR.**



# CONTROL BOX CONNECTIONS



## MACHINE PREPARATION

**NB. THE ELECTRICAL CONTROL BOX IS INSPECTED THEN SEALED WITH A YELLOW SEAL, IF THIS SEAL IS BROKEN ON DELIVERY INFORM THE SUPPLIERS IMMEDIATELY. THE SEAL SHOULD ONLY BE BROKEN FOR THE INITIAL MAINS POWER CONNECTION.**

Once the machine has been sited and connected electrically, the protective coatings must be removed to prepare the machine for running.

The protective coatings applied to the slideways and bright surfaces can be removed using a kerosene based solvent. The coatings must be removed from the slideways before any attempt to move them is made.

Once the protective coatings have been removed, all untreated surfaces should be coated with a light covering of machine oil. (i.e. BP: CS 68).

The protective plastic sheeting on the guard windows should be removed and the glass and perspex cleaned with an anti-static cleaner.

### LUBRICATION

The TRIAC 200 is fitted with an automatic lubrication system. The reservoir on the system should be filled to the correct level before any work commences and a check should be made to ascertain if the oil is being pumped to the slides and the ballscrews.

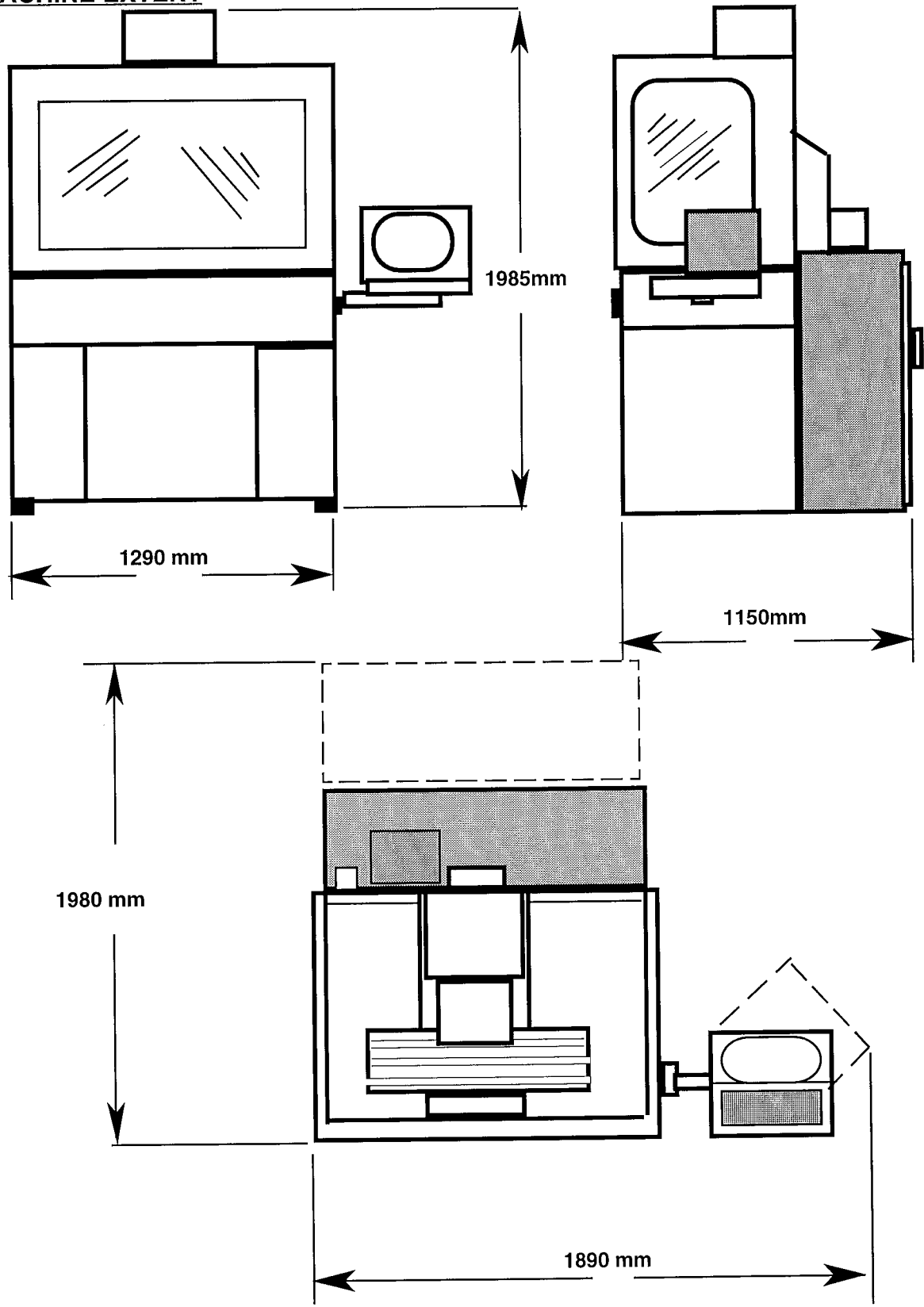
The lubrication system works from a signal on the main spindle so the pump is only active when the spindle is running.

Use SAE 10 for the lubrication system. All bearings are of the "sealed for life" type and no maintenance should be required.

The slides and the indexing cam mechanism of the ATC will require lubrication from time to time. This is effected with an oilcan beneath the ATC guard. **DO NOT** lubricate whilst the machine is running.



**MACHINE EXTENT**



## SITING OF MACHINE

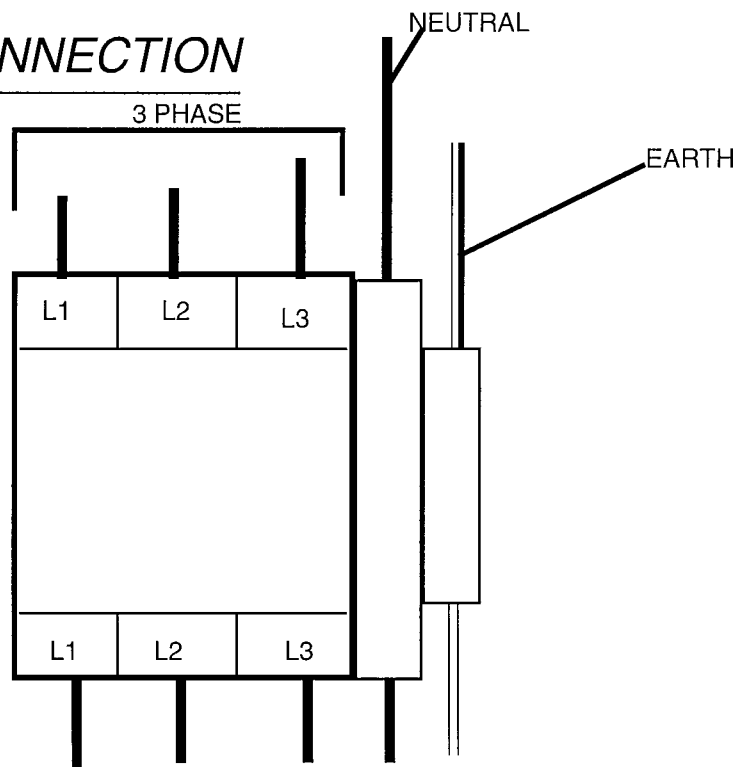
Care must be exercised when siting the machine, to ensure that sufficient room is allowed for effective maintenance to be carried out.

### NOTE:

IT IS ESSENTIAL TO THE SMOOTH RUNNING OF THE SYSTEM THAT THE POWER SUPPLY BE CONSTANT AND STABLE.

ALL INSTALLATION WORK MUST BE CARRIED OUT BY SUITABLY QUALIFIED PERSONNEL.

## ELECTRICAL CONNECTION



CABLE REQUIRED :- 4 CORE(3PHASE ,NEUTRAL)+ EARTH, 2.5 mm per PHASE

**TOOLS REQUIRED:- SMALL PHILIPS SCREWDRIVER AND CRIMPING PLIERS.**

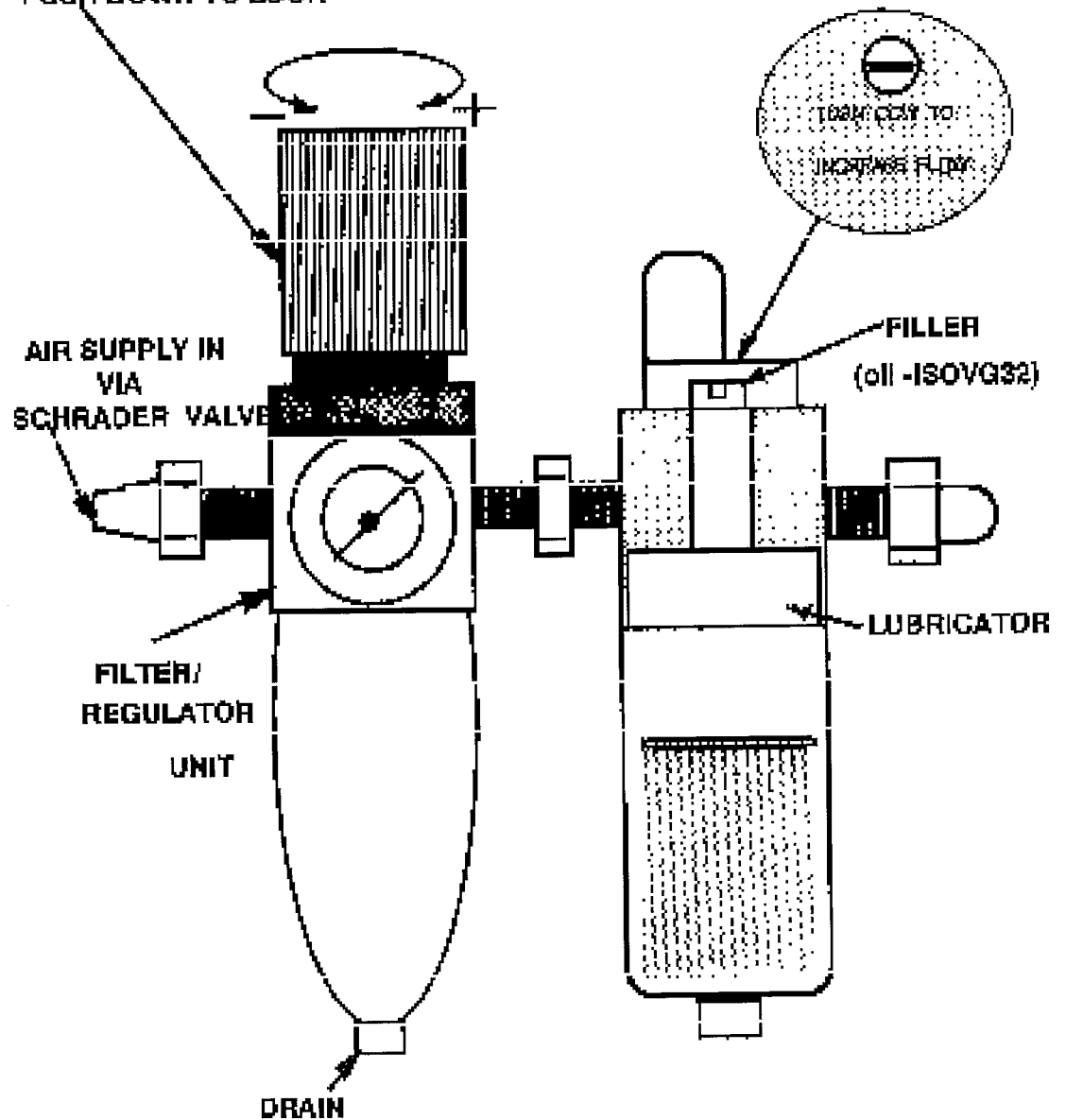
CONNECTIONB PROCEDURE:- UNLOCK AND OPEN ELCTRICAL CONTROL BOX. PUT CRIMP CONNECTORS ON TO MAINS, NEUTRAL AND EARTH WIRES. CONNECT THE MAINS WIRES INTO THE CONTACT BLOCK AS SHOWN ABOVE.

## AIR FILTER REGULATOR

**PRESSURE ADJUSTER**

**PULL UP TO UNLOCK**

**PUSH DOWN TO LOCK**

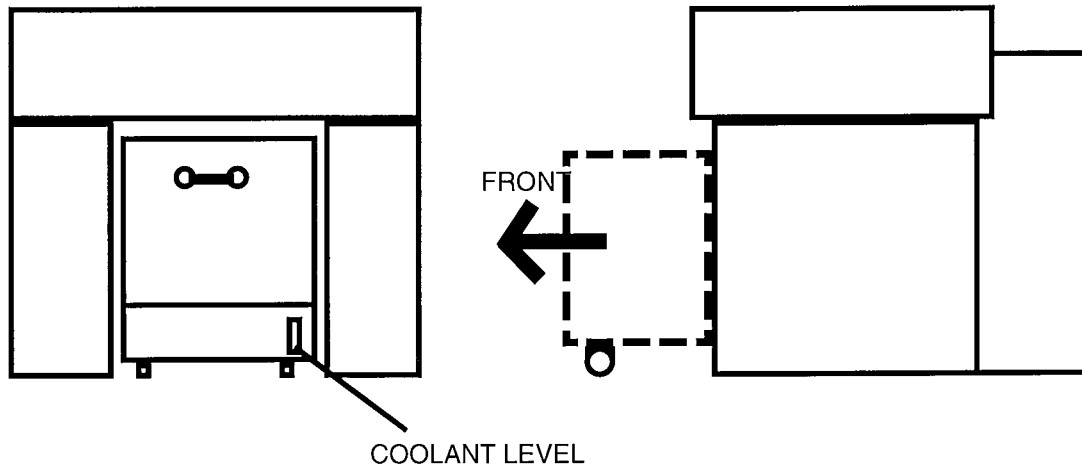


Maximum pressure for air regulator  $9.9 \text{ Kg F/cm}^2$  (150 lbs sq")

Operating pressure 100lbs sq." (6.9 Bar)

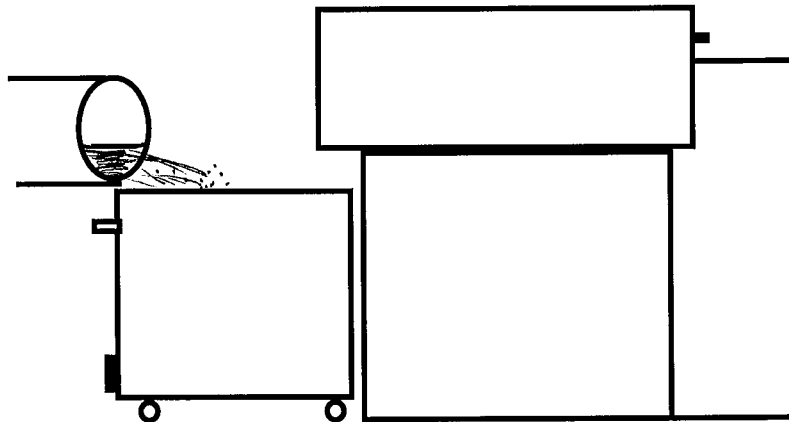
Check main supply pressure before adjusting pressure at the regulator.

## COOLANT TANK

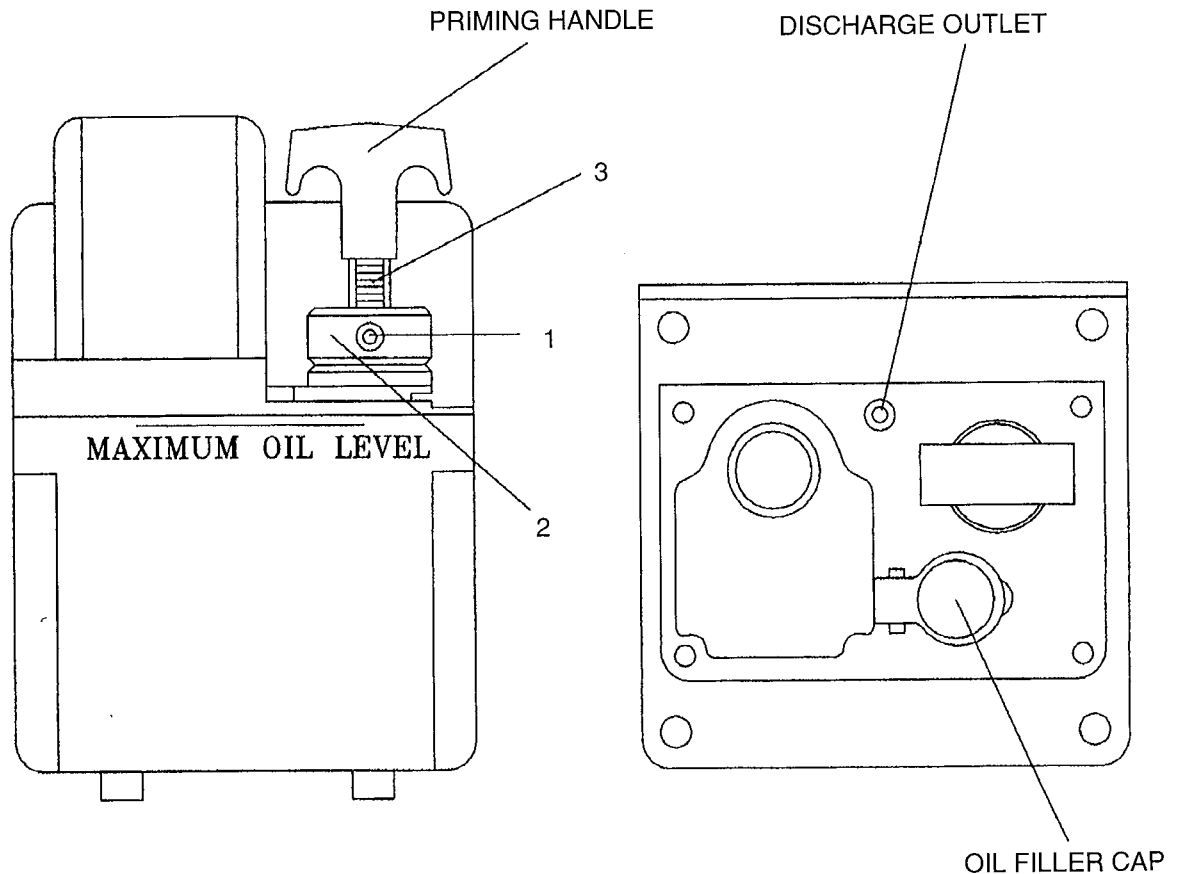


The coolant tank is located beneath the machine bench and pulls out towards the front of the machine for filling and removal of swarf.

When filling the tank or removing swarf pull out the tank sufficient to just clear the bench to prevent strain on the pump cable and the coolant pipe.



## LUBRICATION PUMP



The lubrication pump is found on the LH side of the machine (front facing).

### ADJUSTING THE PUMP OUTPUT

To adjust the output of the pump, first release screw (1) until the adjusting nut turns freely. Adjust the nut (2) for the required output, the shaft (3) is graduated in 0.5 ml stops to assist in setting. After adjusting, the screw (1) must be carefully re-tightened.

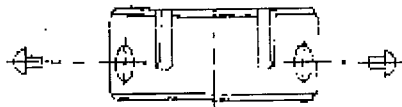

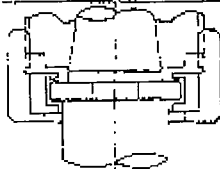
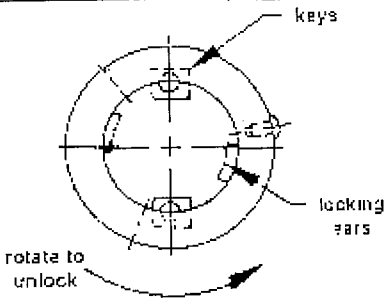
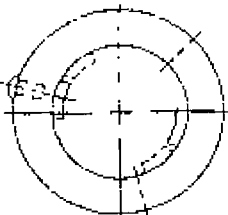
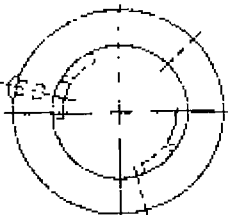
**DO NOT OVER TIGHTEN.**

**NOTE:-** Before tightening screw (1) always ensure that the adjuster (2) is positioned so that the screw (1) is always tightened towards the flat graduated part of the shaft (3). Your system is now ready for trouble free operation. Do not let the lubricant level drop below 18mm. The lubrication pump only operates when the spindle is running.

