Special quadrupole magnets for KEKB IR

2/10/00
KEKB Review
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Contents

QC1LE Trouble

・ One coil of QC1LE was overheated Dec. 16.

→ We attached the temperature sensor to each coil and Cu-plates to the coils connected to the bus bar to decrease power.

・ After repairing the coil, the temperature of two coils, which were connected to the bus bars had risen gradually.

→After all, the temperature rise of the coils was caused by CuO stuck at the outlet horses of the cooling water.

But we don't understand why CuO was stuck at the horse?

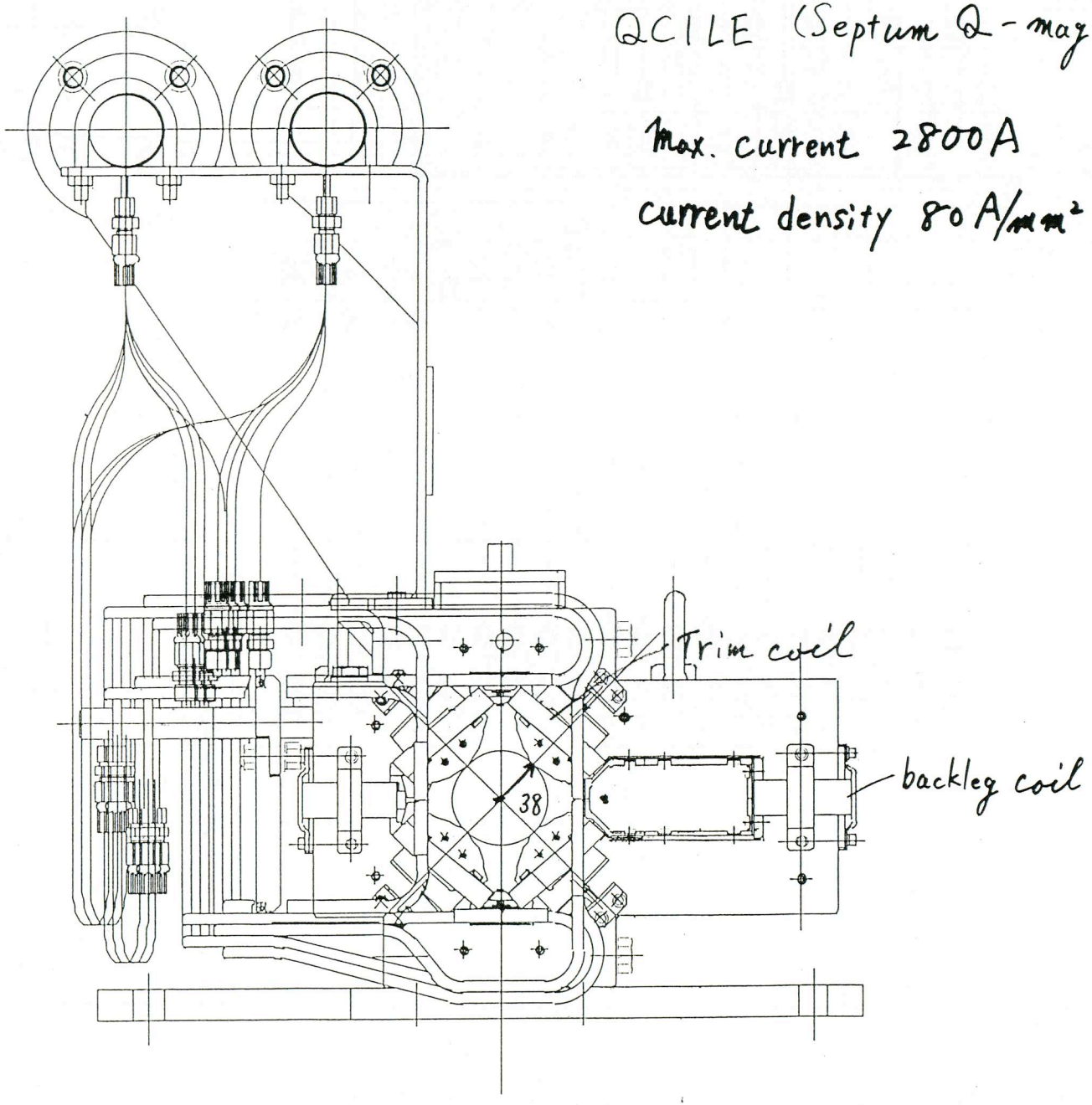
○ QC1LE will have the interlock system such as quench detector for super-conducting magnet.

