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MISSION OPERATIONS DEPARTMENT

HUYGENS

Huygens Mission Operational Report

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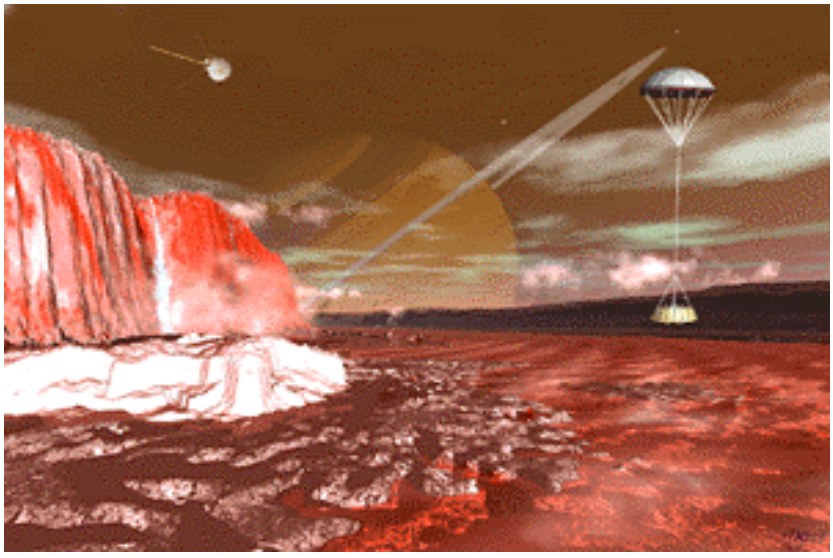

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Prepared by: HUYGENS Flight Control Team

Approved by: _____ Date 23-FEB-05

C. Sollazzo,
HUYGENS Mission Operations Manager,
Mission Operations Department, ESOC

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1. INTRODUCTION

1.1 EXECUTIVE SUMMARY

1.1.1 GOALS

The Huygens Probe is the ESA contribution to the joint ESA-NASA Cassini/Huygens interplanetary mission to deliver a combined Saturn Orbiter — ***CASSINI*** — and a Titan atmospheric Probe — ***HUYGENS*** — for scientific research to the Saturnian system. The Huygens System was designed to research chemical, electrical and physical properties and wind motion of the atmosphere of Titan, from a height of 159 km down to the surface, as well as some properties of the actual surface.

The nominal mission duration (i.e. the descent) was expected to be 135 minutes, with an uncertainty of circa 15 minutes due to uncertainty on the structure of the atmosphere. Should the Probe survive the impact with the solid or liquid surface, it was expected to continue transmitting data until the batteries were exhausted. Should its transmitting antenna be favourably oriented toward the Orbiter, data could be recorded until 70 min after the latest predicted touchdown, up to the point at which the link can no longer be maintained. Then, the Orbiter was to be reoriented to conduct Cassini Titan scientific activities and to transmit the recorded data to Earth.

1.1.2 MAIN EVENTS

Cassini/Huygens arrived at Saturn on 1st July 2004 and the Huygens Probe was released for entry in the atmosphere of Titan on Christmas Day, 25th December 2004. The Probe Mission was performed, as planned, from 06:50:45 (Probe Power On at 04:41:18) to 13:37:32 SCET/UTC on the 14th of January 2005. Owing to a commanding problem, Probe data were received on Cassini via transmission chain B only.

The Huygens data were received by the Cassini High Gain Antenna (HGA) and stored directly by the Cassini on-board Data System. Subsequently the Huygens data were downlinked by Cassini HGA to Earth at a distance of 1207 million kilometres (8.07 AU) from the Earth (OWLT = 67min 6secs) and 1354 million kilometres (9.05 AU) from the Sun (Earth-Sun angular separation of 1.24 degrees). The data were received by the ground stations of the NASA Deep Space Network (DSN) and forwarded to the JPL Telemetry Delivery Subsystem (TDS). The first incoming data set was Broadcast by JPL to the Huygens Probe Operations Centre (HPOC) from 15:24-18:00 UTC. During the Broadcast the Huygens engineering data were monitored by PIs and Engineering teams at HPOC via displays on the Huygens Monitoring and Control System (HMCS).

All Huygens data packets stored on-board Cassini were subsequently dumped to ground in multiple playbacks, after which a fully consolidated Huygens data set was retrieved by HPOC from the JPL TDS server and made available to the Engineering and Science teams as Stream 524.

1.1.3 RESULTS

The Huygens Mission was performed successfully and all available data was provided to the instrument teams within the planned time frame. Due to a commanding problem, which is now the subject of a Non-Conformance Report (ARTS1-HUY_NCR-1), no Probe data was received via Chain-A. The loss of Chain-A data was partially compensated by redundancy in the transmission of essential data on both chains. The loss of Chain-A Receiver data needed by the DWE experiment was mitigated by simultaneous measurements of the Probe Transmitter-A carrier frequency conducted by ground-based radio telescopes in the frame of the Very Long Baseline Interferometry experiment. With respect to the NCR both the Huygens Flight Control Team (FCT) and the Project Support Team reported that all the engineering systems and subsystems performed nominally.

The Probe's on-board Mission Timer Unit (MTU) powered on the probe approximately 4h 28min 56s before S_0, atmospheric entry detection by the Probe On-board Software POSW, (at 4:41:18 SCET/UTC). All three Central Accelerometers (CASUs) behaved nominally, detecting the deceleration loads from the Atmospheric Entry, Chute Deployment and Surface Impact events. The G-Switches also functioned nominally, detecting the entry into Titan's atmosphere 7 seconds before the POSW declared S_0 using the CASU values. The Radar digital processing stage for the probe platform indicated lock at 25km, but delivered only half the true altitude value. The Radar analogue signals delivered directly to the HASI instrument were successfully interpreted to derive the true altitude. From 16km downwards the Radar subsystem functioned correctly delivering the correct digital values for altitude, and lock was lost as expected, at 140m.

A total of 2 hours 27 minutes and 11 seconds worth of data was received from the Probe during the descent, along with 1 hour 12 minutes and 7 seconds worth of data while on the surface. Four copies of this data were recorded aboard Cassini and played back to Earth four times, resulting in a total of 16 copies of all the Huygens data being filed within the JPL Telemetry Data Server (TDS). These 16 datasets were subsequently retrieved by HPOC and analysed to ensure that all recorded packets had been downlinked correctly and, as a result, allow JPL to remove the write-protect flag from relevant areas of Cassini memory. A consolidated dataset then retrieved and made available to all of the Huygens teams.

All of the Probe packets transmitted during the descent via Chain B were received, correctly decoded and archived on-ground by the Huygens Mission Control System (HMCS). Almost all of the Probe packets transmitted from the surface via Chain B were received, correctly decoded and archived on-ground by the HMCS. However, just over 6 minutes worth of surface data were lost due to the weakening of the link, around 50 minutes after the landing event: 248 packets being severely corrupted by noise and 2 packets being completely lost at the Huygens receiver aboard Cassini. Using a post-processing Reed-Solomon tool for recovering Probe Packets another 9 Probe Super Packets were recovered and made available as Stream 538.

1.2 APPLICABLE DOCUMENTS

AD1 **Huygens User Manual (HUM):**

Description: HUY.AS/c.100.OP.0201, Issue 02

Operations: HUY.AS/c.100.OP.0384, Issue 01

AD2 **Spacecraft Data Operations Handbook (SDOH):**

DOPS-SMD-HUY-DB-004, Issue 1.0

AD3 **Flight Operations Plan (FOP): Vol. 4 Timelines, Book 17: Probe Mission Timeline**

DOPS-SMD-HUY-FOP-001, Issue 2.17

AD4 **Evaluation and Recovery of Data for the Cassini/Huygens Mission**

ESA/ESOC Contract 15054/01/D/HK, Dancode ApS, January 2002

AD5 **Probe Mission HPOC Data Quality Assessment**

HUY-MOC-MCS-TN-1003-OPS-OFH, Issue 1.0, January 2005

1.3 REFERENCE DOCUMENTS

RD1 **Huygens F14 Check-Out Operational Report**
HUY--OPS-RP-1003-OPS-OFH, Issue 1.0 – September 2004

(Referenced for a performance comparison of some TM Parameters during the Mission)

2. HUYGENS MISSION OVERVIEW

The Huygens Probe is the ESA contribution to the joint ESA-NASA Cassini/Huygens interplanetary mission aiming at the delivery of a combined Saturn Orbiter — ***CASSINI*** — and a Titan atmospheric Probe — ***HUYGENS*** — for scientific research to the Saturnian system. The Huygens Probe flew as a passenger of Cassini, the NASA spacecraft, to Saturn where it was released for entry in the atmosphere of Titan, the largest satellite of Saturn, on 25th December 2004. During the controlled descent phase, on-board experiments executed a very complex sequence of measurements to study the chemical and physical properties of this atmosphere. Also after impact, another experiment collected data to study Titan surface properties for a minimum time of three minutes and until the end of the Huygens Mission.

2.1 THE VOYAGE TO THE SATURNIAN SYSTEM

The Cassini/Huygens mission was launched by a Titan IV/Centaur rocket from Cape Canaveral on 15th of October 1997, on a journey of 10.7 years duration, which includes a 6.7-year flight time to Saturn and a 4-year orbital tour of the planet, its rings, satellites, and magnetosphere. The Cassini Orbiter mission control is under the responsibility of NASA/JPL. The Huygens Probe mission control is under the responsibility of ESA/ESOC. The data exchange with the Probe (TC, TM) is routed via the Cassini Mission Support Area (MSA) at JPL and uses the NASA Deep Space Network (DSN) facilities.

During the first two years of the 6.7-year interplanetary cruise phase, the Cassini/Huygens spacecraft performed three gravity-assisted manoeuvres, flying by Venus twice and flying by the Earth once. During the first 4.7 years of the cruise phase, spacecraft activities are limited to routine maintenance of the Orbiter engineering subsystems and scientific payload, Probe checkouts, and several radio science gravity wave experiments. For the Orbiter, cruise scientific activities began at Saturn Orbit Insertion minus two years, though some activities were performed during the fly-by of Jupiter in December 2000.

2.2 THE HUYGENS PROBE RELEASE

Upon Saturn arrival in June 2004, the spacecraft executed a Saturn Orbit Insertion manoeuvre. After this manoeuvre, Cassini initial orbital period around Saturn was about 152 days. Approximately 76 days after orbit insertion, the spacecraft executed a manoeuvre to raise its orbit periapsis and to target the combined Orbiter and Probe for Titan impact.

The Probe was released from the Orbiter 20 days before the third Cassini Titan flyby. Two days after Probe release, the Orbiter performed an Orbit Deflection manoeuvre to place itself into a trajectory flying over the Probe landing site, to allow collection of Probe descent telemetry data. In order to receive relay data from the Probe, the Orbiter pointed its high-gain antenna at the predicted Probe entry point on Titan.

2.3 THE COAST PHASE

After Probe release, there is no longer any possibility to send commands to Huygens from the ground; all Probe activities were, from then on, controlled by on-board autonomous event- and timer-driven sequences. During the coast phase the Probe was essentially dormant, with only a timer running. Shortly before the Probe was predicted to enter the atmosphere of Titan (i.e., ca. 7 hours prior to Titan surface touch-down), the timer initiated a sequence that applied power to the platform and its subsystems and scientific instruments.

2.4 THE ENTRY PHASE

The descent of the Probe through the atmosphere was controlled by parachutes and the aerodynamic conditions under which the main parachute should be deployed were critical. The correct instant was therefore determined by accelerometers, which monitored the deceleration as an indicator of Mach number. Pyrotechnic devices released the front shield and back cover and a pilot parachute pulled out the main parachute. During the entry phase, telemetry could not be transmitted by the Probe, so that a limited set of engineering housekeeping data was stored on-board the Probe for later transmission to the Orbiter. Subsequent events were determined by a software timer, initiated at the moment of parachute release, T_0. These events included establishment of the radio relay link for transmission of data back to the Orbiter for recording and later playback to Earth, switching on of further instruments, and replacement of the parachute by a smaller "stabiliser chute" to ensure that the Probe reached the surface of Titan within the design duration of the mission (150 minutes maximum for the descent, plus at least 3 minutes on ground). That duration was constrained by the capacity of the Probe batteries and by the changing geometry of the relay link as the Orbiter continued on its orbit about Saturn.

Critical functions like pyrotechnics, which could endanger the mission if executed prematurely, were protected by an independent hardware timer, which was initiated at a higher deceleration value a few seconds before T_0. In addition to the release of the front shield, back cover and parachutes, certain scientific instrument operations (mechanisms, heaters, surface lamp), which had to be inhibited during cruise checkouts, were also subject to this control. Other payload operations were controlled from the instruments themselves, using information about time and predicted or measured altitude provided to them by the Probe Command and Data Management Subsystem.