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
HEADSTOCK	GREASE SEAL	ON MAINTENANCE OF HEADSTOCK	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

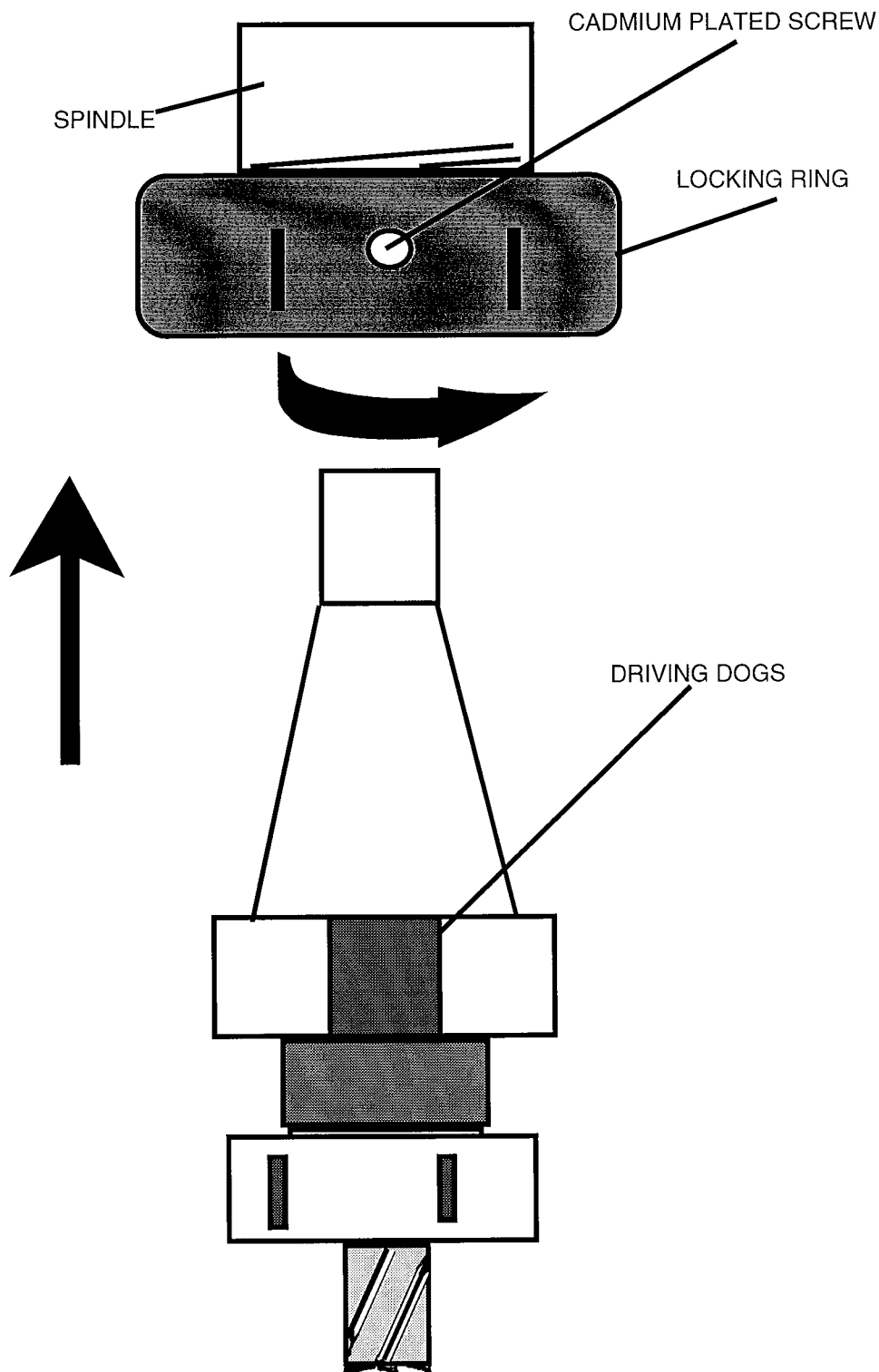
**QUICK CHANGE TOOLING**

TOOLING IS STANDARD ISO 30

<p>1. Remove three (3) screws from locknut.</p>	
<p>2. Screw on locknut assembly as far as possible - then back off one (1) turn.</p>	
<p>3. Insert standard Quick Change adapter and tighten locknut. 3A. Insert standard "V" flange adapter and tighten locknut. Note: When using "V" flange tooling index one drive key 180°</p>	
<p>4. Screw the longest button head screw (dog point) into hole that permits the greatest amount of rotation for unlocking. (this is usually the hole closest to a locking ear.)</p>	
<p>5. Rotate nut back to cad position. This is when the locking ears and keys are in line.</p>	
<p>6. Insert the cadmium plated screw into the hole that is in line with the locking ear. This is the identifying screw so the operator knows how to cad adapters.</p>	
<p>7. Put remaining screw in the last open hole. The spindle is now ready to use.</p>	

**TO LOAD TOOL HOLDER:-**

Line up the cadmium plated screw and the driving dog (to front of machine) and tighten locking ring by turning anti - clockwise using C Spanner.



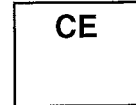


**SWITCHING ON THE CONTROL UNIT - ( HEIDENHAIN 360 )**

Switch on the power control on the operations panel - GREEN BUTTON

The system will then do a MEMORY CHECK, this will clear automatically

POWER INTERRUPT will then be displayed , press



to clear.

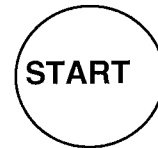
RELAY EXT. DC VOLTAGE will be displayed, press on voltage.



to switch

PASS OVER Z - AXIS REFERENCE POINT  
 PASS OVER X - AXIS REFERENCE POINT  
 PASS OVER Y - AXIS REFERENCE POINT

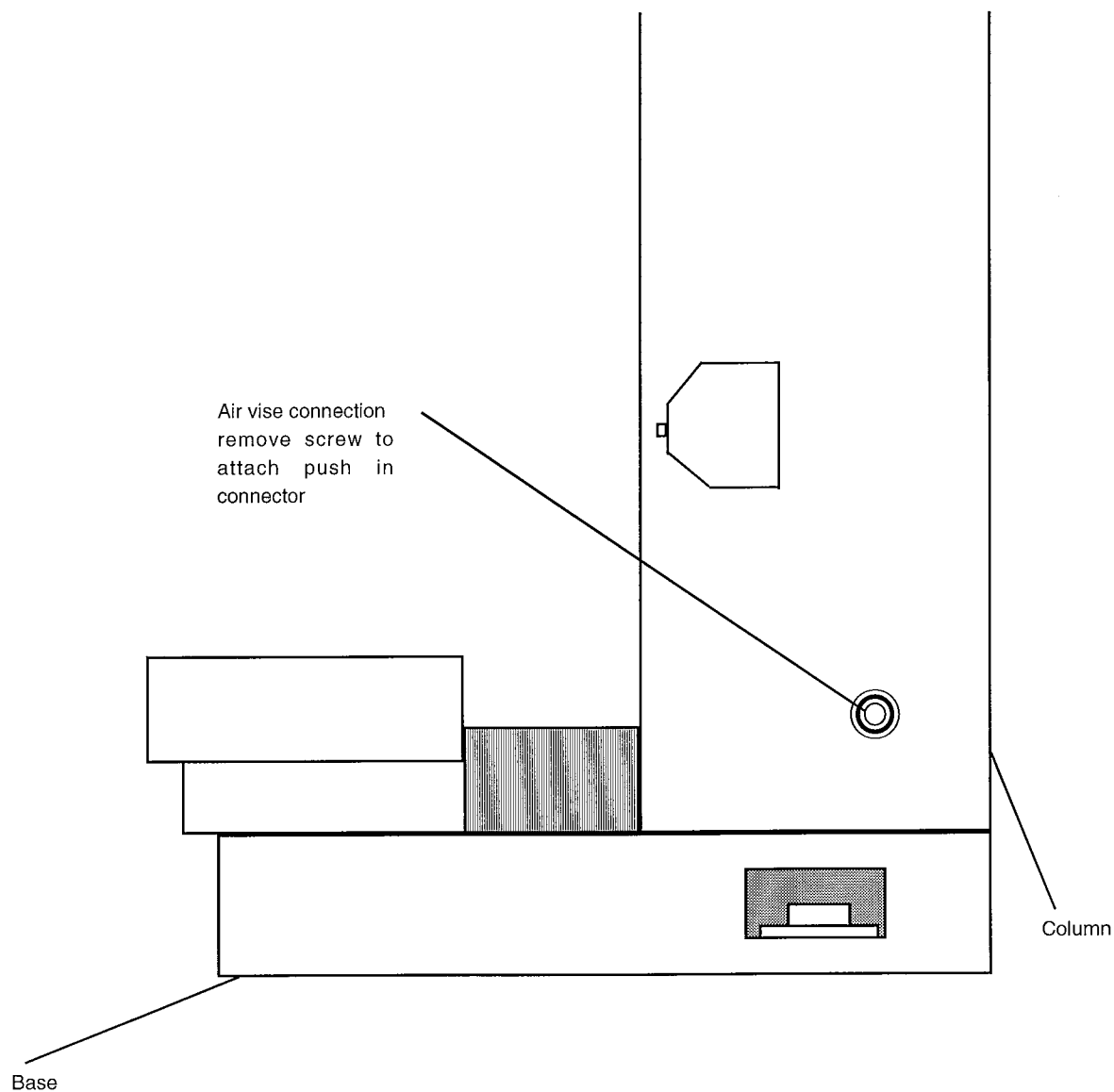
press



Pass over the reference point of each axis. After passing over the reference point, the axis travels to the reference mark or back to the software limit switch. Re - start each limit switch individually. The axis sequence is determined by the machine parameters set by the manufacturer.

The machine is now ready for manual operation.

**AIR VISE CONNECTION**



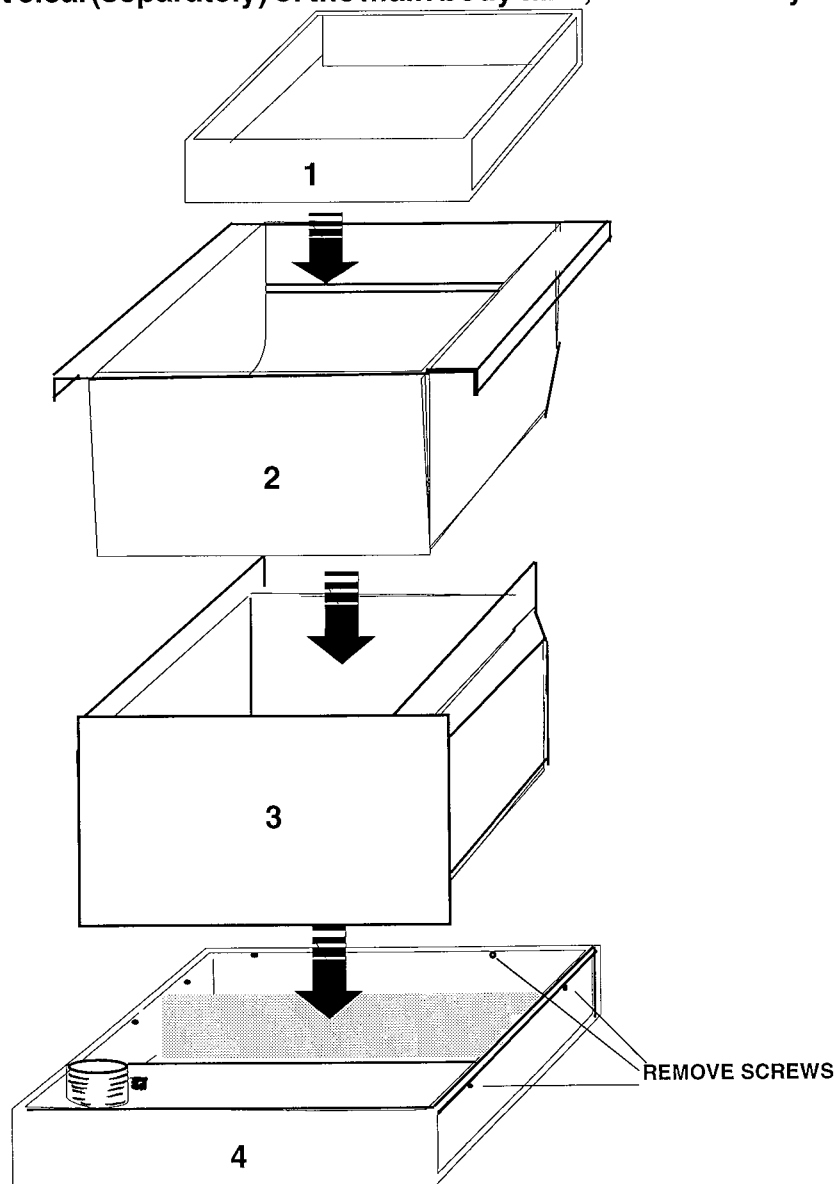
R.H. SIDE OF MACHINE (FRONT FACING)

**FOR MACHINES FITTED WITH HEAVY DUTY MACHINE BENCH(WITH COOLANT TANK)**

The coolant tank breaks down into four component parts :-

1. The Ferrous filter tray
2. The Non - Ferrous filter tray
3. The Main Body tank
4. The Pump Filter Tank Base.

Trays 1 and 2 lift clear(separately) of the main body tank, the main body tank can then be

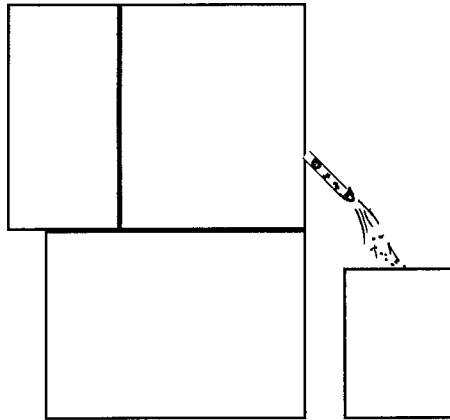


separated from the base by removing the six screws.

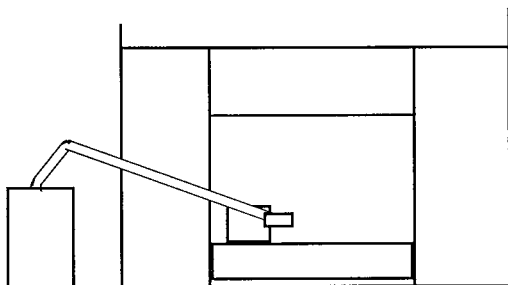
## COOLANT DRAINING

There are basically two methods of draining the coolant tank :-

1. With the coolant tank still in place beneath the cabinet base, place the drum or container which is to hold the drained off coolant as near to the machine cabinet as possible. Angle the coolant nozzle(s) into the drum and switch on the coolant flow (see diagram below). When the coolant ceases to flow, switch off the coolant and pull out the tank from beneath the cabinet (front or rear depending on the cabinet model). The tank can then be separated as in the diagram on the previous page and the remainder of the coolant removed from the base.



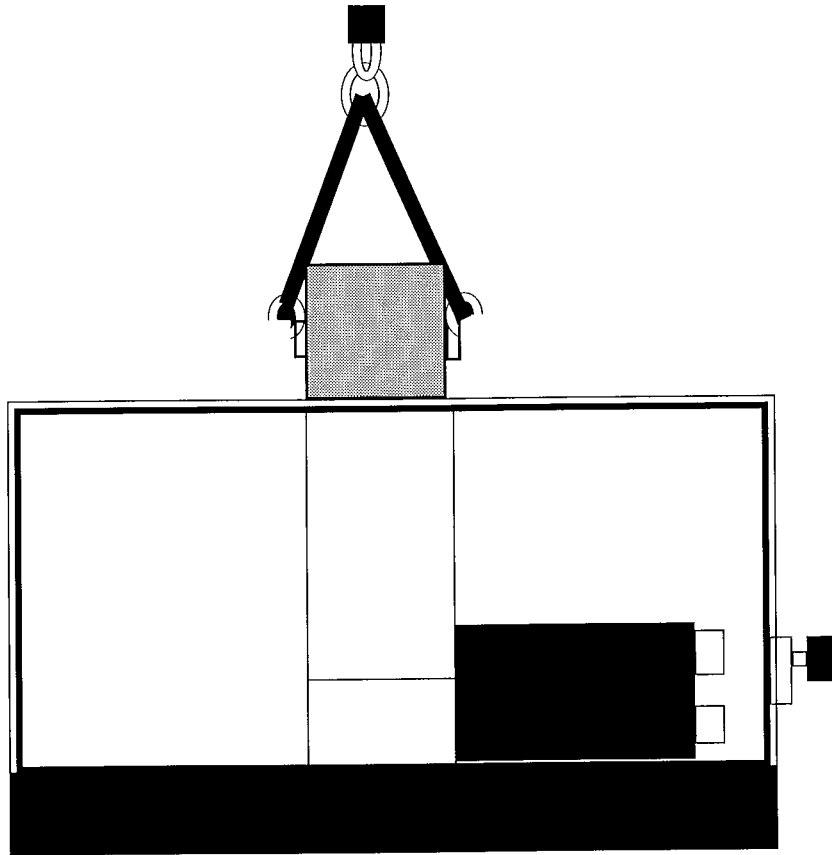
2. With the coolant tank still in place beneath the cabinet and with the coolant switched off, remove the coolant delivery pipe from the pump by removing the clip. Place a pipe of the same size over the pump nozzle which you have just removed the delivery pipe from, clamp with the same clip and place the other end in a drum or container, then switch on the coolant pump to drain the coolant into the drum. When the coolant ceases to flow, switch off the coolant pump, pull out the coolant tank from beneath the cabinet. The tank can then be separated as in (1) above. Ensure delivery pipe is reconnected to pump after the draining operation is completed.



