ORAC

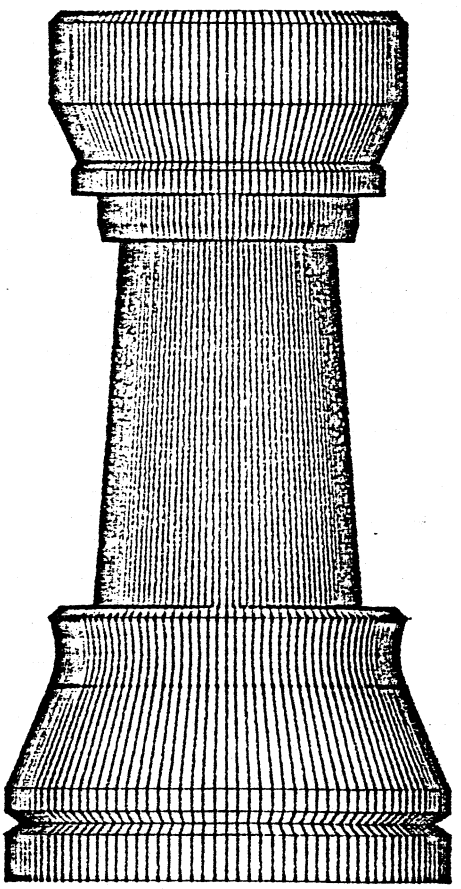
****

CHESS SET PROGRAMS

****

CHESS SET

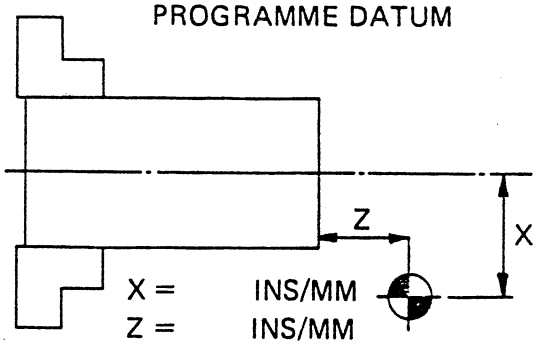
TURNED ON ORAC



DENFORD MACHINE TOOLS LTD

DRAWING No.	1
DESCRIPTION	PAWN
CASSETTE I/D	
MATERIAL	
PROGRAMME BY	
DATE	

BELOW IS AN EXAMPLE OF A THREAD CUTTING PAGE



ORAC

TOOLING:

No. 0 - TOOL REF	
" 1	
" 2	
" 3	
" 4	
" 5	
" 6	
" 7	
" 8	
" 9	

PAGE _____ THREAD DIA _____ ROOT DIA _____ CUT. INCR...X _____ LENGTH.Z (INCR) _____ PITCH _____

.. STARTS _____ TOOL No _____ SPINDLE SPEED _____

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	INCR									
03	PROG DAT.	15	5							
04	PTP			-2	-4			1000	1	1500
05	DO 4									
06	PTP			0	-0·5			1000	1	1500
07	PTP			-13	0			80	1	1500
08	PTP			13	0			1000	1	1500
09	END DO									
10	PTP			-0·5	0·2			1000	1	1200
11	DO 4									
12	PTP			-0·83	0			1000	1	1200
13	PTP			0	-39			100	1	1200
14	PTP			0	39			1000	1	1200
15	END DO									
16	PTP			-0·98	0			1000	1	1200
17	DO 3									
18	PTP			0	-29·8			100	1	1200
19	PTP			0	29·8			1000	1	1200
20	PTP			-1	1·6			1000	1	1200
21	END DO									
22	PTP			0	-4·8			1000	1	1200
23	DO 2									
24	PTP			0	-10·1			100	1	1200
25	PTP			0	10·1			1000	1	1200
26	PTP			-0·75	0·5			1000	1	1200
27	END DO									
28	ABS									
29	PTP	3·4	-0·8					1000	1	1200
30	PTP	4·51	-4·6					100	1	1200

SHEET No. 2 PAWN

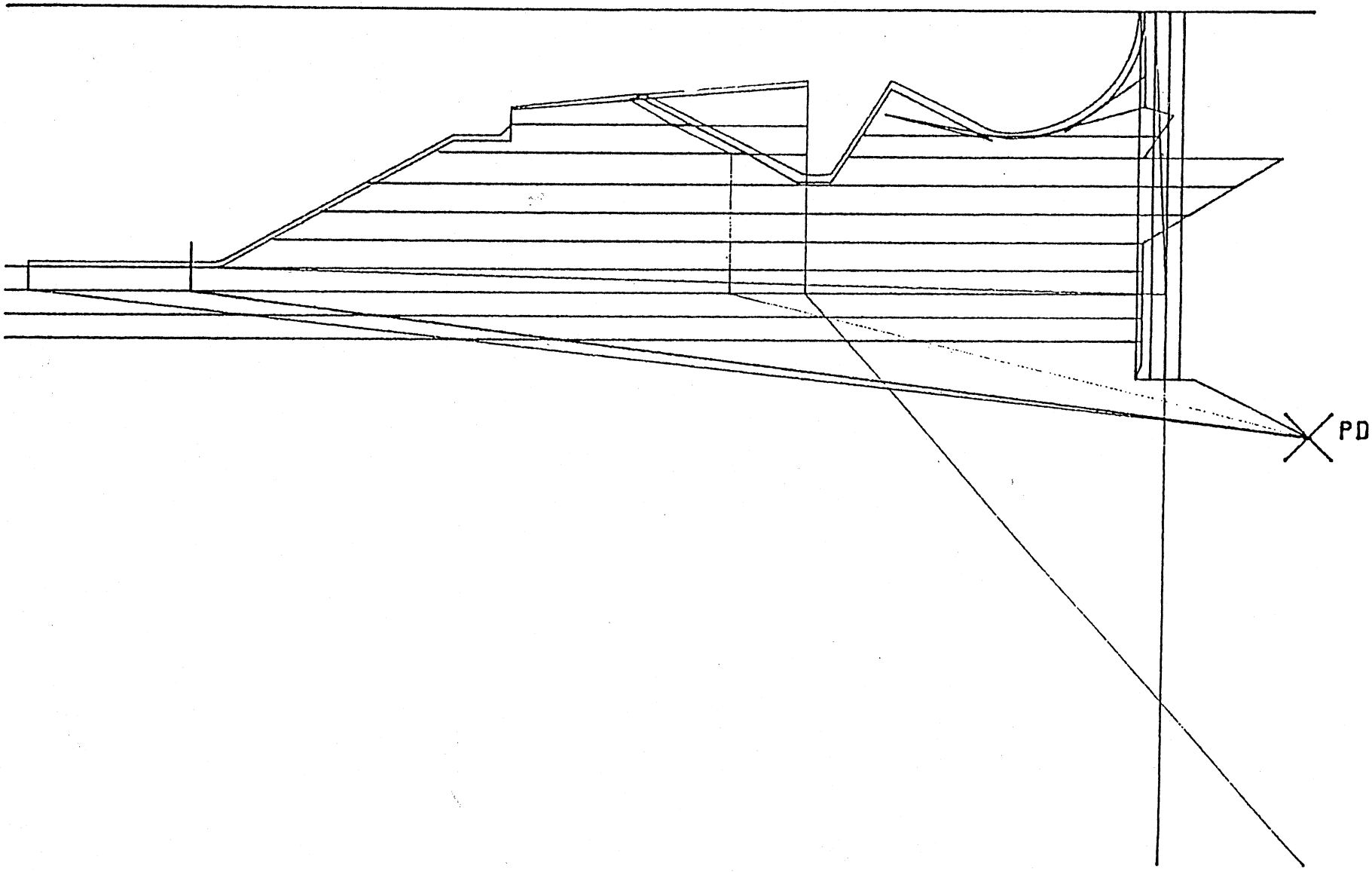
PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
31	PTP	3·4	−0·8					1000	1	1200
32	PTP	2·3	−0·8					1000	1	1200
33	PTP	4·3	−3·5					100	1	1200
34	PTP	2·3	−0·8					1000	1	1200
35	PTP	0	−0·85					1000	1	1200
36	CIRC	4·54	−5·39			4·44	CW	80	1	1200
37	PTP	3·7	−9·7					100	1	1200
38	PTP	4·6	−6					1000	1	1200
39	PTP	2·8	−9·5					100	1	1200
40	PTP	6·1	−11·5					100	1	1200
41	PTP	6·1	−12·7					100	1	1200
42	PTP	5·1	−14·4					60	1	1200
43	PTP	5·1	−25					100	1	1200
44	PTP	5·1	−14·4					1000	1	1200
45	PTP	4·1	−16·3					100	1	1200
46	PTP	4·1	−22·5					100	1	1200
47	PTP	4·1	−16·3					1000	1	1200
48	PTP	3·2	−18					100	1	1200
49	PTP	3·6	−22·5					80	1	1200
50	PTP	4·7	−22·5					200	1	1200
51	PTP	4·7	−24·5					100	1	1200
52	PTP	9·2	−32·5					100	1	1200
53	PTP	10	0					1000	1	1200
54	PTP	0	−0·5					1000	1	1200
55	PTP	0	−1·05					30	1	1200
56	CIRC	4·34	−5·39			4·34	CW	100	1	1200
57	CIRC	4	−6·5			2	CW	100	1	1200
58	PTP	2·5	−9·5					100	1	1200
59	PTP	5·8	−11·5					100	1	1200
60	CIRC	5·8	−12·5			2	CW	80	1	1200
61	PTP	3	−18					100	1	1200
62	PTP	3·5	−22·5					100	1	1000
63	PTP	4·15	−22·5					200	1	1000
64	PTP	4·5	−22·85					100	1	1000
65	PTP	4·5	−24·5					100	1	1000
66	PTP	8·9	−32·3					100	1	1000
67	PTP	9	−32·6					100	1	1000
68	PTP	9	−39					100	1	1000
69	PTP	10	−39					1000	1	1000
70	PTP	15	5					1200	1	1000
71	PTP	10	−33·5					1200	2	1600