2.5 THE DESCENT PHASE

The nominal mission duration (i.e. the descent) was predicted to be 135 minutes, with an uncertainty of circa 15 minutes due to uncertainty on the structure of the atmosphere. The actual duration of the descent was 147min, thus within limits. The Probe survived the impact with the Titan surface, and continued thereafter to transmit data for more than 260mins as shown by the detection and monitoring of the Probe RF carrier signal by the Earth-based Very Long Baseline Interferometry experiment (VLBI).

During the Descent phase, the Probe radiated S-band Telemetry on the two redundant transmission Chains A and B, intended to be received by Cassini which had been oriented to point its high-gain antenna towards the Probe. Owing to a commanding problem, probe data were received by Cassini via Chain B only. The data were passed on to the S-band receiver located in the Probe Support Equipment (the part of the Huygens Probe system which remained attached to the Orbiter, once the Probe was released). Reception continued for 72min following the landing until Cassini passed beyond the Probe's local horizon.

The Huygens data were stored on-board Cassini by redundant solid-state recorders. Subsequently Cassini was re-oriented to point its antenna to Earth, and the Huygens data were downlinked by Cassini at an initial bit rate of 65 Kbps. The transmissions were received in a succession of passes by ground stations of the NASA Deep Space Network (DSN), and forwarded to the JPL Telemetry Delivery Subsystem (TDS), whence they were delivered to the Huygens Probe Operations Centre (HPOC) at the European Space Operations Centre (ESOC) for processing and distribution to the Science and Engineering teams. The Probe telemetry data were retained on-board the Orbiter until successful downlink had been confirmed by ESOC.

2.6 HUYGENS EXPERIMENTS

The Huygens Probe has been equipped with the following instruments:

Aerosol Collector and Pyrolyser (ACP): collects aerosols for chemical-composition analysis. After extension of the sampling device, a pump draws the atmosphere through filters to capture aerosols. Each sampling device can collect about 30 micrograms of material.

Descent Imager/Spectral Radiometer (DISR): takes images and makes spectral measurements using sensors covering a wide spectral range. A few hundred metres before impact, the instrument switches on its lamp in order to acquire spectra of the surface material.

Doppler Wind Experiment (DWE): uses radio signals to deduce atmospheric properties. The probe drift caused by winds in Titan's atmosphere should induce a measurable Doppler shift in the carrier signal. The swinging motion of the probe beneath its parachute and other radio-signal-perturbing effects, such as atmospheric attenuation, should also be detectable from the signal.

Gas Chromatograph and Mass Spectrometer (GCMS): a versatile gas chemical analyser designed to identify and quantify various atmospheric constituents. It is also equipped with gas samplers to be filled at high altitude for analysis later in the descent when more processing time is available, this design should smooth out the processing load of the instrument.

Huygens Atmosphere Structure Instrument (HASI): comprise sensors for measuring the physical and electrical properties of the atmosphere and an on-board microphone to send back sounds from Titan.

Surface Science Package (SSP): is a suite of sensors to determine the physical properties of the surface at the impact site and to provide unique information about its composition. The package includes an accelerometer to measure the impact deceleration, and other sensors to measure the index of refraction, temperature, thermal conductivity, heat capacity, speed of sound, and dielectric constant of the (liquid) material at the impact site.

3. PROBE MISSION

3.1 DESCRIPTION

The Huygens Probe Mission was carried out over the 14th January 2005. Figure 1 below illustrates the timeline of the relevant activities.

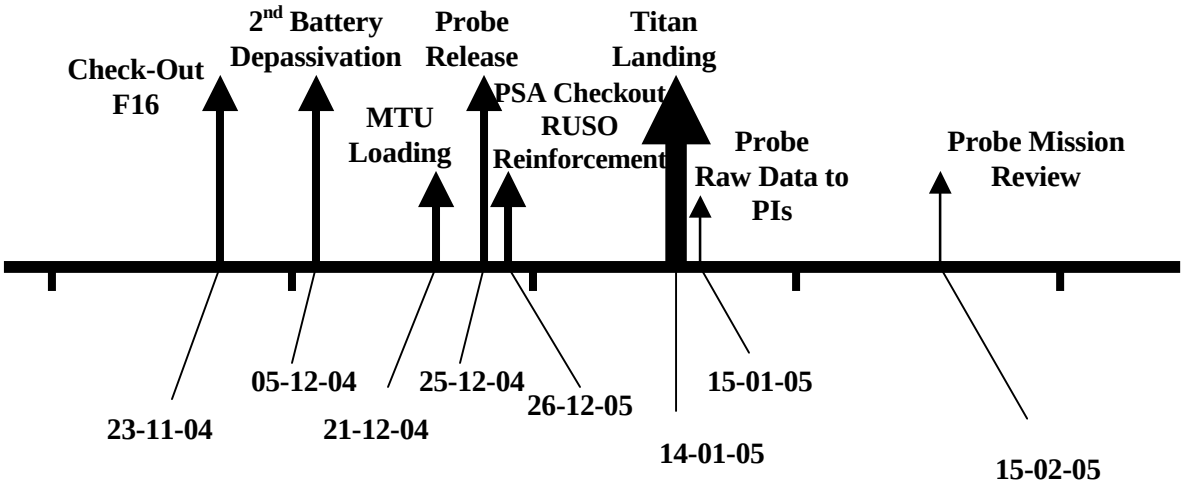


Figure 1: Probe Mission Timeline

The Probe was switched on by its on-board Mission Timer Unit at 04:41:18 SCET/UTC, being 4h 24m 30s before it arrived at the nominal Interface Altitude of 1270 km. Atmospheric Entry occurred at 09:08:00 SCET/UTC, with the maximum aerodrag deceleration and highest heat flux occurring at around 09:09:10 SCET/UTC. The Probe On-Board Software (POSW) correctly detected the Entry by the nominal method based on accelerometer data, and declared the S_0 event at 09:10:14 SCET/UTC. At S_0 + 6.375 seconds the Probe deployed the Pilot parachute which removed the Probe Top Cover, and then deployed the Main parachute. After a further 32.5s the Probe released the Heat Shield, and at 09:11:06 SCET/UTC the High Power Amplifier was switched on to establish the radio link to Cassini. Another 14min 15s later the Probe released the Main chute and deployed the Stabiliser chute for the remainder of the descent. The exact timing of these events is given in the timeline in Appendix 5.2.

The duration of the descent following S_0 was 2h 27min 57s, during which the Probe followed the nominal sequence of operation of the Payload defined by commands in the on-board Mission Timeline Table and the Arming Timer sequence of the POSW. The Probe survived the impact with the Titan surface, and continued thereafter to transmit data for at least 4h 20min as

shown by the detection and monitoring of the Probe RF carrier signal by the Earth-based Very Long Baseline Interferometry experiment (VLBI). It can be assumed that in effect the transmission was terminated by exhaustion of the Probe batteries. The Orbiter continued to receive the Chain B data for 1h 12 min 13s following the landing until it passed beyond the Probe's local horizon.

During the Descent phase, the Probe radiated S-band Telemetry at 2040 and 2090 MHz respectively on the two redundant transmission chains A and B. These signals were received by the Orbiter's High Gain Antenna (HGA) – the Orbiter was oriented for the purpose to point its antenna towards the Probe's expected landing site. The incoming signals were passed on to the two S-band receivers of the Probe Support Avionics (PSA) – the part of the Huygens Probe system that remained integrated with the Orbiter. Owing to a commanding problem (which is currently the subject of an NCR and further investigation) failing to switch on the USO receiver, the PSA receiver for Chain A did not lock on the RF carrier signal, and Probe data were received via Chain B only.

The Huygens data were stored in two redundant solid-state recorders (SSR) by the on-board Cassini Data System; two redundant copies of the data were held in separate partitions of each SSR. The data could not be immediately relayed to Earth as the Cassini High Gain Antenna was pointed towards the Probe, and thus away from Earth. Subsequently Cassini was re-oriented to point its antenna to Earth, and the Huygens data could then be downlinked. The Cassini downlinks were received in a succession of passes by ground stations of the NASA Deep Space Network (DSN), and forwarded to the JPL Telemetry Delivery Subsystem (TDS). For more details about the telemetry data processing see chapter 3.2.2.

The Probe Mission timeline is detailed in **Appendix 5.2**.

The probe mission went very smoothly and as planned. The results can be summarised as follows:

- The MTU wakeup of the probe functioned nominally.
- All the 47 commands automatically issued by the Probe On-Board Software Mission Time Tables have been verified.
- The Huygens Probe Experiments performed very satisfactorily.
- The receiver AGC on Chain B functioned nominally. Due to a commanding issue the PSA RUSO receiver on Chain A was not switched on and although the TUSO transmitter on the Probe were switched on no Probe Data could be received on Chain A.
- The power subsystem functioned nominally over the entire mission.

3.2 PROBE MISSION EXECUTION

3.2.1 COMMANDING AND TIMING

From the commanding point of view, the main characteristics of the Probe Mission can be summarised as follows:

3.2.1.1 Probe Mission Command Sequence

No Spacecraft Activity Sequence File was produced for the Probe Mission since the Probe cannot receive any telecommands after the separation with Cassini. Instead the Probe follows the on-board software Mission Timeline Table (MTT) and the Arming Timer sequence issuing automatic commands.

The necessary Spacecraft Sequence File (SSF) to turn on the PSA receiver on Cassini was produced by JPL and embedded in the Cassini Critical Sequence. Due to a commanding issue, which is now the subject of a Non-Conformance Report (ARTS1-HUY_NCR-1), the RUSO on Cassini was selected but not switched on causing the loss of Chain A data from the Probe.

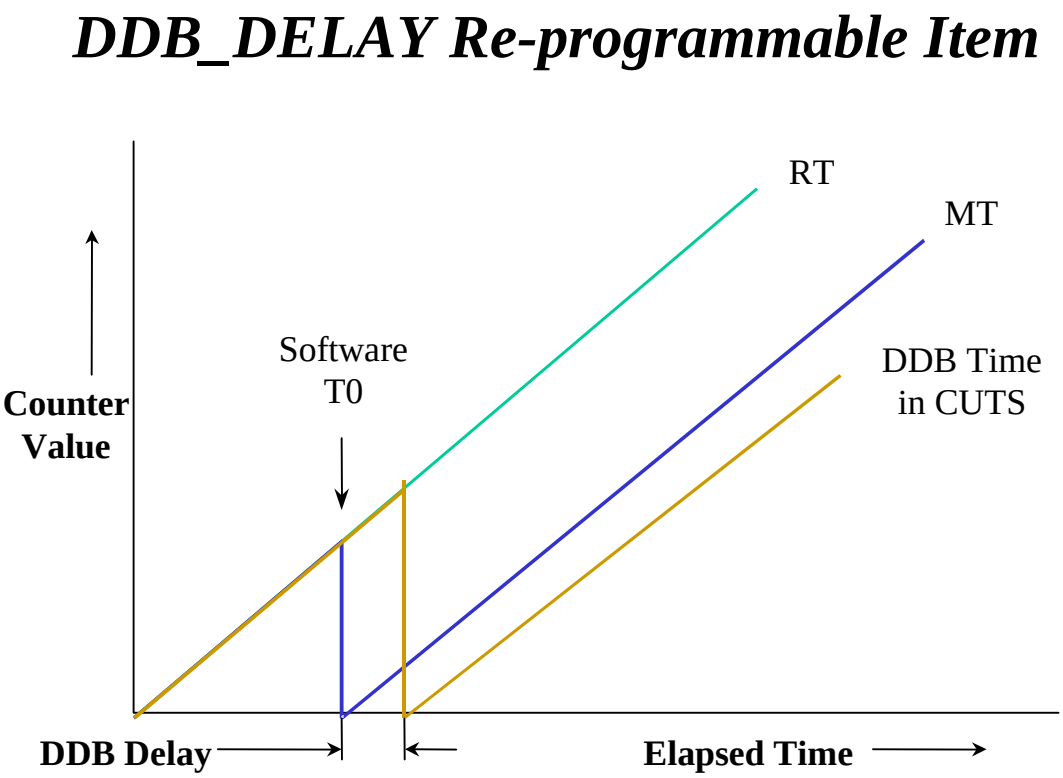
3.2.1.2 Probe Mission Timeline of Events

The full timeline of events can be found in Annex **Appendix 5.2**. The table below summarises the major events and how they are time-stamped in the various time reference frames used.