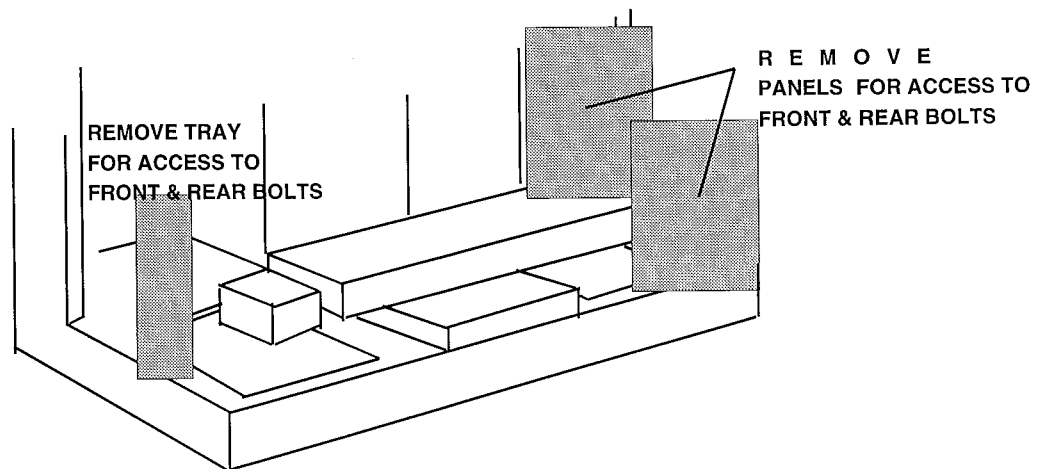
## BENCH TOP MODEL

### LIFTING

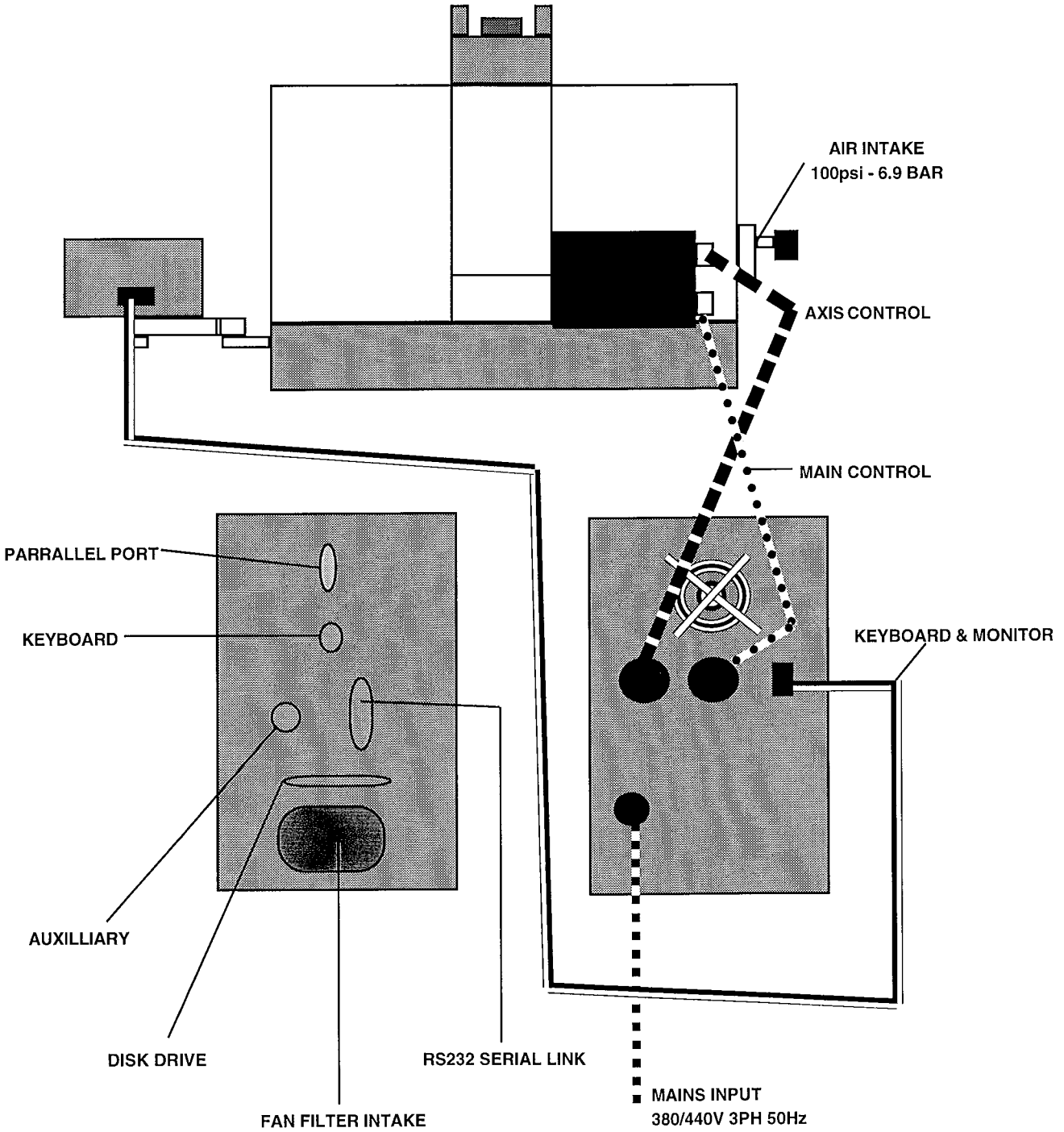
Lifting is effected using the two red lifting hooks at the side of the column. Ensure the machine is balanced before moving.



### CLAMPING BOLTS



**MACHINE CONNECTIONS (BENCH MODEL)**



***PARTS LIST***  
***FOR***  
***TRIAC 200 HEIDENHAIN 360***





## TR20/100 HEAD ASSEMBLY

TR20/101	..	SPINDLE PULLEY	1
TR20/103	.	DRIVING DOGS	2
TR20/104	.	SPINDLE MOTOR PLATE	1
TR20/105	..	SPINDLE LOCK BRKT	1
TR20/106	..	SHOT BOLT	1
TR20/107	..	MOTOR PULLEY	1
TR20/108	..	HEAD COVER	1
TR20/109	..	HEADSTOCK	1
BVS100/226	..	COOLANT PIPE BRKT.	1
BI 00195M	..	O/BUSH 10X14X10	1
BI 00319A	..	SPINDLE MOTOR TR200	1
BI 00425	..	MICROSWITCH V3S-1009	1
BI 00425A	..	MICROSWITCH ACTUATOR	1
BI 00628Q	..	POLY-V-BELT 190J12	1
RS 385-806	..	DIE CAST BOX	2

## TR21/200 BASE & X SLIDE DRIVE

BI 00318A	..	MOTOR ML2340A-10	1
BI 00381H	..	M/SWITCH BNS519FD60	1
TR21/205	..	Y ENCODER PULLEY	1
TR21/206	..	30T PULLEY	1
TR21/207	..	X SLIDE ENCODER BKT	1
TR20/201	..	BALLSCREW EXTENSION	1
TR20/204A	..	BEARING HOUSING	1
TR20/207	..	Y DATUM TRIP	1
TR20/208	..	PLUG	1
TR20/209	..	BASE	1
TR20/210	..	CROSSLIDE	1
BI 00442I	..	ENCODER ROD 456/500	1
BI 00636D	..	TIMING BELT 130XLO37	1

## TR21/300 COLUMN & HEAD DRIVE

BI 00318A	..	MOTOR ML2340A-10	1
BI 00381G	..	M/SWITCH BNS543B2016	1
BI 00381H	..	M/SWITCH BNS519FD60	1
BI 00370	..	HALOGEN LIGHT	1
BI 00442I	..	ENCODER ROD 456/500	1
BI 00636D	..	TIMING BELT 130XLO37	1
BI 01427C	..	CONC.COVER TR.Z AXIS	1
TR20/301A	..	REAR CABLE COVER	1
TR20/302	..	COUNTERWEIGHT COVER	1
TR20/303A	..	Z MOTOR PLATE	1
TR20/304	..	COLUMN	1
TR21/205	.	Y ENCODER PULLEY	1
TR21/301	..	Z ENCODER PULLEY	1
MCV2/304	..	Z DATUM BKT	1
MCV1/213A	..	X SLIDE LIMIT TRIP	1

## TR21/400 TABLE & X SLIDE ASSY

BI 00318A	..	MOTOR ML2340A-10	1
BI 00380F	..	M/SWITCH 14CE91	1
BI 00442I	..	ENCODER ROD 456/500	1
BI 00110	..	BEARING 6200 2RS	1
TR20/401	..	TABLE MOTOR COVER	1
TR20/402	..	TABLE ENCODER COVER	1
TR20/403	..	TABLE DRIVE FLANGE	1
TR20/404	..	X DATUM TRIP	1
TR20/405	..	TABLE	1
TR21/401	..	TABLE ENCODER BKT	1
TR21/402	..	TABLE END PLATE	1
TR21/403	..	BEARING HOUSING	1

## TR21/500 CABINET ASSY

TR5/536	..	CENTRE PLATE	1
TR5/537	..	PIVOT BUSH	2
TR5/540	..	TORSION BAR	1
TR5/541	..	LEVER	1
TR5/545	..	GUARD PIVOT BLOCK	4
TR5/546	..	LATCH BRACKET	1
TR5/1401	..	SWARF CABINET	1
TR5/1402	..	COOLANT TANK	1
TR5/1403	..	SWARF CHUTE	1
TR5/1404	..	BASKET	1
TR5/1406A	..	SIDE PLATE RH	1
TR5/1407A	..	SIDE PLATE LH	1
TR5/1409	..	BASKET HANDLE	2
TR5/1410	..	HANDLE MOUNT	4
TR20/501	..	CABINET BASE	1
TR20/509	..	CANOPY BASE	1
TR20/510	..	CANOPY TR200	1
TR20/514	..	FRONT WINDOW	1
TR20/515	..	SIDE WINDOW	2
TR20/516	..	UPPER ARM	2
TR20/517	..	LOWER ARM	2
RM5/506	..	END CAP	2
RM5/507	..	MICROSWITCH TRIP	1
RM5/508	..	BUSH	2
RM5/509	..	CYLINDER SUPPORT	1

SP164	..	TAILPIPE ADAPTOR	2
BVS100/226	..	COOLANT PIPE BRKT.	1
BI 00170C	..	AX816 THRUST BEARING	8
BI 00171D	..	CP816 THRUST WASHER	8
BI 00370	..	HALOGEN LIGHT	1
BI 00398	..	COOLANT PUMP 3PH	1
BI 00380G	..	TITAN SWITCH 24V	1
BI 01118	..	OIL LEVEL IND.HCX76	1
BI 01445G	..	CASTOR 2198U00045P60	4
BI 01212	..	DRAWER HANDLE 102/5"	1
BI 01212B	..	HANDLE 6921-12001	1
BI 01417C	..	GAS SPRING TRIAC ATC	1
BI 01428	..	ANTI-VIB PAD NO 1	6
BI 01435B	..	IRS 736 WS WINDOW	3
BI 01435C	..	BLACK TRIM LF1B	3
BI 01451	..	FILTER/REGULATOR BO6	1
BI 01451A	..	PRESSURE GAUGE	1
BI 01451B	..	BRACKET 18-001-053	1
BI 01451Z	..	34-0321-27	1
BI 01102B	..	1/4" COOLANT PIPE	1
BI 01102G	..	1/4" NPT ADAPTOR	1
BI 01102H	..	1/4"X 1"FLARE NOZZLE	1
BI 01116	..	BALL VALVE 0.25"(TAP)	1
BI 01128Q	..	REDUCER 3/8M-1/4F	1
ELBOW 3/8BSP M/F	..	ELBOW 3/8" BSP M/F	1
CLIP RC54 COPP	..	CLIP RC54 COPPER	2

# TR20/600 LUBRICATION SYSTEM

BI 01120 .. OIL PUMP ELECTRIC 1

## TR21/800 MAIN PANEL

BI 00418Z	..	SAREL BOX 800 HIGH	1
BI 00419	..	PLATE FOR ABOVE	1
BI 00441Y	..	HEID TNC360 CONTROL	1
BI 00318	..	AXIS BL30F DRIVE	3
BI 00318D	..	PSU 220 M20A	1
BI 00361Z	..	RELAY BD5987.02/001	1
BI 00362C	..	RELAY 24V DC 11 PIN	2
BI 00362D	..	RELAY BASE 11 PIN	2
BI 00362H	..	RELAY MODULE 24V DC	3
BI 00362I	..	I/FACE MODULE 54097	2
BI 00365T	..	FAN 109S074UL	1
BI 00365U	..	FINGER GRD.109-091C	2
BI 00366A	..	ISOLATOR OETL 40D1	1
BI 00366V	..	C/BREAKER C60 HD216	1
BI 00366Z	..	C/BREAKER C60 HD210	1
BI 00374A	..	TRANSFORMER 300VA	1
BI 00375	..	24V POW.SUPP 110V	2
BI 00376	..	T/FORMER 415V PRIM.	1
BI 00381N	..	100A09ND3	1
BI 00381X	..	CONTACTOR 100A18ND3	1
BI 00388	..	T12-221-SN-2AMP	1
BI 00388A	..	BRAKING RESISTOR	1
BI 00391	..	140-MN1000 6.0/10.0A	1



BI 00391A	..	140-MN0100 0.6/1.0A	2
BI 00430C	..	SUPPRESSOR 23006	2
BI 00432L	..	COMBIVERT 2.2KW KEB	1
BI 00449Z	..	57-506-9053 EARTH	7
BI 00450	..	57.503.0053 WK2.5/32	38
BI 00450A	..	57.910.5053 FUSE FIT	2
BI 00450C	..	07.311.0153 END SECT	12
BI 00450D	..	57.504.9053.0 EARTH	6
BI 00450F	..	07.311.7653.0	1
BI 00450G	..	57.510.01530 MAINS	4

## TR21/800A OPERATORS PANEL

SK1234	..	PENDANT HOUSING	1
SK1235	..	REAR PANEL	1
BI 00364S	..	HINGED GUARD 593032	1
BI 00365I	..	PUSHBUTTON	8
BI 00365J	..	PUSH BUTTON	8
BI 00365K	..	LENS RED	2
BI 00365L	..	LENS GREEN	3
BI 00365M	..	LENS WHITE	3
BI 01429D	..	MONITOR HSG SUPP ARM	1

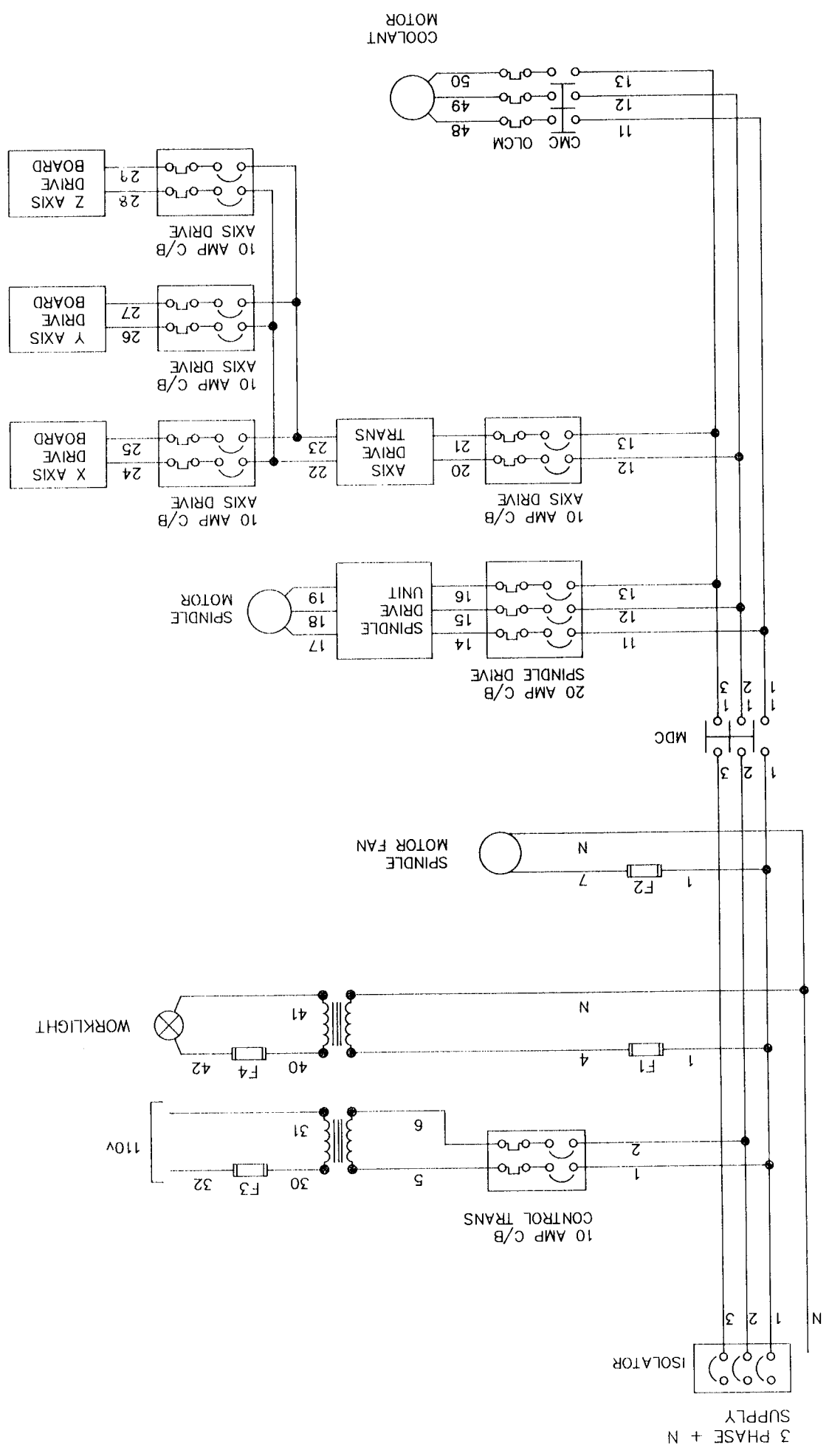
## TR21/2000 NAMEPLATES

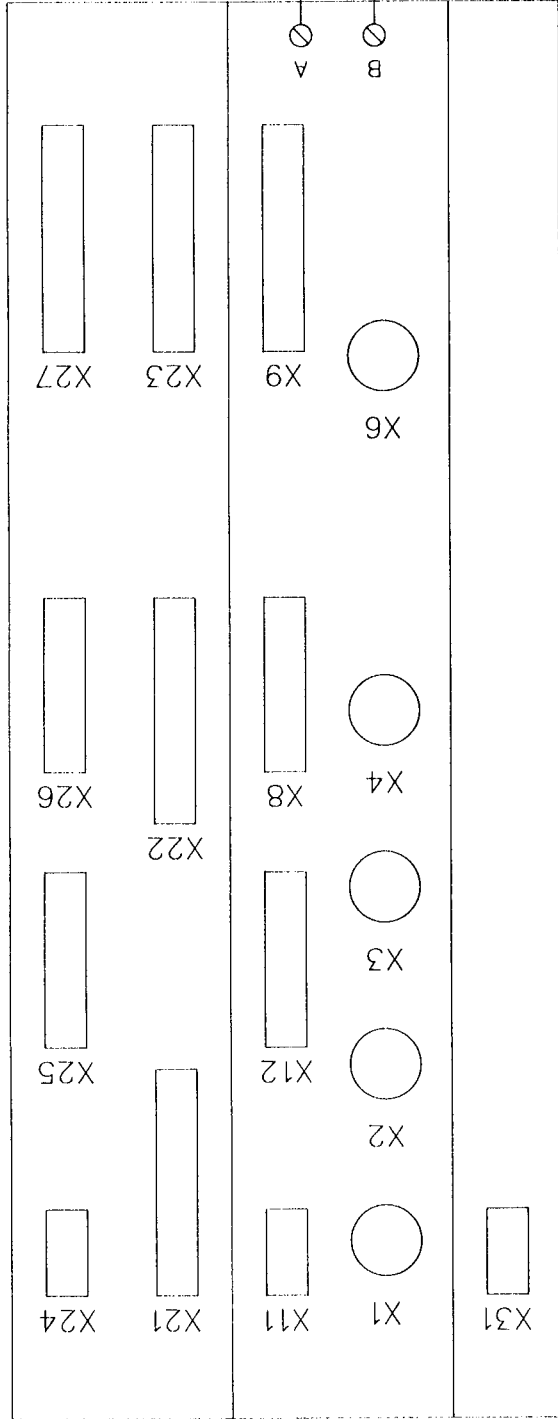
CH269A	..	ELECTRIC WARNING LAB	1
CH357	..	LUBE PLATE TRIAC	1
CH489	..	DENFORD NAMEPLATE	1
CH512	..	E/STOP PANEL	1
CH519	..	TRIAC 200 PLATE	1
CH534	..	SPECIFICATION PLATE	1