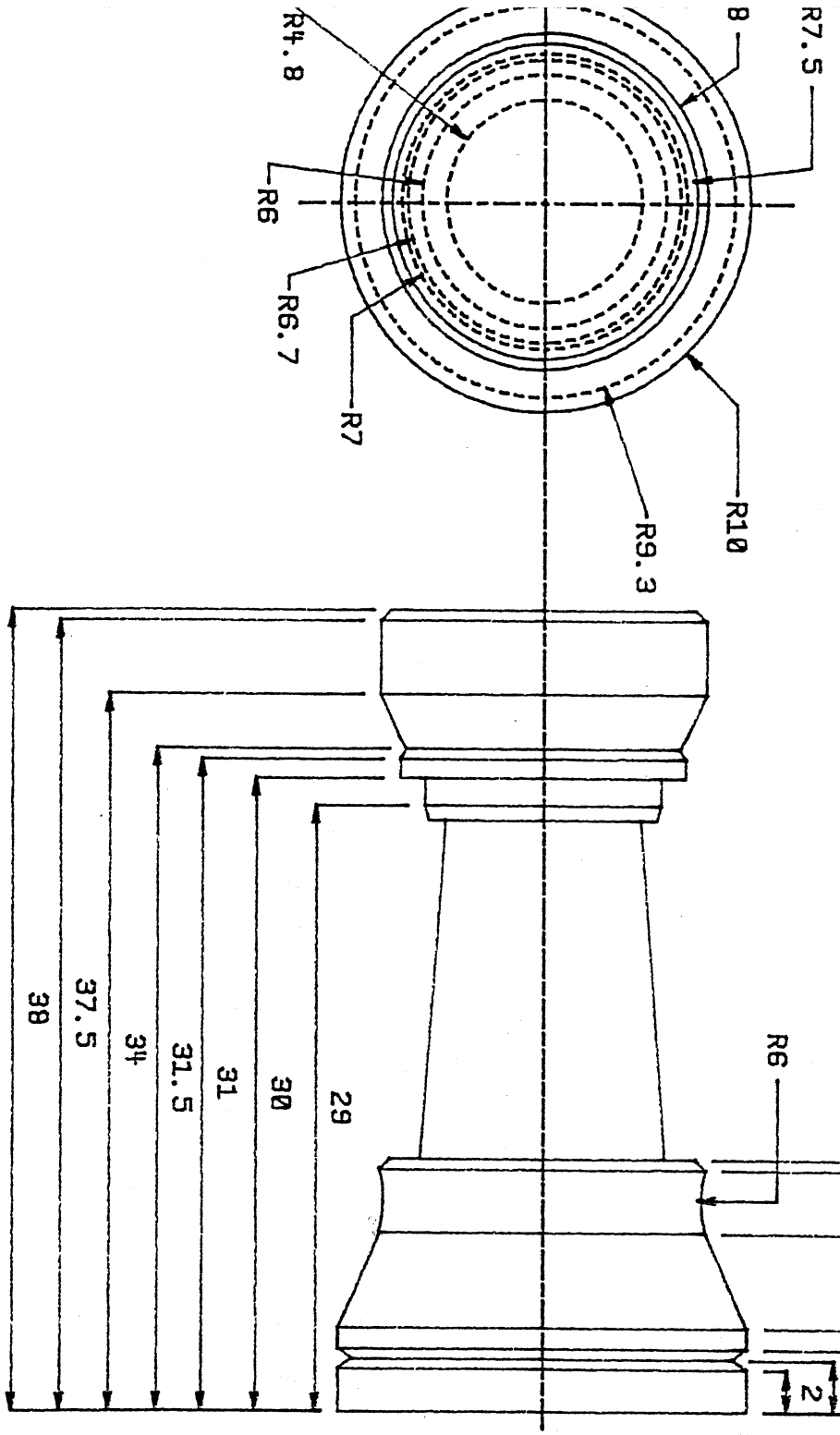
SHEET No. 3 PAWN

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
72	PTP	9	-33·5					100	2	1600
73	PTP	8·3	-33·5					25	2	1600
74	PTP	10	-33·5					900	2	1000
75	PTP	15	5					1200	2	1000
76	PTP	10	-15					1200	4	1200
77	PTP	5·1	-15					900	4	1200
78	PTP	5·1	-12·4					80	4	1200
79	PTP	5·1	-15					1000	4	1200
80	PTP	4·1	-17					1000	4	1200
81	PTP	4·1	-12·4					80	4	1200
82	PTP	4·1	-17					1000	4	1200
83	PTP	3·2	-18·5					100	4	1200
84	PTP	2·7	-12·4					60	4	1200
85	PTP	3·2	-18·5					1000	4	1200
86	PTP	3	-18					60	4	1200
87	PTP	2·5	-12·4					100	4	1200
88	PTP	10	-12·4					400	4	1200
89	PTP	30	5					1200	4	1200
90	PTP	10	-39·6					1200	3	1400
91	PTP	91	-39·6					80	3	1400
92	PTP	0	-39·6					10	3	1400
93	PTP	14	5					1200	3	1000
94	PTP	15	5					1000	0	1000
95	END PROG.									

PAWN

SCALE 5:1





TOOL LIBRARY

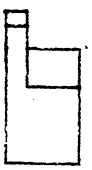
TOOL 1



TOOL 2



TOOL 3



TOOL 4

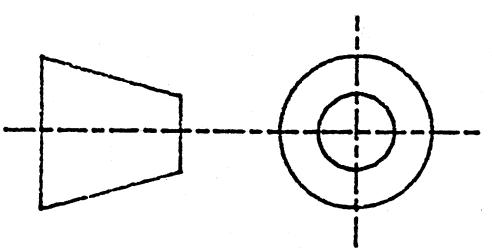


TOOL 6

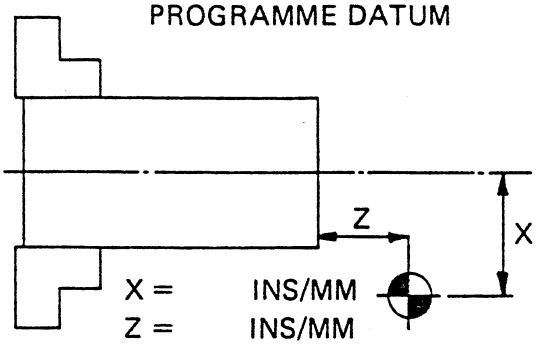


ALL DIMENSIONS IN MM

DENFORD	
ORAC CHESS SET	
SCALE 3:1	TITLE ROOK
BAR STOCK 25.4x70	MATL EN 1A



DRAWING No.	1
DESCRIPTION	ROOK
CASSETTE I/D	
MATERIAL	
PROGRAMME BY	
DATE	



ORAC

TOOLING:

No. 0 - TOOL REF
" 1
" 2
" 3
" 4
" 5
" 6
" 7
" 8
" 9

BELOW IS AN EXAMPLE OF A THREAD CUTTING PAGE

PAGE _____ THREAD DIA _____ ROOT DIA _____ CUT. INCR...X _____ LENGTH.Z (INCR) _____ PITCH _____

.. STARTS _____ TOOL No _____ SPINDLE SPEED _____

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	INCR									
03	PROG. DAT.	15	5							
04	PTP			-2	-4			1000	1	1600
05	DO 4									
06	PTP			0	-0.5			1000	1	1600
07	PTP			-13	0			80	1	1600
08	PTP			13	0			1000	1	1600
09	END DO									
10	PTP			-0.2	0.2			1000	1	1200
11	DO 3									
12	PTP			-0.87	0			1000	1	1200
13	PTP			0	-42			100	1	1200
14	PTP			0	42			1000	1	1200
15	END DO									
16	PTP			-0.74	0			1000	1	1200
17	DO 3									
18	PTP			0	-32.8			100	1	1200
19	PTP			0	32.8			1000	1	1200
20	PTP			-0.6	1.5			1000	1	1200
21	END DO									
22	ABS									
23	PTP	8.2	-0.8					1000	1	1200
24	PTP	8.2	-5					200	1	1200
25	PTP	7.2	-8					100	1	1200
26	PTP	7.2	-26.9					100	1	1200
27	PTP	7.3	-9					1000	1	1200
28	PTP	6.2	-11.4					80	1	1200
29	PTP	6.3	-26.9					100	1	1200
30	PTP	6.2	-11.4					1000	1	1200

SHEET No. 2 ROOK

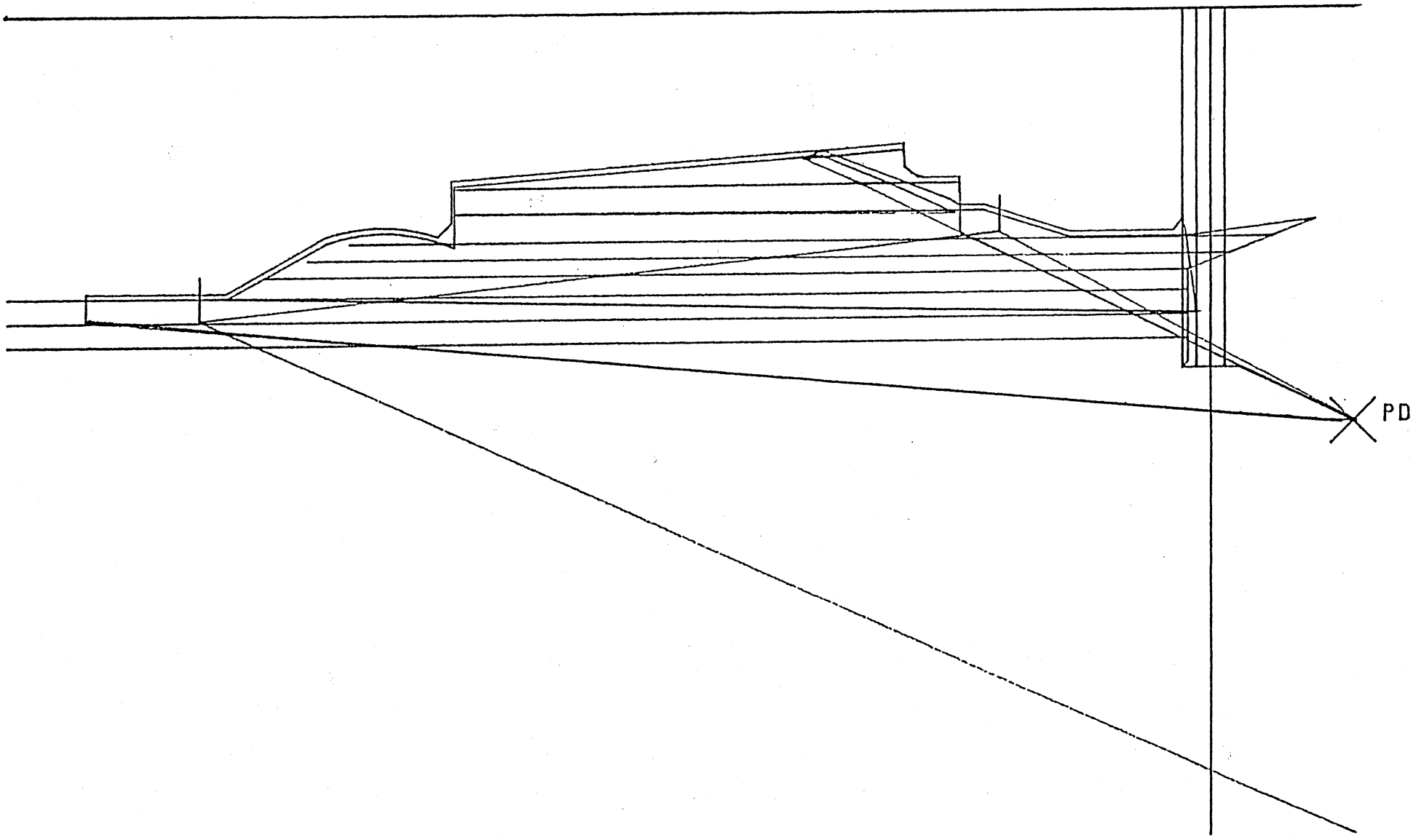
PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
31	PTP	5·2	−13·8					80	1	1200
32	PTP	6·2	−26·9					100	1	1200
33	PTP	8·4	−26·9					200	1	1200
34	CIRC	8·2	−31·4			6	CCW	60	1	1200
35	PTP	10·2	−35					100	1	1200
36	PTP	11	−0·5					1200	1	1000
37	PTP	7·5	−0·95					200	1	1000
38	PTP	8	−1·3					100	1	1000
39	PTP	8	−5					100	1	1000
40	PTP	7	−8					100	1	1000
41	PTP	7	−8·9					100	1	1000
42	PTP	6·8	−9·2					80	1	1000
43	PTP	5	−13·8					100	1	1000
44	PTP	6	−27					100	1	1000
45	PTP	7·5	−27					100	1	1000
46	PTP	8	−27·5					100	1	1000
47	CIRC	8	−31·5			6	CCW	100	1	1000
48	PTP	10	−35					100	1	1000
49	PTP	10	−40					100	1	1000
50	PTP	11	−40					1000	1	1000
51	PTP	15	5					1200	1	1200
52	PTP	6·2	−12·5					1200	4	1200
53	PTP	6·2	−8·9					100	4	1200
54	PTP	6·2	−12·5					1000	4	1200
55	PTP	5·3	−14·5					100	4	1200
56	PTP	5	−10·9					100	4	1200
57	PTP	5·3	−14·5					1000	4	1200
58	PTP	5	−13·8					60	4	1200
59	PTP	4·78	−10·9					100	4	1200
60	PTP	5·6	−10·9					100	4	1200
61	PTP	6	−10·4					100	4	1200
62	PTP	6	−8·9					100	4	1200
63	PTP	8	−8·9					100	4	1200
64	PTP	15	5					1200	4	1200
65	PTP	8	−7·5					1200	2	1600
66	PTP	6·7	−7·5					20	2	1600
67	PTP	8	−7·5					800	2	1600
68	PTP	11	−36					1200	2	1600
69	PTP	10	−36					100	2	1600
70	PTP	9·4	−36					20	2	1600
71	PTP	11	−36					800	2	1600

