



COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

1 C 0078-001-H904 (AXIS) DRAWING NO. 41285376-001-02

PAGE 1

1 C 0078-001-H904 (AXIS) DRAWING NO. 41285376-001-02

2 C

3 C

4 C

5 C COMPUTER: H316, DDP-516

6 C

7 C

8 C PROGRAM CATEGORY: INPUT/OUTPUT

9 C

10 C

11 C PROGRAM TITLE: AXIS

12 C TO PLOT AND LABEL AXES WITH THE DIGITAL PLOTTER

13 C

14 C

15 C

16 C

17 C

18 C

19 C

20 C

21 C

22 C

23 C

24 C

APPROVAL

DATE

25 C

26 C

27 C

28 C

PROG- *H. A. Diamant**23 Sep 70*

29 C

30 C

31 C

SUPR- *N. G. Douglas**23 Sep 70*

32 C

33 C

34 C

QUAL- *S. Little**24 Sep 70*

35 C

36 C

37 C

NO. OF PAGES

7



1 C 0078-001-H904 (AXIS)

DRAWING NO. 41285376-001-02

PAGE 2

38 C
39 C
40 C AUTHOR
41 C
42 C HONEYWELL - COMPUTER CONTROL DIVISION (EUROPE)
43 C
44 C
45 C PURPOSE
46 C
47 C TO PLOT AXES WITH VARIABLE STARTING POINT, LABELLING EITHER SIDE,
48 C OF VARIABLE SIZE, VARIABLE ANGLE OF INCLINATION AND VARIABLE
49 C SCALING ON THE DIGITAL PLOTTER
50 C
51 C
52 C RESTRICTIONS
53 C
54 C THIS ROUTINE WILL WORK ON AN H316 OR DDP-516 COMPUTER WITH A
55 C DIGITAL PLOTTER
56 C
57 C
58 C STORAGE
59 C
60 C 1332 (OCTAL)
61 C 730 (DECIMAL)
62 C
63 C
64 C USE
65 C
66 C PLOT AN AXIS
67 C
68 C CALL AXIS (X,Y,BCD,N,SIZE,THETA,XMIN,DX,DV)
69 C
70 C OR
71 C
72 C CALL AXIS PLOT AN AXIS
73 C DAC X STARTING POINT X COORDINATE
74 C DAC Y STARTING POINT Y COORDINATE



1 C 0078-001-H904 (AXIS)

DRAWING NO. 41285376-001-02

PAGE 3

75 C	DAC	BCD	AXIS TITLE ALPHA INFORMATION
76 C	DAC	N	NUMBER OF CHARACTERS IN THE BCD TITLE
77 C	DAC	SIZE	LENGTH OF THE AXIS
78 C	DAC	THETA	ANGLE OF INCLINATION OF THE AXIS
79 C	DAC	XMIN	VALUE OF VARIABLE AT FIRST POINT OF AXIS
80 C	DAC	DX	DIFFERENCE BETWEEN FIRST AND SECOND VALUES
81 C	DAC	DV	NUMBER OF DIVISIONS PER UNIT OF AXIS LENGTH
82 C	OCT	0	END OF PARAMETER LIST
83 C			NORMAL RETURN

84 C
85 C NOTE-XMIN AND DX ARE NORMALLY DEFINED BY ROUTINE SCALE (41285377).
86 C ALL ARE FLOATING POINT EXCEPT BCD AND N WHICH ARE ALPHANUMERIC
87 C AND INTEGER RESPECTIVELY. THETA IS IN DEGREES MEASURED ANTI-
88 C CLOCKWISE TO THE X-AXIS OF THE PLOTTER, WHILST X, Y, AND SIZE
89 C ARE INCHES (OR MILLIMETRES FOR THE METRIC PLOTTER).