Packet Time (SCET/UTC)	**Activity**	**Probe On Relative Time (HH:MM:SS)**	**S0 Related Time**	**Mission Time (MT)**	**DDBT**
2005-014T04:41:18	**Wake Up Time**	-00:00:15	S0 -04:28:56	N/A	N/A
2005-014T04:41:33	**Probe On**	00:00:00	S0 -04:28:41	00:00:00	00:00:00
2005-014T04:41:48	Generic Event In Pre-T0 Phase (GCMS ON)	00:00:15	S0 -04:28:26	00:00:15	00:00:15
2005-014T06:50:45	**Start of Probe Mission: PSAs Power ON**	02:09:27	S0 -02:19:29	02:09:12	02:09:12
2005-014T09:10:14	**S_0 ("software T_0") Detection**	04:28:41	S0	00:00:00	04:28:41
2005-014T09:10:18	Generic Event In Post-T0 Phase (mission time less than the DDB_DELAY)	04:28:45	S0 + 00:00:04	00:00:04	04:28:45
2005-01409:10:25	Generic Event In Post-T0 Phase (mission time greater than the DDB_DELAY)	04:28:52	S0 + 00:00:11	00:00:11	00:00:05
2005-014T09:11:06	HPA ON	04:29:33	S0 + 00:00:51	00:00:51	00:00:45
2005-014T11:38:11	Surface Impact	06:56:38	S0 + 02:27:57	02:27:57	02:27:50
2005-014T12:50:24	Loss of Signal by Cassini	08:08:51	S0 + 03:40:10	03:40:10	03:40:03
2005-014T13:37:32	**End of Probe Mission: PSAs Power OFF**	**08:55:59**	**S0 + 04:27:18**	**04:27:18**	**N/A**

3.2.1.3 Time Correlation

The following graphic recalls the analytical relationship between the DDB time, the Mission Time and the Real Time since the beginning of mission execution.



3.2.2 HMCS OPERATIONS: TELEMETRY DATA PROCESSING

During the Probe Mission Cassini directed its High Gain Antenna (HGA) towards the predicted landing site of Huygens. The data transmitted by the Probe was collected by Cassini in four copies and were stored in its solid-state recorder (SSR), each within a specific partition (i.e. A4, A5, B4 and B5). Once stored, each partition was then downlinked to the ground four times, resulting in sixteen copies of the original set of packets being stored in the JPL Telemetry Data Server, which was then queried by the Huygens Mission Control System (HMCS), see Figure 2 below, in order to obtain local copies of the downlinked partitions for off-line analysis.

The Probe Mission broadcast data were received as relayed by Cassini via the High Gain Antenna to Earth via the Deep Space Network Ground Station at Canberra (DSS-15). Cassini was at a distance of 1207 million kilometres (8.07 AU) from the Earth (One Way Light Time = 67min 6secs) and 1354 million kilometres (9.05 AU) from the Sun, which gave an Earth-Sun angular separation of 1.24 degrees. The first probe data set was downlinked at 65 kbits/s from 15:24-18:00 SCET/UTC and received in Probe Relay mode at the Huygens Probe Operations Centre (HPOC). The broadcast data was processed by the HMCS as Stream 518. The incoming Broadcast was monitored in near-real-time by the Huygens Flight Control Team, and the on-site teams of the PI groups, Project and Prime. Only one DSN pass was necessary to downlink the first data partition, which contained 100% of the total amount Huygens data stored on Cassini during the mission. The data was received without a single packet lost over the Cassini-Earth link.

Following the broadcast the 15 remaining downlinks (four playbacks from each of the four redundant SSR memory partitions) were performed over three different DSN Stations – Canberra (DSS-43), Madrid (DSS-63) and Goldstone (DSS-14) – at the downlink rate of 142 kbps/s. For details of the data quality assessment of the downlinked partitions including the consolidated data set see [AD5].

Subsequently, a fully consolidated Huygens data set was retrieved by HPOC on 16th January from the JPL TDS server (the data were automatically selected by the TDS consolidation function from the dumped data sets) and made available to the Engineering and Science teams as Stream 524. The Instrument data were put onto the Huygens Data Distribution Server. Files of Engineering data parameter values were generated, and were put on the dedicated Huygens FTP Server ("PISA Servers") for engineering analysis by the Science and Engineering teams supporting the Mission. During the input of all TM data from the TDS Server, the HMCS performed in-line a first-level recovery of transmission errors in the Probe data, by means of the Reed-Solomon correction data included by the Probe in each Transfer Frame.

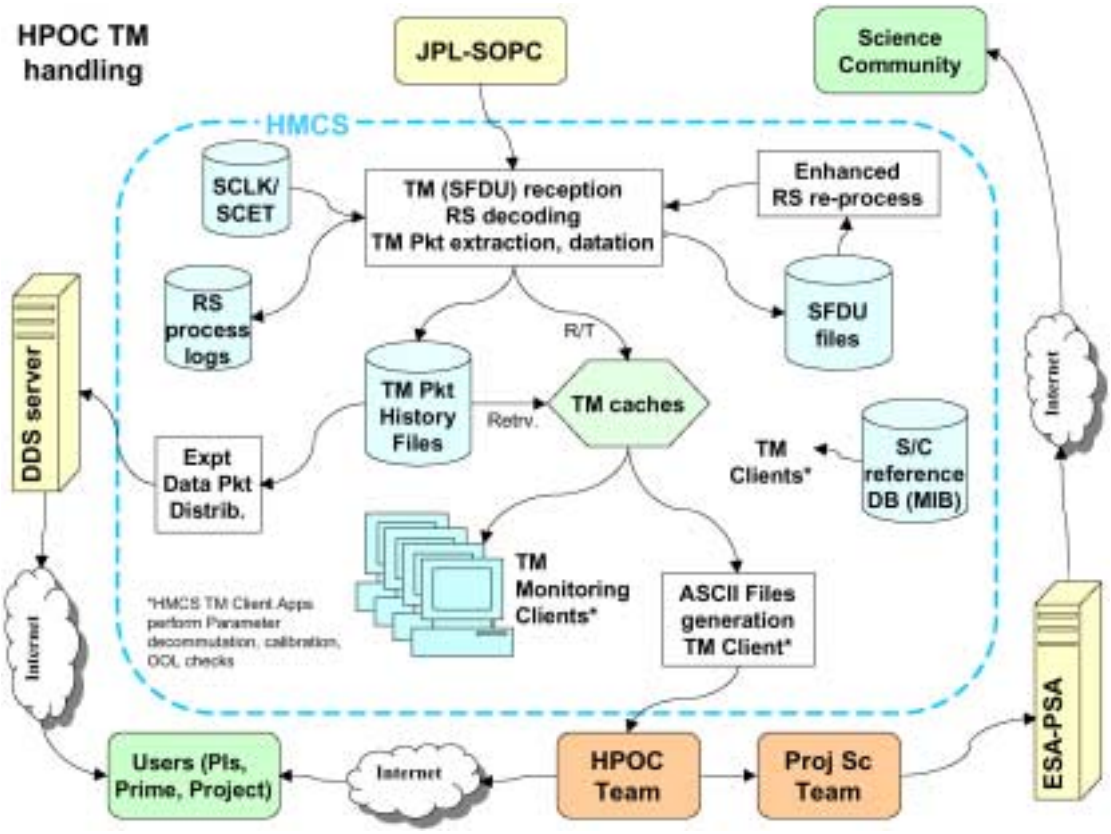


Figure 2. HPOC TM Handling.

The Probe Data contained 13086 Probe Super Packets on Chain B of which 248 failed RS decoding and 326 packets had to be corrected[1]. Another two Probe Super Packets were lost and replaced with PSE Dump Super Packets. The size of the Probe Mission data set transmitted by Cassini was approximately:

- 407 min 47 s of PSA HK or PSA Dump (1 pkt per second * 91 words per packet * 2 chains * 16 bits per word = 2912 bit/s): 8.9 Mbytes
- 407 min 47 s of PSA Dump Super Packets or Probe Superpackets (1 pkt per second * 516 words per packet * 2 chains * 16 bits per word = 16512 bit/s): 50.4 Mbytes

in total 59.2 Mbytes = 474.1 Mbits

Due to the commanding issue on Chain A the total Probe Mission Data, only retrieved on Chain B, was approximately:

- 218 min 8 s of Probe Super Packets B (1 pkt per second * 516 words per packet * 1 chain * 16 bits per word = 16512 bit/s): 13.5 Mbyte

Two further levels of Reed-Solomon correction were subsequently performed by an off-line application of HMCS, and resulted in the recovery of the data of a further 9 Probe Transfer Frames (from the respective Probe Superpackets). Details of the Reed-Solomon processing results are given in Sections 3.3.1.2and 3.3.1.3.

[1] Those packets, which failed Reed-Solomon decoding or were successfully corrected were associated with the link degradation between Huygens and Cassini, as explained in Section 3.4.1.2, which occurred more than 50 min after landing on Titan's surface when Cassini was approaching the Probe's local horizon..

3.2.3 DATA DISTRIBUTION & LOGISTICS

The HPOC configuration for the Probe Mission can be summarised as follows:

- 1 server workstation (huyg2) located in the Server room connected remotely through sun171 from the Huygens Dedicated Control Room. This is the third instance where the new, quicker Server has been used for Flight Operations.
- 1 server workstation (huylta) located in the Server room connected remotely through sun172 from the Huygens Dedicated Control Room. This is the second instance where the Operational Backup Server has been used for Flight Operations.
- 17 client workstations located in the Huygens MCR (14), PISA 1 (1), PISA 2 (1) and Portakabin 1 (1). 7 clients were connected to huyg2 and the rest to huylta.
- 2 main SOPC located in the Huygens Dedicated Control Room
- 1 NASCOM 384 kbps line used for data (no voice) exchange with JPL. For day-to-day operations the line was shared with ESA Integral Mission Operations, with 128kbps minimum guaranteed for Huygens. During the Huygens Mission operations, Integral did not use the line, and the full bandwidth was available to Huygens
- HPOC voice communications with JPL are via ISDN dial-up telephone

The Probe Mission TM Data was distributed as follows:

- **Science Data**: raw science data was made available to the Principal Investigators via the dedicated ESOC server once the first broadcast had been retrieved from the JPL archive on 14th January. The consolidated data set was made available on 16th January.

3.3 PROBE MISSION DATA COMPLETE ANALYSIS

3.3.1 OVERALL DATA RETURN

3.3.1.1 Summary

A summary of the overall Probe Mission data return is shown in the following table:

Packet	Created On-Board	Not Received or Incomplete	Received	Failed Reed-Solomon	Reed-Solomon Corrected	Available
Probe Sup A	N/A (*)	All	0	0	0	0
Probe Sup B	13088 (**)	2	13086	248	326	12838
PSE-A Housekeeping	24408	0	24408	N/A	N/A	24408
PSE-B Housekeeping	24404	0	24404	N/A	N/A	24404
Dump Sup A	24409	2 (***)	24407	N/A	N/A	24407
Dump Sup B	11320	3 (***)	11317	N/A	N/A	11317
Dump PSE-A	0	0	0	N/A	N/A	0
Dump PSE-B	0	0	0	N/A	N/A	0
Total Packets (Both Chains)	**97629 (100.000%)**	**7 (0.007%)**	**97622 (99.993%)**	**248 (0.254%)**	**326 (0.334%)**	**97374 (99.739%)**
Total Probe Packets* (Chain B)	**13088 (100.000%)**	**2 (0.015%)**	**13086 (99.985%)**	**248 (1.895%)**	**326 (2.491%)**	**12838 (98.090%)**

where:

Created On-Board: Telemetry packets actually produced by the Huygens Probe System;
Not Received or Incomplete: Telemetry packets that did not reach HMCS because they were either not received or were detected as being incomplete
Received: Telemetry packets that reached HMCS (*Received + Not Received or Incomplete = 100%)*
Failed Reed-Solomon: Probe Super Packets that failed the Reed-Solomon checking performed by HMCS
Reed-Solomon Corrected: Probe Super Packets affected by Reed-Solomon errors but corrected by HMCS
Available: Telemetry packets that have actually been processed by HMCS for telemetry monitoring. *(Available = "Received" – "Failed Reed-Solomon").*
Total Packets: Counted at source/super-packet level

(*) No probe data was received on the A Chain due to a commanding problem.

(**) Values include Probe Frames not received by PSA because receiver was unlocked – they differ from the Source Sequence Counter (SSC) values reported in Section 5.3 because the SASW creates Probe Super Packets from the received Probe Frames and then writes the SSC within the header, so the first Probe Super Packet has SSC=1

(***) First received Dump Super-packet is labelled 3 on Chain A and 4 on Chain B (initialisation effect).

3.3.1.2 Reed-Solomon Analysis

The summary of the Reed-Solomon errors detected and corrected in the incoming data "on the fly" by HMCS is shown in the following table:

Data Stream	Received Probe Sup	Failed Reed-Solomon	Reed-Solomon Corrected Packets
524	• 0 (SUP-A) • 13086 (SUP-B) • 13086 (Total)	• 0 (0%) (SUP-A) • 248 (1.895%) (SUP-B) • 248 (1.895%) (Total)	• 0 (SUP-A) • 326 (SUP-B) • 326 (Total)

where:

Data Stream: It identifies the HMCS data set containing all the received Probe Mission data
Received Probe Sup: Super-packets which reached HMCS
Failed Reed-Solomon: Telemetry packets which failed the Reed-Solomon checking performed by HMCS
Reed-Solomon Corrected Packets: Telemetry packets affected by Reed-Solomon errors but corrected by HMCS

All the Reed-Solomon failures and corrections on Chain B can be explained:

Two periods of link degradation occurred before the link to Cassini was lost at 12:50:24 (T_{Titan}+1h 12min 13sec). The link degradation corresponds to the expected performance of the Cassini-Huygens link.