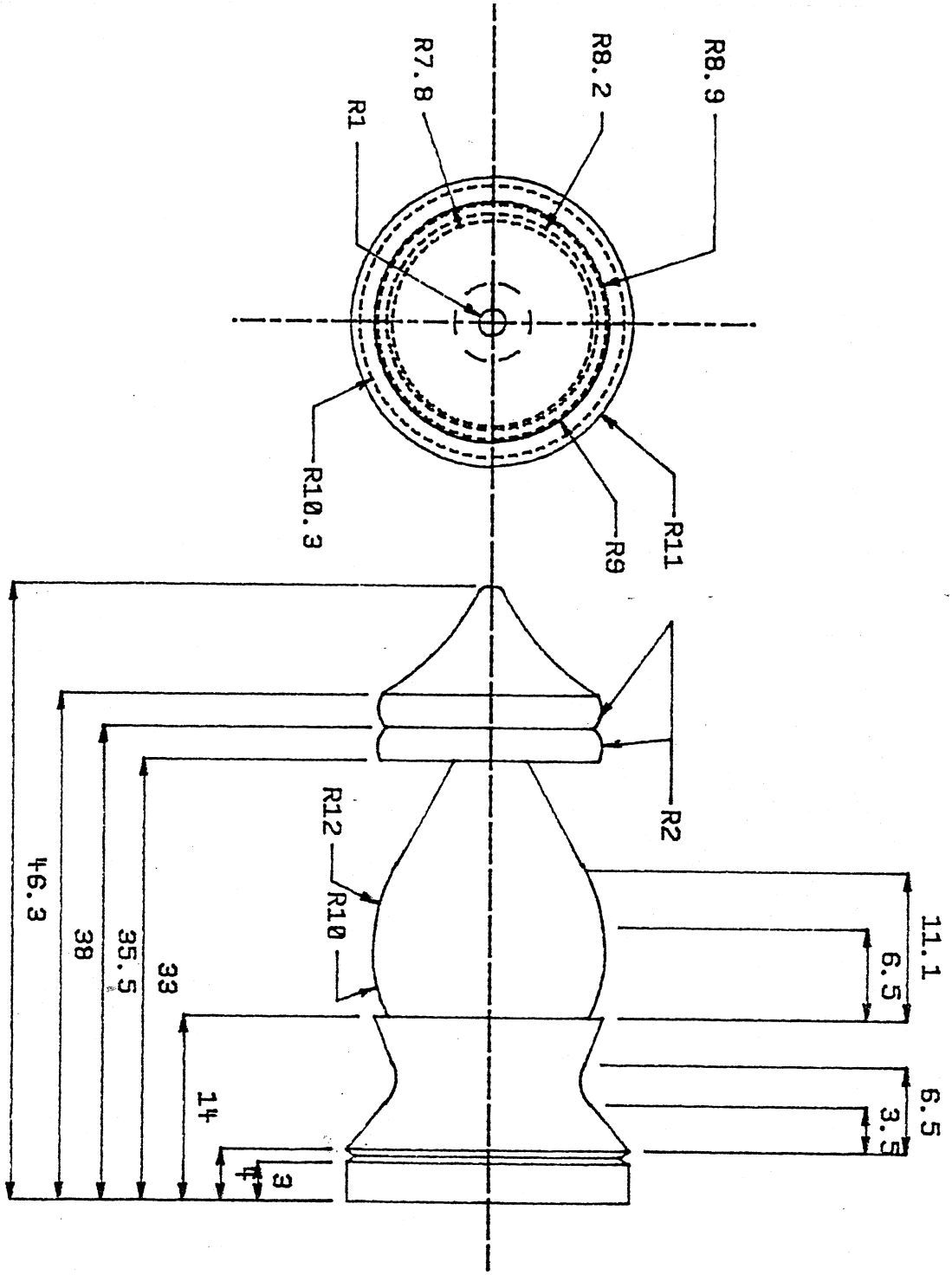
SHEET No. 3 ROOK

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
72	PTP	30	5					1200	2	1600
73	PTP	11	-42					1000	3	1400
74	PTP	10·2	-42·1					100	3	1400
75	PTP	0	-42·1					10	3	1400
76	PTP	14	5					1200	3	1000
77	PTP	15	5					1000	0	1000
78	END PROG.									

ROOK

SCALE 5:1





TOOL LIBRARY

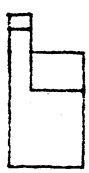
TOOL 1



TOOL 2



TOOL 3



TOOL 4

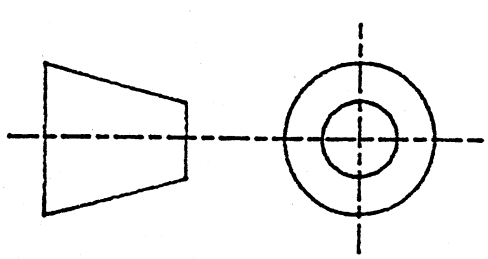


TOOL 6



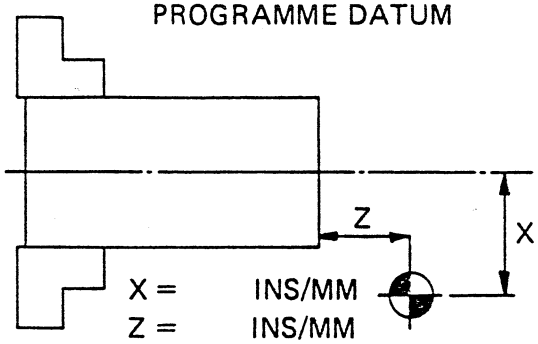
ALL DIMENSIONS IN MM

DENFORD	
ORAC CHESS SET	
SCALE 2:1	TITLE KNIGHT
BAR STOCK 25.4x80	MATL EN 1A



DRAWING No.	1
DESCRIPTION	KNIGHT
CASSETTE I/D	
MATERIAL	
PROGRAMME BY	
DATE	

PROGRAMME DATUM



ORAC

TOOLING:

No. 0 - TOOL REF
" 1
" 2
" 3
" 4
" 5
" 6
" 7
" 8
" 9

BELOW IS AN EXAMPLE OF A THREAD CUTTING PAGE

PAGE _____ THREAD DIA _____ ROOT DIA ____ CUT. INCR...X ____ LENGTH.Z (INCR) _____ PITCH ____

.. STARTS _____ TOOL No _____ SPINDLE SPEED _____

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	INCR									
03	PROG DAT.	15	5							
04	PTP			-2	-4			1000	1	1600
05	DO 4									
06	PTP			0	-0·5			1000	1	1600
07	PTP			-13	0			100	1	1600
08	PTP			13	0			1000	1	1600
09	END DO									
10	PTP			-0·3	0·2			1000	1	1200
11	DO 2									
12	PTP			-0·8	0			1000	1	1200
13	PTP			0	-50			100	1	1200
14	PTP			0	50			1000	1	1200
15	END DO									
16	DO 3									
17	PTP			-0·63	0·74			1000	1	1200
18	PTP			0	-42			100	1	1200
19	PTP			0	42			1000	1	1200
20	END DO									
21	PTP			-0·98	-2·22			1000	1	1200
22	DO 8									
23	PTP			0	-8·2			100	1	1200
24	PTP			0	8·2			1000	1	1200
25	PTP			-0·9	0·99			1000	1	1200
26	END DO									
27	ABS									
28	PTP	1·2	-1·2					100	1	1200
29	CIRC	9	-9·5			21	CCW	60	1	1200
30	PTP	9·5	-9·5					1000	1	1200