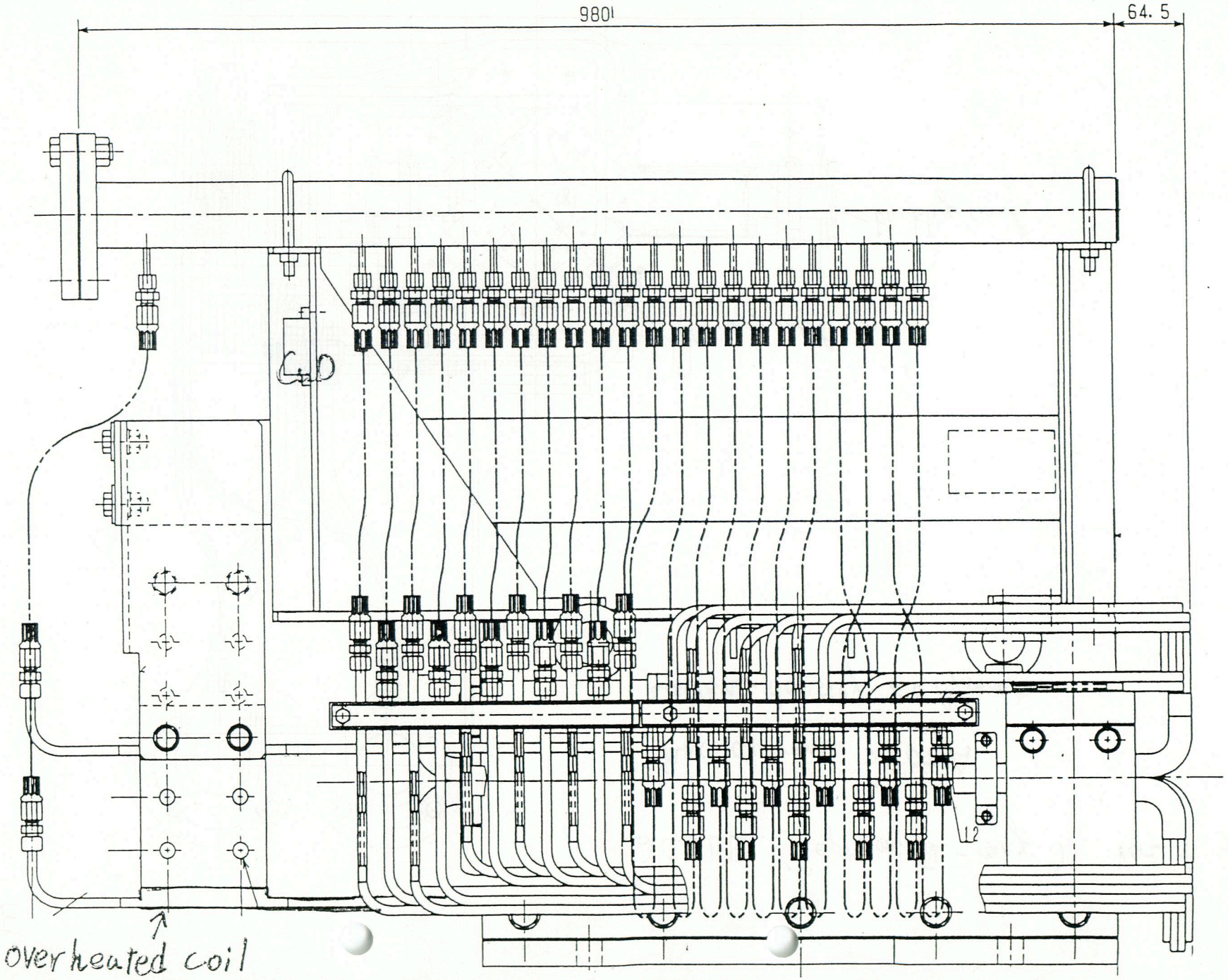
QCILE

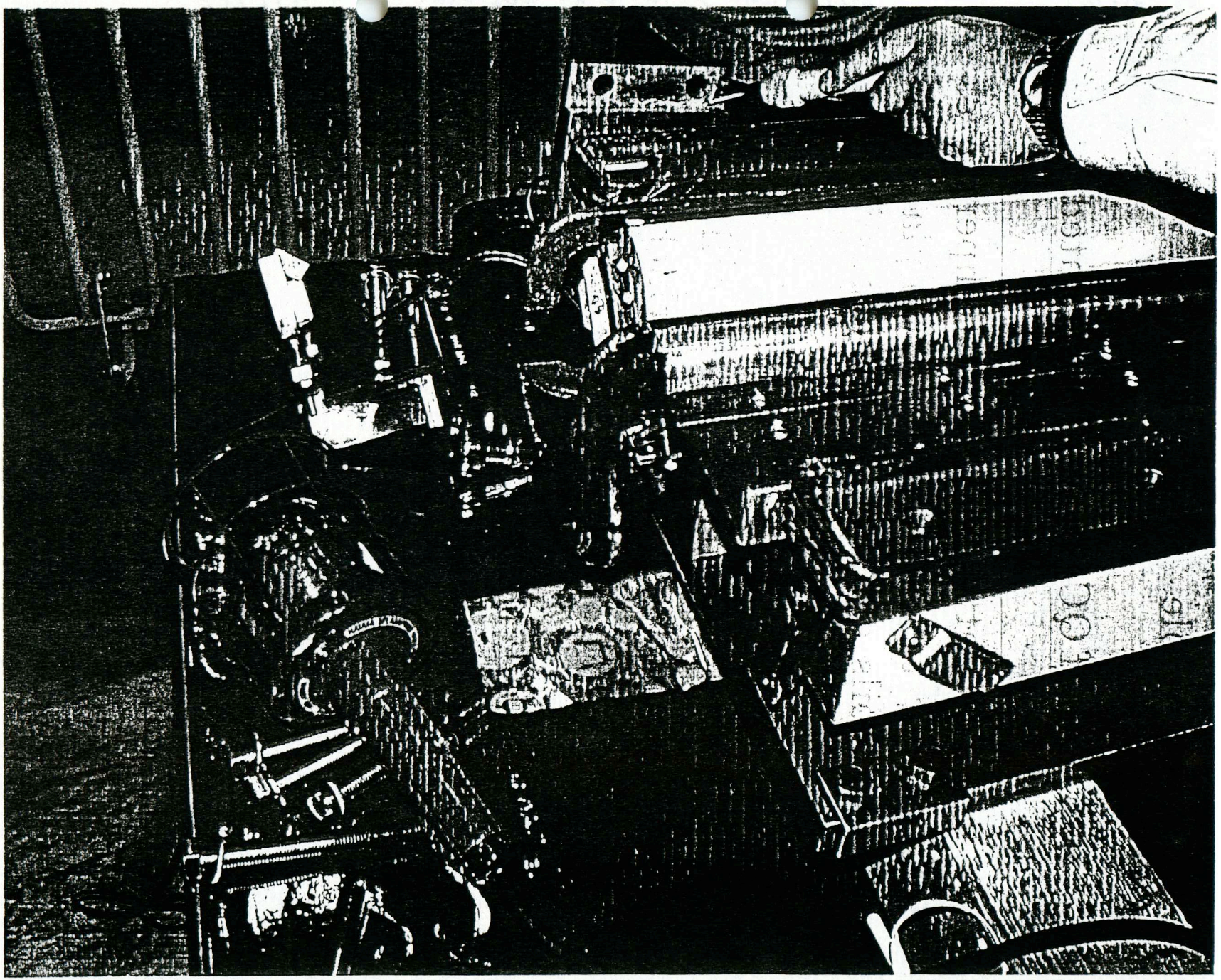
