

LHC - Cold masses: HELIUM MASS SPECTROMETER LEAK TEST REPORT

ITP Nr.
23
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Cold Mass Nr. **2034**

Step Nr. **1** CM -> Vacuum
Volume / Volume to be tested

Fuga calibrata / Calibrated leak parameter

Calibrated leak N°	4011007195	4011007225	4011007195
Data calibr. / calibration date	08/10/02	08/10/02	08/10/02
Temp. calibrazione fuga / Calibration Temp.	23,0 °C	23,0 °C	23,0 °C
Valore nom. fuga calibrata / Calibrated leak nom. value	3,00E-08 mbar l s-1	3,30E-08 mbar l s-1	3,00E-08 mbar l s-1

Calibrazione del sistema / System calibration

Conc. He nelle linee di test (100%) / Volumetric fraction of tracer gas in the injection envelope

T ambiente / Test temp.

Fuga calibrata con correz. T ed età / Size of calib. leak after corr. for ageing and T)

Segnale residuo prima delle misure di SFR / Residual signal prior SFR meas.

Segnale del LD / Signal given by the calibrated leak

Min. dev. segnale (=2x amp. segn. residuo) / Smallest read. signal dev. (= 2 x ampl. of RFR noise)

Tempo di attesa stabiliz. segnale / Time to achieve stabilised leak signal

$$= S_w \frac{q_{FR}}{S_{FR} - R_{FR}} \frac{1}{C}$$

C	1	1	1
T	17,5 °C	17,5 °C	17,5 °C
qFR	2,42E-08 mbar l s-1	2,66E-08 mbar l s-1	2,42E-08 mbar l s-1
RFR	8,56E-09 mbar l s-1	5,86E-10 mbar l s-1	1,98E-10 mbar l s-1
SFR	3,73E-08 mbar l s-1	2,58E-08 mbar l s-1	2,45E-08 mbar l s-1
Sm	2,00E-11 mbar l s-1	2,00E-12 mbar l s-1	2,00E-12 mbar l s-1
3t	900 sec	700 sec	900 sec
qGm	1,69E-11 mbar l s-1	2,11E-12 mbar l s-1	1,99E-12 mbar l s-1

Condizioni del test / Leak test conditions

Pressione del sistema / System pressure

Segnale residuo del cercatughe ad inizio test / Residual signal prior to SF measurement

Segnale del LD a fine test / Signal given by the leak after 30 min. (>3)

$$= \frac{q_{FR}}{S_{FR} - R_{FR}} \frac{(S_F - R_F)}{C}$$

CALCOLO DELLA FUGA / Leak evaluation

P	8,10E-05 mbar	mbar	7,90E-05 mbar
Rf	8,02E-08 mbar l s-1	mbar l s-1	1,88E-10 mbar l s-1
Sf	8,11E-08 mbar l s-1	mbar l s-1	1,79E-10 mbar l s-1
qg	7,59E-11 mbar l s-1	mbar l s-1	<1,0E-09 mbar l s-1

VALORE DI RIFERIMENTO / REF. VALUE (MAX)

1,0E-09 mbar l s-1 at 26 bar	1,0E-10 mbar l s-1 at 26 bar	1,0E-05 mbar l s-1 at 26 bar	1,0E-09 mbar l s-1 at 5 bar
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CONFORMANCE

YES YES YES YES

Doc. di riferimento / Ref. documents

CERN contract number: F302LHC/LHC

CERN technical spec.: LHC MMS-98-198 rev.2

Leak test procedure (Ref. N° Revision): 780RM09442 rev.0

Strumentazione / Test equipment

Helium Mass Spectrometer type:

Pressure gauge type:

Pumping group:

on vessel	PFEIFFER HLT 260	full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 II/s rotary vane pump PFEIFFER DUO 65 m3/h
on heat exchanger line	PFEIFFER HLT 260	rotary vane pump PFEIFFER DUO 20 m3/h
on c.b.t. lines	PFEIFFER HLT 260	rotary vane pump PFEIFFER DUO 20 m3/h
on vessel	PFEIFFER HLT 260	full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 II/s rotary vane pump PFEIFFER DUO 65 m3/h