## TRIAC 200 STD. EQUIPMENT

RS 413-608	..	FUSE SEMI 20MM 3.15A	2
RS 413-556	..	FUSE	1
ALLEN KEYS MET	..	ALLEN KEY SET METRIC	1
BI 01813F	..	TRIAC INST MAN PVC	1
SPANNER 16/17MM	..		1
SPANNER 17/19MM	..		1

# ***ELECTRICAL DRAWINGS***



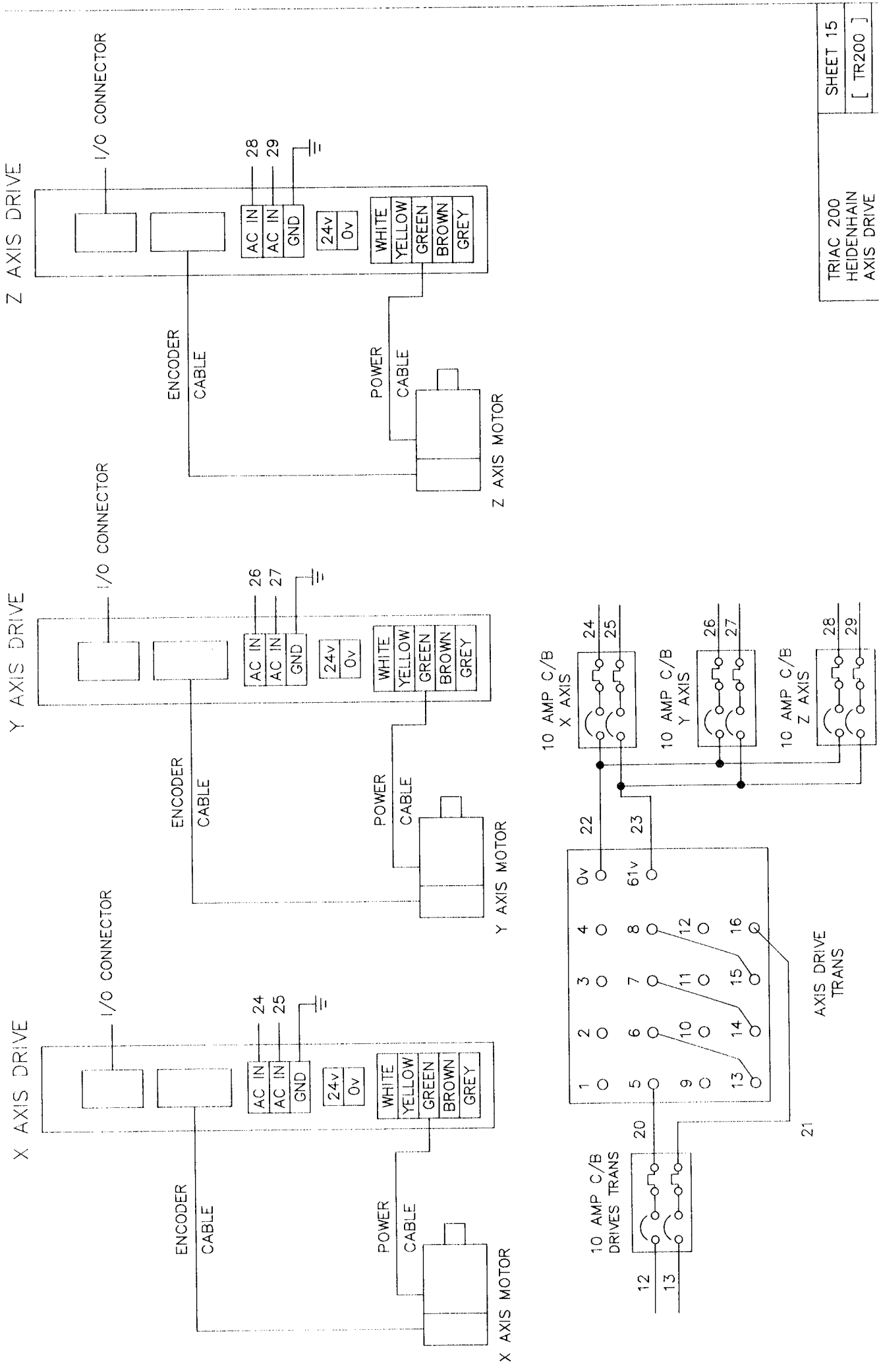


- X1 X ENCODER
- X2 Y ENCODER
- X3 Z ENCODER
- X4 IV ENCODER
- X8 ANALOGUES TO DRIVES SEE SHEET 12
- X11 HANDWHEEL (OPTION) SEE SHEETS 7 AND 8
- X21 PLC OUTPUTS SEE SHEETS 5 AND 6
- X22 PLC INPUTS SEE SHEET 2
- X24 PC POWER SUPPLY SEE SHEET 2
- X31 NC POWER SUPPLY

TRIAC 200  
HEIDENHAIN  
360 CONTROL  
CONNECTIONS

SHEET 14

[ TR200 ]

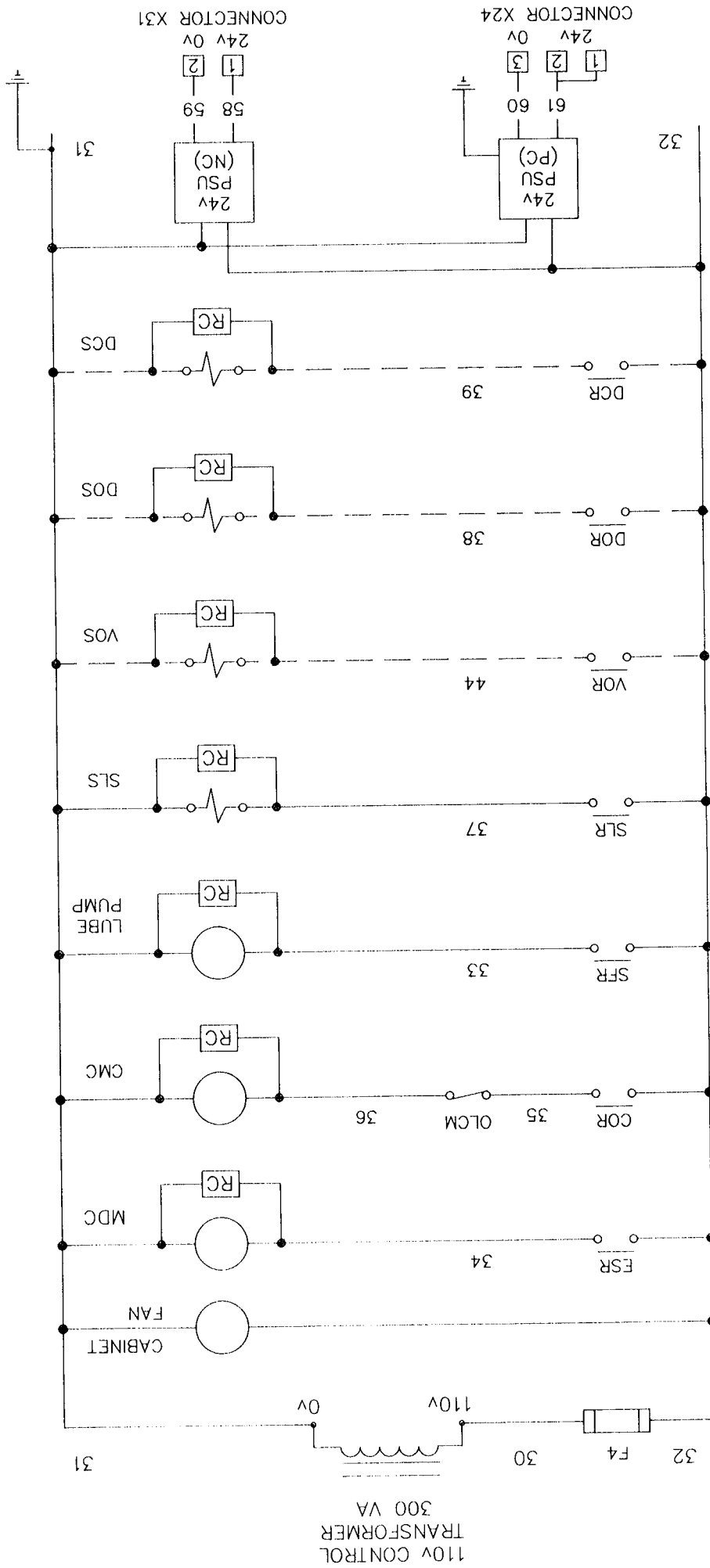


TRIAC 200  
HEIDENHAIN  
AXIS DRIVE  
DETAILS

SHEET 15  
[ TR200 ]

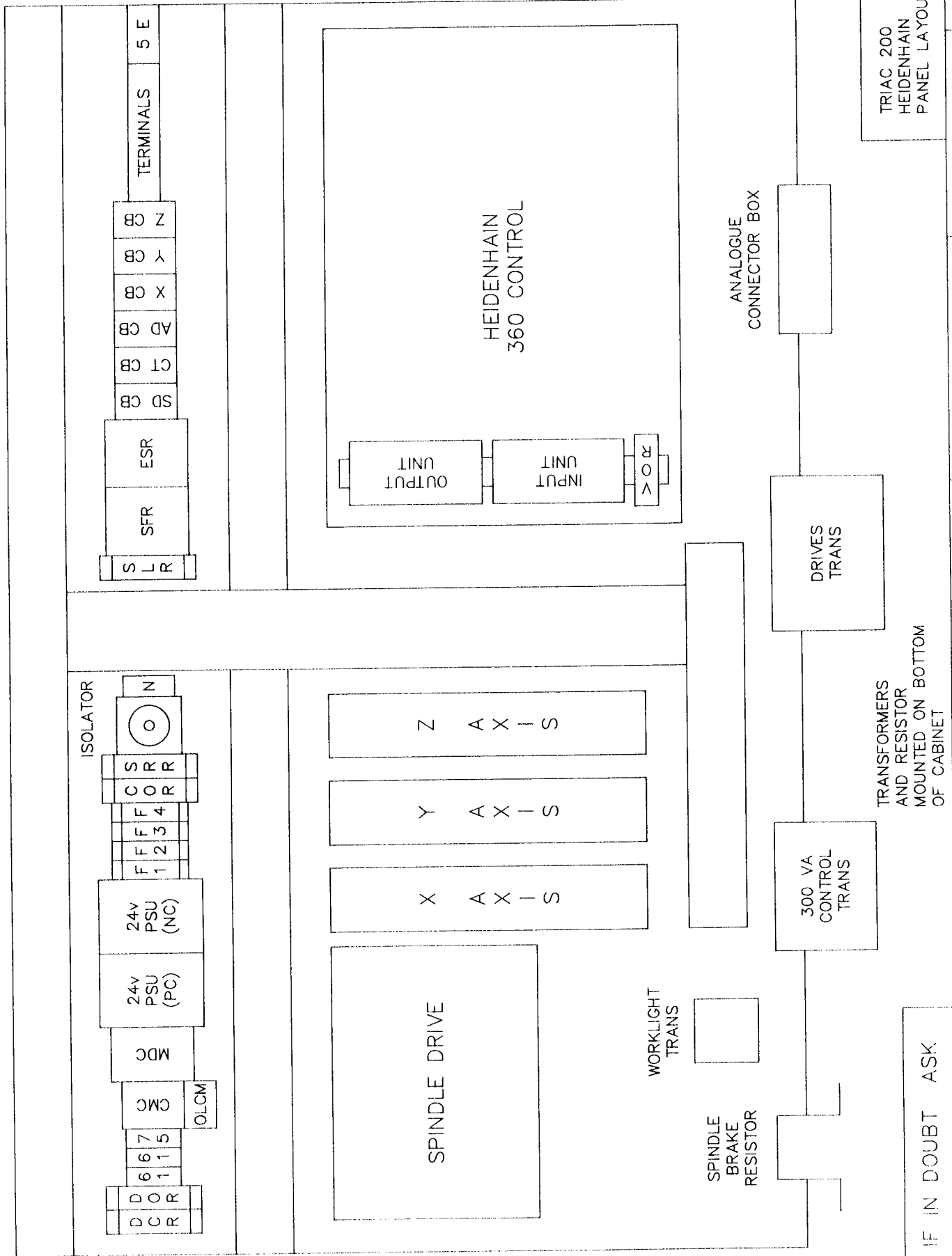


IF IN DOUBT ASK



SHEET 2  
TRIAC 200  
HEIDENHAIN  
110V SCHEMATIC  
[ TR200 ]





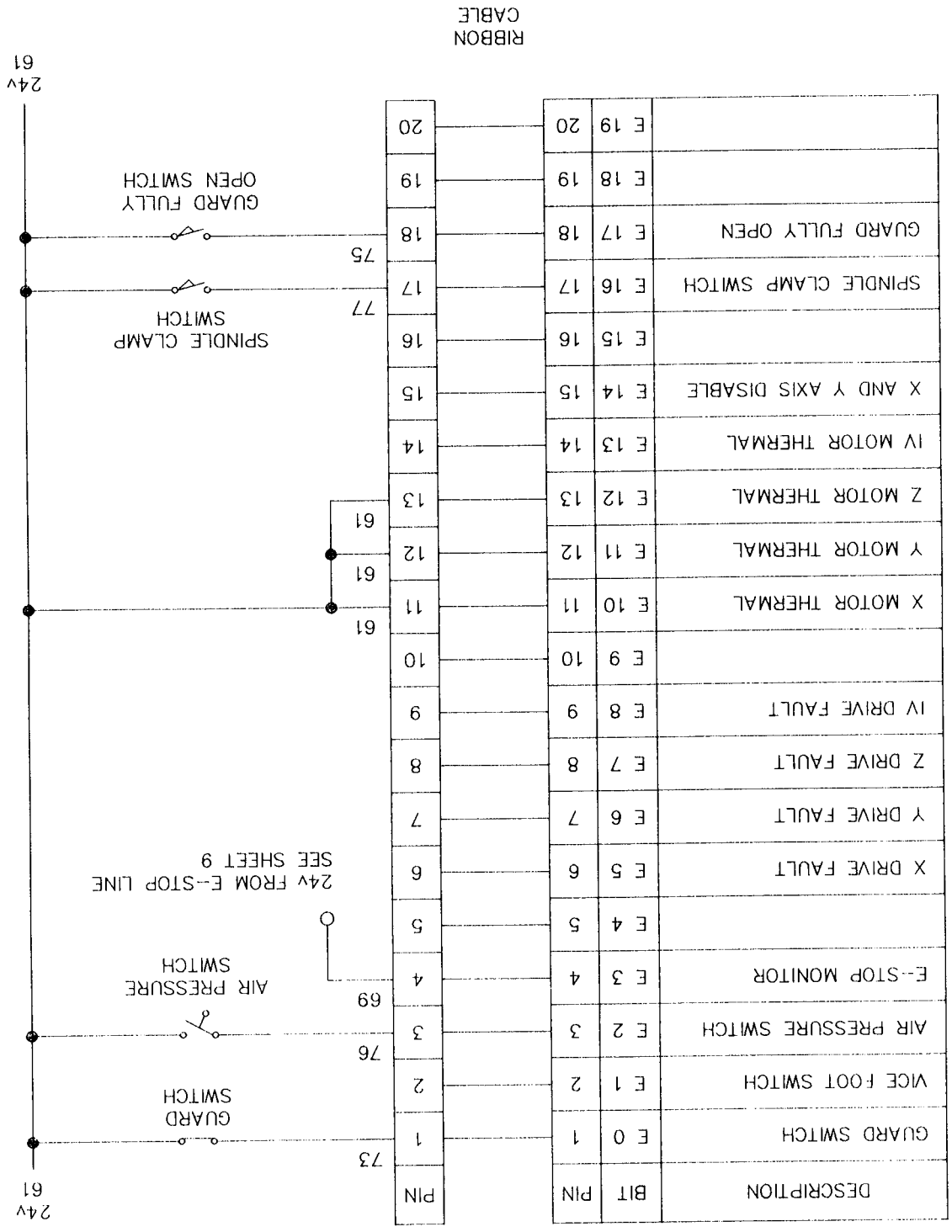
IF IN DOUBT ASK

TRANSFORMERS AND RESISTOR MOUNTED ON BOTTOM OF CABINET

TRIAC 200 HEIDENHAIN PANEL LAYOUT

SHEET 4 [ TR200 ]

INPUTS X22  
37 WAY D TYPE MALE  
INTERFACE UNIT



RIBBON  
CABLE

DESCRIPTION	BIT	PIN	PIN
GUARD SWITCH	E 0	1	1
VICE FOOT SWITCH	E 1	2	2
AIR PRESSURE SWITCH	E 2	3	3
E-STOP MONITOR	E 3	4	4
X DRIVE FAULT	E 5	6	6
Y DRIVE FAULT	E 6	7	7
Z DRIVE FAULT	E 7	8	8
IV DRIVE FAULT	E 8	9	9
X MOTOR THERMAL	E 10	11	11
Y MOTOR THERMAL	E 11	12	12
Z MOTOR THERMAL	E 12	13	13
IV MOTOR THERMAL	E 13	14	14
X AND Y AXIS DISABLE	E 14	15	15
SPINDLE CLAMP SWITCH	E 16	17	17
GUARD FULLY OPEN	E 17	18	18
	E 18	19	19
	E 19	20	20