During the first link degradation period the first Reed-Solomon corrected packet occurred at T_{Titan}*+47min 24sec (12:25:45) and the last Reed-Solomon corrected packet occurred at T_{Titan}+55min 59sec (12:34:17). The first period of Reed-Solomon failed packets occurred roughly between T_{Titan}+50min 36sec (12:28:54) and T_{Titan}+53min 51sec (12:32:09) resulting in the loss of 168 Probe Superpackets – at one instance one Probe Super packet was replaced with a Dump Super packet (T_{Titan}+52min 55sec).

Within the second link degradation period the first Reed-Solomon corrected packet occurred at T_{Titan}+1h 07min 06sec (12:45:24) and the last Reed-Solomon corrected packet occurred at T_{Titan}+1h 9min 43sec (12:48:01). The second period of Reed-Solomon failed packets occurred between T_{Titan}+1h 09min 20sec (12:47:38) and T_{Titan}+1h 10min 56sec (12:49:14) resulting in the loss of 82 Probe Superpackets – at one instance one Probe Super packet was replaced with a Dump Super packet (T_{Titan}+1h 10min 49sec).

The detailed list of Reed-Solomon errors and missing packets is given in **Appendix 5.5.**

* T_{Titan} represents the time that the Huygens probe detected the landing on the Titan surface.

3.3.1.3 Reed-Solomon Recovery

To recover some of the failed Reed-Solomon decoded packets the first two levels of the DanCode Tool [AD4] was used to re-process in an offline post-processing stage the consolidated data stream as received from JPL. The first level, HuyDec1, recovered 8 Probe Super packets while the second level, HuyDec2, only recovered one additional Probe Super Packet. Compared to the total number of 248 failed Reed-Solomon decoded packets this nine recovered packets (see detailed table below) only represents 3.6% of the failed packets. The reason for this low result is probably the very high number of bits corrupted (more than 64 bits) in the failed packets, that is they are all within periods of a very low link budget. Further processing of individual science packets is possible, e.g., using HuyDec3, since most of the PI's have included internal error detection codes within their packets. The resulting data stream from HuyDec1 and HuyDec2 was made available as Stream 537 and 538.

SCET/UTC	**SSC/ SCLK**	**Recovered HuyDec1**	**Recovered HuyDec2**	**Recovered Packets**
12:28:54.471	11868/ 1484398500.254	4 erasures 64 bits corrected		6 DISR, 1 GCMS
12:29:02.471	11876/ 1484398508.062	4 erasures 65 bits corrected		5 DISR, 1 GCMS, 1 SSP
12:29:07.471	11881/ 1484398513.102	4 erasures 62 bits corrected		5 DISR, 1 GCMS, 1 SSP
12:29:09.471	11883/ 1484398515.118		4 erasures 60 bits corrected	4 DISR, 2 GCMS, 1 HK1
12:31:39.470	12032/ 1484398665.038	4 erasures 64 bits corrected		6 DISR, 1 GCMS
12:32:09.470	12062/ 1484398695.022	4 erasures 59 bits corrected		4 DISR, 1 GCMS, 1 SSP, 1 HK2
12:47:38.464	12991/ 1484399624.030	4 erasures 61 bits corrected		6 DISR, 1 GCMS
12:47:50.464	13003/ 1484399636.126	4 erasures 63 bits corrected		6 DISR, 1 GCMS
12:47:56.464	13009/ 1484399642.174	4 erasures 57 bits corrected		4 DISR, 1 GCMS, 1 SSP, 1 HASI
Total Recovered Packets	46 DISR packets, 10 GCMS packets, 4 SSP packets, 1 HASI packet, 1 HK1 packet, 1 HK2 packet			

3.3.1.4 Missing Huygens Packets Analysis

The complete list of the missing packets is provided in **Appendix 5.5**.

- **Probe Super-Packets – Chain A (APID = 1947)**

Due to a commanding issue no Chain A Probe super-packets were received.

- **Probe Super-Packets – Chain B (APID = 1979)**

Apart from the above-mentioned Reed-Solomon errors, there were two missing Chain B Probe super-packets replaced by PSE Dump Super packet at T_{Titan}+52min 55sec (12:31:14) and T_{Titan}+1h 10min 49sec (12:49:07).

- **PSE Dump Super-Packets – Chain A (APID = 1935)**

2 PSE Dump Super-Packets were not received at the start of the data stream. This is an SASW initialisation effect and has occurred on all previous checkouts.

- **PSE Dump Super-Packets – Chain B (APID = 1967)**

3 PSE Dump Super-Packets were not received at the start of the data stream. This is an SASW initialisation effect and has occurred on all previous checkouts.

3.3.1.5 Missing Probe Packets Analysis

Analysis of the Source Sequence Counters (SSC) of those packets contained within the Probe Frames (i.e. the Probe Super-Packets) shows that the following were missing. Due to a commanding issue no Chain A Probe super-packets were received hence the missing probe packets analysis can only be performed on chain B.

- **CDMU Report packets – Chain B (APID = 1961)**

The first 3520 CDMU Report packets (SSC 0-3519) were not transmitted to ground and the SSC began at 3520. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was in-lock and so were not received by the PSA (see explanation of receiver lock status in Section 3.4.5) or were replaced by experiment packets.

1 CDMU Report packet was reported missing at the time of the first link loss after more than 50min on Titan surface (between 12:26:22 and 12:35:39).

[NOTE: Similar losses have been observed on all previous checkouts due to the loss of receiver lock, as reported in Section 3.4.5]

- **CDMU Housekeeping 1 – Chain B (APID = 1957)**

The first 1010 CDMU HK1 packets (SSC 1-1010) were not transmitted to ground and the SSC began at 1011. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was turned on and in-lock and so were not received by the PSA.

11 CDMU Housekeeping 1 packets (SSC 1753-1763) were lost due to link degradation after more than 50 min on Titan surface (between 12:28:45-12:31:56 Huygens SCET/UTC).

- **CDMU Housekeeping 2 – Chain B (APID = 1958)**

The first 1010 CDMU HK2 packets (SSC 1-1010) were not transmitted to ground and the SSC began at 1011. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was turned on and in-lock and so were not received by the PSA.

11 CDMU Housekeeping 2 packets (SSC 1754-1764) were lost due to link degradation after more than 50 min on Titan surface (between 12:29:06-12:32:16 Huygens SCET/UTC).

- **CDMU Housekeeping 3 – Chain B (APID = 1975)**

The first 1010 CDMU HK3 packets (SSC 0-1009) were not transmitted to ground and the SSC began at 1010. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was turned on and in-lock and so were not received by the PSA.

10 CDMU Housekeeping 2 packets (SSC 1753-1762) were lost due to link degradation after more than 50 min on Titan surface (between 12:28:54-12:31:48 Huygens SCET/UTC).

- **CDMU Housekeeping 4 – Chain B (APID = 1976)**

The first 986 CDMU HK4 packets (SSC 0-985) were not transmitted to ground and the SSC began at 986. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was turned on and in-lock and so were not received by the PSA.

11 CDMU Housekeeping 4 packets (SSC 1728-1738) were lost due to link degradation after more than 50 min on Titan surface (between 12:22:18-12:25:28 Huygens SCET/UTC).

- **GCMS packets – Chain B (APID = 1952)**

The first 8927 GCMS packets (SSC 0-8926) were not transmitted to ground and the SSC began at 8927. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was turned on and in-lock and so were not received by the PSA.

A total of 199 GCMS packets (SSC 4693,4699,4702-4703,4705-4707,4709-4711,4714-4715,4717,4720-4886,4889-4894,4900,4904,4911,5921,5932-5939,5941) were lost due to link degradations after more than 50 min on Titan surface (between 12:28:25-12:32:02 & 12:47:29-12:47:49 Huygens SCET/UTC).

- **HASI packets – Chain B (APID = 1969)**

The first 1723 HASI packets (SSC 0-1722) were not transmitted to ground and the SSC began at 1723. These packets were incorporated within Probe Frames that were generated before the Chain B receiver was turned on and in-lock and so were not received by the PSA.

At least 1 HASI packet (SSC 2) was lost due to link degradations after more than 50 min on Titan surface (between 12:29:04-12:31:47 Huygens SCET/UTC). [Due to the applied pre-heating patch HASI keeps resetting itself approximately every 30 sec after more than 32 min on Titan surface (after 12:10:32), hence more packets may have been lost after this event that cannot be traced by HPOC.]

- **SSP packets – Chain B (APID = 1972)**

A total of 86 SSP packets (SSC 6073,6075,6077-6079,6081,6085-6086,6088-6159,6161-6162,6165,6169,6625-6626) were lost due to link degradation after more than 50 min on Titan surface (between 12:28:47-12:32:02 & 12:47:39:12:47:49 Huygens SCET/UTC).

- **DISR packets – Chain B (APID = 1970)**

A total of 871 DISR packets (SSC 5163-5168,5190-5194,5205-5215,5221-5234,5240-5248,5263-5272,5278-5281,5291-6012,6017-6046,6072-6077,6092-6096,6122-6125,10706-10711,10760-10794,10801-10804) were lost due to link degradation after more than 50 min on Titan surface (between 12:28:45-12:32:02 & 12:47:29:12:47:49 Huygens SCET/UTC).

3.3.2 HUYGENS PROBE SYSTEM

During the Probe Mission the Huygens Probe System performed nominally.

3.3.2.1 TC/TM correlation

A brief description of Probe Mission system level main events (as observed) is reported in the following table:

Event	**Results**
Probe-ON at S_0 – 04:28:41	As expected
PSA-ON at S_0 – 02:19:29	As expected
T_0 Detection	As expected
47 Automatic POSW MTT Commands Executed	As expected (only verifiable on Chain B)
PSA-OFF at S_0 + 04:27:17	As expected
Probe Power depletion	Unknown (Longer life time than expected)

Moreover, the Probe Mission timeline [AD3] has been compared step by step with the generated telemetry stream: all the values are as expected in the Timeline.

3.3.2.2 Analogue Parameters

The plots relevant to the Huygens Probe System behaviour are provided in **Appendix 5.7.1.**

They have been compared to the similar printouts of the previous in –flight checkouts (e.g. F1 F16). The few notable differences are reported with respect to the appropriate sub-systems in the subsequent parts of Section 3.4.

3.3.2.3 Status Parameters

All other status values (not represented as "pseudo-analogue" parameters in the series of plots mentioned above) have been compiled in Status Files. The Status Files are automatically generated from the Probe Mission dataset, by extracting the first and last values of each status parameter, and all the intermediate values when the status has changed.

The resulting ASCII files have been analysed and cross-correlated to the sequence of events during the checkout. The remaining singularities (unexpected status changes) are reported in the relevant sub-system section.

3.3.3 COMMAND & DATA MANAGEMENT SUBSYSTEM (CDMS)

The CDMS performed nominally during the Probe Mission.

The plots relevant to the CDMS behaviour are provided in **Appendix 5.7.2.**

All three Central Accelerometers (CASUs) behaved nominally detecting the Entry. They all also detected the Chute deployment and Surface Impact. The G-Switches was also functioning nominally detecting the entry of the Titan atmosphere.

The Radial Accelerometers (RASUs) detected a Probe Spin Rate of circa 7.5 rpm at entry. After surface impact the spin rate read a fixed value of 2.2 rpm indicating that the probe landed slightly tilted on the surface.

The Radar digital processing stage for the probe platform indicated lock at 25km, but delivered only half the true altitude value. The Radar analogue signals delivered directly to the HASI instrument were successfully interpreted there to derive the true altitude. From 16km downwards the Radar subsystem functioned correctly delivering the correct digital values for altitude, and lock was lost as expected, at 140m.

3.3.3.1 MTU Wakeup

The MTU woke up the Probe as expected after a cruise phase of exactly 20 days 2h 41min. The Probe was woken up 4h 28 min 56s before detection of the S_0 event.

3.3.4 ELECTRICAL POWER SUBSYSTEM (EPSS)

The EPSS performed nominally during the Probe Mission, with the Chain B telemetry indicating healthy voltages for Battery 3, 4 and 5 of over 71V during the entire descent phase and throughout the 72 minutes worth of the surface phase for which telemetry was available.

No problems were identified.

The plots relevant to the EPSS behaviour are provided in **Appendix 5.7.3.**

3.3.5 PROBE DATA RELAY SUBSYSTEM (PDRS)

The PDRS performed nominally during the Probe Mission but due to a commanding issue regarding the Cassini RUSO receiver no Probe Data was received on Chain A. However, the TUSO transmitter signal was observed functioning nominally on Earth via the Green Bank radio telescope. System lock on chain B was achieved correctly.