QCILE (Septum Q-mag.) Vert. f for HER

Max. current 2800A

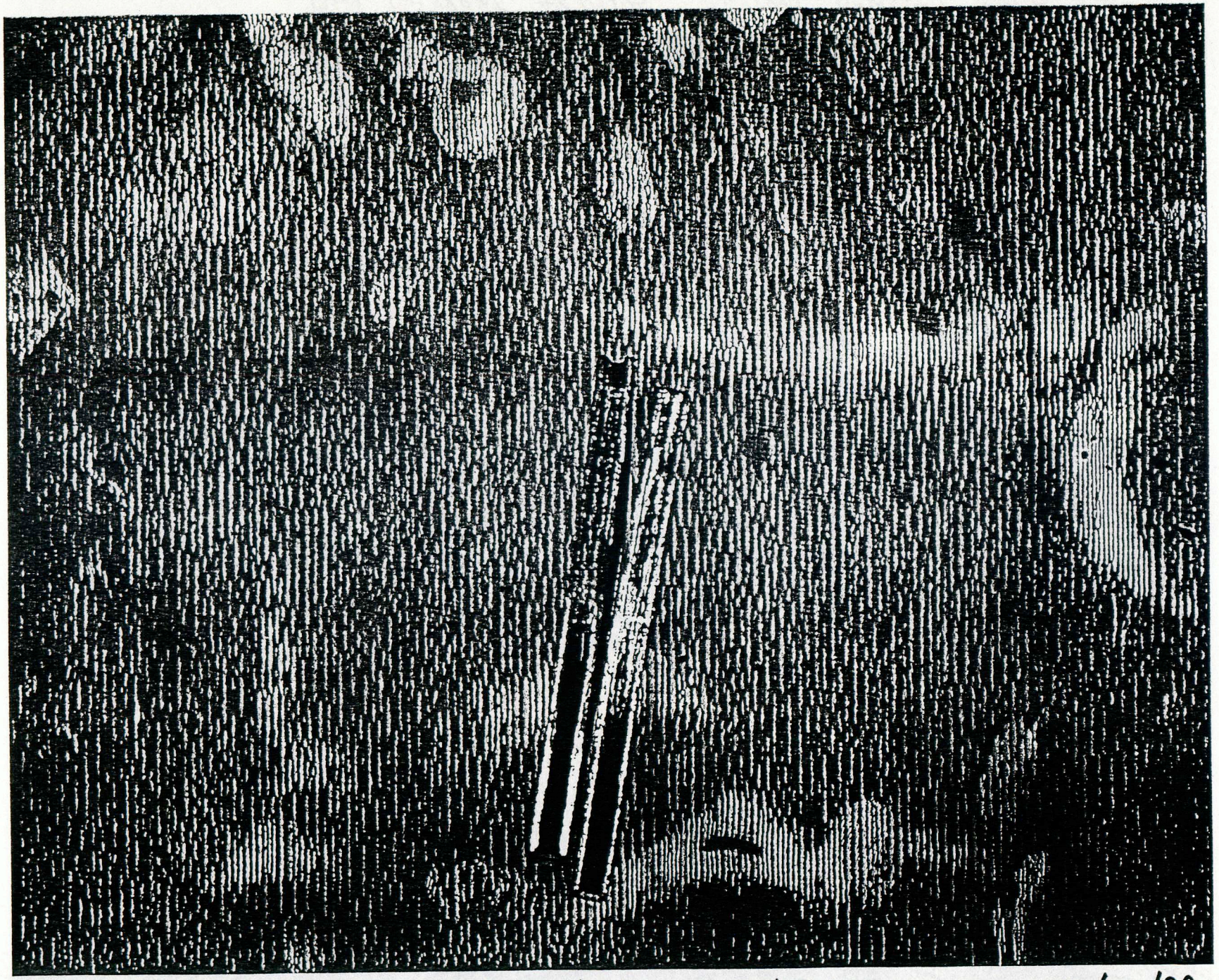