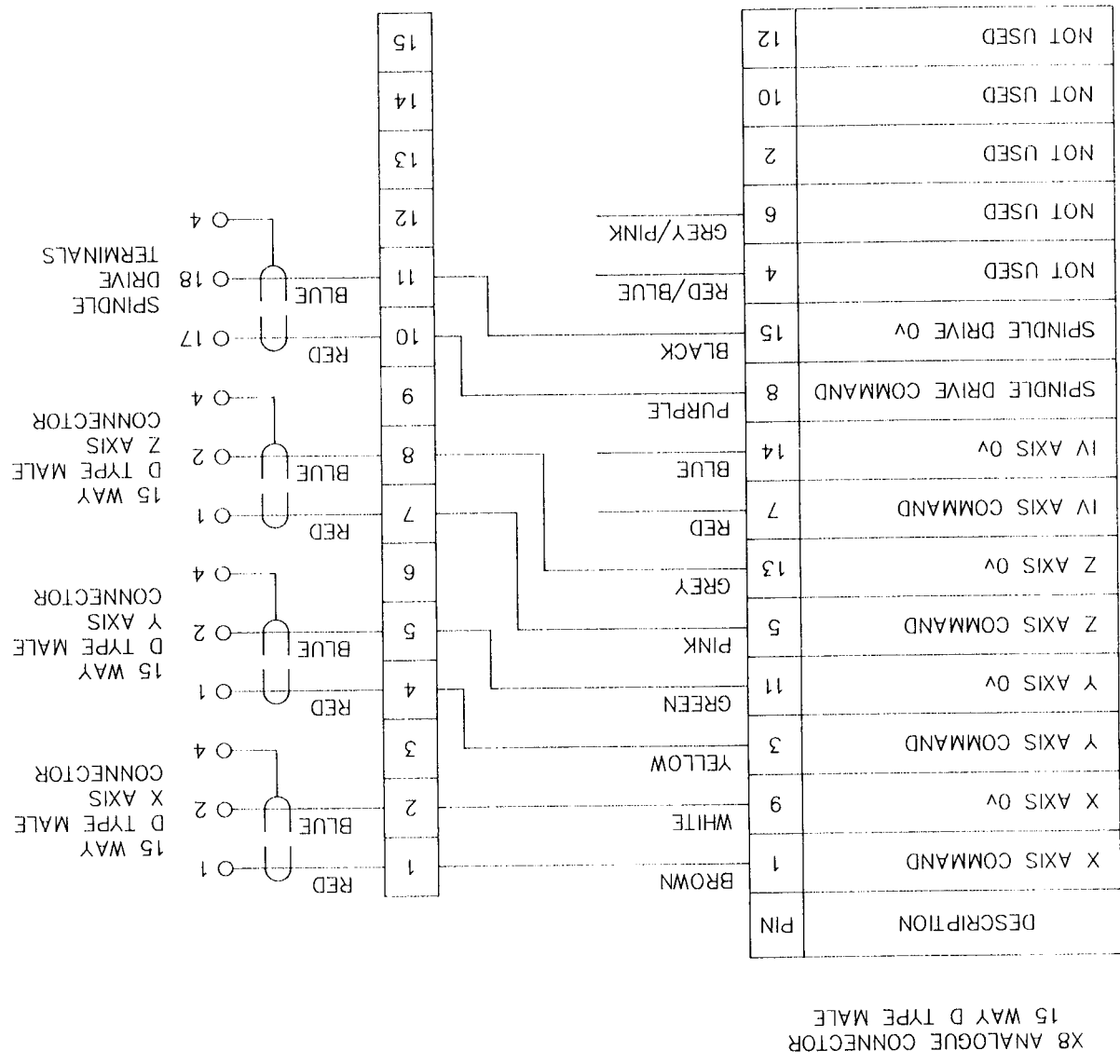
24V  
61

24V  
61

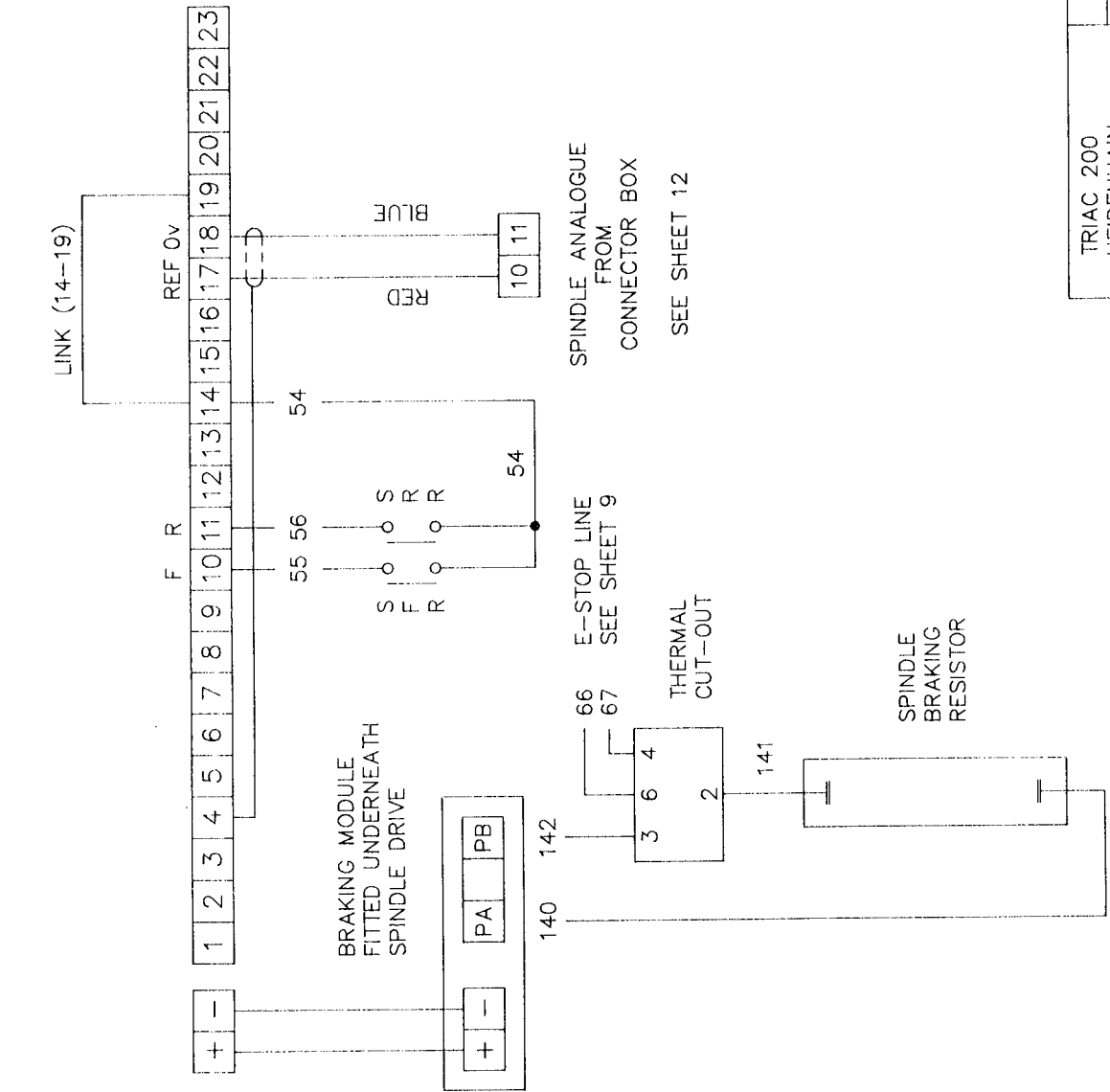
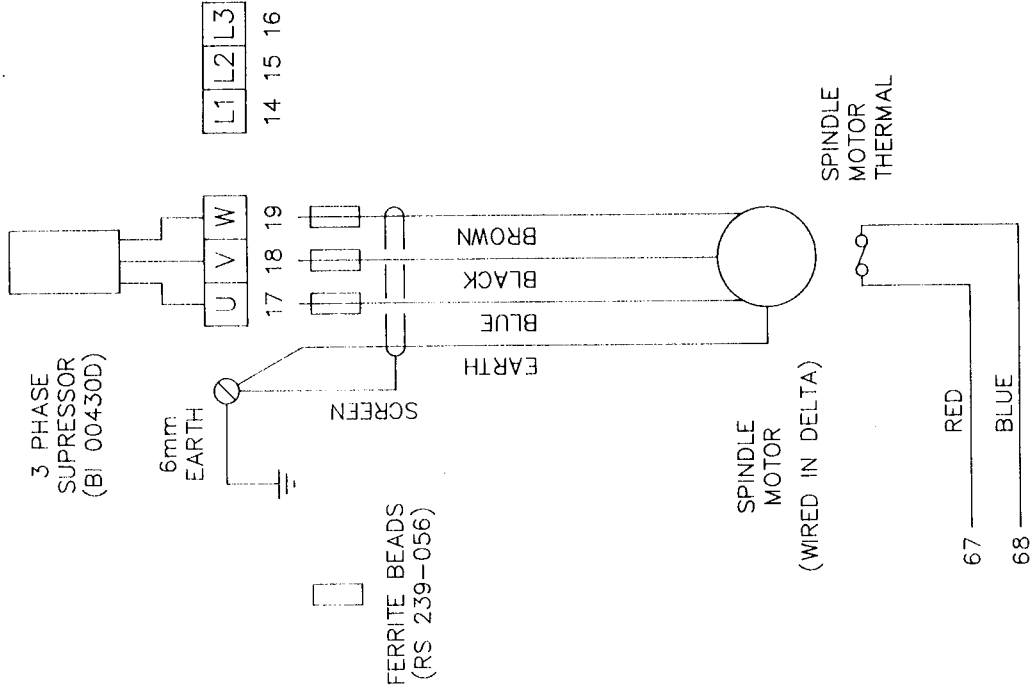
ANALOGUE CONNECTION BOX  
 MOUNTED ON BOTTOM OF CABINET

MULTI-CORE  
 FROM CONTROL TO  
 CONNECTOR BOX

2 CORE SCREENS  
 FROM CONNECTOR BOX  
 TO DRIVES



X8 ANALOGUE CONNECTOR  
 15 WAY D TYPE MALE



E-STOP LINE  
SEE SHEET 9

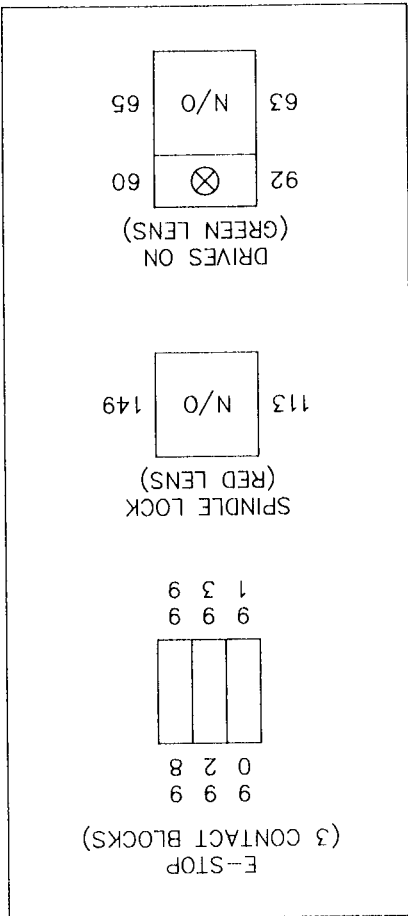
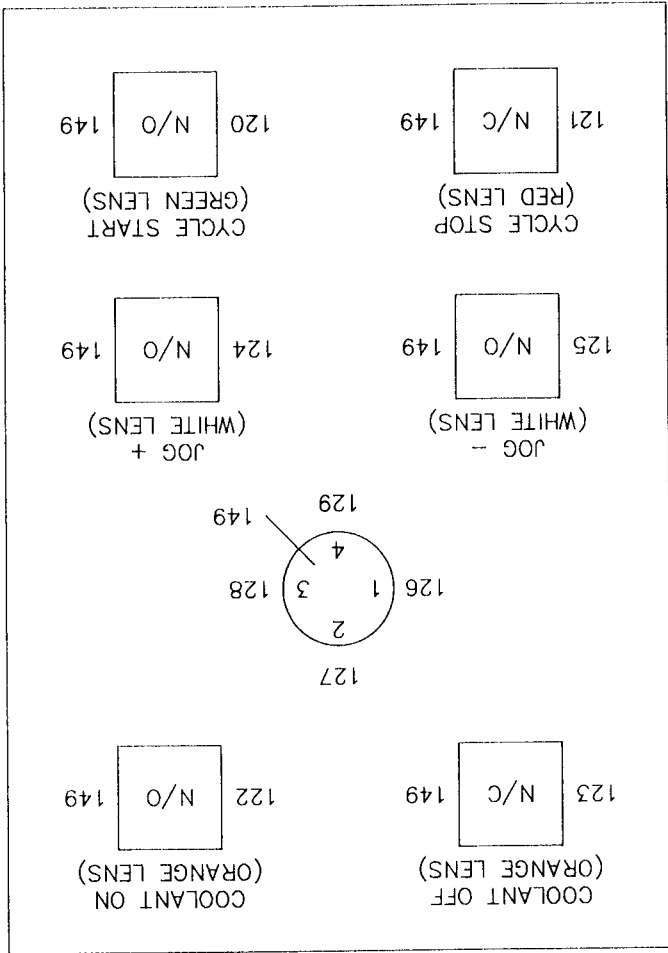
TRIAC 200 HEIDENHAIN SPINDLE DRIVE DETAILS	SHEET 13 [ TR200 ]
---	-----------------------

12 WAY QM CONNECTOR

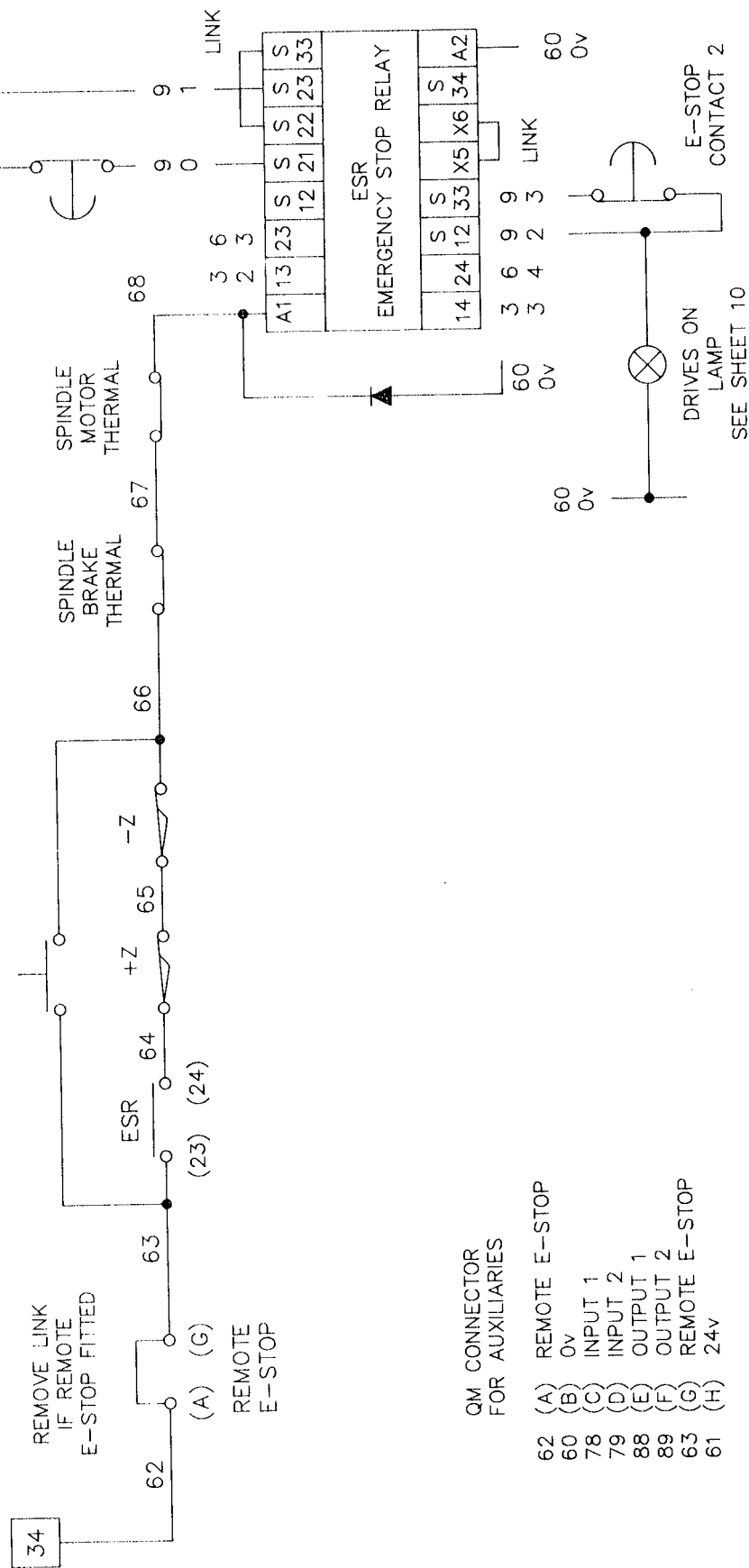
- |    |        |    |
|----|--------|----|
| 1  | BLACK  | 90 |
| 2  | BROWN  | 91 |
| 3  | RED    | 92 |
| 4  | ORANGE | 93 |
| 5  | YELLOW | 98 |
| 6  | GREEN  | 99 |
| 7  | BLUE   | 63 |
| 8  | VIOLET | 65 |
| 9  | GREY   | 60 |
| 10 | WHITE  | 92 |
| 11 | RED    |    |
| 12 | BLUE   |    |

0.5mm SINGLES  
FROM PUSHBUTTONS

12 CORE SCREEN  
TO TERMINALS



E-STOP OUTPUT  
 24V FROM CONTROL  
 37 WAY OUTPUT UNIT  
 CONNECTOR X21



QM CONNECTOR  
 FOR AUXILIARIES

- 62 (A) REMOTE E-STOP
- 60 (B) 0v
- 78 (C) INPUT 1
- 79 (D) INPUT 2
- 88 (E) OUTPUT 1
- 89 (F) OUTPUT 2
- 63 (G) REMOTE E-STOP
- 61 (H) 24v

SHEET 9  
 [ TR200 ]  
 TRIAC 200  
 HEIDENHAIN  
 E-STOP CIRCUIT



TR21 200  
HEIDENHAIN  
X21 OUTPUTS  
PINS 21 - 37

SHEET 8  
[ TR200 ]

37 WAY  
INTERFACE UNIT

OUTPUTS X21  
37 WAY D TYPE MALE

DESCRIPTION	BIT	PIN	PIN
AUX OUTPUT 1	A 20	21	88
AUX OUTPUT 2	A 22	23	89
	A 23	24	
	A 24	25	
	A 25	26	
	A 26	27	
	A 27	28	
	A 28	29	
	A 29	30	
	A 30	31	
		32	
		33	
E-STOP OUTPUT	24v	34	62
		35	
		36	
		37	

- QM CONNECTOR  
FOR AUXILIARIES
- 62 (A) REMOTE E-STOP
  - 60 (B) 0v
  - 78 (C) INPUT 1
  - 79 (D) INPUT 2
  - 88 (E) OUTPUT 1
  - 89 (F) OUTPUT 2
  - 63 (G) REMOTE E-STOP
  - 61 (H) 24v

24v OUTPUT  
TO E-STOP LINE  
SEE SHEET 9

RIBBON  
CABLE

TRIAC 200  
HEIDENHAIN  
X21 OUTPUTS  
PINS 1 - 20

SHEET 7

[ TR200 ]

TR21-07

24-3-95

DATE

DRN BY A McHENRY

WEST YORKSHIRE

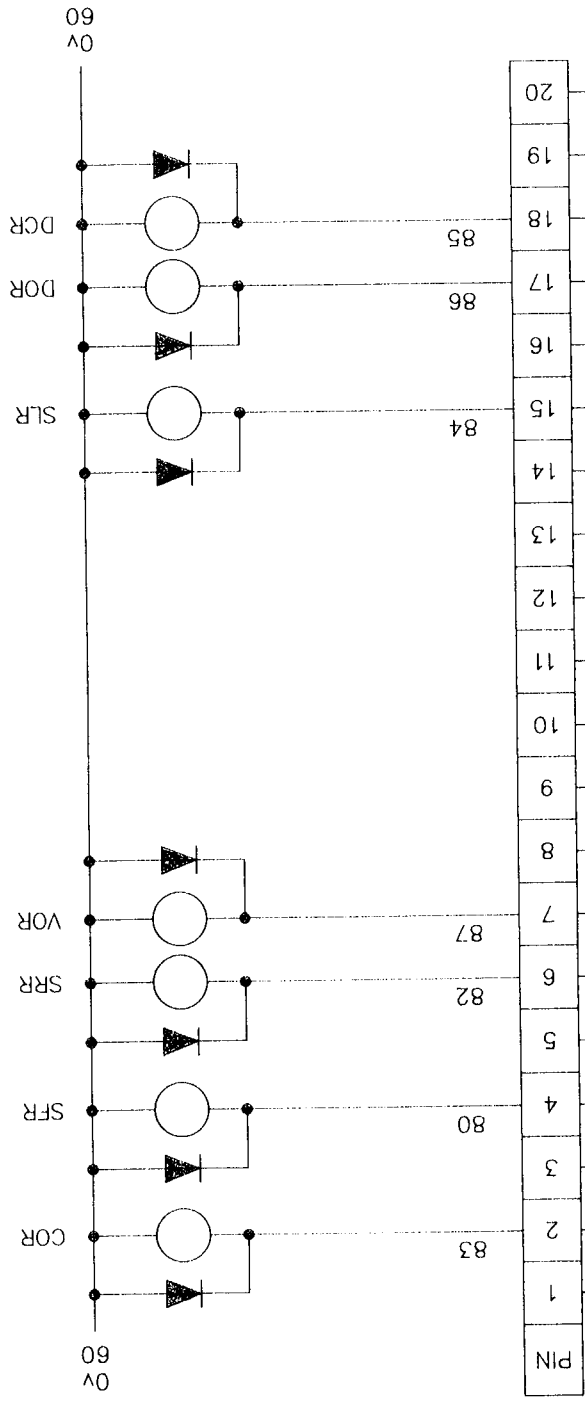
BRIGHOUSE

DENFORD MACHINE TOOLS LTD

37 WAY  
INTERFACE UNIT

OUTPUTS X21  
37 WAY D TYPE MALE

RIBBON  
CABLE



DESCRIPTION	BIT	PIN	PIN
COOLANT ON RELAY	A 0	1	1
	A 1	2	2
	A 2	3	3
SPINDLE FORWARD RELAY	A 3	4	4
	A 4	5	5
SPINDLE REVERSE RELAY	A 5	6	6
VICE OPEN RELAY	A 6	7	7
	A 7	8	8
	A 8	9	9
	A 9	10	10
	A 10	11	11
	A 11	12	12
	A 12	13	13
	A 13	14	14
SPINDLE LOCK RELAY	A 14	15	15
	A 15	16	16
DOOR CLOSE RELAY	A 16	17	17
DOOR OPEN RELAY	A 17	18	18
	A 18	19	19
	A 19	20	20