90 C
91 C DV IS THE NUMBER OF DIVISIONS (AS PLOTTED) PER INCH. IT DEFINES
92 C THE DISTANCE BETWEEN THE TRANSVERSE MARKINGS ON THE AXES. THE
93 C WORKING RANGE IS 1.0 TO 25.4, VALUES OUTSIDE THIS RANGE BEING
94 C EQUATED TO 10.0. DV HAS TWO PURPOSES:-

95 C
96 C A. IT CAN BE USED FOR INCH INCREMENT PLOTTERS
97 C TO PLOT METRIC AXES (DV=25.4).

98 C
99 C B. IT IS USED TO INCREASE OR DECREASE THE NUMBER
100 C OF AXIS MARKERS PER UNIT USED.

101 C
102 C NORMALLY DV WILL BE 10.0.

103 C
104 C
105 C METHOD

106 C
107 C USING PARAMETERS OFFSET TO THE REQUIRED ANGLE, AND HAVING
108 C DETERMINED THE RANGE OVER WHICH THE AXIS WILL RUN, THE ROUTINE
109 C PLOTS THE AXIS SCALE AND TITLE. THE TITLE IS PLACED CENTRALLY
110 C ABOUT THE AXIS. A NEGATIVE VALUE OF N WILL PLACE THE TITLE ON THE
111 C CLOCKWISE SIDE OF THE AXIS AND VICE VERSA. FOR A SCALE TOO LARGE



1 C 0078-001-H904 (AXIS)

DRAWING NO. 41285376-001-02

PAGE 4

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112 C   FOR THE PLOTTER PAGE, THE RELEVANT POWER OF TEN TO WHICH THE SCALE
113 C   VALUES ARE TO BE RAISED IS PLOTTED BESIDE THE TITLE.  THE AXIS
114 C   LINE IS THEN PLOTTED AND DIVIDED INTO THE NUMBER OF DIVISIONS
115 C   SPECIFIED.
116 C
117 C
118 C   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
119 C
120 C
121 C       SUBROUTINE AXIS (X,Y,BCD,N,SIZE,THETA,XMIN,DX,DV)
122 C
123 C
124 C       DIMENSION ICHAR(4).
125 C
126 C   CONSTANTS 7H(X10 )
127 C       ICHAR(1)=-22312
128 C       ICHAR(2)=-20048
129 C       ICHAR(3)=-24416
130 C       ICHAR(4)=-22112
131 C
132 C       DIV=DV
133 C       TWO=2.0
134 C
135 C   NUMBER OF DIVISIONS PER PAGE UNIT MUST LIE BETWEEN 1.0 AND 25.4
136 C       IF (DIV.LT.1.0.OR.DIV.GT.25.4) DIV=10.0
137 C
138 C       TH=THETA*0.0174533
139 C       CTH=COS (TH)
140 C       STH=SIN (TH)
141 C       DIVA=DIV
142 C
143 C   IS THE NUMBER OF DIVISIONS PER UNIT IN THE HIGHER (25.4) OR THE LOWER
144 C   (1.0) RANGE?
145 C       IF (DIV-20.0) 1,2,2
146 C   1 DIVA=2.0*DIV
147 C       TWO=1.0
148 C   2 SPACE=10.0/DIVA
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COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

1 C 0078-001-H904 (AXIS)

DRAWING NO. 41285376-001-02

PAGE 5

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149      ZN=N
150      DYB=(-0.1+SIGN(0.3,ZN))*SPACE
151      DXB=-0.2*SPACE
152 C
153 C CALCULATE THE PARAMETERS TO BE USED IN OFFSETTING THE AXIS AND SYMBOLS
154      DXC=SIZE/2.0 - (0.24*FLOAT((N+7)/2))*SPACE
155      DYC=(-0.15+SIGN(0.65,ZN))*SPACE
156      NOTE=SIZE/SPACE/2.0+1.0
157      SPC=CTH*SPACE*2.0
158      SPS=STH*SPACE*2.0
159 C
160 C OFFSET COORDINATES
161      XN=X + DXB*CTH - DYB*STH
162      YN=Y + DYB*CTH + DXB*STH
163 C
164 C ESTABLISH LIMITS TO THE SCALE OF VALUES
165      ADY=ABS(DX)*10.0/DIV
166      EX=0.0
167      IF (ADY) 3,7,3
168 C
169 C ARE THE SCALE INCREMENTS GREATER THAN 100.0?
170      3 IF (ADY-100.0) 6,4,4
171      4 ADY=ADY/10.0
172      EX=EX+1.0
173      GOTO 3
174      5 ADY=ADY*10.0
175      EX=EX-1.0
176      6 IF (ADY-0.01) 5,7,7
177 C
178 C CALCULATE THE FIRST NUMBER TO BE PLOTTED ALONG THE AXIS SCALE
179      7 ABSV=XMIN/10.0**EX
180      ADY=SIGN(ADY,DX)*TWO
181      NT=SQRT(DXC**2+DYC**2)
182 C
183 C PLOT THE AXIS SCALE AND TITLE. THE TITLE WILL BE PLOTTED IN THE
184 C CENTRE OF THE AXIS AND BELOW THE SCALE NUMBERS
185      DO 10 I=1,NOTE
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1 C 0078-001-H904 (AXIS) DRAWING NO. 41285376-001-02