SHEET No. 2 KNIGHT

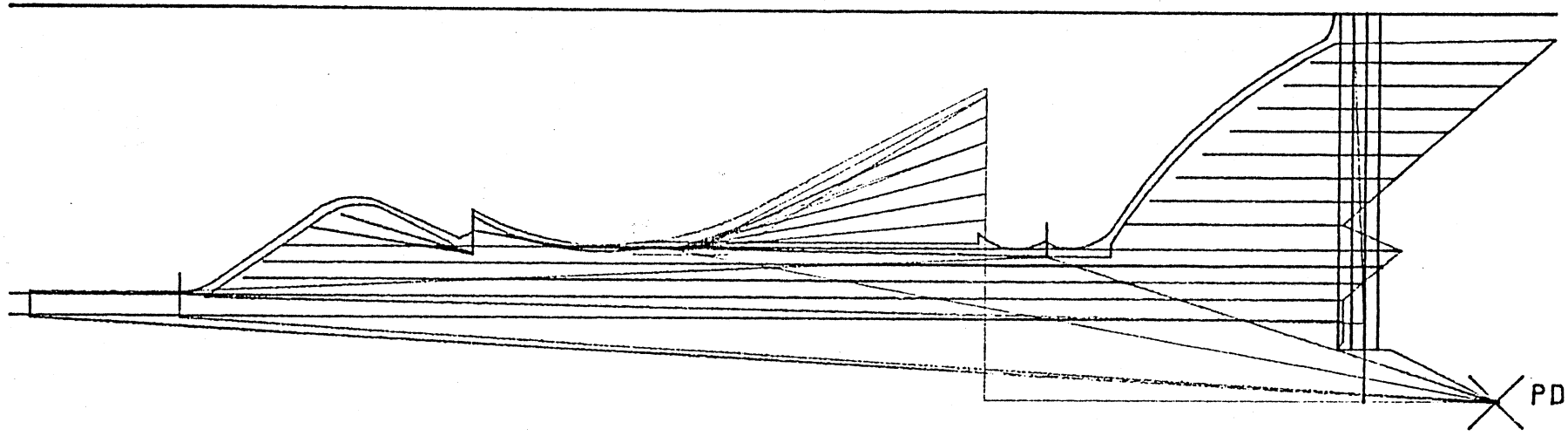
PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
31	PTP	9·2	-30					1000	1	1200
32	PTP	8·6	-33·4					60	1	1200
33	PTP	9·2	-30					1000	1	1200
34	PTP	9·25	-27					1000	1	1200
35	CIRC	8·05	-33·5			10	CW	60	1	1200
36	PTP	9·5	-33·5					1000	1	1200
37	PTP	8·5	-39·5					80	1	1000
38	PTP	9·5	-33·5					1000	1	1000
39	PTP	8	-38·4					100	1	1200
40	PTP	9·5	-33·5					1000	1	1200
41	PTP	7·7	-37					100	1	1200
42	CIRC	8·2	-39·2			2·5	CCW	60	1	1000
43	PTP	11·2	-43·5					100	1	1000
44	PTP	12	0					1200	1	1000
45	PTP	0	-0·5					1200	1	1200
46	PTP	0	-1·2					40	1	1200
47	CIRC	1	-1·5			2	CW	100	1	1200
48	CIRC	8·5	-9·5			20	CCW	70	1	1200
49	CIRC	8·9	-12			2	CW	100	1	1200
50	CIRC	8·6	-14·5			2	CW	70	1	1200
51	PTP	9	-14·5					100	1	1200
52	PTP	9	-27					100	1	1200
53	CIRC	7·8	-33·5			10	CW	100	1	1200
54	PTP	8·65	-33·5					100	1	1200
55	PTP	8·9	-34					100	1	1200
56	PTP	7·5	-37					100	1	1200
57	CIRC	8	-39·5			2·5	CCW	100	1	1200
58	PTP	10·7	-43·3					100	1	1200
59	PTP	11	-44					100	1	1200
60	PTP	11	-50					100	1	1200
61	PTP	12	-50					1000	1	1200
62	PTP	15	5					1200	1	1200
63	PTP	9·3	-26					1000	4	1200
64	PTP	8·1	-14·3					100	4	1200
65	PTP	9·3	-26					1000	4	1200
66	PTP	7·1	-14·3					100	4	1200
67	PTP	9·3	-26					1000	4	1200
68	PTP	6·1	-14·3					100	4	1200
69	PTP	9·3	-26					1000	4	1200
70	PTP	5·1	-14·3					100	4	1200
71	PTP	9·2	-25					1000	4	1200

SHEET No. 3 KNIGHT

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SEL CW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
72	PTP	4·1	-14·3					100	4	1200
73	PTP	9·2	-25					1000	4	1200
74	PTP	3·3	-14·3					100	4	1200
75	PTP	9·5	-24					1000	4	1200
76	PTP	9·5	-27·5					500	4	1200
77	PTP	9	-27					80	4	1200
78	CIRC	7·4	-22·4			12	CCW	100	4	1200
79	PTP	3	-14·3					100	4	1200
80	PTP	15	-14·3					800	4	1200
81	PTP	15	5					1200	4	1200
82	PTP	9·5	-12					1200	2	1600
83	PTP	8·2	-12					20	2	1600
84	PTP	9·5	-12					1000	2	1600
85	PTP	11	-44·5					1200	2	1600
86	PTP	10·3	-44·5					20	2	1600
87	PTP	12	-44·5					1000	2	1600
88	PTP	15	5					1200	2	1400
89	PTP	12	-50·6					1200	3	1400
90	PTP	0	-50·6					10	3	1400
91	PTP	14	5					1200	3	1000
92	PTP	15	5					1000	0	1000
93	END PROG.									

KNIGHT

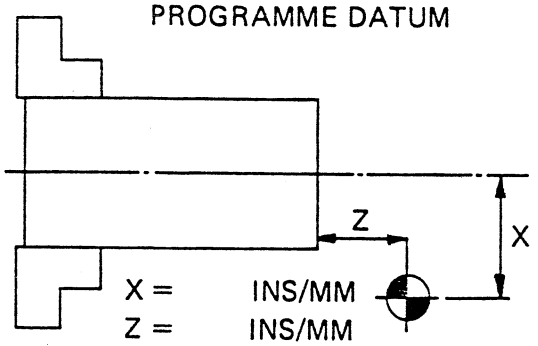
SCALE 4:1



DRAWING No.	1
DESCRIPTION	BISHOP 1
CASSETTE I/D	
MATERIAL	
PROGRAMME BY	
DATE	

BELOW IS AN EXAMPLE OF
A THREAD CUTTING PAGE

PROGRAMME DATUM



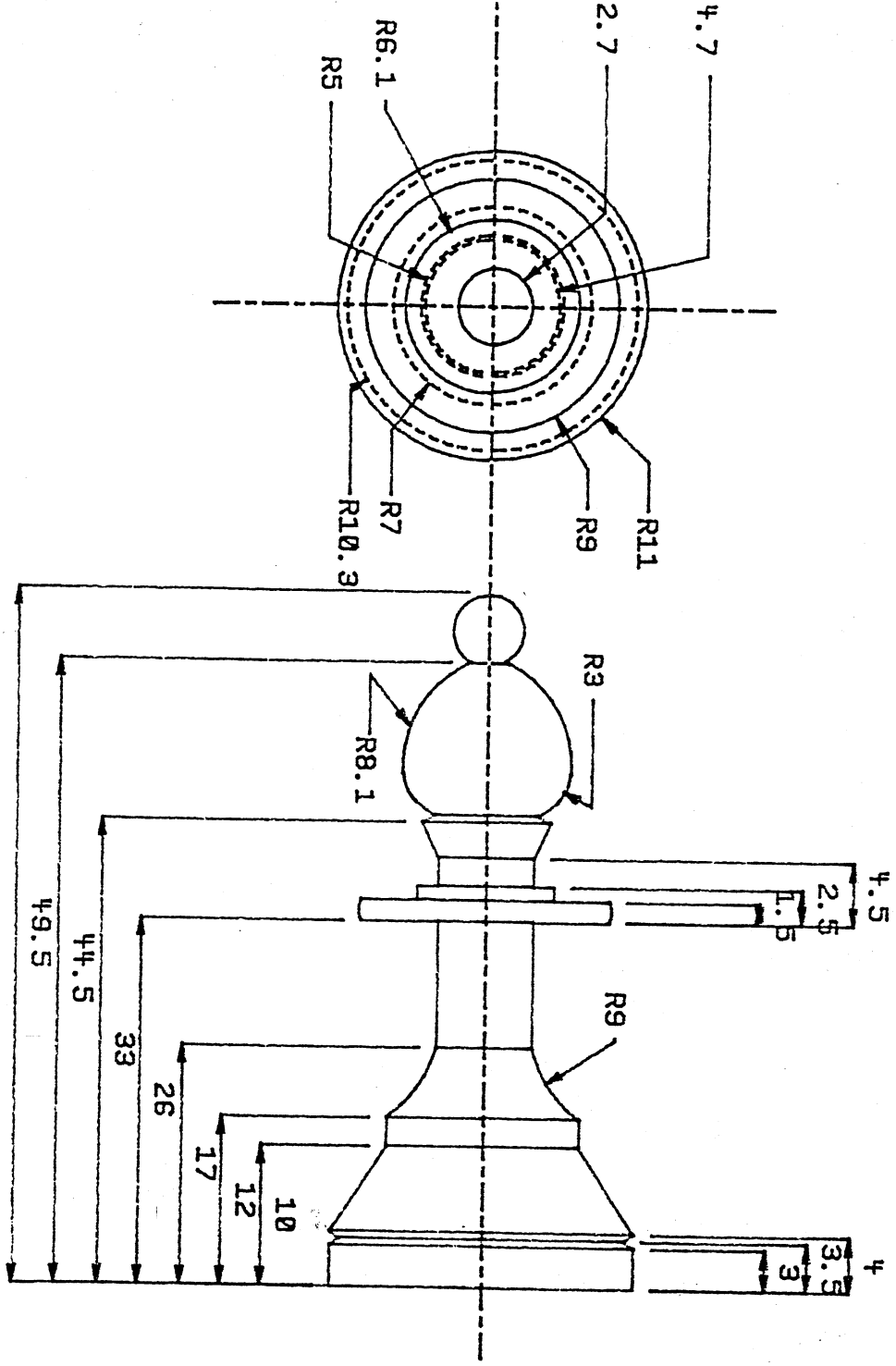
ORAC

TOOLING:

No. 0 - TOOL REF
" 1
" 2
" 3
" 4
" 5
" 6
" 7
" 8
" 9

PAGE_____	THREAD DIA_____ ROOT DIA____ CUT. INCR...X____ LENGTH.Z (INCR)_____ PITCH_____
..	STARTS_____ TOOL No_____ SPINDLE SPEED _____