The plots relevant to the PDRS behaviour are provided in **Appendix 5.7.4.**

→ OBSERVATION: Chain B locked directly at carrier, sub-carrier and bit synchroniser levels at the turn-on of the Probe transmitter at 09:11:00 (power-on of the High Power Amplifier via an arming timer command) and Probe data was received until 12:25:35 without any RS corrections. Due to link degradation after more than 46 min on Titan's surface, when Cassini was approaching the Probe's local horizon, the bit synchroniser level switched between locked and unlocked in two intervals between 12:24:28 to 12:36:11 and between 12:43:32 to 12:49:57. The subcarrier lock was lost at 12:50:03 and finally the carrier was lost at 12:50:18.

→ OBSERVATION: The PSA counter for Frame Data Interrupt Start ("FDI" Parameter A2011W), showed behaviour during the Mission that was different from its typical behaviour during Flight Checkouts. The behaviour can be seen in the plot of GRD W118P in Section 5.7.7

Parameter A2011W is a measure of the time delay between

- the Frame Data Interrupt signalled by the PSA receiver on detection of the start of each arriving Probe Transfer Frame, and
- the **preceding** RTI (Cassini 8 Hz timing pulse to the SASW)

The value of A2011W includes some PSA software interrupt response delays that can be assumed fixed. What is of interest is the variation of A2011W over time.

In Checkouts, the behaviour of Parameter A2011W simply reflected the small drift in frequency of the Probe RTI locally generated by each CDMU, vs. the highly stable frequency of the PSA RTI clock from the Cassini clock circuitry. A typical example is shown in the F14 Checkout Report [RD1]. The observed small continuously increasing rate of change of A2011W reflects a slight slowing of the Probe CDMU TM (bitrate) clock frequency over the 6hr 20 min period of the Checkout, which is probably a thermal effect. This assumes that any variation of the Cassini clock frequency, and hence the PSA RTI frequency, is negligible over that period.

During the Mission, the evolution of the rate of change A2011W was markedly different. Initially A2011W showed a decreasing trend that flattened out to a minimum after about 1 hour. Thereafter the trend was increasing at a slowly accelerating rate, until it "wrapped" to zero at 12:02:46 SCET/UTC. The "wraparound" indicates the point where the Probe Transfer Frame arrived virtually simultaneously with the occurrence of a PSA RTI. Thereafter the A2011W value continued to increase at a slowly accelerating rate, approximately consistent with the behaviour during Flight Checkouts.

It is assumed that the reason for the observed difference in behaviour of A2011W during the Mission (first a negative trend, then a minimum, then a positive trend) was the varying distance between the Probe and Cassini during the period of Probe data reception – a kind of "Doppler effect" on the observed rate of arrival of Probe Transfer Frames at Cassini.

3.3.6 THERMAL CONTROL SUBSYSTEM (THSS)

The THSS performed nominally during the Probe Mission.

No problems were identified but the internal temperatures were between 8-12 degrees higher than predicted.

The plots relevant to the Huygens Probe temperatures are provided in **Appendix 5.7.5.1.**

The plots relevant to the Cassini temperatures are provided in **Appendix 5.7.5.2.**

→ OBSERVATION: Due to the loss of Chain A Probe data some of the temperature, including the PCDU temperature which is the normal reference sensor for the internal Probe temperature on previous checkouts, sensors were lost. However, looking at the internal CDMU temperature it ranges from 24 to 16 degrees C during the complete mission.

3.3.7 EXPERIMENTS

3.3.7.1 ACP

The ACP performed nominally during the Probe Mission.

ACP was correctly powered on at 09:10:51 SCET/UTC (S_0+37.125s) and was switched off at 11:00:20 SCET/UTC (S_0+1h 50min 6.375s). All packets produced have been correctly received. Due to the redundancy of the data no data was lost due to the loss of chain A.

No problems were identified.

The plots relevant to the ACP behaviour are provided in **Appendix 5.7.6 and 5.7.3.**

3.3.7.2 DISR

The DISR performed nominally during the Probe Mission, with the surface lamp being switched on, as expected, around 400m above the surface.

DISR was correctly powered on at 09:11:40 SCET/UTC (S_0+1min 26.375s) and stayed powered on throughout the mission. All packets produced have been correctly received on Chain B until the link degradation occurred. Due to the loss of probe data from Chain A and the fact that not all imaging data was redundant on both chains about half of the images were lost.

No problems were identified on the probe platform level regarding the instrument; however; DISR reported problems with their internal sun sensor and the pendulum and rotational motion of the Probe.

The plots relevant to the DISR behaviour are provided in **Appendix 5.7.6 and 5.7.3.**

3.3.7.3 DWE

Both of the Ultra-Stable Oscillators (USOS) for the DWE were selected during the Probe Mission and the TUSO was powered on at 04:41:34 SCET/UTC (S_0-4h 28min 40.375s) and showed a nominal behaviour. However, due to a commanding problem on Cassini that resulted in the RUSO not being powered on, the Chain A link could not be established. The signal was although received successfully on Earth via the array of radio telescopes involved in the Very Long Baseline Interferometer (VLBI) experiment. For more details see **Appendix 5.5.**

The plots relevant to the DWE behaviour are provided in **Appendix 5.7.4.**

3.3.7.4 GCMS

The GCMS performed nominally during the Probe Mission. The response of the instrument was as expected.

GCMS was correctly powered on at 04:41:48 SCET/UTC (S_0-4h 28min 26.250s) and stayed powered on throughout the mission. All packets produced after the Probe High power transmitters were powered on have been correctly received on Chain B until the link degradation occurred. Due to the redundancy of the data no data was lost due to the loss of chain A.

No problems were identified on the probe platform level regarding the instrument

The plots relevant to the GCMS behaviour are provided in **Appendix 5.7.6 and 5.7.3.**

3.3.7.5 HASI

The HASI performed nominally during the Probe Mission.

HASI was correctly powered on at 04:59:18 SCET/UTC (S_0-4h 10min 56.250s) and stayed powered on throughout the mission. Due to the applied preheating patch it was, as designed, resetting itself between S_0-12min 41.375s and S_0-12min 13.500s to clear its telemetry buffers before the start of the Probe Mission. All packets produced after the Probe High power transmitters were powered on have been correctly received on Chain B until the link degradation occurred. Due to the loss of probe data from Chain A some data that was not redundant on both chains were lost. HASI's software forces it to continuously reset itself when the DDB time is greater than 3:00:00, which means that HASI only gathered approximately 30 min of surface data.

No problems were identified on the probe platform level regarding the instrument

The plots relevant to the HASI behaviour are provided in **Appendix 5.7.6 and 5.7.3.**

3.3.7.6 SSP

The SSP performed nominally during the Probe Mission.

SSP was correctly powered on at 09:11:10 SCET/UTC (S_0+55.625s) and stayed powered on throughout the mission. SSP successfully switched into the required modes at the desired descent phases and was able to detect the surface impact in the correct high-resolution sensor mode. All packets produced have been correctly received on Chain B until the link degradation occurred. Due to the redundancy of the data no data was lost due to the loss of chain A.

No problems were identified on the probe platform level regarding the instrument.

The plots relevant to the SSP behaviour are provided in **Appendix 5.7.6 and 5.7.3.**

3.3.8 SUPPORT AVIONICS SOFTWARE (SASW)

The SASW performed nominally during the Probe Mission and no packets were lost from the Probe that could be detected in the receiver. The SASW correctly created Dump Super Packets on Chain A to replace all the lost Probe data on Chain A. On Chain B two Dump Super Packets also replaced two unrecognisable Probe Super Packets during the link degradation period between Cassini-Huygens.

No problems were identified.

The plots relevant to the SASW behaviour are provided in **Appendix 5.7.7.**

No memory dumps were taken from the SASW RAM or EEPROM.

3.3.9 PROBE ON-BOARD SOFTWARE (POSW)

The POSW performed nominally during the Probe Mission.

The POSW was operating in pre-heating mode as expected due to the fact that the Probe was woken up by the Mission Timer Units 4h 28min 56s before S_0 as expected. The Probe Platform behaviour shows that both Probe CDMU's were fully operational 15s later as expected. All 47 Automatic POSW MTT Commands were successfully executed (only verifiable in Telemetry on Chain B). Through Instrumentation telemetry it could also be determined that the Chain A was healthy software wise since all instruments used this chain as their primary chain.

Since the transmitters were not turned on until S_0+51s, no telemetry was received before (except the buffered HK4 packets containing only CASU & G-switch data) and hence only the exact timings of the last 21 Automatic POSW MTT commands could be verified. However, the rest of the commands are indicated by the events detected in the CASU readings such as the parachutes release and deployment and the front shield mechanism jettison. Also the correct operation of the instruments turned on before the high power transmitter can be verified from the power readings behaviour.

No problems were identified.

The plots relevant to the POSW behaviour are provided in **Appendix 5.7.8.**

No memory dumps were taken from the POSW RAM or EEPROM.

3.4 FLIGHT OPERATIONS CONFIGURATION CONTROL

The complete set of Probe Mission Configuration Control Tables is composed of the following reports:

- **Probe Platform and Instrument Software CIDL:** Description of the Probe Platform and Instrumentation Software configuration (CIDL) history through all in-flight checkouts.
- **Probe Mission Report**: Identifiers of telecommands, telemetry and timing files.
- **Data Streams Report** (1 stream only for Probe Mission): Identification of available and lost telemetry packets.

It is contained in **Appendix 5.3**.

The software release 8.2.1p1 – including a specific MVDA patch – of Huygens Mission Control System (HMCS) was used during the Probe Mission and to produce the post processed data.

4. ANOMALIES

4.1 GROUND ANOMALIES

4.1.1 JPL

None

4.1.2 ESOC

None

4.2 PROBE MISSION ON-BOARD ANOMALIES

One anomaly was raised as a result of the Loss of Chain A during the Probe Mission.

4.3 SUMMARY OF ON-BOARD ANOMALIES

Anomaly	Detected	Status	Remarks
HANF01n1	F1	Closed	Closed by Huygens AGC Anomaly Investigation Team Report (PY/050/CMC, 23 July, 1998).
HANF01n2	F1	Closed	Closed by Huygens AGC Anomaly Investigation Team Report (PY/050/CMC, 23 July, 1998).
HANF01n3	F1	Closed	Long-term behaviour of DWE/USOs needs to be understood to assess impact on the Mission Phase. Closed during the F16 Checkout Review, 3rd December 2004.
HANF01n4	F1	Closed	Loss of one command at the level of GCMS.
HANF03n1	F3	Closed	EEPROM status to be monitored during future checkouts.

5. APPENDICES

5.1 MISSION PARAMETERS

This appendix details all parameters related to the various Retrievals made from the TDS. This list of Mission parameters are used to specify the SOPC task when initiating the retrievals and contains the Stream numbers, the actual dates/times of the queries, the names of the respective SOPC Task logs and Dump files, etc. Also included is the corresponding operations done for the DanCode post processing of the consolidated stream 524 (HuyDec1, HuyDec2). The purpose of this information is to permit all the files for each of these operations to be identified directly and to record exactly the setup used for their generation.

Data Stream	Creation date	SOPC log	Dump file	Comments
518	**Jan 14 2005 18:03**	**SOPC_518_2005-014T14.57.15.428094.log**	2005-014T14:57:15.428094.A/B.dmp	**Broadcast dump**
520	Jan 15 2005 23:40	SOPC_520_2005-015T23.03.14.714504.log	*N/A*	Query 1
521	Jan 16 2005 00:19	SOPC_521_2005-015T23.42.22.303342.log	*N/A*	Query 2
522	Jan 16 2005 01:00	SOPC_522_2005-016T00.22.37.596194.log	*N/A*	Query 3
523	Jan 16 2005 01:40	SOPC_523_2005-016T01.02.53.995650.log	*N/A*	Query 4
524	**Jan 16 2005 02:46**	**SOPC_524_2005-016T02.09.29.673661.log**	**2005-016T02:09:29.673661.A/B.dmp, 2005-016T02:09:29.673661.B.d1/d2.dmp**	**Consolidated dump, HuyDec1 & 2 outputs [AD5]**
525	Jan 20 2005 15:18	SOPC_525_2005-020T14.43.04.354138.log	*N/A*	Query 5
526	Jan 21 2005 08:35	SOPC_526_2005-021T07.59.48.275219.log	*N/A*	Query 6
527	Jan 21 2005 09:15	SOPC_527_2005-021T08.38.15.597828.log	*N/A*	Query 7
528	Jan 21 2005 09:59	SOPC_528_2005-021T09.19.50.218409.log	*N/A*	Query 8
529	Jan 21 2005 12:54	SOPC_529_2005-021T12.18.50.811251.log	*N/A*	Query 9
530	Jan 21 2005 14:24	SOPC_530_2005-021T13.30.13.934785.log	*N/A*	Query 10
531	Jan 23 2005 15:50	SOPC_531_2005-023T15.14.27.334155.log	*N/A*	Query 11
532	Jan 23 2005 16:30	SOPC_532_2005-023T15.54.27.662220.log	*N/A*	Query 12
533	Jan 23 2005 17:16	SOPC_533_2005-023T16.40.48.488828.log	*N/A*	Query 13
534	Jan 24 2005 08:29	SOPC_534_2005-024T07.53.37.978904.log	*N/A*	Query 14
535	Jan 24 2005 09:10	SOPC_535_2005-024T08.34.35.415331.log	*N/A*	Query 15