current density 80 A/mm²



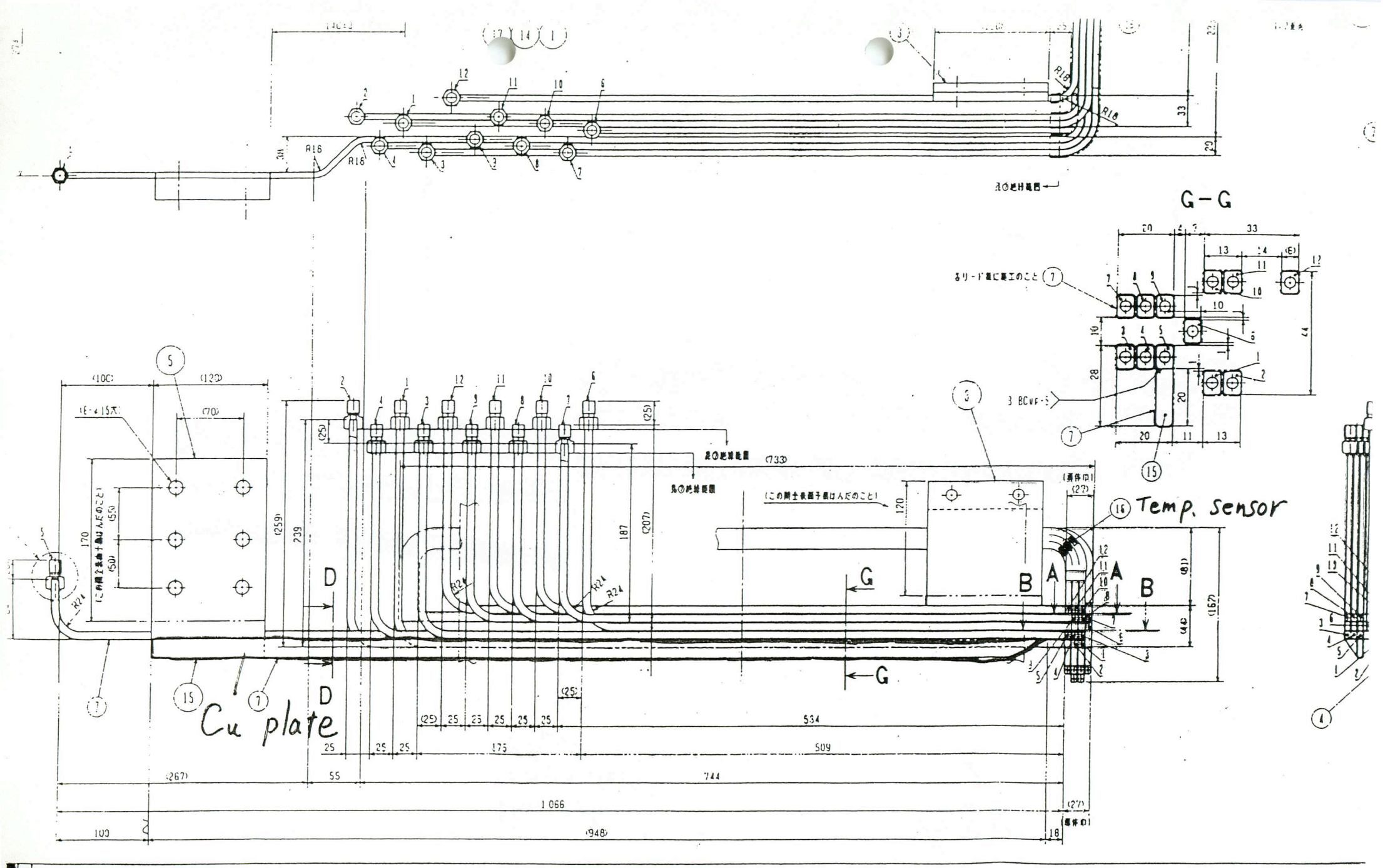

980
64.5
L2
overheated coil