Prepared by: Name / Date

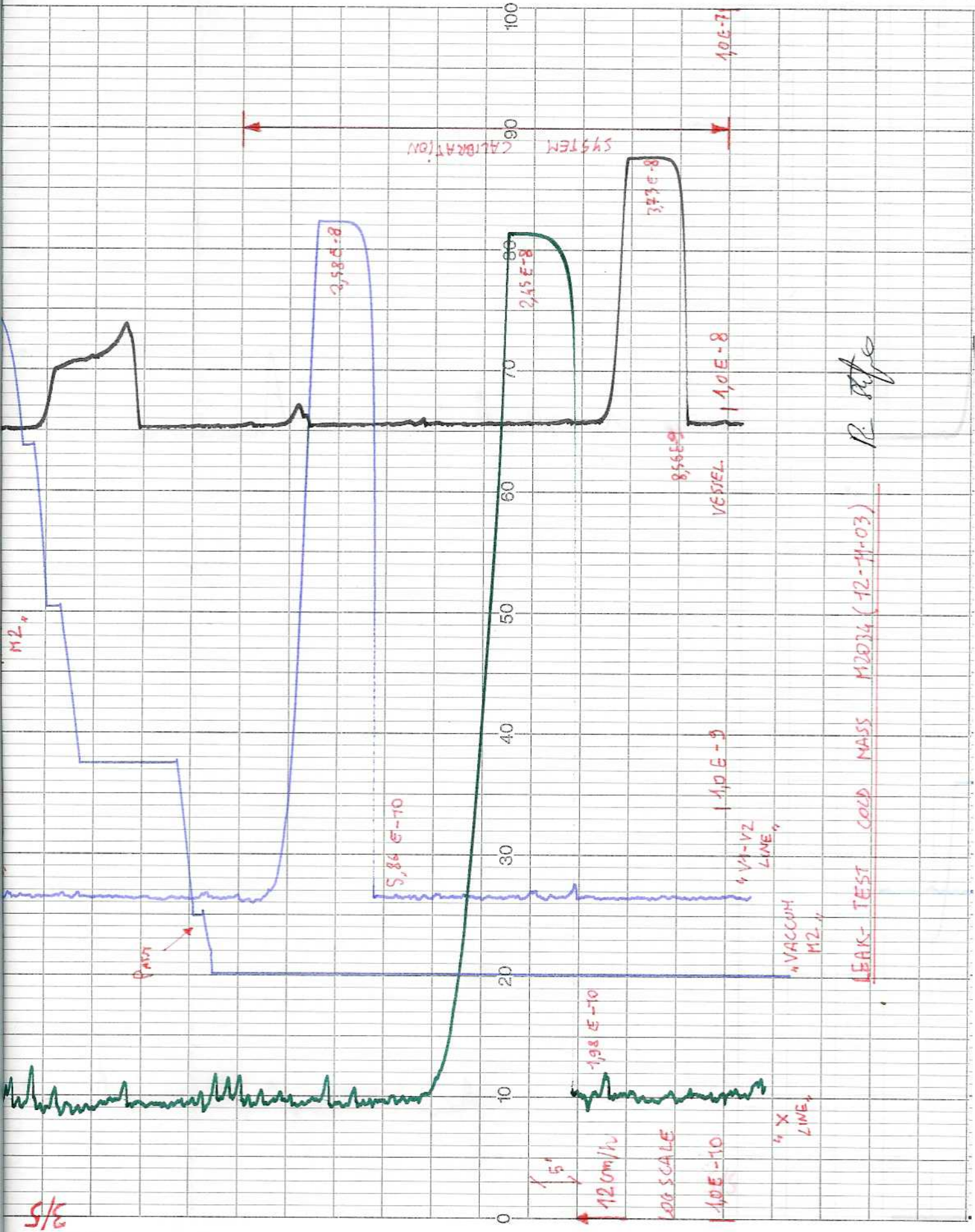
Approved by: Name / Date

Checked by: Name / Date

Checked at CERN by / Signature / Date

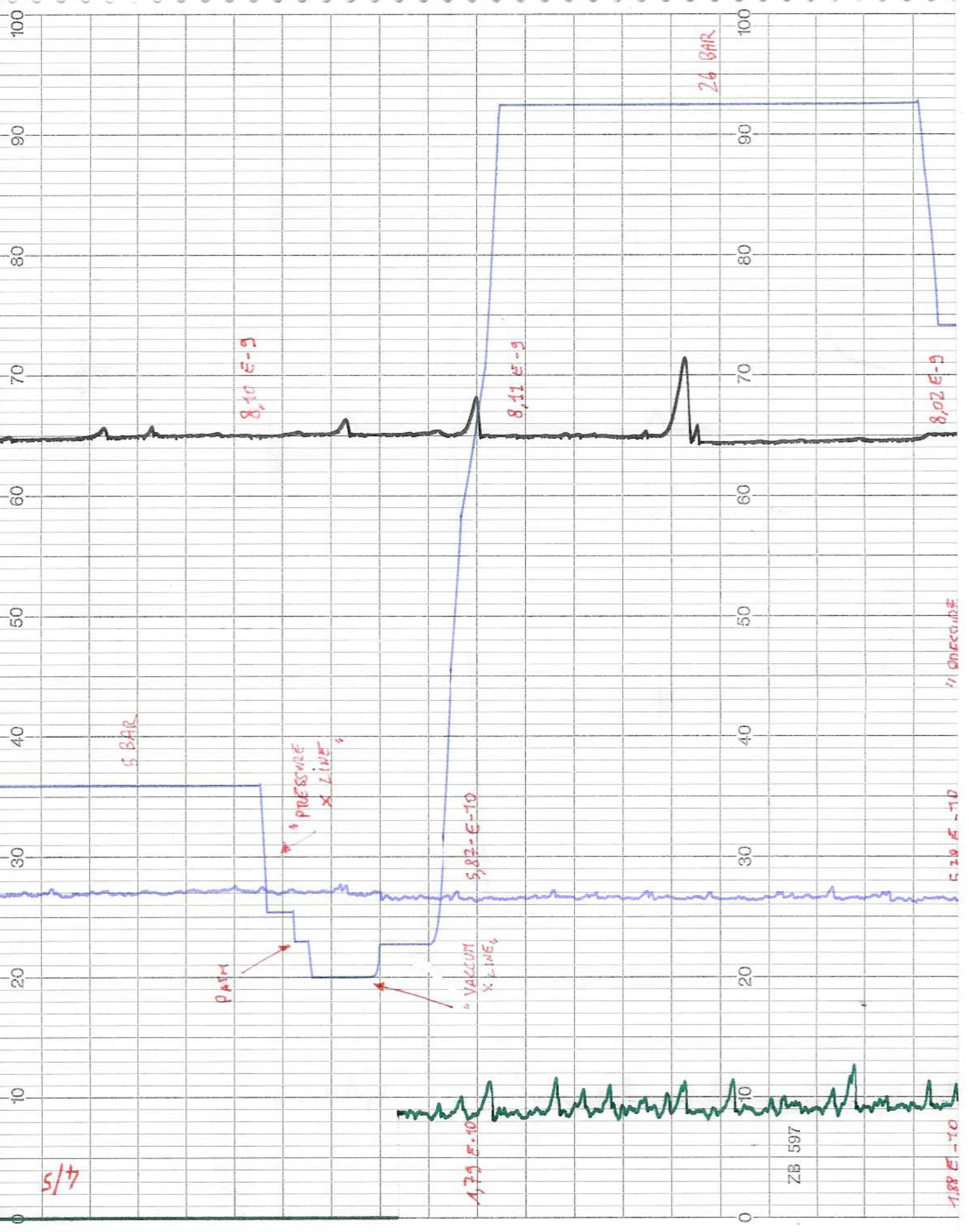
Test performed after welding of flange (Ø100) the capillary tube cold head, installed on the cold mass

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LEAK TEST COLD MASS M2034 (12-11-03) R. Pfeiffer