Data Stream	Creation date	SOPC log	Dump file	Comments
536	Jan 24 2005 09:50	SOPC_536_2005-024T09.15.38.425099.log	*N/A*	Query 16
537	**Feb 11 2005 10:27**	**SOPC_537_2005-042T08:55:49.300613.log**	*N/A*	**HuyDec1 resulting stream from dump file 2005-016T02:09:29.673661.B.d1.dmp created using TGShmcsrun.**
538	**Feb 11 2005 18:12**	**SOPC_538_2005-042T16:42:25.042111.log**	**2005-042T16:42:25.042111.A/B.dmp**	**HuyDec2 resulting stream from dump file 2005-016T02:09:29.673661.B.d2.dmp created using TGShmcsrun.**

Data Stream	Query Start	Query End	Description	Time Type	Mode	Data Group	Reset List	Get From
518	**2005-014T06:30:00**	**2005-014T14:30:00**	**Probe Mission (huyg2)**	**SCET**	**Operational**	**probe_pkts_vc_1**	**NONE**	**Broadcast**
520	2005-014T15:04:00	2005-014T18:20:00	Playback B4 Probe Mission Q1	ERT	Operational	probe_pkts_vc_1	NONE	NERT
521	2005-014T17:40:00	2005-014T20:04:00	Playback B5 Probe Mission Q2	ERT	Operational	probe_pkts_vc_2	NONE	NERT
522	2005-014T19:30:00	2005-014T21:21:00	Playback A4 Probe Mission Q3	ERT	Operational	probe_pkts_vc_1	NONE	NERT
523	2005-014T20:41:00	2005-014T22:27:00	Playback A5 Probe Mission Q4	ERT	Operational	probe_pkts_vc_2	NONE	NERT
524	**2005-014T06:00:00**	**2005-014T14:00:00**	**Consolidation#2 Probe Mission**	**SCET**	**Operational**	**probe_pkts**	**NONE**	**NERT**
525	2005-014T21:51:00	2005-014T23:44:00	Playback B4 Probe Mission Q5	ERT	Operational	probe_pkts_vc_1	NONE	NERT

Data Stream	Query Start	Query End	Description	Time Type	Mode	Data Group	Reset List	Get From
526	2005-014T23:04:00	2005-015T00:50:00	Playback B5 Probe Mission Q6	ERT	Operational	probe_pkts_vc_2	NONE	NERT
527	2005-015T00:16:00	2005-015T02:09:00	Playback A4 Probe Mission Q7	ERT	Operational	probe_pkts_vc_1	NONE	NERT
528	2005-015T01:29:00	2005-015T03:15:00	Playback A5 Probe Mission Q8	ERT	Operational	probe_pkts_vc_2	NONE	NERT
529	2005-015T02:39:00	2005-015T04:34:00	Playback B4 Probe Mission Q9	ERT	Operational	probe_pkts_vc_1	NONE	NERT
530	2005-015T03:54:00	2005-015T05:40:00	Playback B5 Probe Mission Q10	ERT	Operational	probe_pkts_vc_2	NONE	NERT
531	2005-015T05:06:00	2005-015T07:01:00	Playback A4 Probe Mission Q11	ERT	Operational	probe_pkts_vc_1	NONE	NERT
532	2005-015T06:21:00	2005-015T08:07:00	Playback A5 Probe Mission Q12	ERT	Operational	probe_pkts_vc_2	NONE	NERT
533	2005-015T07:31:00	2005-015T09:28:00	Playback B4 Probe Mission Q13	ERT	Operational	probe_pkts_vc_1	NONE	NERT
534	2005-015T08:48:00	2005-015T10:34:00	Playback B5 Probe Mission Q14	ERT	Operational	probe_pkts_vc_2	NONE	NERT
535	2005-015T10:00:00	2005-015T11:56:00	Playback A4 Probe Mission Q15	ERT	Operational	probe_pkts_vc_1	NONE	NERT
536	2005-015T11:16:00	2005-015T13:15:00	Playback A5 Probe Mission Q16	ERT	Operational	probe_pkts_vc_2	NONE	NERT
537	**2005-014T06:00:00**	**2005-014T14:00:00**	**Probe Mission using HuyDec1**	**SCET**	**Operational**	**probe_pkts**	**NONE**	**NERT**
538	**2005-014T06:00:00**	**2005-014T14:00:00**	**Probe Mission using HuyDec2**	**SCET**	**Operational**	**probe_pkts**	**NONE**	**NERT**

5.2 PROBE MISSION TIMELINE

S0 (min:sec)	OPERATION	TYPE OF COMMAND
S0 – 268 min 56 s	Probe wake-up (04:41:18 SCET/UTC)	Probe on activation through MTU timeout. Battery lines 2, 4, 1, 3, 5 powered on.
S0 – 268 min 41 s	CDMU ON	CDMU Operational
S0 – 268 min 40.375 s	TUSO on	Automatic sequence (“pre-T0” MTT)
S0 – 268 min 40.250 s	TX-A & TX-B on	Automatic sequence
S0 – 268 min 26.250 s	GCMS 1 on	Automatic sequence
S0 – 250 min 56.250 s	HASI 1 on	Automatic sequence
S0 – 229 min 58.250 s	ACP in Engineering mode	Pre-heating patch automatic TC
S0 – 139 min 29 s	PSAs on (06:50:45 SCET/UTC)	PSA activation through Orbiter CDS power on TC
S0 – 139 min 45 s	RUSO on [-MISSING-]	PSA TC from Cassini Critical Sequence [-MISSING-]
S0 – 138 min 30 s	PSA Switch-to-Base	PSA TCs via Cassini (ATC-9)
S0 – 12 min 41.375 s	HASI reset sequence starts (3.5 min long)	Pre-heating patch automatic TC
S0	**09:10:14.385 SCET/UTC**	
S0 + 0 min 2.125 s	Reset PDD pyro selection relay	Automatic sequence ("post-T0" MTT)
S0 + 0 min 2.25 s	Reset BCM 3 pyro selection relays	Automatic sequence
S0 + 0 min 2.375 s	Set PDD pyro selection relay	Automatic sequence
S0 + 0 min 6.375 s	PDD current limiter fire	Automatic sequence
S0 + 0 min 6.625 s	Reset PDD pyro selection relay	Automatic sequence
S0 + 0 min 8.625 s	Set BCM 3 pyro Norm. Selection relays	Automatic sequence
S0 + 0 min 8.75 s	Set BCM 3 pyro Red. Selection relays	Automatic sequence
S0 + 0 min 8.875 s	BCM 3 current limiter fire	Automatic sequence
S0 + 0 min 12.875 s	Reset BCM 3 pyro selection relays	Automatic sequence
S0 + 0 min 16.375 s	TUSO on	Automatic sequence
S0 + 0 min 16.625 s	TXs on	Automatic sequence
S0 + 0 min 34.875 s	Set FSM 3 pyro selection relays	Automatic sequence
S0 + 0 min 37.125 s	ACP 1 on	Automatic sequence

S0 (min:sec)	OPERATION	TYPE OF COMMAND
S0 + 0 min 38.875 s	FSM 3 current limiter fire	Automatic sequence
S0 + 0 min 39.375 s	Reset GCMS inlet pyro selection relay	Automatic sequence
S0 + 0 min 39.5 s	Reset GCMS outlet pyro selection relay	Automatic sequence
S0 + 0 min 39.625 s	Reset DISR cover pyro selection relay	Automatic sequence
S0 + 0 min 42.875 s	Reset FSM 3 pyro selection relays	Automatic sequence
S0 + 0 min 44.5 s	HPA on	Automatic sequence
S0 + 0 min 49.375 s	HASI 1 on	Automatic sequence
S0 + 0 min 52.375 s	Set GCMS inlet pyro selection relay	Automatic sequence
S0 + 0 min 55.625 s	SSP on	Automatic sequence
S0 + 0 min 56.375 s	GCMS inlet current limiter fire	Automatic sequence
S0 + 1 min 0.375 s	Reset GCMS inlet pyro selection relay	Automatic sequence
S0 + 1 min 0.5 s	Set GCMS outlet pyro selection relay	Automatic sequence
S0 + 1 min 4.5 s	GCMS outlet current limiter fire	Automatic sequence
S0 + 1 min 8.5 s	Reset CGMS outlet pyro selection relay	Automatic sequence
S0 + 1 min 8.625 s	Set DISR cover pyro selection relay	Automatic sequence
S0 + 1 min 12.625 s	DISR cover current limiter fire	Automatic sequence
S0 + 1 min 25.625 s	Reset DISR cover pyro selection relay	Automatic sequence
S0 + 1 min 26.375 s	DISR 1 on	Automatic sequence
S0 + 3 min 6.375 s	GCMS 1 on	Automatic sequence
S0 + 3 min 36.375 s	ACP 1 on	Automatic sequence
S0 + 15 min 2.375 s	Set PJM 3 pyro selection relays	Automatic sequence
S0 + 15 min 6.375 s	PJM 3 current limiter fire	Automatic sequence
S0 + 15 min 10.375 s	Reset PJM 3 pyro selection relays	Automatic sequence
S0 + 82 min 6.375 s	DISR 1 on	Automatic sequence
S0 + 108 min 6.375 s	SSP on	Automatic sequence
S0 + 110 min 6.375 s	ACP 3 off	Automatic sequence
S0 + 110 min 6.625 s	ACP 1 off	Automatic sequence
S0 + 147 min 56 s	Landing on Titan Surface	Event
S0 + 220 min 9 s	Loss of Link with Cassini	Event
S0 + 267 min 17s	PSAs off	PSA activation through Orbiter CDS power on TC