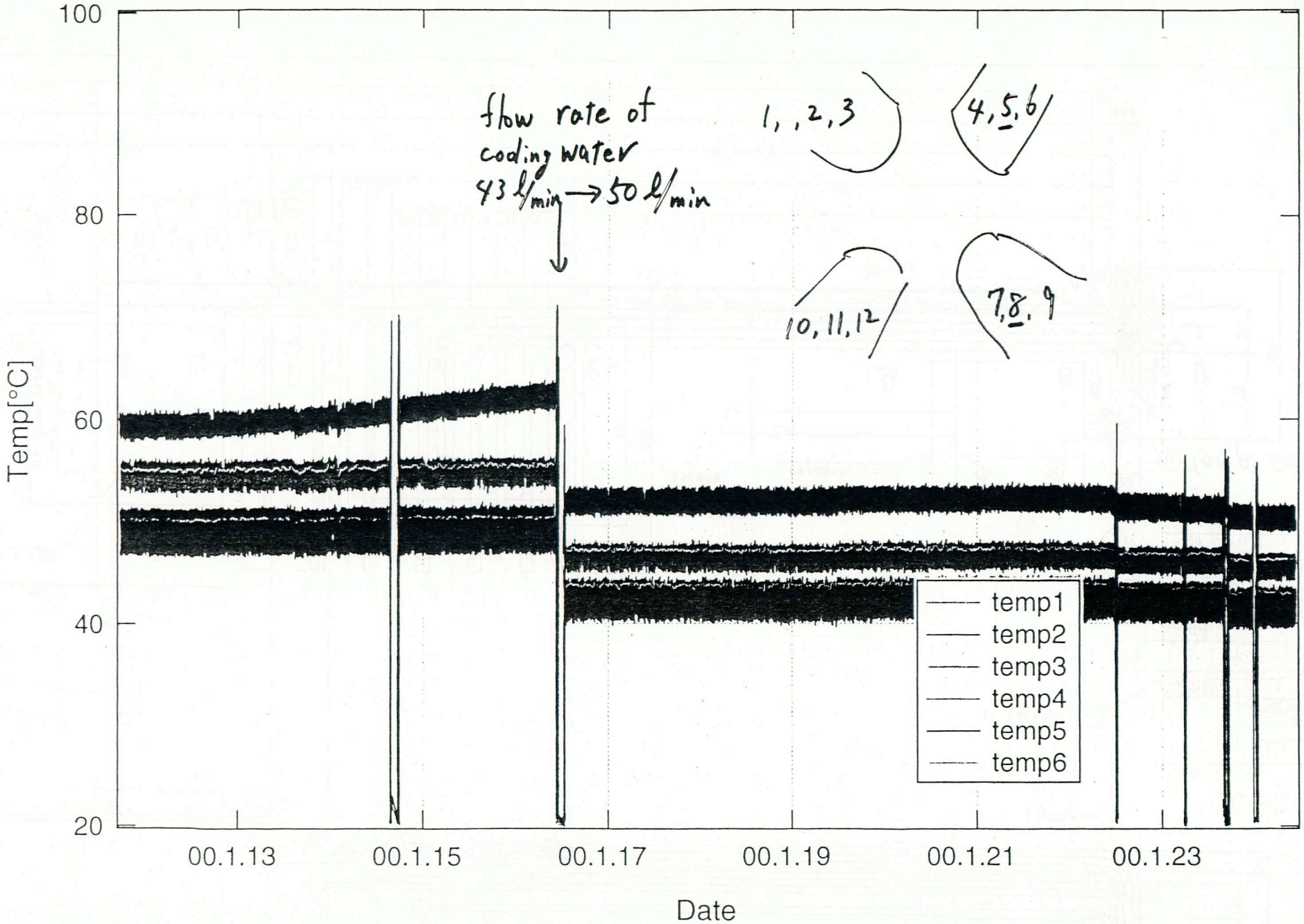
Max. current 2800A, current density 80 A/mm²