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	INCR									
03	PROG. DAT.	15	5							
04	PTP			-2	-4			1000	1	1600
05	DO 4									
06	PTP			0	-0·5			1000	1	1600
07	PTP			-13	0			90	1	1600
08	PTP			13	0			1000	1	1600
09	END DO									
10	PTP			-0·2	0·2			1000	1	1200
11	DO 2									
12	PTP			-0·8	0			1000	1	1200
13	PTP			0	-53			100	1	1200
14	PTP			0	53			1000	1	1200
15	END DO									
16	DO 4									
17	PTP			-0·75	1·13			1000	1	1200
18	PTP			0	-45·5			100	1	1200
19	PTP			0	45·5			1000	1	1200
20	END DO									
21	PTP			0	-4·6			1000	1	1200
22	DO 2									
23	PTP			-0·95	0			1000	1	1200
24	PTP			0	-22			100	1	1200
25	PTP			0	22			1000	1	1200
26	END DO									
27	PTP			-0·2	-0·1			1000	1	1200
28	DO 4									
29	PTP			-0·8	0·9			1000	1	1200
30	PTP			0	-9			100	1	1200



TOOL LIBRARY

TOOL 1



TOOL 2



TOOL 3



TOOL 4

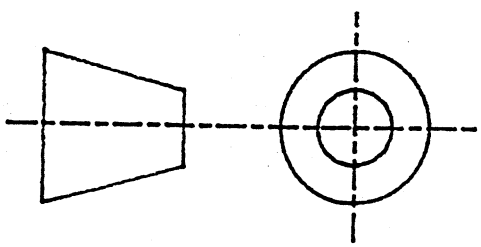


TOOL 6



ALL DIMENSIONS IN MM

DENFORD	
ORAC CHESS SET	
SCALE 2:1	TITLE BISHOP
BAR STOCK 25.4x80	MATL EN 1A



SHEET No. 2 BISHOP 1

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
31	PTP			0	9			1000	1	1200
32	END DO									
33	ABS									
34	PTP	0	-0·8					1000	1	1200
35	CIRC	2·85	-3·65			2·8	CW	70	1	1200
36	CIRC	0	-0·8			2·8	CCW	800	1	1200
37	PTP	0	-1					100	1	1200
38	CIRC	2·66	-3·66			2·66	CW	100	1	1200
39	PTP	2·3	-6·2					80	1	1200
40	CIRC	6·25	-14			8·2	CW	80	1	1200
41	PTP	5·2	-23					80	1	1200
42	PTP	6·2	-15·5					1000	1	1200
43	PTP	4·2	-22					80	1	1200
44	PTP	6·2	-15·5					1000	1	1200
45	PTP	3·5	-20·5					80	1	1200
46	PTP	3·5	-22					100	1	1200
47	PTP	4·6	-22					100	1	1200
48	PTP	5	-22·3					100	1	1200
49	PTP	5	-23					100	1	1200
50	PTP	7·8	-23					100	1	1200
51	CIRC	7·8	-24·5			2	CW	100	1	1200
52	PTP	7·1	-26·6					100	1	1200
53	PTP	7·1	-38·3					100	1	1200
54	PTP	7·1	-26·6					1000	1	1200
55	PTP	6	-28·7					100	1	1200
56	PTP	6	-37					100	1	1200
57	PTP	6	-28·7					1000	1	1200
58	PTP	4·9	-31					100	1	1200
59	PTP	4·9	-35·5					100	1	1200
60	PTP	4·9	-31					1000	1	1200
61	PTP	3·7	-33·4					100	1	1200
62	CIRC	7·2	-38·3			9	CCW	80	1	1200
63	PTP	7·2	-40·5					100	1	1200
64	PTP	11·2	-46·5					100	1	1200
65	PTP	11	-24·6					1200	1	1200
66	PTP	8	-24·6					1000	1	1200
67	PTP	3·5	-33·4					100	1	1200
68	CIRC	6·8	-38·3			9	CCW	100	1	1200
69	PTP	7	-38·7					100	1	1200
70	PTP	7	-40·5					100	1	1200
71	PTP	10·8	-46·3					100	1	1200

SHEET No. 3 BISHOP 1 / BISHOP 2

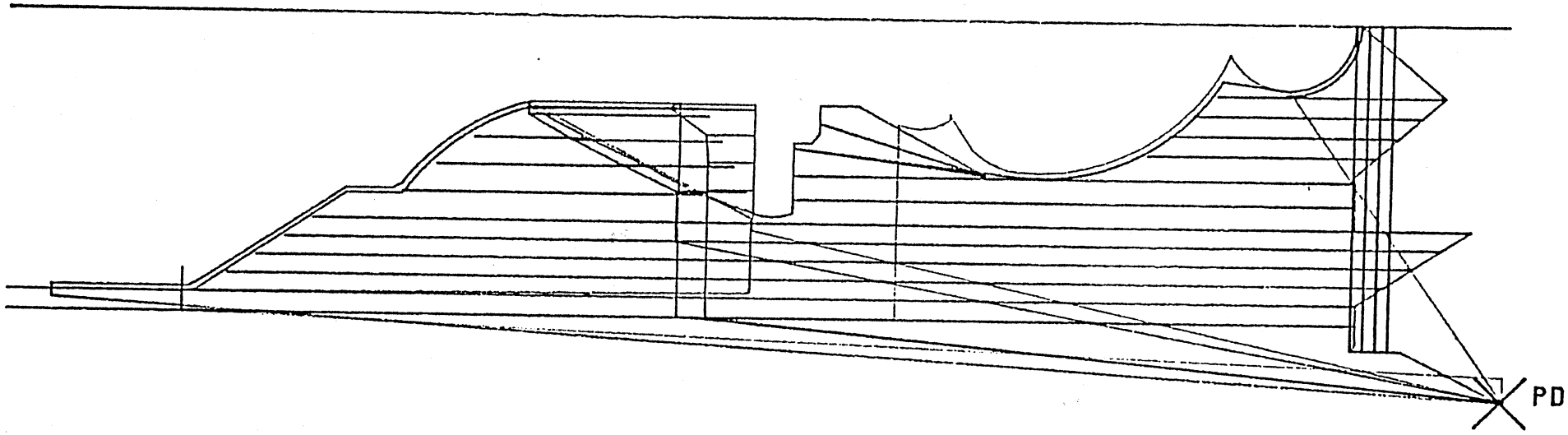
PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
72	PTP	11	-46.7					100	1	1200
73	PTP	11	-52					100	1	1200
74	PTP	11.5	-52					1000	1	1200
75	PTP	15	5					1200	1	1200
76	PTP	3.2	-3.3					1000	2	1400
77	PTP	2.66	-3.66					100	2	1400
78	CIRC	1.25	-6			2.66	CW	60	2	1400
79	CIRC	6.06	-14			8.1	CW	60	2	1400
80	CIRC	5.21	-16.1			3.05	CW	100	2	1500
81	PTP	3.8	-17					70	2	1500
82	PTP	4	-17					80	2	1200
83	CIRC	4.2	-19			2	CW	90	2	1200
84	PTP	12	-19					1000	2	1200
85	PTP	12	-47					1000	2	1500
86	PTP	11	-47					100	2	1500
87	PTP	10.3	-47					10	2	1500
88	PTP	12	-47					900	2	1200
89	PTP	14	5					1200	2	1000
90	PTP	15	5					1000	0	1000
91	END PROG.									
	BISHOP 2									
01	MM									
02	ABS									
03	PROG. DAT.	15	5							
04	PTP	9	-27.6					1200	6	1200
05	PTP	7	-27.6					1000	6	1200
06	PTP	7	-24.9					100	6	1200
07	PTP	7	-27.6					1000	6	1200
08	PTP	6	-29.7					1000	6	1200
09	PTP	6	-25.4					100	6	1200
10	PTP	6	-29.7					1000	6	1200
11	PTP	5	-31.7					1000	6	1200
12	PTP	5	-25.9					100	6	1200
13	PTP	5	-31.7					1000	6	1200
14	PTP	4	-33.5					100	6	1200
15	PTP	4	-26.4					100	6	1200
16	PTP	4	-33.5					1000	6	1200