Extended Timeline

			HK1	HK2	HK3	HK4
T0 (Average)	**09:10:20.760**		09:10:20.760	09:10:20.760	09:10:20.760	09:10:20.759
S0 (Average)	**09:10:14.385**		09:10:14.385	09:10:14.385	09:10:14.385	09:10:14.384
Probe On Time (Average)	**04:41:33.010**		04:41:33.010	04:41:33.010	04:41:33.010	04:41:33.010
HASI Reset Time	**04:16:00.000**	**00:03:30**				
	Delta Time Probe On	**SCET/UTC**	**Rel S0**	**Rel T0**	**MT**	**DDBT**
Wake Up Time	*0:00:00*	**4:41:18**	**4:28:56**	**4:29:03**		
CDMU On	*00:00:15.000*	04:41:33.010	04:28:41.375	04:28:47.750	00:00:00.000	00:00:00.000
TUSO_N_POWER_ON**	00:00:01.000	04:41:34.010	04:28:40.375	04:28:46.750	00:00:01.000	00:00:01.000
TX_A_POWER_ON**	00:00:01.125	04:41:34.135	04:28:40.250	04:28:46.625	00:00:01.125	00:00:01.125
GCMS_!N_POWER_ON**	00:00:15.125	04:41:48.135	04:28:26.250	04:28:32.625	00:00:15.125	00:00:15.125
HASI_1_N_POWER_ON**	00:17:45.125	04:59:18.135	04:10:56.250	04:11:02.625	00:17:45.125	00:17:45.125
ACP_ENG_MODE-A**	00:38:43.125	05:20:16.135	03:49:58.250	03:50:04.625	00:38:43.125	00:38:43.125
ACP_ENG_MODE-B**	00:38:44.125	05:20:17.135	03:49:57.250	03:50:03.625	00:38:44.125	00:38:44.125
PSA ON	**02:09:26.990**	**06:50:45.000**	**02:19:29.385**	**02:19:35.760**	02:09:11.990	02:09:11.990
HASI Reset Start	04:16:15.000	08:57:33.010	00:12:41.375	00:12:47.750	04:16:00.000	04:16:00.000
HASI Reset End	04:19:30.000	09:01:03.010	00:09:13.500	00:09:18.000	04:19:30.000	04:19:30.000
Arrival Interface Alt. (1270km)	*04:24:17.500*	*09:05:48.385*	*00:04:26.000*	*00:04:32.375*	*04:24:17.500*	*04:24:17.500*
S0	**04:28:41.375**	**09:10:14.385**	**00:00:00**	**0:00:06.375**	00:00:00.000	04:28:41.375
Arm Pyro Group 1*	04:28:42.875	09:10:15.885	00:00:01.500	00:00:04.875	00:00:01.500	04:28:42.875
PYRO_1_PDD_RESET **	04:28:43.500	09:10:16.510	00:00:02.125	00:00:04.250	00:00:02.125	04:28:43.500
PYRO_1_BCM_RESET**	04:28:43.625	09:10:16.635	00:00:02.250	00:00:04.125	00:00:02.250	04:28:43.625
PYRO_1_PDD_SET**	04:28:43.750	09:10:16.760	00:00:02.375	00:00:04.000	00:00:02.375	04:28:43.750
PYRO_1_AND_2_FIRE_A** (Pilot chute deployment)	04:28:47.750	09:10:20.760	00:00:06.375	00:00:00.000	00:00:06.375	00:00:00.000
PYRO_1_PDD_RESET**	04:28:48.000	09:10:21.010	00:00:06.625	00:00:00.250	00:00:06.625	00:00:00.250
Pilot Chute Inflation *	**04:28:49.150**	**09:10:22.160**	**00:00:07.775**	**00:00:01.400**	**00:00:07.775**	**00:00:01.400**
PYRO_1_BCM_SET_N**	04:28:50.000	09:10:23.010	00:00:08.625	00:00:02.250	00:00:08.625	00:00:02.250
PYRO_1_BCM_SET_R**	04:28:50.125	09:10:23.135	00:00:08.750	00:00:02.375	00:00:08.750	00:00:02.375
PYRO_1_AND_2_FIRE_A**	04:28:50.250	09:10:23.260	00:00:08.875	00:00:02.500	00:00:08.875	00:00:02.500
Main Chute Inflation *	**04:28:52.650**	**09:10:25.660**	**00:00:11.275**	**00:00:04.900**	**00:00:11.275**	**00:00:04.900**
PYRO_1_BCM_RESET**	04:28:54.250	09:10:27.260	00:00:12.875	00:00:06.500	00:00:12.875	00:00:06.500
TUSO_N_POWER_ON**	04:28:57.750	09:10:30.760	00:00:16.375	00:00:10.000	00:00:16.375	00:00:10.000
TX_A_POWER_ON**	04:28:58.000	09:10:31.010	00:00:16.625	00:00:10.250	00:00:16.625	00:00:10.250
Arming Pyro Group 2*	**04:29:08.045**	**09:10:41.055**	**00:00:26.670**	**00:00:20.295**	**00:00:26.670**	**00:00:20.295**
PYRO_1_FSM_SET**	04:29:16.250	09:10:49.260	00:00:34.875	00:00:28.500	00:00:34.875	00:00:28.500
ACP_1_N_POWER_ON**	04:29:18.500	09:10:51.510	00:00:37.125	00:00:30.750	00:00:37.125	00:00:30.750
PYRO_1_AND_2_FIRE_A** (Front Shield Jettison)	04:29:20.250	09:10:53.260	00:00:38.875	00:00:32.500	00:00:38.875	00:00:32.500
ACP Energise Cap & Valves ACP Purge*	**04:29:20.625**	**09:10:53.635**	**00:00:39.250**	**00:00:32.875**	**00:00:39.250**	**00:00:32.875**
PYRO_1_GCMS_IN_RESET**	04:29:20.750	09:10:53.760	00:00:39.375	00:00:33.000	00:00:39.375	00:00:33.000
PYRO_1_GCMS_OUT_RESET**	04:29:20.875	09:10:53.885	00:00:39.500	00:00:33.125	00:00:39.500	00:00:33.125
PYRO_1_DISR_COVER_RESET**	04:29:21.000	09:10:54.010	00:00:39.625	00:00:33.250	00:00:39.625	00:00:33.250
PYRO_1_FSM_RESET**	04:29:24.250	09:10:57.260	00:00:42.875	00:00:36.500	00:00:42.875	00:00:36.500
Creation time of 1st Rcvd Probe Pkt*	**04:29:26.933**	**09:10:59.943**	**00:00:45.558**	**00:00:39.183**	**00:00:45.558**	**00:00:39.183**
ACP_3_N_POWER_ON **	04:29:27.750	09:11:00.760	00:00:46.375	00:00:40.000	00:00:46.375	00:00:40.000
Arming Pyro Group 3*	**04:29:29.015**	**09:11:02.025**	**00:00:47.640**	**00:00:41.265**	**00:00:47.640**	**00:00:41.265**
HASI_1_N_POWER_ON**	04:29:30.750	09:11:03.760	00:00:49.375	00:00:43.000	00:00:49.375	00:00:43.000
HPA ON*	**04:29:33.205**	**09:11:06.215**	**00:00:51.830**	**00:00:45.455**	**00:00:51.830**	**00:00:45.455**
PYRO_1_GCMS_IN_SET**	04:29:33.750	09:11:06.760	00:00:52.375	00:00:46.000	00:00:52.375	00:00:46.000
SSP_N_POWER_ON**	04:29:37.000	09:11:10.010	00:00:55.625	00:00:49.250	00:00:55.625	00:00:49.250
HASI 2 ON*	04:29:37.405	09:11:10.415	00:00:56.030	00:00:16.847	00:00:56.030	00:00:16.847
PYRO_1_AND_2_FIRE_A** (GCMS inlet cap ejection)	04:29:37.750	09:11:10.760	00:00:56.375	00:00:50.000	00:00:56.375	00:00:50.000
PYRO_1_GCMS_IN_RESET**	04:29:41.750	09:11:14.760	00:01:00.375	00:00:54.000	00:01:00.375	00:00:54.000
PYRO_1_GCMS_OUT_SET**	04:29:41.875	09:11:14.885	00:01:00.500	00:00:54.125	00:01:00.500	00:00:54.125
PYRO_1_AND_2_FIRE_A** (GCMS exhaust tube opening)	04:29:45.875	09:11:18.885	00:01:04.500	00:00:58.125	00:01:04.500	00:00:58.125
PYRO_1_GCMS_OUT_RESET**	04:29:49.875	09:11:22.885	00:01:08.500	00:01:02.125	00:01:08.500	00:01:02.125
PYRO_1_DISR_COVER_SET**	04:29:50.000	09:11:23.010	00:01:08.625	00:01:02.250	00:01:08.625	00:01:02.250
HASI Boom Deployment (latest)*	**04:29:50.789**	**09:11:23.799**	**00:01:09.414**	**00:01:03.039**	**00:01:09.414**	**00:01:03.039**
PYRO_1_AND_2_FIRE_A** (DISR Cover Jettison)	04:29:51.000	09:11:24.010	00:01:09.625	00:01:03.250	00:01:09.625	00:01:03.250
PYRO_1_DISR_COVER_RESET**	04:30:07.000	09:11:40.010	00:01:25.625	00:01:19.250	00:01:25.625	00:01:19.250
DISR_1_N_POWER_ON**	04:30:07.750	09:11:40.760	00:01:26.375	00:01:20.000	00:01:26.375	00:01:20.000
ACP Cap Ejection*	**04:31:17.750**	**09:12:50.760**	**00:02:36.375**	**00:02:30.000**	**00:02:36.375**	**00:02:30.000**
GCMS_1_N_POWER_ON**	04:31:47.750	09:13:20.760	00:03:06.375	00:03:00.000	00:03:06.375	00:03:00.000
HASI OFF*	**04:32:08.395**	**09:13:41.405**	**00:03:27.020**	**00:03:20.645**	**00:03:27.020**	**00:03:20.645**
ACP_1_N_POWER_ON**	04:32:17.750	09:13:50.760	00:03:36.375	00:03:30.000	00:03:36.375	00:03:30.000
ACP_3_N_POWER_ON**	04:32:30.250	09:14:03.260	00:03:48.875	00:03:42.500	00:03:48.875	00:03:42.500
Arming Pyro Group 4*	**04:33:44.865**	**09:15:17.875**	**00:05:03.490**	**00:04:57.115**	**00:05:03.490**	**00:04:57.115**
ACP 2 OFF*	**04:34:43.585**	**09:16:16.595**	**00:06:02.210**	**00:05:55.835**	**00:06:02.210**	**00:05:55.835**
PYRO_1_PJM_SET**	04:43:43.750	09:25:16.760	00:15:02.375	00:14:56.000	00:15:02.375	00:14:56.000
PYRO_1_AND_2_FIRE_A** (Main Chute Jettison, Stabiliser Deployment)	04:43:47.750	09:25:20.760	00:15:06.375	00:15:00.000	00:15:06.375	00:15:00.000
Stabiliser Inflation	**04:43:51.150**	**09:25:24.160**	**00:15:09.775**	**00:15:03.400**	**00:15:09.775**	**00:15:03.400**
PYRO_1_PJM_RESET**	04:43:51.750	09:25:24.760	00:15:10.375	00:15:04.000	00:15:10.375	00:15:04.000
GCMS Energise Line 2*	**04:57:39.315**	**09:39:12.325**	**00:28:57.940**	**00:28:51.565**	**00:28:57.940**	**00:28:51.565**
Proximity Sensor ON*	**05:00:43.865**	**09:42:16.875**	**00:32:02.490**	**00:31:56.115**	**00:32:02.490**	**00:31:56.115**
DISR_1_N_POWER_ON**	05:50:47.750	10:32:20.760	01:22:06.375	01:22:00.000	01:22:06.375	01:22:00.000
SSP_N_POWER_ON**	06:16:47.750	10:58:20.760	01:48:06.375	01:48:00.000	01:48:06.375	01:48:00.000
DISR Energise Line 2*	**06:18:40.505**	**11:00:13.515**	**01:49:59.130**	**01:49:52.755**	**01:49:59.130**	**01:49:52.755**
ACP_3_N_POWER_OFF**	06:18:47.750	11:00:20.760	01:50:06.375	01:50:00.000	01:50:06.375	01:50:00.000
ACP_1_N_POWER_OFF**	06:18:48.000	11:00:21.010	01:50:06.625	01:50:00.250	01:50:06.625	01:50:00.250
DISR Lamp ON	**06:54:32.612**	**11:36:05.622**	**02:25:51.237**	**02:25:44.862**	**02:25:51.237**	**02:25:44.862**
Surface Impact	**06:56:38**	**11:38:11**	**02:27:57**	**02:27:50**	**02:27:57**	**02:27:50**
HASI start autoresetting	07:29:00	12:10:33	03:00:19	03:00:12	03:00:19	03:00:12
Loss of Signal by Cassini	**08:08:51**	**12:50:24**	**03:40:10**	**03:40:03**	**03:40:10**	**03:40:03**
PSA Power OFF	**08:55:59**	**13:37:32**	**04:27:18**	**04:27:11**	**04:27:18**	**04:27:11**
Probe release	**25/12/2004 02:00:00**					
End of Cruise Phase	**14/01/2005 04:41:18**					
Cruise Phase Time	**20T02:41:18**					
Probe Mission Data Time (incl. AGC Data)	**03:39:18**					
Descent Data Duration	**02:27:11**					
Surface Data Duration	**01:12:07**					

*Arming timeline event **Mission Timeline Table event

5.3 PROBE MISSION CONFIGURATION CONTROL

This section describes the Probe Platform and Instrumentation Software configuration (CIDL history through all probe in-flight activities. Included is also the Preheating Patch Loading and Test (PPLT), which purpose was to implement the patches to the POSW, GCMS and HASI to be able to handle both preheating and no-preheating mission scenarios. The activity also included two in-flight checkouts – one type 1b without preheating and one type 1b with preheating. The final part of the configuration control covers the Probe Mission Data Stream Report.

Platform Software CIDL on FM during in-flight tests

In-flight test	POSW	SASW
F 1*	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 2	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 3	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 4	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 5	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 6	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 7	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 8	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 9	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 10	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2

* F stands for In-flight Checkout.