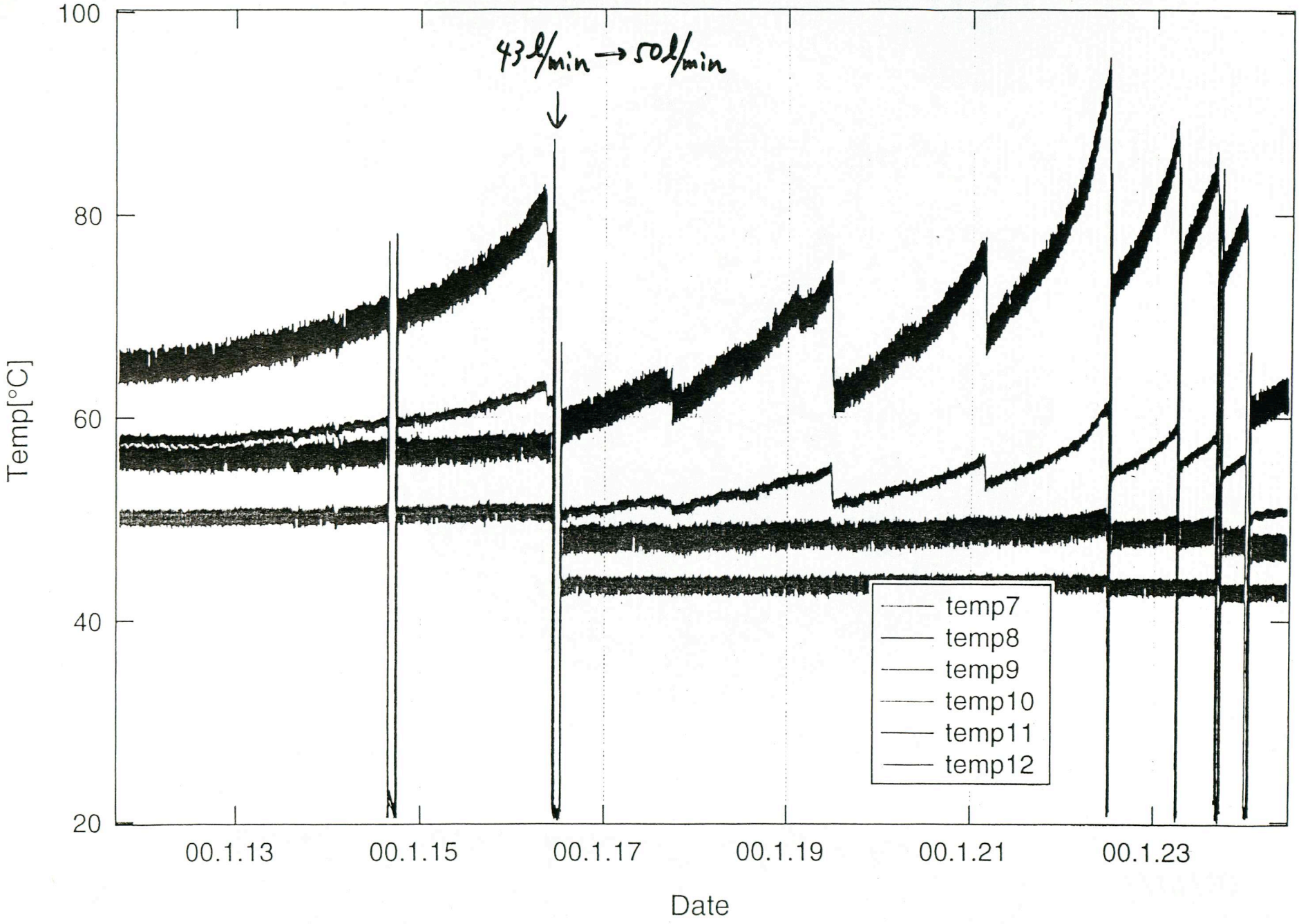


QCILE molten hollow conductor 12/18/99



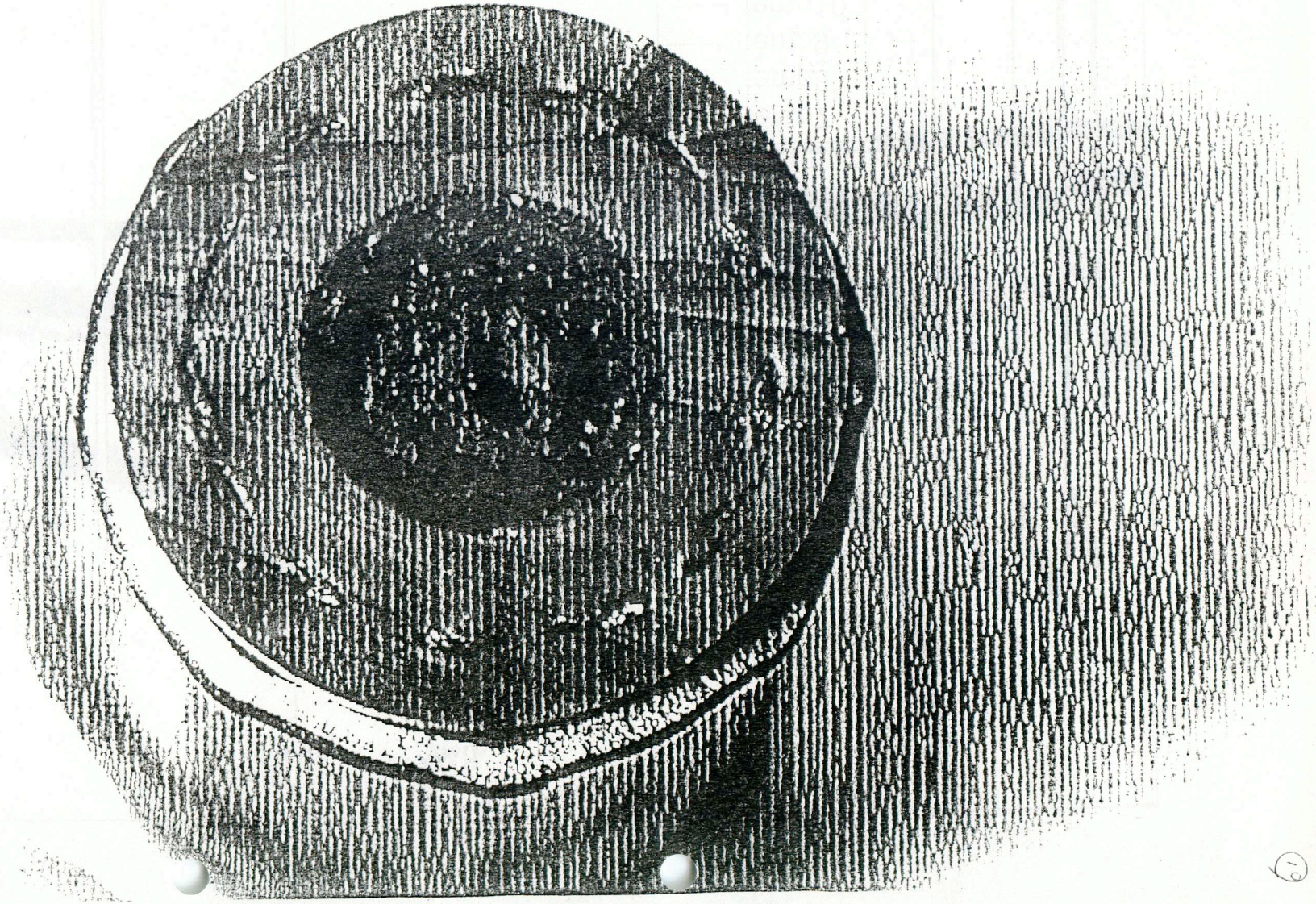
PCB-26
39-12-22

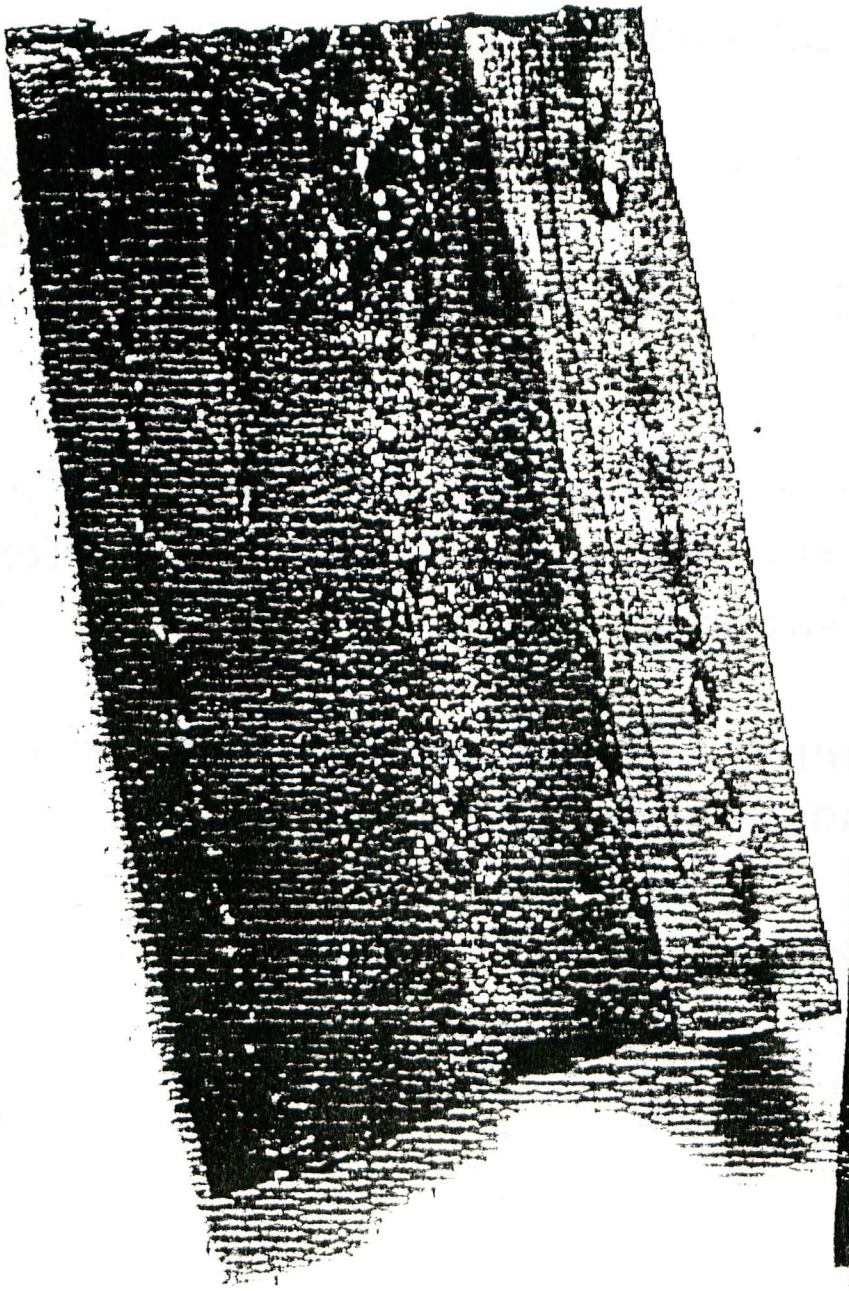

100
80
60
40
20
Temp[°C]
00.1.13
00.1.15
00.1.17
00.1.19
00.1.21
00.1.23
Date
flow rate of
coding water
43 l/min → 50 l/min
1, , 2, 3
4, 5, 6
10, 11, 12
7, 8, 9
temp1
temp2
temp3
temp4
temp5
temp6