PAGE 6

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186 C
187 C PLOT AN AXIS SCALE NUMBER
188     CALL NUMBER (XN,YN,0.21*SPACE,ABSV,THETA,2)
189 C
190 C GET THE NEXT NUMBER TO BE PLOTTED ALONG THE AXIS SCALE
191     ABSV=ABSV+ADY
192     XN=XN+SPC
193     YN=YN+SPS
194 C
195 C IS THERE AN AXIS TITLE TO BE PLOTTED?
196     IF (NT) 10,8,10
197 C
198 C OFFSET AND CENTRE THE AXIS TITLE
199     8     XT=X + DXC*CTH - DYC*STH
200         YT=Y + DYC*CTH + DXC*STH
201 C
202 C IF THE FIRST POINT TO BE PLOTTED IS AT THE ORIGIN, OFFSET SLIGHTLY
203     IF (XT.EQ.0.0) XT=0.00001
204     IF (YT.EQ.0.0) YT=0.00001
205 C
206 C PLOT THE TITLE
207     CALL O$XA (XT,YT,0.28*SPACE,BCD,THETA,IABS(N))
208 C
209 C ARE THE SCALE VALUES TO BE RAISED TO A POWER OF 10?
210     IF (EX) 9,10,9
211 C
212 C PLOT THE LEGEND "(X10 )" NEXT TO THE AXIS TITLE
213     9     CALL O$XA (0.0,0.0,0.28*SPACE,ICAR,THETA,7)
214         XT=XT + (0.24*FLOAT(IABS(N)+4)*CTH - 0.12*STH)*SPACE
215         YT=YT + (0.24*FLOAT(IABS(N)+4)*STH + 0.12*CTH)*SPACE
216 C
217 C PLOT THE INDECES
218     CALL NUMBER (XT,YT,0.21*SPACE,EX,THETA,-1)
219     10     NT=NT-1
220 C
221 C PLOT THE AXIS
222 C
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COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

1 C 0078-001-H904 (AXIS)

DRAWING NO. 41285376-001-02

PAGE 7

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223 C CALCULATE THE OFFSET COORDINATES FOR THE START OF THE AXIS
224     NTIC=DIV*SIZE/10.0+1.0
225     XN=X + CTH*SIZE
226     YN=Y + STH*SIZE
227     SPC=CTH*10.0/DIV
228     SPS=STH*10.0/DIV
229 C
230 C PLOT THE AXIS LINE
231     CALL O$XP (XN,YN,3)
232 C
233 C PLOT THE DIVISION LINES ALONG THE AXIS
234     XN=FLOAT(NTIC-1)*SPC + X
235     YN=FLOAT(NTIC-1)*SPS + Y
236     DO 11 I=1,NTIC
237         IF (XN.EQ.0.0) XN=0.00001
238         IF (YN.EQ.0.0) YN=0.00001
239         CALL O$XA (XN,YN,0.21*SPACE,13,THETA,-2)
240         XN=XN-SPC
241     11  YN=YN-SPS
242     RETURN
243 C
244 C END OF AXIS 15.JUL.70 HAD
245     END
```