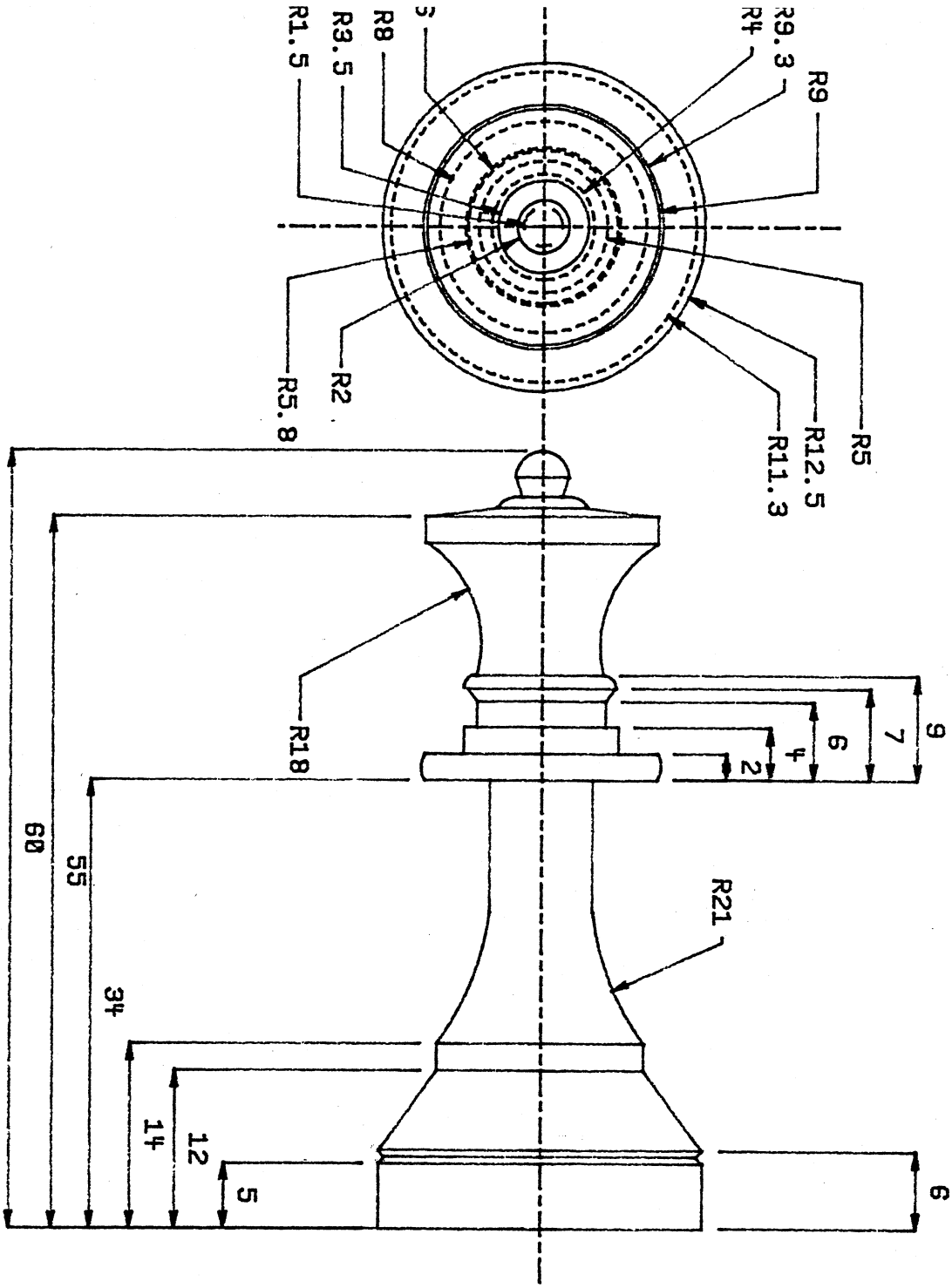
SHEET No. 4 BISHOP 2

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
17	PTP	3·7	-33·5					100	6	1200
18	PTP	3·7	-26·8					100	6	1200
19	PTP	3·8	-33·6					1000	6	1200
20	PTP	3·5	-33·4					80	6	1200
21	PTP	3·5	-27·5					100	6	1200
22	PTP	12	-27·5					1000	6	1200
23	PTP	15	5					1200	6	1200
24	PTP	12	-26·4					1000	4	1200
25	PTP	6·9	-26·4					800	4	1200
26	PTP	6·9	-24·6					100	4	1200
27	PTP	6·9	-26·4					1000	4	1200
28	PTP	5·8	-26·4					1000	4	1200
29	PTP	5·8	-24·6					100	4	1200
30	PTP	5·8	-26·4					1000	4	1200
31	PTP	4·7	-26·5					1000	4	1200
32	PTP	4·7	-24·6					100	4	1200
33	PTP	4·7	-26·5					1000	4	1200
34	PTP	3·7	-27·9					100	4	1200
35	PTP	3·7	-24·6					100	4	1200
36	PTP	3·7	-27·9					1000	4	1200
37	PTP	3·5	-27·7					100	4	1200
38	PTP	3·5	-24·6					100	4	1200
39	PTP	8·5	-24·6					100	4	1200
40	PTP	15	5					1200	4	1200
41	PTP	13	-53·5					1200	3	1400
42	PTP	0	-53·5					10	3	1400
43	PTP	14	5					1200	3	1000
44	PTP	15	5					1000	0	1000
45	END PROG.									

BISHOP

SCALE 4:1





TOOL LIBRARY

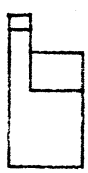
TOOL 1



TOOL 2



TOOL 3



TOOL 4



TOOL 6

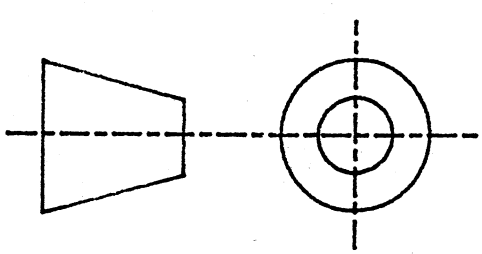


ALL DIMENSIONS IN MM

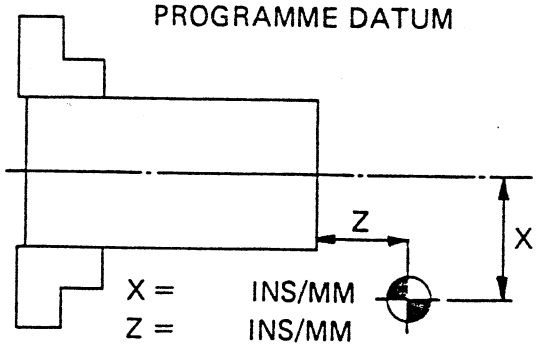
DENFORD

ORAC CHESS SET

SCALE	TITLE
2:1	QUEEN
BAR STOCK 25.4x96	MATL EN 1A



DRAWING No.	1
DESCRIPTION	QUEEN
CASSETTE I/D	
MATERIAL	
PROGRAMME BY	
DATE	



ORAC

TOOLING:

No. 0 - TOOL REF
" 1
" 2
" 3
" 4
" 5
" 6
" 7
" 8
" 9

BELOW IS AN EXAMPLE OF A THREAD CUTTING PAGE

PAGE _____ THREAD DIA _____ ROOT DIA ____ CUT. INCR...X _____ LENGTH.Z (INCR) _____ PITCH ____

.. STARTS _____ TOOL No _____ SPINDLE SPEED _____

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	INCR									
03	PROG DAT.	15	5							
04	PTP			-2	-4			1200	1	1600
05	DO 4									
06	PTP			0	-0·5			1000	1	1600
07	PTP			-13	0			80	1	1600
08	PTP			13	0			1000	1	1600
09	END DO									
10	PTP			-0·4	0·2			1000	1	1200
11	DO 3									
12	PTP			-0·9	1·2			1000	1	1200
13	PTP			0	-54			100	1	1200
14	PTP			0	54			1000	1	1200
15	END DO									
16	PTP			-0·9	-3·6			1000	1	1200
17	PTP			0	-22			100	1	1200
18	PTP			0	22			1000	1	1200
19	DO 9									
20	PTP			-0·75	0·16			1000	1	1200
21	PTP			0	-5			100	1	1200
22	PTP			0	5			1000	1	1200
23	END DO									
24	ABS									
25	PTP	0	-1					70	1	1400
26	CIRC	2	-3			2	CW	80	1	1400
27	PTP	1·5	-4·5					80	1	1400
28	CIRC	3·5	-5·3			2	CW	70	1	1400
29	PTP	8·7	-6					100	1	1200
30	PTP	8·95	-6·3					100	1	1200

SHEET No. 2 QUEEN

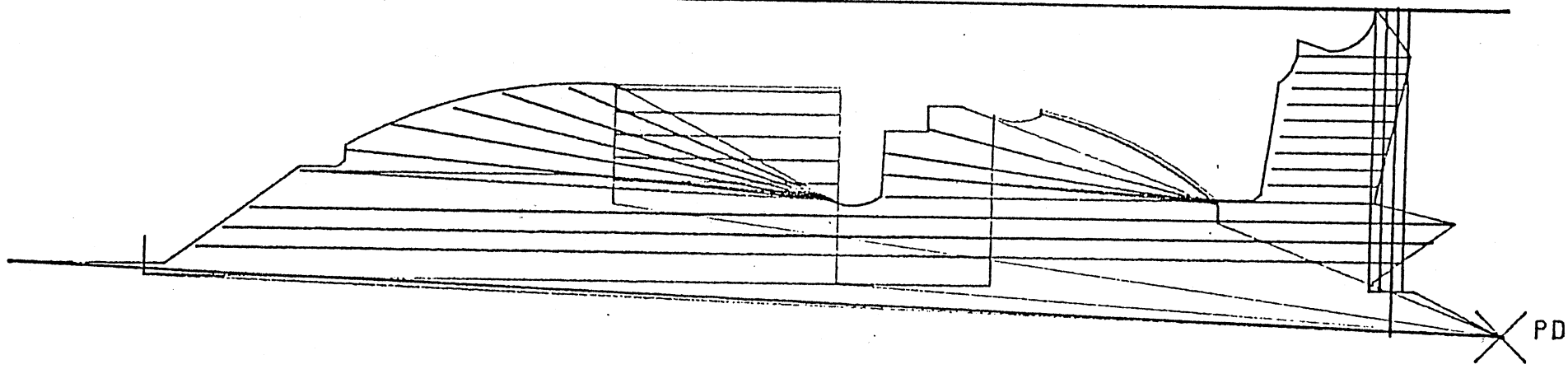
PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
31	PTP	8·95	-8·1					100	1	1200
32	PTP	8	-22·9					80	1	1200
33	PTP	9·1	-8·1					1000	1	1200
34	PTP	7	-22·9					100	1	1200
35	PTP	9·1	-8·1					1000	1	1200
36	PTP	5·9	-20·9					100	1	1200
37	PTP	9·1	-8·1					1000	1	1200
38	PTP	4·8	-19·5					50	1	1200
39	PTP	4·8	-21					80	1	1400
40	PTP	6	-21					100	1	1200
41	PTP	6	-22·9					100	1	1200
42	PTP	9	-23					100	1	1200
43	CIRC	9	-25·5			2	CW	80	1	1400
44	PTP	8·2	-36					60	1	1200
45	PTP	8·2	-49					90	1	1200
46	PTP	9·2	-25·2					1000	1	1200
47	PTP	7·2	-47					60	1	1200
48	PTP	9·2	-25·2					1000	1	1400
49	PTP	6	-45					60	1	1400
50	PTP	9·2	-25·2					1000	1	1400
51	PTP	5·2	-42·2					60	1	1400
52	PTP	9·2	-25·2					1000	1	1400
53	PTP	4·5	-40					60	1	1400
54	PTP	9·2	-25·2					1000	1	1400
55	PTP	4·2	-37					60	1	1400
56	PTP	9·2	-25·2					1000	1	1400
57	PTP	4	-35					60	1	1400
58	CIRC	7	-47			21	CCW	80	1	1400
59	PTP	7·7	-47					100	1	1200
60	PTP	8	-47·3					100	1	1400
61	PTP	8	-49					100	1	1400
62	PTP	12·5	-55					100	1	1400
63	PTP	12·5	-62					100	1	1400
64	PTP	15	5					1200	1	1200
65	PTP	9·5	-35					1200	4	1200
66	INCR									
67	DO 5									
68	PTP			-1·06	0			1000	4	1200
69	PTP			0	10			100	4	1200
70	PTP			0	-10			1000	4	1200
71	END DO									