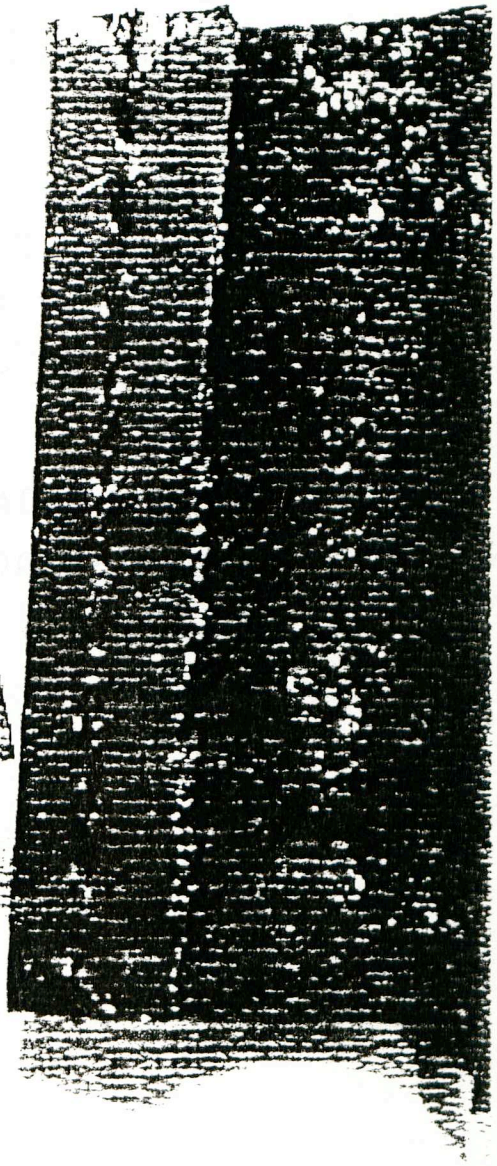

43l/min → 50l/min
100
80
60
40
20
Temp[°C]
00.1.13
00.1.15
00.1.17
00.1.19
00.1.21
00.1.23
Date
temp7
temp8
temp9
temp10
temp11
temp12

1/17/00

OCILE. outlet horse of cooling water







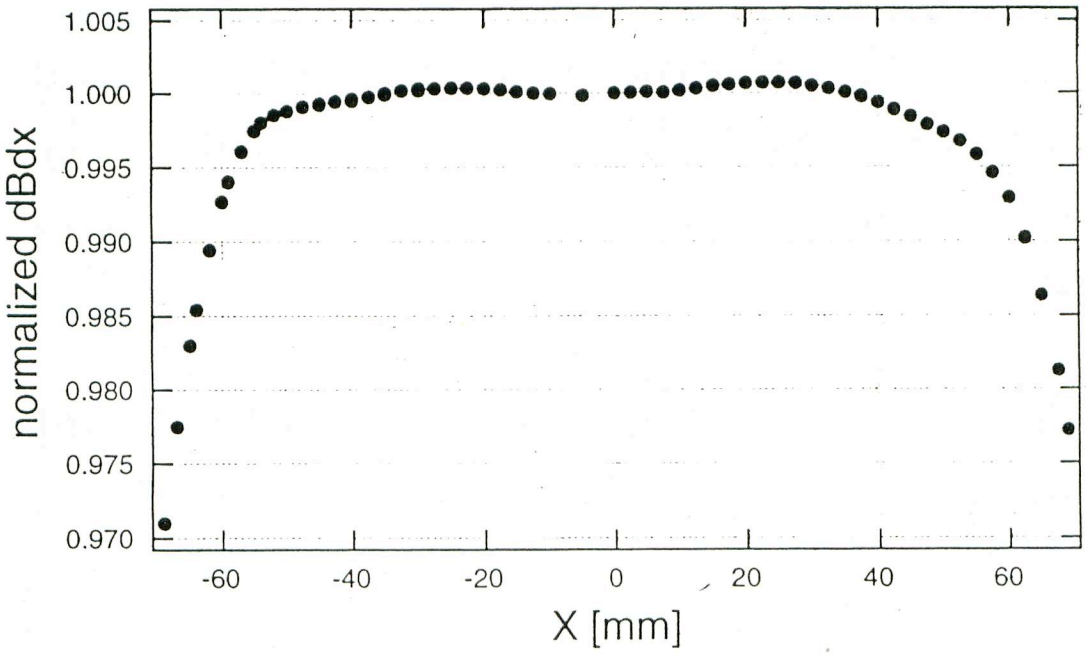
Field measurement of QC2 magnets

Since the amplitude of the β x at the QC2 magnet is large, the required horizontal aperture of the QC2 is larger than bore radius.

We have measured the field distributions of QC2LP by shifting the harmonic coil center during last summer shutdown.

Next summer we will measure the other magnets and make end-shims.

QC2LP field mapping result (10/14/99)
(preliminary result)



Requirement:

normalized dB/dx<1E-3 within x_max=65 mm

QC1RE

Problems of QC1RE

1, The ratio of dipole field strength and the quadrupole field is 1.06 at x=46mm. It makes dispersion function $\eta \neq 0$ at crab cavity.

2, The field distribution of dBx/dy is not so good.

○ We have to re-design and fabricate QC1RE before crab cavity installation.

Summary

1, One coil of QC1LE was overheated. This was caused by CuO stuck at the outlet horse of the cooling water.

2, We will measure all aperture region of the other QC2 magnets and apply the end-shims corrections.

3, QC1RE has a problem for the dispersion function at crab cavity. We have to re-design QC1RE to meet specifications.