X1 CONNECTOR  
OPERATORS PANEL  
25 WAY D TYPE MALE

DESCRIPTION	BIT	PIN
CYCLE START P/B	E 44	1
CYCLE STOP P/B	E 43	2
COOLANT ON P/B	E 42	3
COOLANT OFF P/B	E 41	4
AXIS + P/B	E 40	5
AXIS - P/B	E 39	6
X SELECT INPUT	E 38	7
Y SELECT INPUT	E 37	8
Z SELECT INPUT	E 36	9
IV SELECT INPUT	E 35	10
SPINDLE LOCK P/B	E 34	11
	E 33	12
	E 32	13
OVERRIDE POT.	0V	14
	12V	15
FEEDRATE OVERRIDE		16
SPINDLE OVERRIDE		17
DO NOT ASSIGN		18
DO NOT ASSIGN		19
DO NOT ASSIGN		20
DO NOT ASSIGN		21
	15V	22
	E 47	23
	E 46	24
	E 45	25

120	BLACK	
121	BROWN	
122	RED	
123	ORANGE	
124	YELLOW	
125	GREEN	
126	BLUE	
127	VIOLET	
128	GREY	SEE SWITCH ROTARY SHEET 10
129	WHITE	
113	TURQUOISE	
149	PINK	

TRAC 200  
HEIDENHAIN  
OPERATORS PANEL  
CONNECTOR

SHEET 11

[ TR200 ]



*ELECTRICAL*

*DRAWINGS*

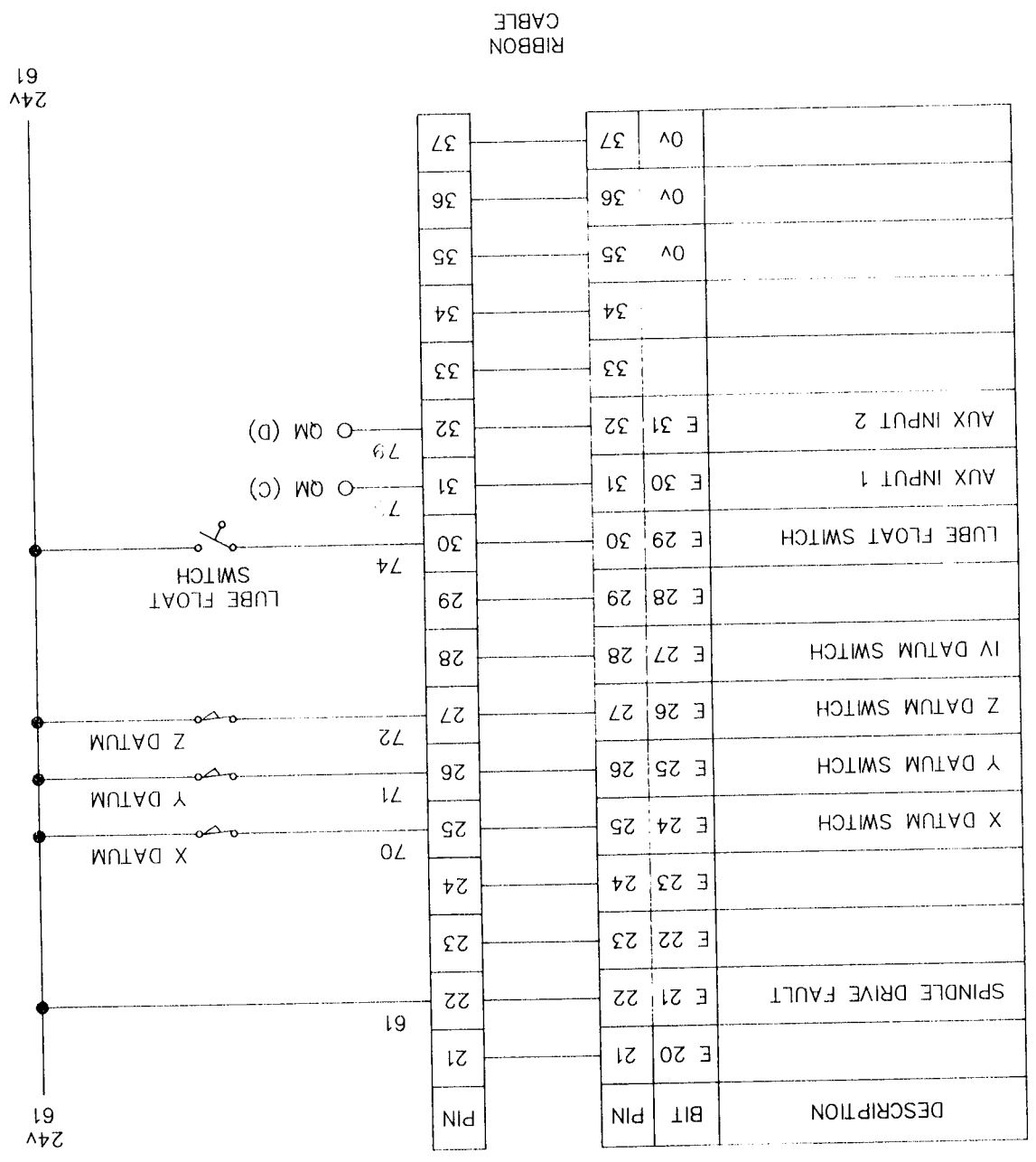


GM 8 WAY ROUND CONNECTOR  
 FOR AUXILIARIES

SHEET 6  
 [ TR200 ]  
 TRIAC 200  
 HEIDENHAIN  
 X22 INPUTS  
 PINS 21 - 37

37 WAY  
 INTERFACE UNIT

INPUTS X22  
 37 WAY D TYPE MALE



X1 CONNECTOR  
OPERATORS PANEL  
25 WAY D TYPE MALE

DESCRIPTION	BIT	PIN	120	121	122	123	124	125	126	127	128	129	113
CYCLE START P/B	E 44	1	BLACK	BROWN	RED	ORANGE	YELLOW	GREEN	BLUE	VIOLET	GREY	WHITE	TURQUOISE
CYCLE STOP P/B	E 43	2											
COOLANT ON P/B	E 42	3											
COOLANT OFF P/B	E 41	4											
AXIS + P/B	E 40	5											
AXIS - P/B	E 39	6											
X SELECT INPUT	E 38	7											
Y SELECT INPUT	E 37	8											
Z SELECT INPUT	E 36	9											
IV SELECT INPUT	E 35	10											
SPINDLE LOCK P/B	E 34	11											
	E 33	12											
	E 32	13											
OVERRIDE POT.	0V	14											
	12V	15											
FEEPRATE OVERRIDE		16											
SPINDLE OVERRIDE		17											
DO NOT ASSIGN		18											
DO NOT ASSIGN		19											
DO NOT ASSIGN		20											
DO NOT ASSIGN		21											
	15V	22											
		23											
		24											
		25											

15V  
149

ROTARY  
SWITCH  
SEE  
SHEET 10

149 PINK

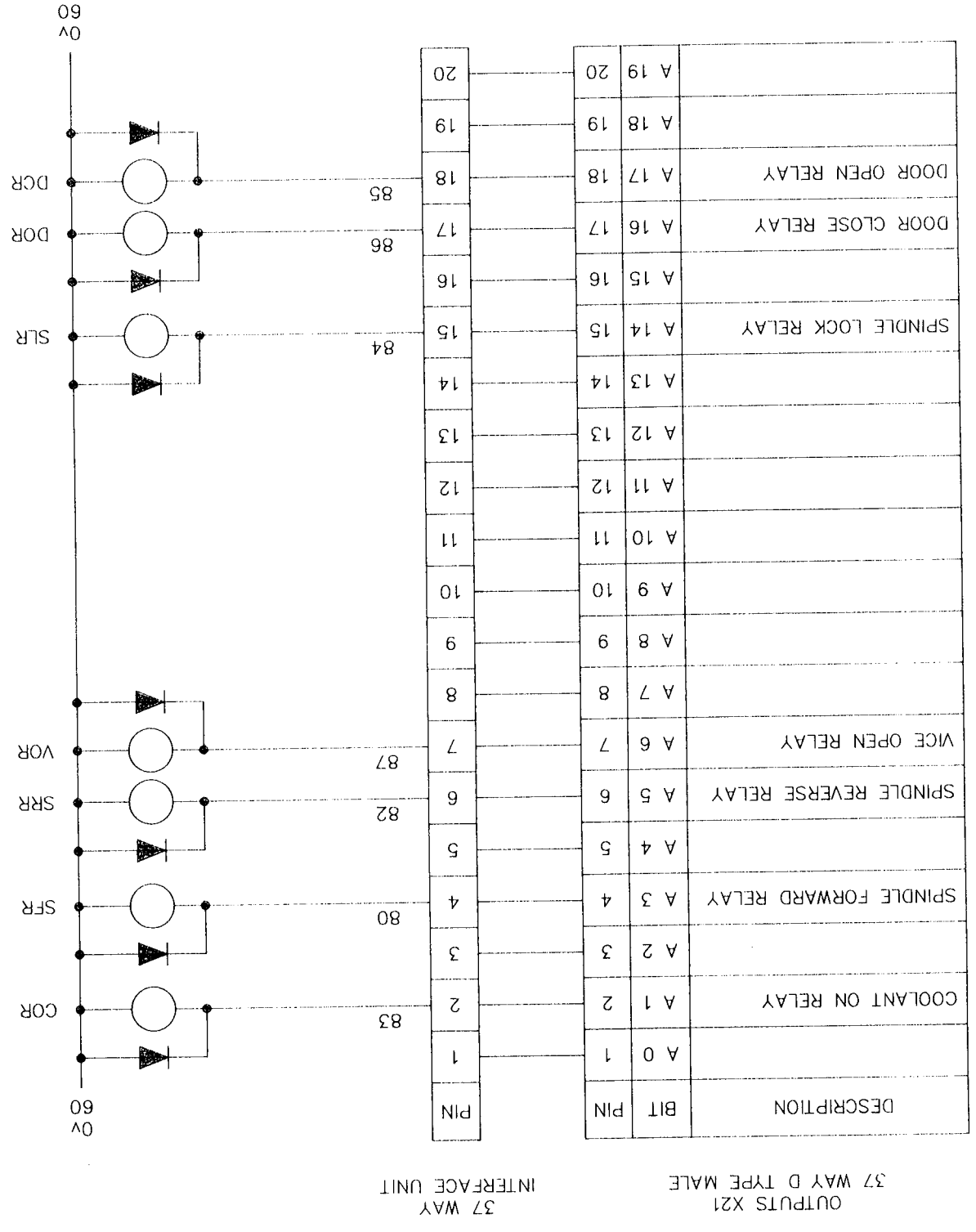
TRAC 200  
HEIDENHAIN  
OPERATORS PANEL  
CONNECTOR

SHEET 11

[ TR200 ]



RIBBON  
 CABLE



37 WAY  
 INTERFACE UNIT  
 OUTPUTS X21  
 37 WAY D TYPE MALE

37 WAY  
INTERFACE UNIT

OUTPUTS X21  
37 WAY D TYPE MALE

DESCRIPTION	BIT	PIN	PIN
AUX OUTPUT 1	A 20	21	88
AUX OUTPUT 2	A 22	23	89
	A 21	22	
	A 23	24	
	A 24	25	
	A 25	26	
	A 26	27	
	A 27	28	
	A 28	29	
	A 29	30	
	A 30	31	
		32	
		33	
E-STOP OUTPUT	24V	34	62
		35	
		36	
		37	

24V OUTPUT  
TO E-STOP LINE  
SEE SHEET 9

- QM CONNECTOR  
FOR AUXILIARIES
- 62 (A) REMOTE E-STOP
  - 60 (B) 0V
  - 78 (C) INPUT 1
  - 79 (D) INPUT 2
  - 88 (E) OUTPUT 1
  - 89 (F) OUTPUT 2
  - 63 (G) REMOTE E-STOP
  - 61 (H) 24V

RIBBON  
CABLE

TRAC 200  
HEIDENHAIN  
X21 OUTPUTS  
PINS 21 - 37

SHEET 8

[ TR200 ]

TR21-08

DATE 24-3-95

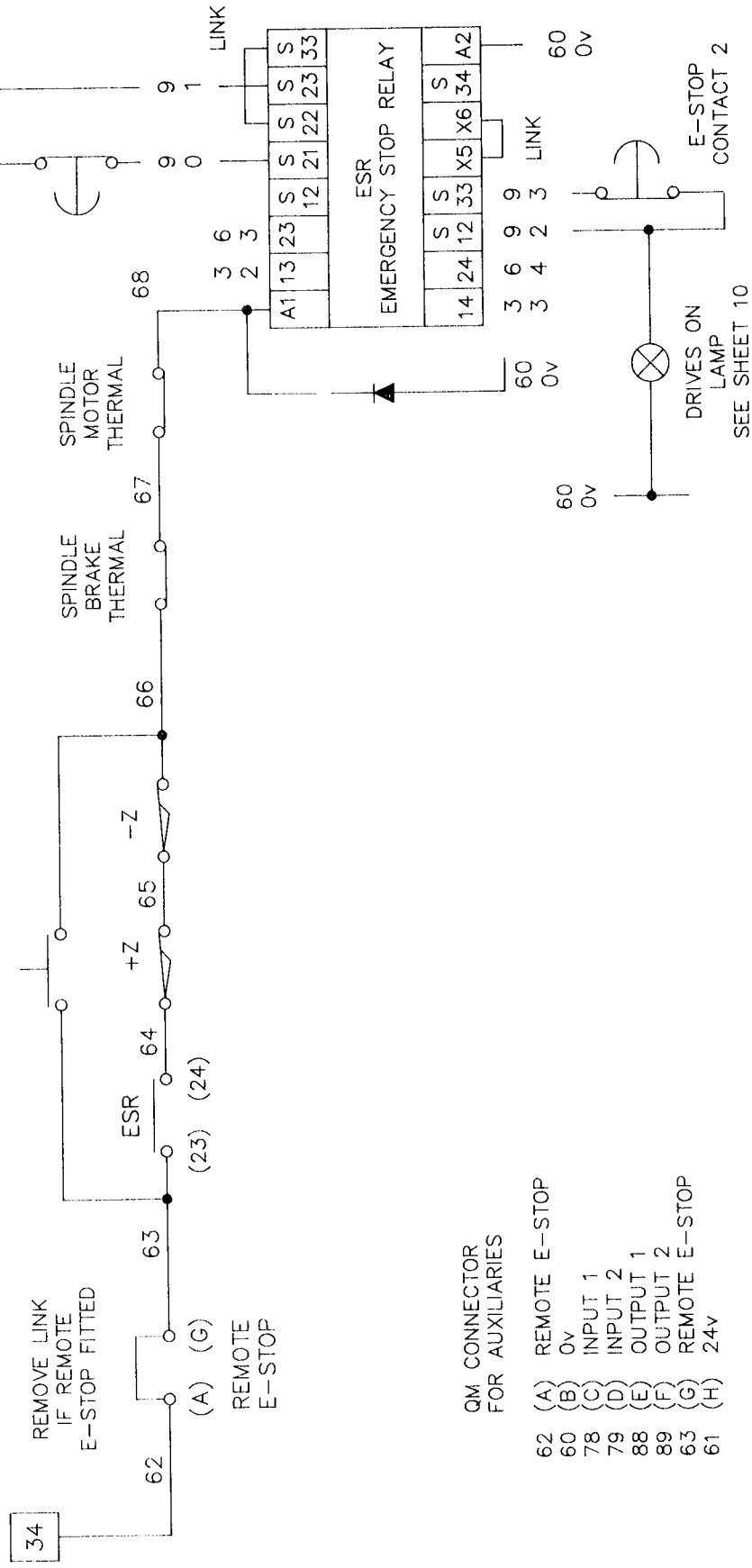
DRN BY A McHENRY

WEST YORKSHIRE

BRIGHOUSE

DENFORD MACHINE TOOLS LTD

E-STOP OUTPUT  
24V FROM CONTROL  
37 WAY OUTPUT UNIT  
CONNECTOR X21



QM CONNECTOR  
FOR AUXILIARIES

- 62 (A) REMOTE E-STOP
- 60 (B) 0v
- 78 (C) INPUT 1
- 79 (D) INPUT 2
- 88 (E) OUTPUT 1
- 89 (F) OUTPUT 2
- 63 (G) REMOTE E-STOP
- 61 (H) 24v

DRIVES ON  
LAMP  
SEE SHEET 10

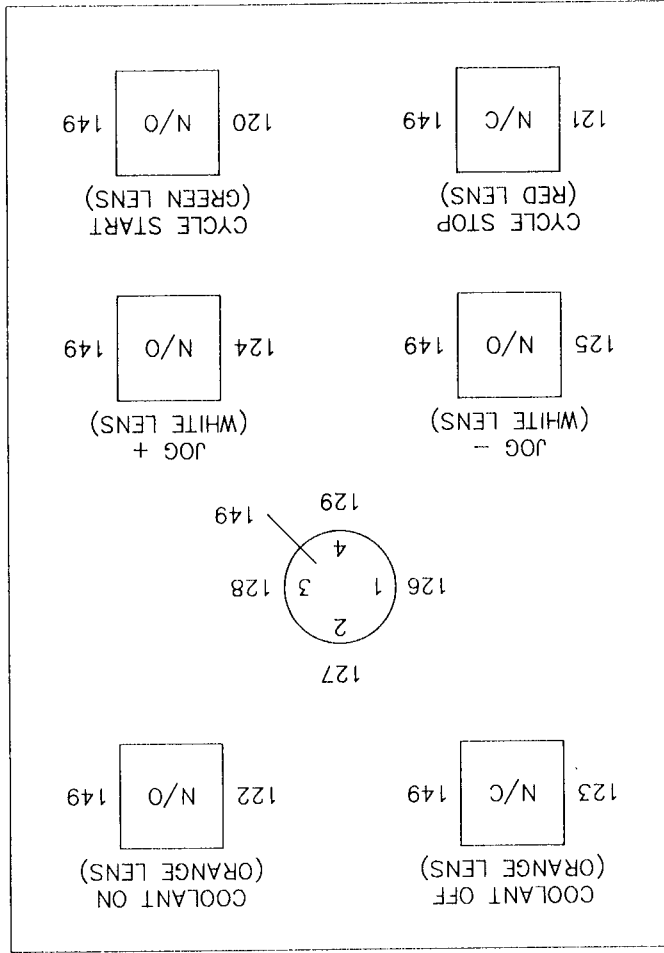
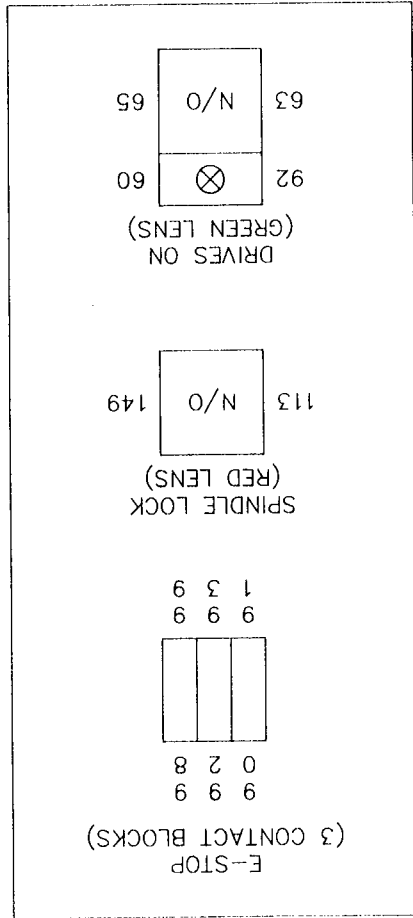
SHEET 9  
[ TR200 ]  
TRIAC 200  
HEIDENHAIN  
E-STOP CIRCUIT