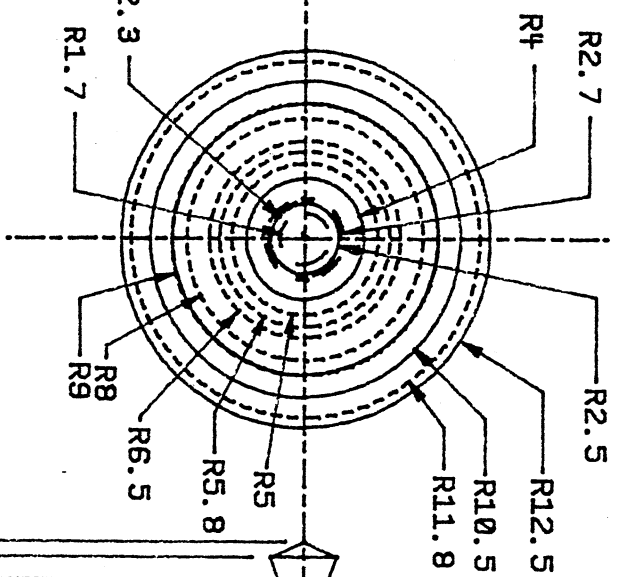
SHEET No. 3 QUEEN

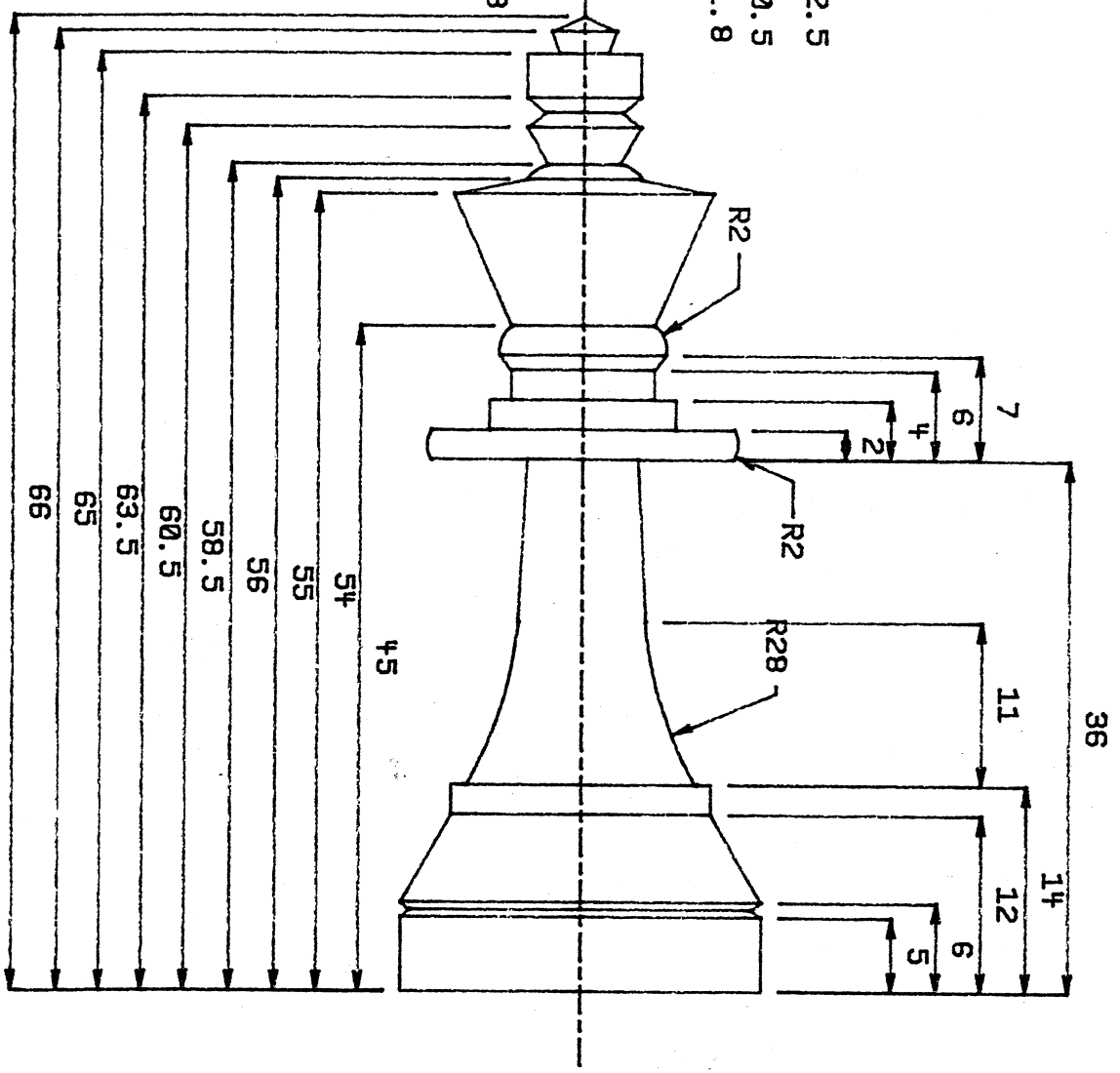
PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
72	ABS									
73	PTP	4	-35.2					100	4	1200
74	PTP	4	-25					100	4	1200
75	PTP	13	-25					100	4	1200
76	PTP	15	5					1200	4	1200
77	PTP	10	-8					1200	2	1600
78	PTP	9.25	-8					80	2	1600
79	CIRC	5.1	-16			19	CCW	50	2	1600
80	CIRC	9.25	-8			19	CW	600	2	1200
81	PTP	9	-8					80	2	1200
82	CIRC	4.9	-16			18	CCW	100	2	1200
83	PTP	5.2	-16					200	2	1200
84	CIRC	5.2	-18.1			2	CW	90	2	1200
85	PTP	13	-18.1					1000	2	1500
86	PTP	13	-56					1200	2	1600
87	PTP	11.3	-56					20	2	1600
88	PTP	13	-56					900	2	1400
89	PTP	15	5					1200	2	1400
90	PTP	13.5	-64					1000	3	1200
91	PTP	0	-64					10	3	1400
92	PTP	14	5					1200	3	1000
93	PTP	15	5					1000	0	1000
94	END PROG									

QUEEN

SCALE 3.5:1







TOOL LIBRARY

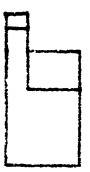
TOOL 1



TOOL 2



TOOL 3



TOOL 4

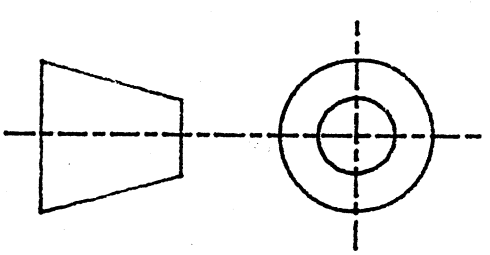


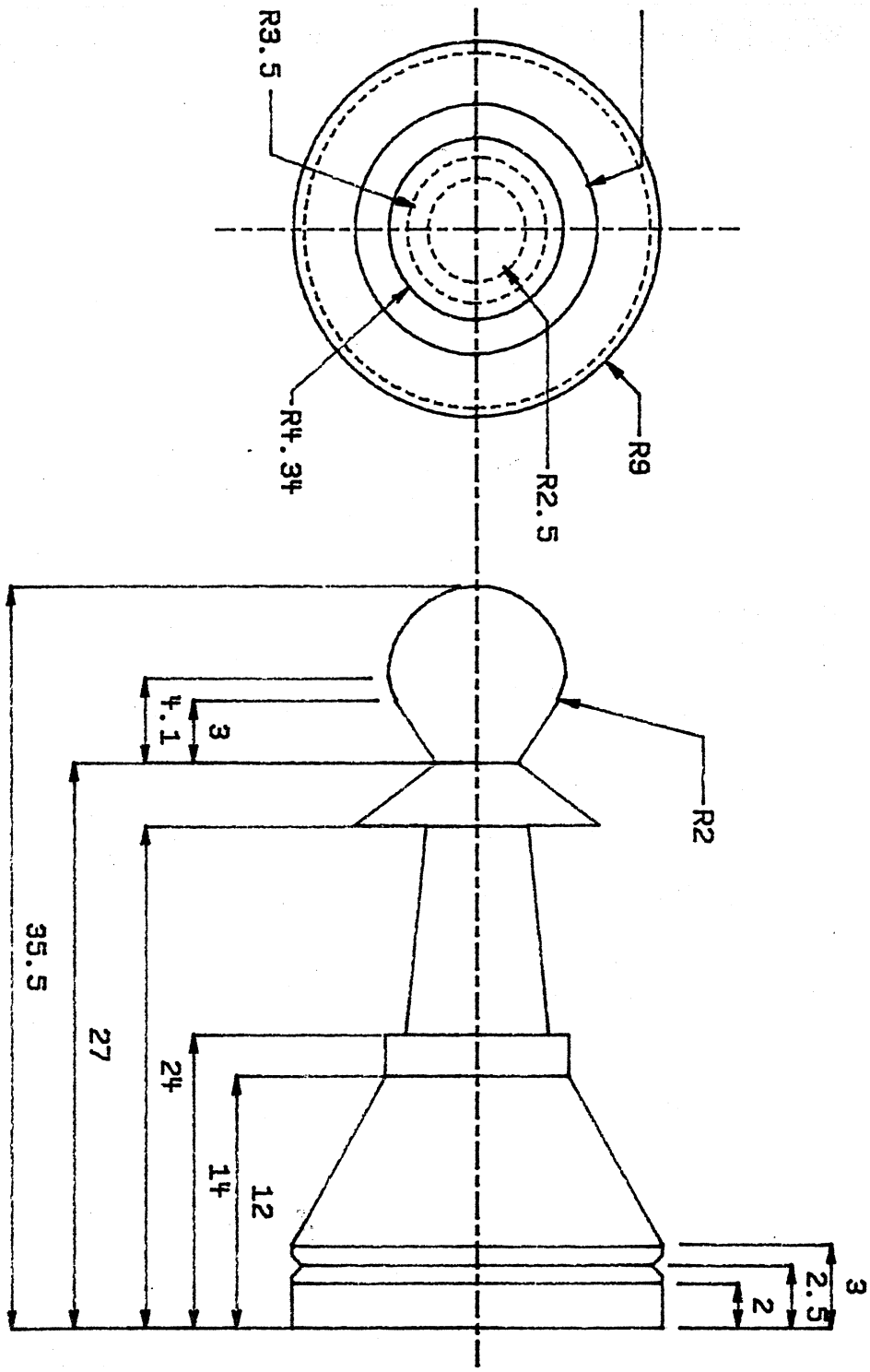
TOOL 6



ALL DIMENSIONS IN MM

DENFORD	
ORAC CHESS SET	
SCALE 2:1	TITLE KING
BAR STOCK 25.4x96	MATL EN 1A





TOOL LIBRARY

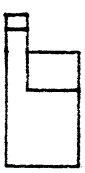
TOOL 1



TOOL 2



TOOL 3



TOOL 4

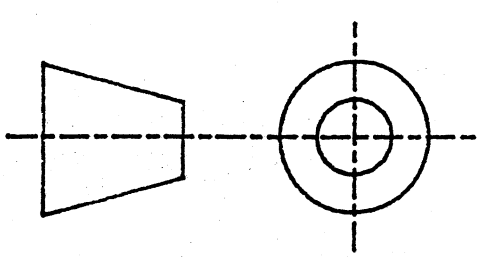


TOOL 6



ALL DIMENSIONS IN MM

DENFORD	
ORAC CHESS SET	
SCALE 3:1	TITLE PAWN
BAR STOCK 25.4x70	MATL EN 1A



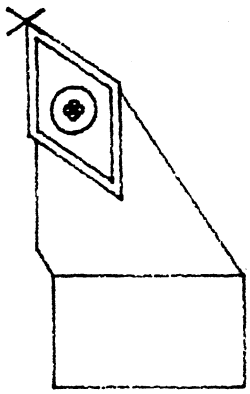
TOOL LIBRARY and TOOL OFFSET POSITIONS

(X)