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5 BAR

8,10 E-9

8,11 E-9

26 BAR

8,02 E-9

PATH

PRESSURE X LINE

VACUUM X LINE

5,82 E-10

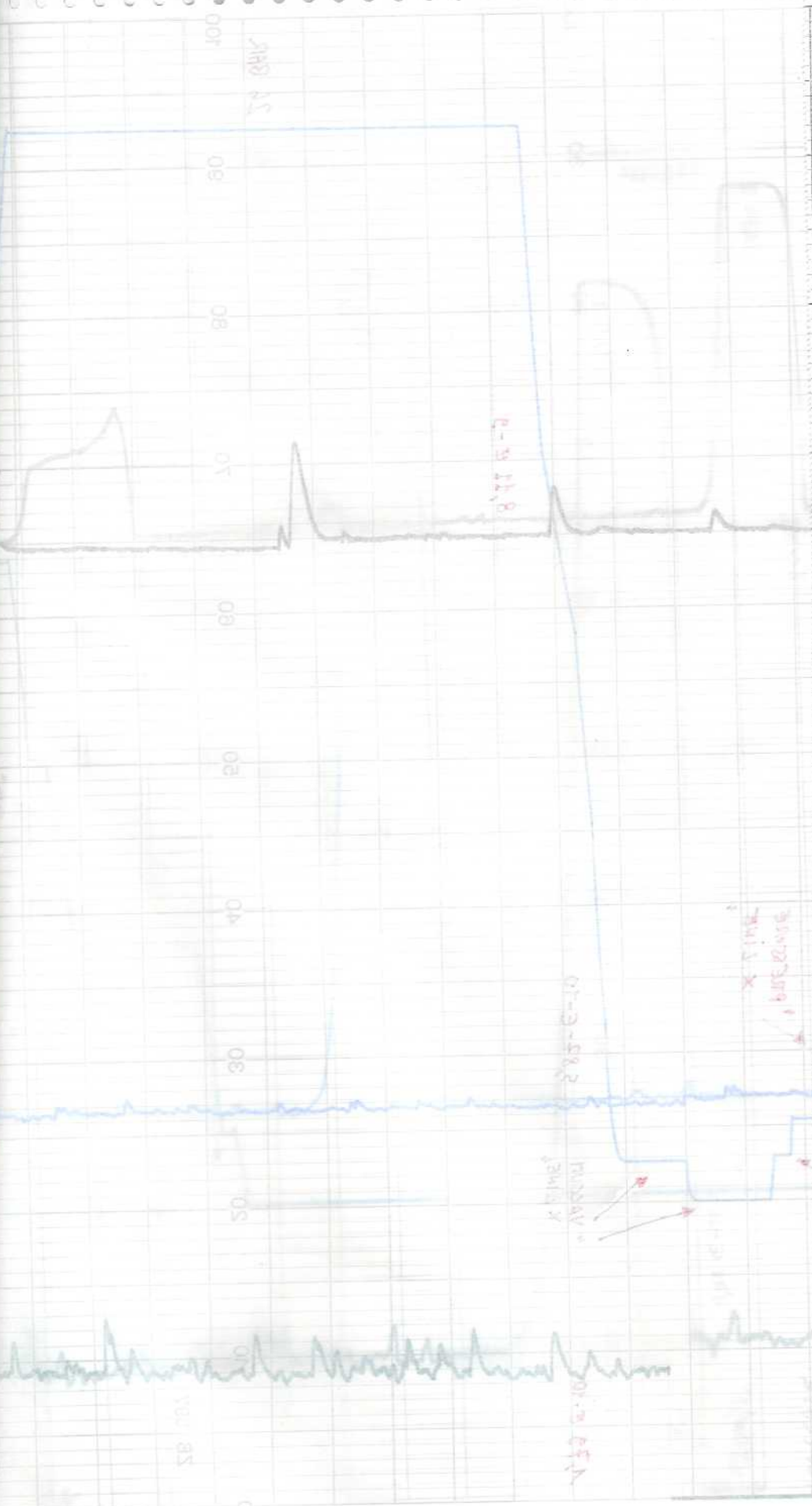
1,79 E-10

ZB 597

1,88 E-10

5,19 E-10

1/100 SECONDS



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