12 WAY QM CONNECTOR

- |    |        |    |
|----|--------|----|
| 1  | BLACK  | 90 |
| 2  | BROWN  | 91 |
| 3  | RED    | 92 |
| 4  | ORANGE | 93 |
| 5  | YELLOW | 98 |
| 6  | GREEN  | 99 |
| 7  | BLUE   | 63 |
| 8  | VIOLET | 65 |
| 9  | GREY   | 60 |
| 10 | WHITE  | 92 |
| 11 | RED    |    |
| 12 | BLUE   |    |

0.5mm SINGLES  
FROM PUSHBUTTONS

12 CORE SCREEN  
TO TERMINALS



TRIAC 200  
HEIDENHAIN  
OPERATORS PANEL

SHEET 10  
[ TR200 ]

IF IN DOUBT ASK

GUARD INTERLOCK  
WITH SOLENOID

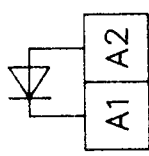
(REMOVE LINK 12 - 41)

GUARD  
SWITCH  
CONTACTS


BLACK  
RED  
GREEN

BROWN  
YELLOW  
BLUE

GUARD  
SOLENOID

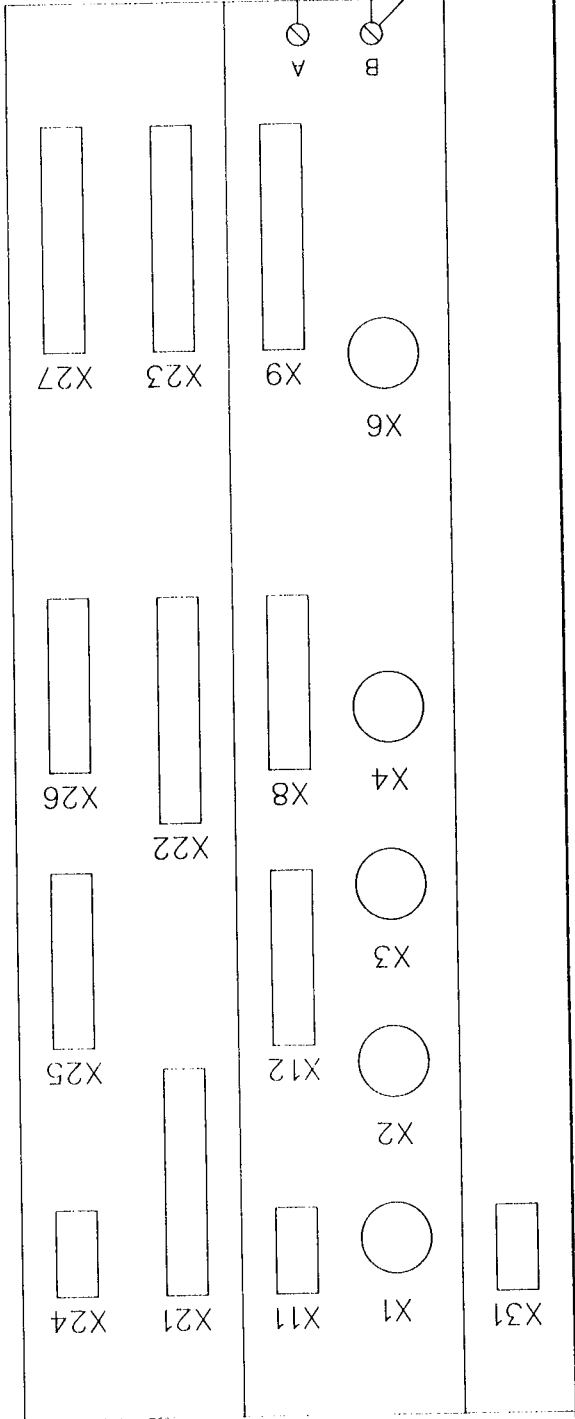


8 CORE SCREEN  
FROM GUARD INTERLOCK  
TO TERMINALS

BLACK 61  
BROWN 73  
RED 94  
YELLOW 95  
GREEN 200  
BLUE 201  
WHITE 99  
VIOLET 60

SHEET 17

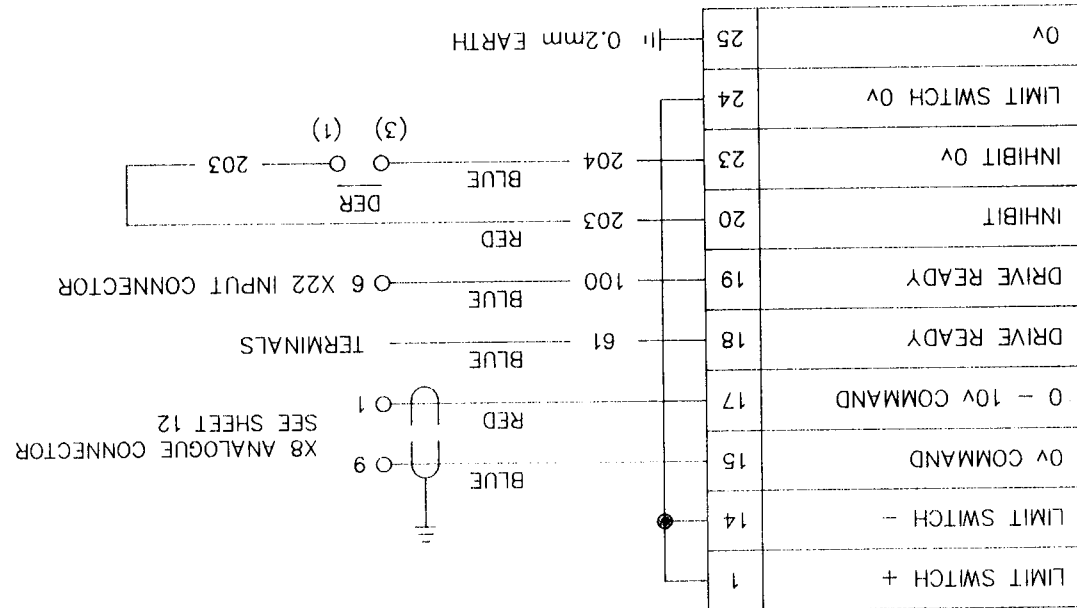
[ TR200 ]



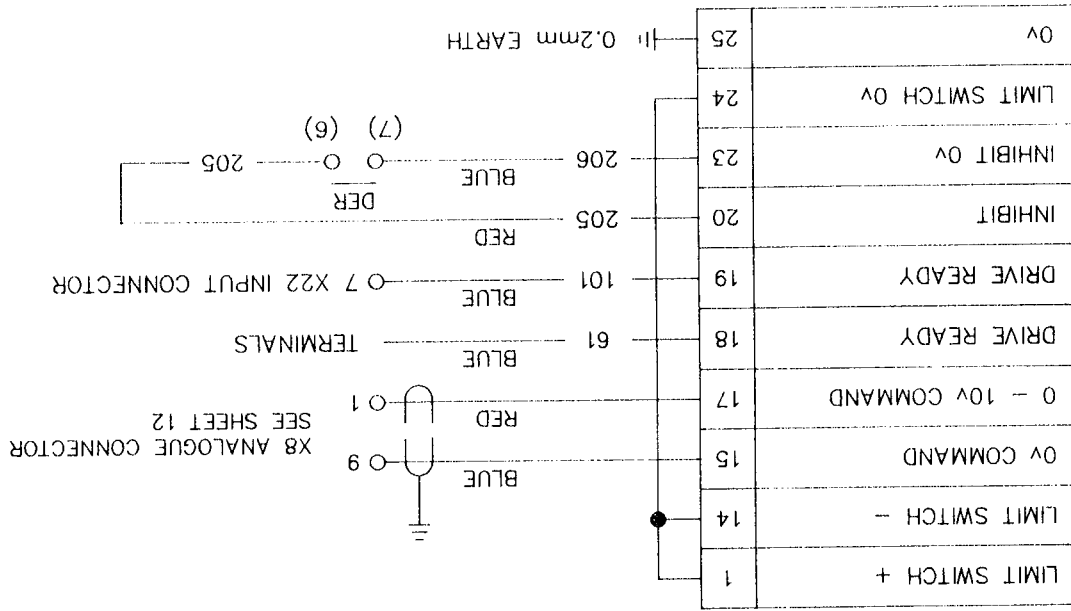
EARTHS FROM  
 AXIS DRIVE ANALOGUES  
 SEE SHEET 12

- X1 X ENCODER
  - X2 Y ENCODER
  - X3 Z ENCODER
  - X4 IV ENCODER
  - X8 ANALOGUES TO DRIVES
  - X11 HANDWHEEL (OPTION)
  - X21 PLC OUTPUTS
  - X22 PLC INPUTS
  - X24 PC POWER SUPPLY
  - X31 NC POWER SUPPLY
- SEE SHEET 12  
 SEE SHEETS 7 AND 8  
 SEE SHEETS 5 AND 6  
 SEE SHEET 2  
 SEE SHEET 2

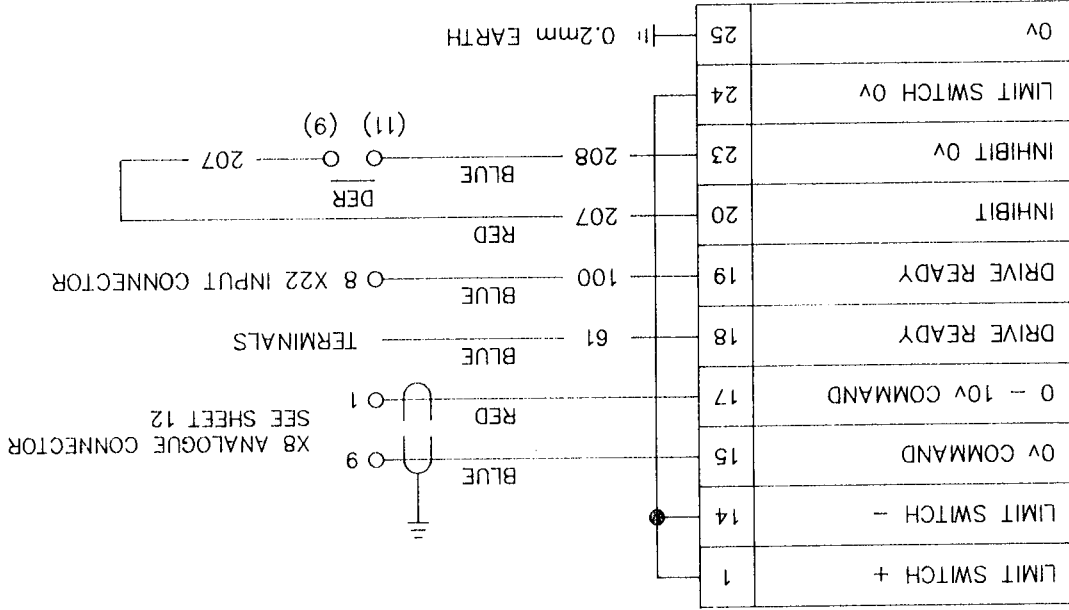
TRIAC 200 HEIDENHAIN 360 CONTROL CONNECTIONS	SHEET 14 [ TR200 ]
---	-----------------------



X AXIS CONNECTOR  
25 WAY D TYPE FEMALE



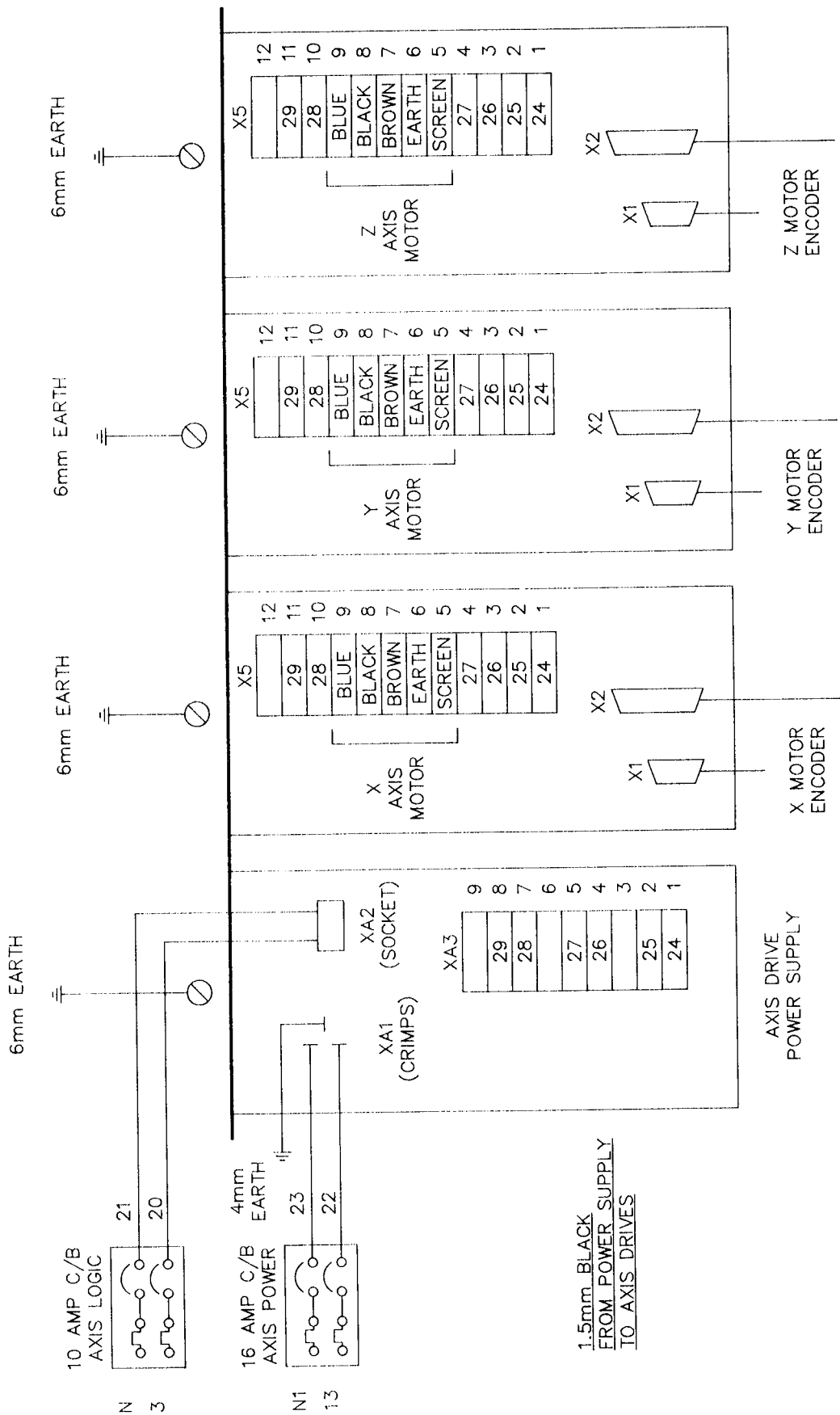
Y AXIS CONNECTOR  
25 WAY D TYPE FEMALE



Z AXIS CONNECTOR  
25 WAY D TYPE FEMALE

TRIAK 200  
HEIDENHAIN  
AXIS DRIVE  
SIGNAL DETAILS

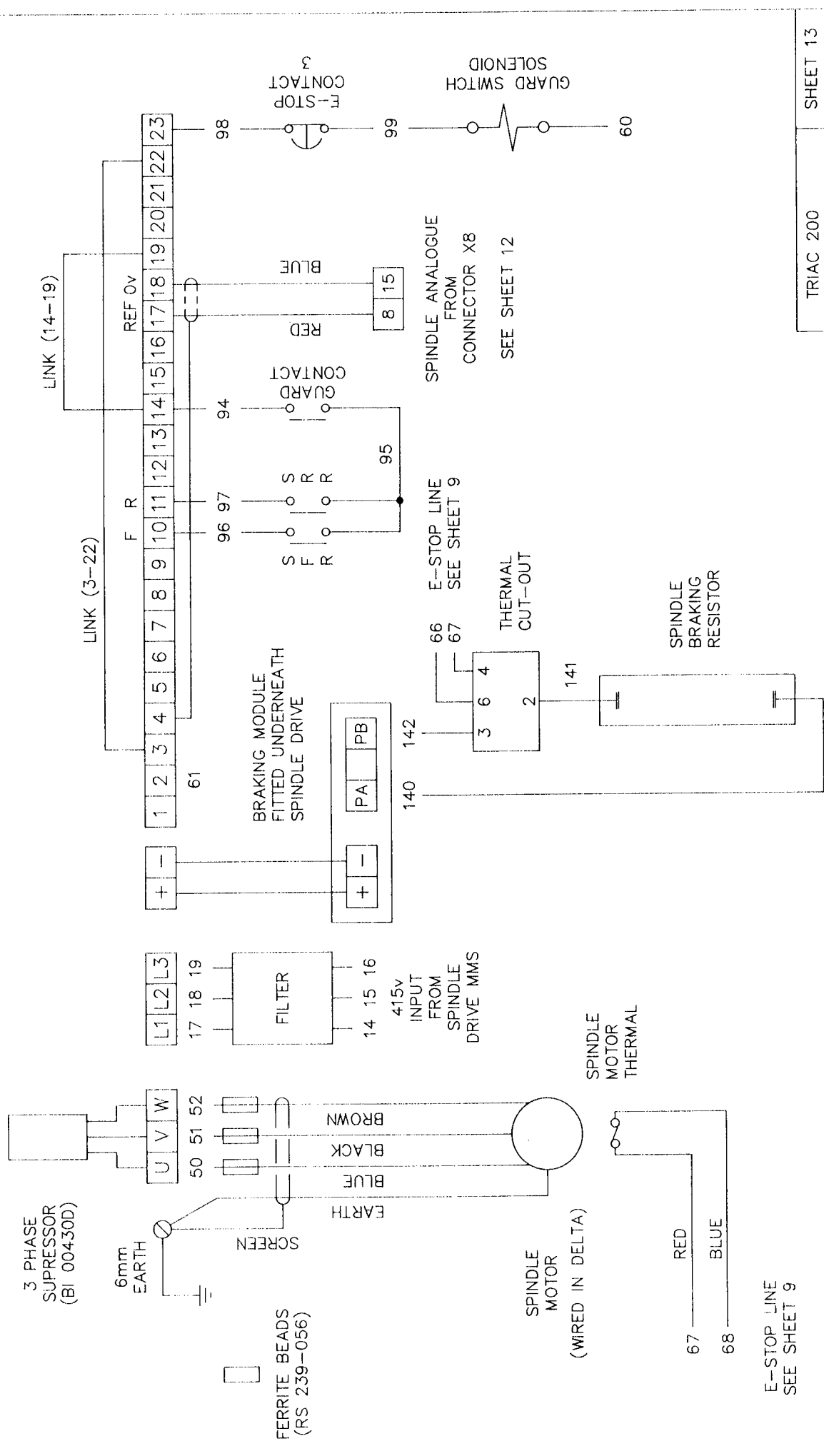
SHEET 16  
[ TR200 ]