TOOL ONE

R-H TURNING TOOL

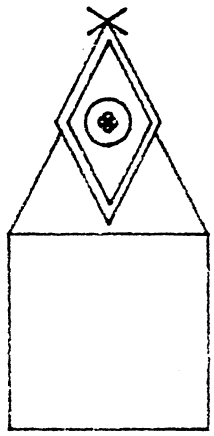
TIP 56°



TOOL TWO

COPY TOOL

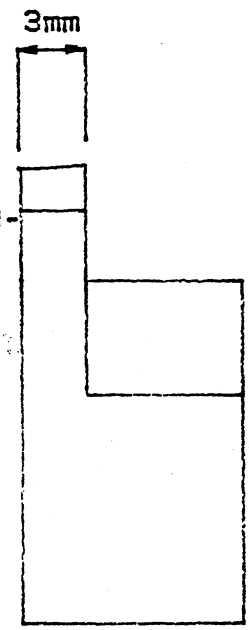
TIP 56°



TOOL THREE

PARTING-OFF TOOL

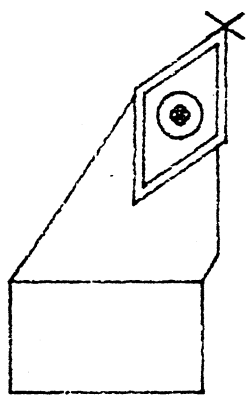
SET AGAINST Z0-



TOOL FOUR

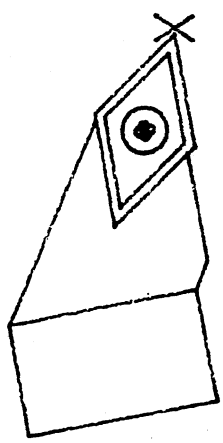
L-H TURNING TOOL

TIP 56°



TOOL SIX

L-H TURNING TOOL
(TOOL 4)
TWISTED ANTI-CLOCKWISE
THROUGH ONE DIVISION
(1/40 of a rev)
TIP 56°

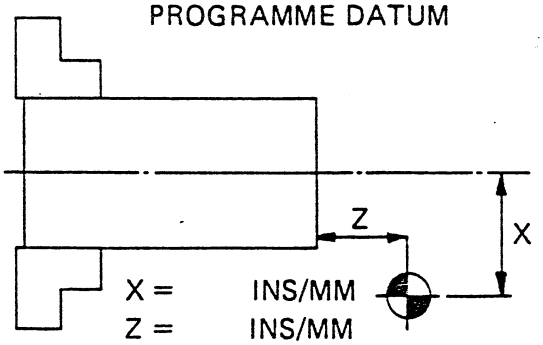


Note

ALL TOOLS ARE STANDARD STELLRAM TOOLS

DRAWING No.	1
DESCRIPTION	KING 1
CASSETTE I/D	
MATERIAL	
PROGRAMME BY	
DATE	

BELOW IS AN EXAMPLE OF A THREAD CUTTING PAGE



ORAC

TOOLING:

No. 0 - TOOL REF	
" 1	
" 2	
" 3	
" 4	
" 5	
" 6	
" 7	
" 8	
" 9	

PAGE _____ THREAD DIA _____ ROOT DIA _____ CUT. INCR...X _____ LENGTH.Z (INCR) _____ PITCH _____

.. STARTS _____ TOOL No _____ SPINDLE SPEED _____

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	INCR									
03	PROG. DAT.	15	5							
04	PTP			-2	-4			1000	1	1500
05	DO 4									
06	PTP			0	-0·5			1000	1	1500
07	PTP			-13	0			80	1	1500
08	PTP			13	0			1000	1	1500
09	END DO									
10	PTP			-0·4	0·2			1000	1	1200
11	DO 2									
12	PTP			-0·75	1·2			1000	1	1200
13	PTP			0	-59·8			100	1	1200
14	PTP			0	59·8			1000	1	1200
15	END DO									
16	PTP			0	-2·4			1000	1	1200
17	DO 2									
18	PTP			-0·75	0			1000	1	1200
19	PTP			0	-28·2			100	1	1200
20	PTP			0	28·2			1000	1	1200
21	END DO									
22	DO 7									
23	PTP			-0·77	0·14			1000	1	1200
24	PTP			0	-12			100	1	1200
25	PTP			0	12			1000	1	1200
26	END DO									
27	ABS									
28	PTP	3·4	-0·8					1000	1	1200
29	PTP	3·4	-3·5					100	1	1200
30	PTP	3·4	-0·8					1000	1	1200

SHEET No. 2 KING 1

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
31	PTP	2·7	−0·8					1000	1	1200
32	PTP	2·7	−3·5					100	1	1200
33	PTP	2·7	0					1000	1	1200
34	PTP	0	−1					100	1	1200
35	PTP	2·25	−1·75					100	1	1200
36	PTP	2·25	−2·15					100	1	1200
37	PTP	1·7	−3·5					100	1	1200
38	PTP	3·7	−3·5					100	1	1200
39	PTP	4	−4					100	1	1200
40	PTP	4	−8·5					100	1	1200
41	PTP	2·6	−11					100	1	1200
42	CIRC	4	−12			2	CW	100	1	1200
43	PTP	9·5	−13					80	1	1200
44	PTP	8·5	−29					100	1	1200
45	PTP	9·7	−13					1000	1	1200
46	PTP	7·4	−29					80	1	1200
47	PTP	9·7	−13					1000	1	1200
48	PTP	6·3	−27					80	1	1200
49	PTP	9·7	−13					1000	1	1200
50	PTP	5·1	−27					80	1	1200
51	PTP	9·7	−13					1000	1	1200
52	PTP	5·25	−22					60	1	1200
53	PTP	11·5	−22					400	1	1200
54	PTP	11·5	−31·2					1000	1	1200
55	PTP	10·8	−31·2					100	1	1200
56	PTP	9·2	−54·8					80	1	1200
57	PTP	10·8	−31·2					1000	1	1200
58	PTP	8·2	−53					70	1	1200
59	PTP	10·8	−31·2					1000	1	1300
60	PTP	7·1	−50·6					60	1	1300
61	PTP	10·8	−31·2					1000	1	1300
62	PTP	6·1	−47					60	1	1300
63	PTP	10·8	−31·2					1000	1	1300
64	PTP	5·1	−44·5					60	1	1300
65	PTP	10·8	−31·2					1000	1	1300
66	PTP	4·7	−42					60	1	1300
67	CIRC	8·2	−53			28	CCW	60	1	1300
68	PTP	9·25	−53					200	1	1200
69	PTP	9·25	−55					90	1	1200
70	PTP	12·7	−60·8					100	1	1200
71	PTP	12·7	−69					200	1	1200

SHEET No. 3 KING 1

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
72	PTP	13	-12					1200	1	1200
73	PTP	9	-12					1000	1	1200
74	PTP	9	-13.4					100	1	1200
75	PTP	5	-22					100	1	1200
76	PTP	5.5	-22					100	1	1200
77	CIRC	5.5	-24			2	CW	100	1	1200
78	PTP	5	-25.2					70	1	1200
79	PTP	5	-27					80	1	1200
80	PTP	6.5	-27					100	1	1200
81	PTP	6.5	-29					100	1	1200
82	PTP	10.3	-29					1000	1	1200
83	CIRC	10.3	-31.5			2	CW	100	1	1200
84	PTP	4.5	-42					100	1	1200
85	CIRC	8	-53.1			28	CCW	100	1	1200
86	PTP	8.65	-53.1					100	1	1200
87	PTP	9	-53.6					100	1	1200
88	PTP	9	-55					100	1	1200
89	PTP	12.3	-60.7					100	1	1200
90	PTP	12.5	-61.3					100	1	1200
91	PTP	12.5	-68					100	1	1200
92	PTP	13	-68					1000	1	1200
93	PTP	14	5					1200	1	1200
94	PTP	15	5					1000	0	1000
95	END PROG									

SHEET No. 4 KING 2

PAGE	FUNCTION	ABSOLUTE		INCREMENTAL		RADIUS	SENSE CW/CCW	FEED RATE	TOOL	SPINDLE SPEED
		X	Z	X	Z					
01	MM									
02	ABS									
03	PROG DAT.	15	5							
04	PTP	4·5	-7·5					1200	2	1600
05	PTP	2·7	-7·5					10	2	1600
06	PTP	13	-7·5					1000	2	1600
07	PTP	13	-62					1200	2	1600
08	PTP	11·8	-62					12	2	1600
09	PTP	13	-62					1000	2	1200
10	PTP	15	5					1200	2	1000
11	PTP	11	-34·5					1200	4	1000
12	PTP	9	-34·5					1200	4	1200
13	PTP	9	-31·1					100	4	1200
14	PTP	9	-34·5					1000	4	1200
15	PTP	8	-36·5					1000	4	1200
16	PTP	8	-31·1					100	4	1200
17	PTP	8	-36·5					1000	4	1200
18	PTP	7	-38·5					1000	4	1200
19	PTP	7	-31·1					100	4	1200
20	PTP	7	-38·5					1000	4	1200
21	PTP	6	-40·5					1000	4	1200
22	PTP	6	-31·1					100	4	1200
23	PTP	6	-40·5					1000	4	1200
24	PTP	5	-42					800	4	1200
25	PTP	5	-31·1					100	4	1200
26	PTP	~~4~~ 5	-42					1000	4	1200
27	PTP	4·7	-42					70	4	1200
28	PTP	4·1	-31·1					100	4	1200
29	PTP	4·8	-42·3					1000	4	1200
30	PTP	4·5	-42·2					70	4	1200
31	PTP	3·9	-31·1					100	4	1200
32	PTP	10·1	-31·1					100	4	1200
33	PTP	10·6	-30·8					80	4	1200
34	PTP	30	5					1200	4	1200
35	PTP	14	-70					1000	3	1400
36	PTP	0	-70					10	3	1400
37	PTP	20	5					1200	3	1000
38	PTP	15	5					1000	0	1000
39	END PROG.									
40										

KING

SCALE 3·5:1