SEE SHEET 16  
FOR CONTROL TO AXIS DRIVES  
SIGNAL CABLES

TR21-15A
DRN BY A McHENRY DATE 30-3-95
WEST YORKSHIRE BRIGHOUSE
DENFORD MACHINE TOOLS LTD
TR21-15A
TR200
HEIDENHAIN
AXIS DRIVE
POWER DETAILS
SHEET 15





TR21-13A

30-3-95

DATE

A McHENRY

DRN BY

WEST YORKSHIRE

BRIGHOUSE

TOOLS LTD

DENFORD MACHINE

TR21-13A

HEIDENHAIN SPINDLE DRIVE DETAILS

TR200

SHEET 13

SCREENS FROM  
 ANALOGUE CABLES  
 TO EARTH STUD (B)  
 ON THE CONTROL

SEE SHEET 13  
 FOR SPINDLE DRIVE DETAILS

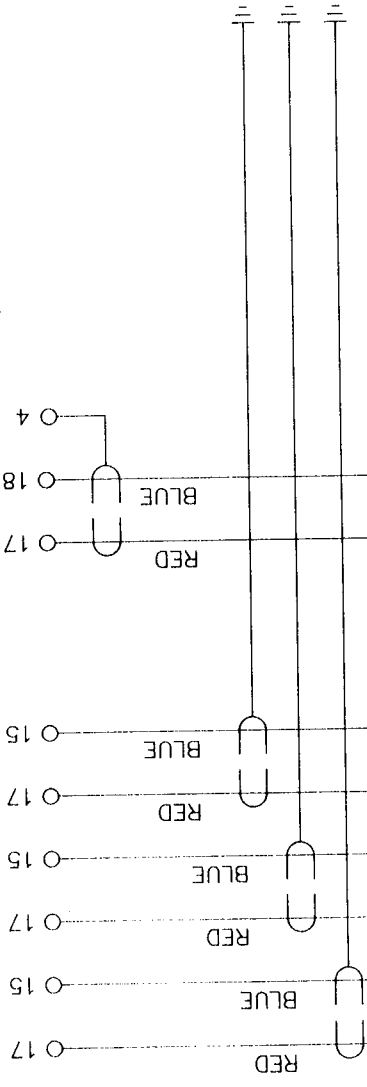
SEE SHEET 15  
 FOR AXIS DRIVE DETAILS

25 WAY D TYPE FEMALE  
 X AXIS CONNECTOR  
 17 15

25 WAY D TYPE FEMALE  
 Y AXIS CONNECTOR  
 17 15

25 WAY D TYPE FEMALE  
 Z AXIS CONNECTOR  
 17 15

SPINDLE  
 DRIVE  
 17 18 4



PIN	DESCRIPTION
1	X AXIS COMMAND
3	Y AXIS COMMAND
5	Z AXIS COMMAND
7	IV AXIS COMMAND
8	SPINDLE DRIVE COMMAND
14	IV AXIS 0V
15	SPINDLE DRIVE 0V
12	NOT USED
10	NOT USED
2	NOT USED
6	NOT USED
4	NOT USED

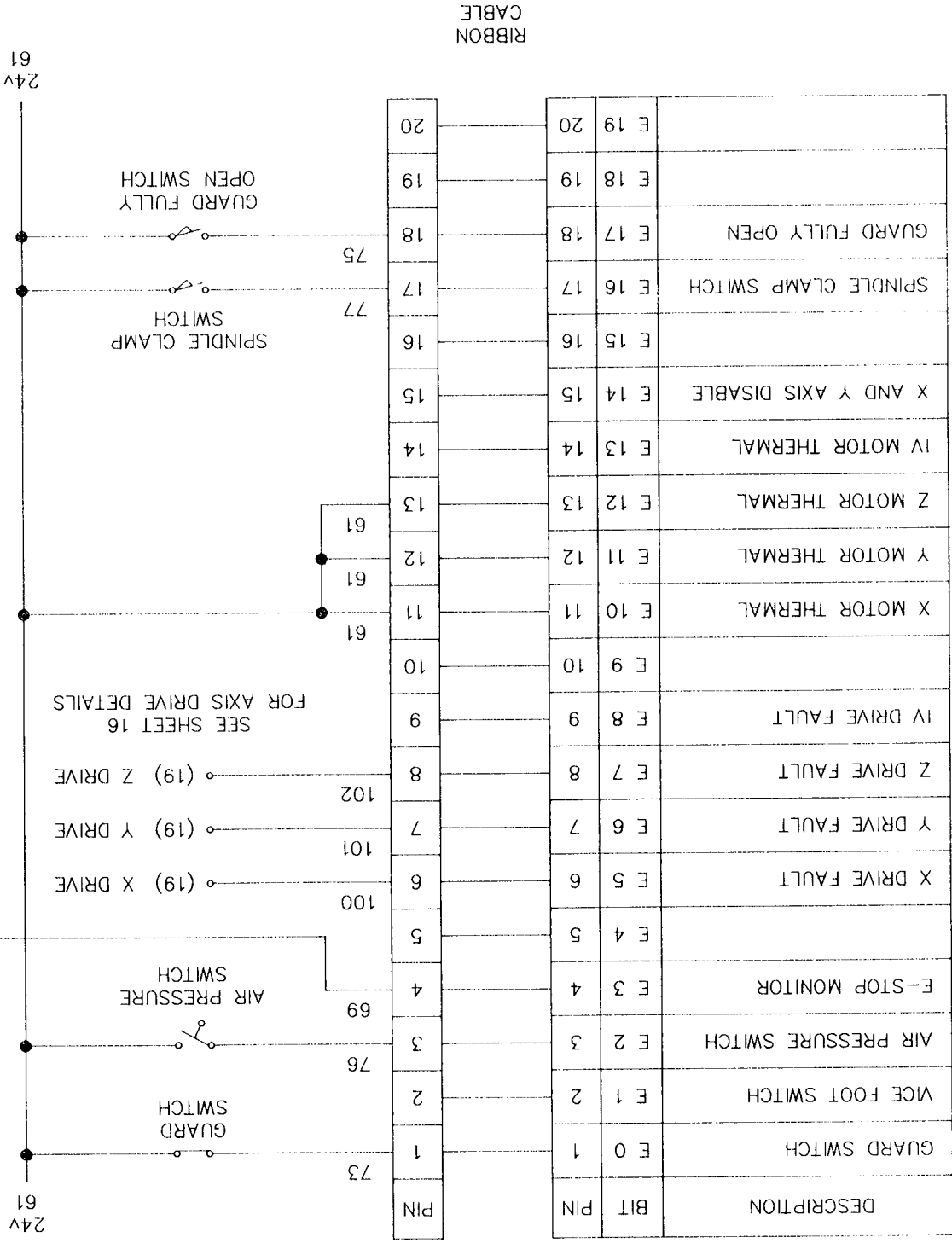
X8 ANALOGUE CONNECTOR  
 15 WAY D TYPE MALE

TR21-05A  
 DATE 30-3-95  
 DRN BY A McHENRY  
 WEST YORKSHIRE  
 BRIGHOUSE  
 DENFORD MACHINE TOOLS LTD

SHEET 5  
 [ TR200 ]

TR21-05A  
 DATE 30-3-95  
 DRN BY A McHENRY  
 WEST YORKSHIRE  
 BRIGHOUSE  
 DENFORD MACHINE TOOLS LTD

INPUTS X22  
 37 WAY D TYPE MALE  
 INTERFACE UNIT  
 37 WAY

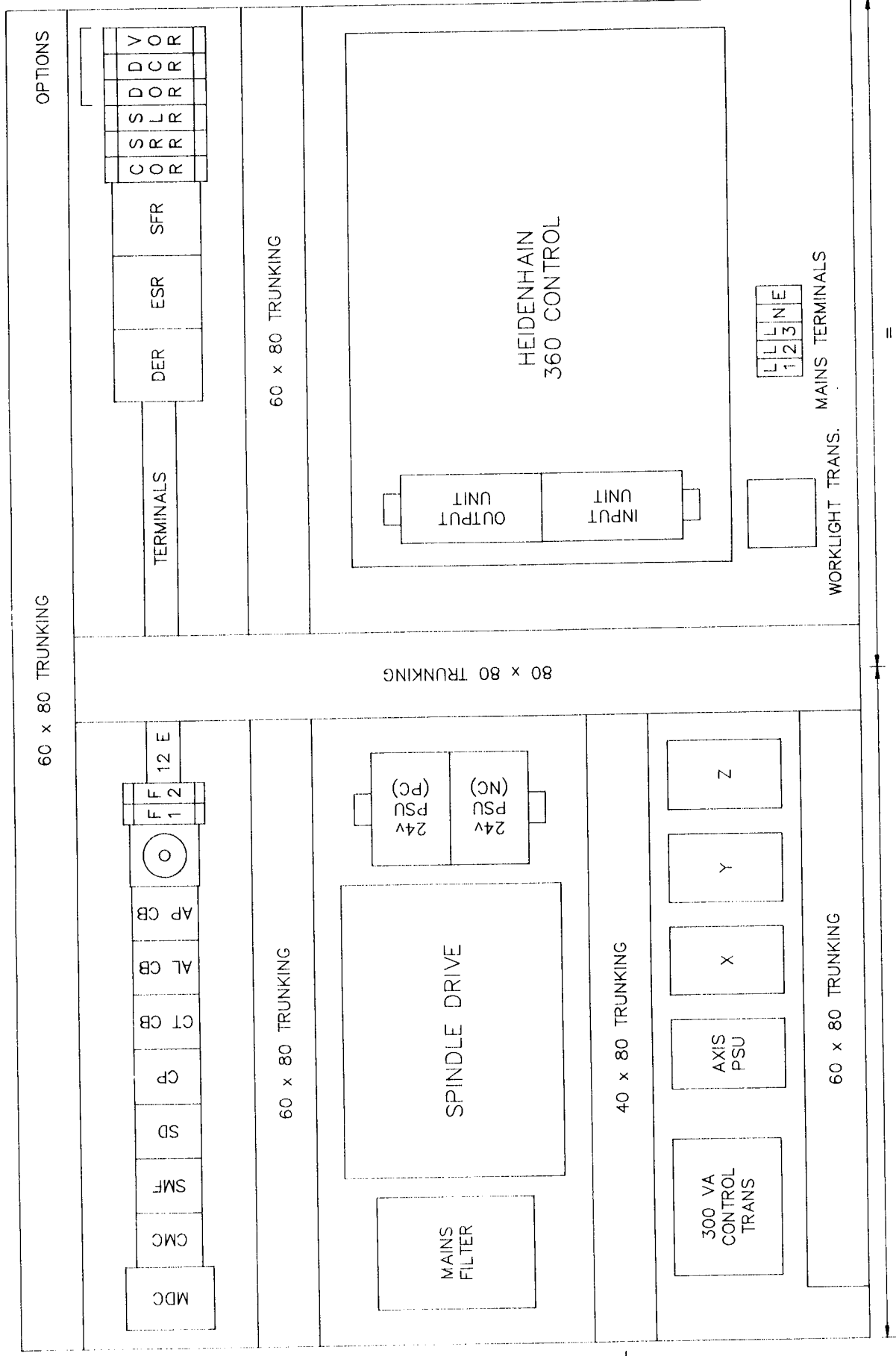


24v FROM E-STOP RELAY  
 SEE SHEET 9

24v  
 61

24v  
 61

RIBBON  
 CABLE



TRIAC 200  
HEIDENHAIN  
PANEL LAYOUT

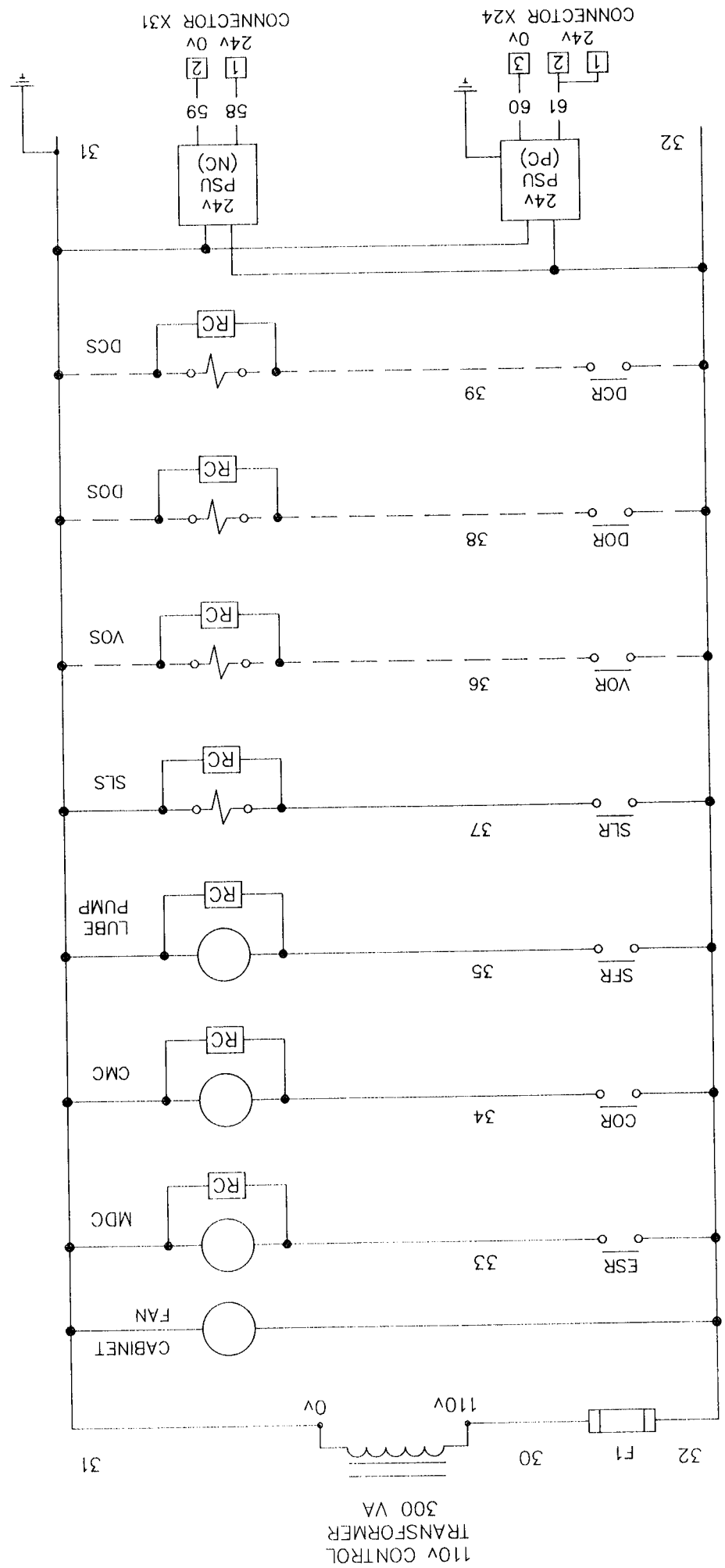
SHEET 4

[ TR200 ]

IF IN DOUBT ASK



IF IN DOUBT ASK



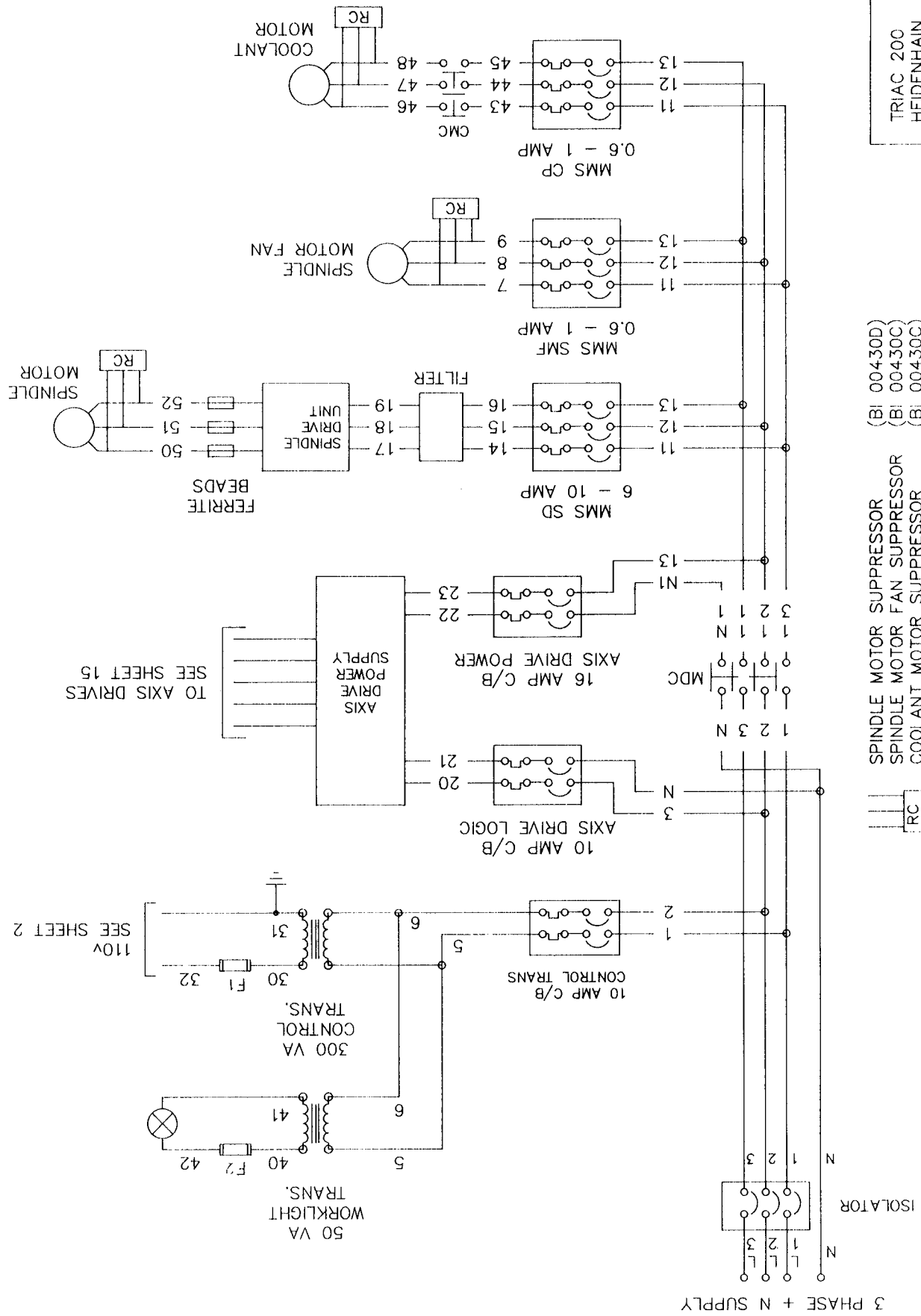
110V CONTROL TRANSFORMER 300 VA

TR200  
HEIDENHAIN  
110V SCHEMATIC  
(INFRANOR DRIVES)

SHEET 2

[ TR200 ]

DENFORD MACHINE TOOLS LTD BRIGHOUSE WEST YORKSHIRE DRN BY A McHENRY DATE 22-3-95 TR21-02A



SPINDLE MOTOR SUPPRESSOR (BI 00430D)  
 SPINDLE MOTOR FAN SUPPRESSOR (BI 00430C)  
 COOLANT MOTOR SUPPRESSOR (BI 00430C)

TRIAC 200  
 HEIDENHAIN  
 POWER SCHEMATIC

SHEET 1

[ TR200 ]