In-flight test	POSW	SASW
F 11	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
F 12	Before: Rel.6.0 + Backup T0 patch After: Rel.6.0 + Backup T0 patch	Before: Rel. 4.2 After: Rel 4.2
PPLT1*	Before: Rel.6.0 + Backup T0 patch After: Rel.6.2 + T0_TIMEOUT, T0_BACKUP, Clean Power-Up Patch. CRID:LOGSW	Before: Rel. 4.2 After: Rel 4.2
F 13	Before: As from PPLT1 After: As from PPLT1	Before: Rel. 4.2 After: Rel 4.2
F 14	Before: As from PPLT1 After: As from PPLT1	Before: Rel. 4.2 After: Rel 4.2
F 15	Before: As from PPLT1 After: As from PPLT1	Before: Rel. 4.2 After: Rel 4.2
F 16	Before: As from PPLT1 After: As from PPLT1	Before: Rel. 4.2 After: Rel 4.2
MISSION	Before: As from PPLT1 After: As from PPLT1	Before: Rel. 4.2 After: Rel 4.2

* PPLT stands for Preheating Patch Loading Test

Instrument Software CIDL on FM during in-flight tests

In-flight test	ACP	DISR	DWE	GCMS	HASI	SSP
F 1 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 1 (AFTER)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 2 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 2 (AFTER)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 3 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 3 (AFTER)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 4 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 4 (AFTER)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 5 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 5 (AFTER)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch

In-flight test	ACP	DISR	DWE	GCMS	HASI	SSP
F 6 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 6 (AFTER)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 7 (BEFORE)	No patches	No Patches	No patches	No patches	MCAregister	APIS patch
F 7 (AFTER)	No patches	Changes the number of fields of view in DLVS data sets CRID:HIRDV00802	No patches	No patches	MCAregister	APIS patch
F 8 (BEFORE)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch
F 8 (AFTER)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch
F 9 (BEFORE)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch
F 9 (AFTER)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch
F 10 (BEFORE)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch
F 10 (AFTER)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch

In-flight test	ACP	DISR	DWE	GCMS	HASI	SSP
F 11 (BEFORE)	No patches	As from F7	No patches	No patches	MCAregister	APIS patch
F 11 (AFTER)	No patches	As from F7 + Patches for 4hr Preheat, Image compression, SLI strips, etc CRID:HIRDV01903 - cycle_min_max_patch, elim_swtch_side_msg_2, fix_surf_cal, ld_compress_4_6_8_17Jul02, reset_at_t0_fix3, set_strip_cols	No patches	No patches	MCAregister + Timeline Preheating patch CRID:HIRHO01101	APIS patch
F 12 (BEFORE)	No patches	As from F11	No patches	No patches	As from F11	APIS patch
F 12 (AFTER)	No patches	As from F11 + Patches for ULVS/DLVS extra columns CRID:HIRDV02201	No patches	Load Valve Safety Patch CRID:HIRGM00802 - #79	As from F11	APIS patch
PPLT1 (BEFORE)	No patches	As from F12	No patches	As from F12	As from F11	APIS patch
PPLT1 (AFTER)	No patches	As from F12	No patches	As from F12 + Autonomous pre-heating patches CRID: IRHP Patches #78, 80-82, 86, 89-91	Autoreset, MCA register, Timeline & EEPROM End patch CRID:IRPH	APIS patch
F 13 (BEFORE)	No patches	As from F12	No patches	As from PPLT1	As from PPLT1	APIS patch
F 13 (AFTER)	No patches	As from F12 + Auto expose patch & Surf D patches CRID:HIRDV02301	No patches	As from PPLT1	As from PPLT1	APIS patch

In-flight test	ACP	DISR	DWE	GCMS	HASI	SSP
F 14 (BEFORE)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	APIS patch
F 14 (AFTER)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	APIS patch for blanking period to 110ms CRID: HIRSO01302
F 15 (BEFORE)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	As from F14
F 15 (AFTER)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	APIS patch for blanking period to 120ms CRID: HIRSO01401
F 16 (BEFORE)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	As from F15
F 16 (AFTER)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	As from F15
MISSION (BEFORE)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	As from F15
MISSION (AFTER)	No patches	As from F13	No patches	As from PPLT1	As from PPLT1	As from F15

Huygens CkOut-MISN Report

CO ID	MISN	**SASF ID**	MTT Only	**ACP**	None	**FOP ID**	DOPS-SMD-HUY-FOP-001
CO Date	14 January 2005	**SSF ID**	N/A	**GCMS**	None	**FOP Date**	14-Jan-05
CO DOY	015	**SCLKSCET**	SCLKSCET.00087	**DISR**	None	**FOP Issue**	2.17
CO StrTime	06:50:44	**DB ID**	3.18	**DWE**	None	**TMLine ID**	TimeLine_17_001
CO EndTime	13:37:31			**HASI**	None	**TMLine Issue**	2.17
				SSP	None		

DS ID	DS StrTime	DS EndTime	Data Source
524	06:50:44	13:37:31	JPL Besting

Huygens Probe Oerations Centre
Robert-Bosch-Str.5
D-64293 Darmstadt
Fax : +49(0)6151-90-2202

Huygens CkOut-MISN Report

Data Stream

CO ID MISN **Data Stream Nb** 524 **Data Source** JPL Besting **DS Start Time** 06:50:44 **DS End Time** 13:37:31

Tot Pkts On-Ground 97622 **RS Fail** 248 Chain B **RS Corrected** 326 Chain B

Log File Time 2005-015T02:09:29 **CD** ☐

Pkt Type	Pkt On-Board	Discarded by Hmcs	Packet Lost	RMK
ACP B	783	0	0	Available: 1-783
CDMU HK 1 B	1822	0	1021	Available: 1011-1752, 1764-1822. Lost SSC 1-1010 (HPA not turned on until T0+45s) and 1753-1763 (Link loss after >50min on Titan surface).
CDMU HK 2 B	1822	0	1021	Available: 1011-1753, 1765-1822. Lost SSC 1-1010 (HPA not turned on until T0+45s) and 1754-1764 (Link loss after >50min on Titan surface).
CDMU HK 3 B	1823	0	1020	Available: 1010-1752, 1763-1822. Lost SSC 0-1009 (HPA not turned on until T0+45s) and 1753-1762 (Link loss after >50min on Titan surface).
CDMU HK 4 B	1799	0	997	Available: 986-1727, 1739-1799. Lost SSC 0-985 (HPA not turned on until T0+45s) and 1728-1738 (Link loss after >50min on Titan surface).
DISR B	59978	0	871	Available: 1-16383,0-16383,0-16383,0-5162,5169-5189,5195-5204,5216-5220,5235-5239,5249-5262,5273-5277,5282-5290,6013-6016,6047-6071,6078-6091,6097-6121,6126-10705,10712-10759,10795-10800,10805-10826. Lost SSC 5163-5168,5190-5194,5205-5215,5221-5234,5240-5248,5263-5272,5278-5281,5291-6012,6017-6046,6072-6077,6092-6096,6122-6125,10706-10711,10760-10794,10801-10804 (Link losses after >50min on Titan surface).
GCMS B	22331	0	9126	Available: 8927-16383,0-4692,4694-4698,4700-4701,4704,4708,4712-4713,4716,4718-4719,4887-4888,4895-4899,4901-4903,4905-4910,4912-5920,5922-5931,5940,5942-5946. Lost SSC 0-8926 (HPA not turned on until T0+45s) and 4693,4699,4702-4703,4705-4707,4709-4711,4714-4715,4717,4720-4886,4889-4894,4900,4904,4911,5921,5932-5940,5941 (Link losses after >50min on Titan surface).
HASI B	8540	0	1724	Available:1723-8127,0-5,0-5,0-5,0-6,1-6,0-5,0-5,0-5,0-5,0-5,0-5,0-16,1-6,0-6,1-7,0-5,0-5,0-5,0-5,0-6,1-7,1-6,1-7,1-7,1-7,0-5,1-6,0-6,0-5,1-6,0-5,1-6,0-5,0-6,1,3-5,3-6,0-5,0-5,0-5,0-5,0-5,0-5,0-8,0-5,0-5,0-5,0-5,0-5,0-5,0-5,0-5,0-5,0-6,1-7,1-6,0-5,0-5,0-5,0-5,1-6,0-5,0-6,1-6,0-6,1-6,4-6 (HASI resets after more than three hours in post T0 due to preheating patch.) Lost SSC 0-1722 (HPA not turned on until T0+45s) and 2 (Link losses after >50min on Titan surface).

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Robert-Bosch-Str.5
D-64293 Darmstadt
Fax : +49(0)6151-90-2202

Probe Super Packet B	13086	248	2	Available: 1-11867,11869-11872,11874-11875,11878,11882,11885-11887,11890,11892-11893,12040,12047-12051,12053-12055,12057-12061,12063-12990,12992-13000,13008,13010-13014. Lost SSC 11868,11873,11876-11877,11879-11881,11883-11884,11888-11889,11891,11894-12039,12041-12046,12052,12056,12062,12991,13001-13007,13009,13015-13086 (Link losses after >50min on Titan surface). 2 Superpackets replaced by Dump Super packets at Landing+53min 8sec & Landing+70min 56sec.
PSE-A Dump Super Packet	24407	0	0	Available: 3-16383,0-8025. SSC starts at 3 owing to SASW initialisation effects.
PSE-A HK	24408	0	0	Available: 1-16383,0-8024
PSE-B Dump Super Packet	11317	0	0	Available: 4-11320. SSC starts at 4 owing to SASW initialisation effects.
PSE-B HK	24404	0	0	Available: 1-16383,0-8020
REPORT B	3668	0	3521	Available: 3520-3647,3649-3667. Lost SSC 0-3519 (HPA not turned on until T0+45s) and 3648 (Link losses after >50min on Titan surface).
SSP B	6630	0	86	Available: 0-6072,6074,6076,6080-6084,6087,6160,6163-6164,6166-6168,6170-6624,6627-6629. Lost SSC 6073,6075,6077-6079,6081,6085-6086,6088-6159,6161-6162,6165,6169,6625-6626 (Link losses after >50min on Titan surface).

Huygens Probe Oerations
Centre
Robert-Bosch-Str.5
D-64293 Darmstadt
Fax : +49(0)6151-90-2202

5.4 REED-SOLOMON ANALYSIS: LISTS

Due to the small number of RS errors, this list is merged with the list of missing and corrupted packets; it can be found in Appendix 5.5.

5.5 MISSING PACKETS: LISTS

Time (Cassini SCET/UTC)	Event	#Pkt Lost	Packet Type	APID	Remark
04:41:33	Probe On	-	-	-	-
06:50:45	PSA's on	-	-	-	-
06:50:44	SSC starts at 3	2	PSE Dump SP - A	1935	SASW initialisation effect
06:50:48	SSC starts at 4	3	PSE Dump SP - B	1967	SASW initialisation effect
09:10:21	T0	-	-	-	-
09:11:10	SSC starts at 1010	1010	CDMU HK-3 - B	1975	Transmitters turned on at T0+45.5s
09:11:14	SSC starts at 986	986	CDMU HK-4 - B	1976	Transmitters turned on at T0+45.5s
09:11:18	SSC starts at 1011	1010	CDMU HK-1 - B	1957	Transmitters turned on at T0+45.5s
09:11:22	SSC starts at 1011	1010	CDMU HK-2 - B	1958	Transmitters turned on at T0+45.5s
12:28:54	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:28:59	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:29:02	Data Loss: Failed RS decoding	2	Super Packet Ch. B	1979	Link degradation
12:29:05	Data Loss: Failed RS decoding	3	Super Packet Ch. B	1979	Link degradation
12:29:09	Data Loss: Failed RS decoding	2	Super Packet Ch. B	1979	Link degradation
12:29:14	Data Loss: Failed RS decoding	2	Super Packet Ch. B	1979	Link degradation
12:29:17	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:29:20	Data Loss: Failed RS decoding	113	Super Packet Ch. B	1979	Link degradation
12:31:14	Data Loss: Dump Super Packet replaced Probe Super Packet	1	Super Packet Ch. B	1979	Link degradation

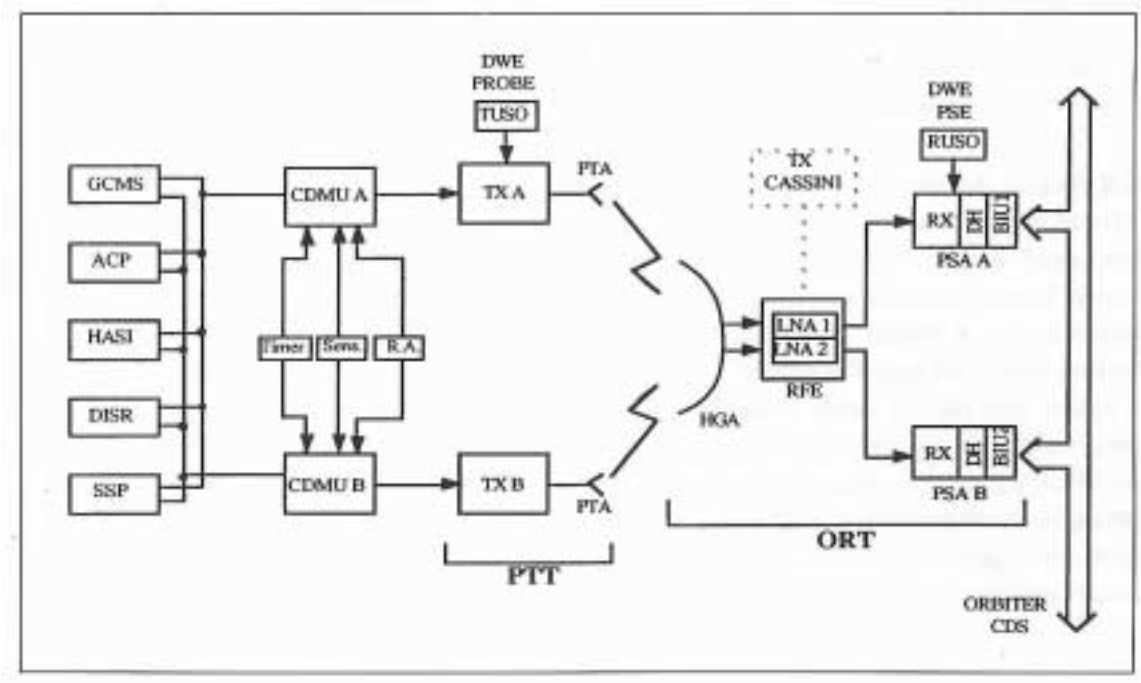
Time (Cassini SCET/UTC)	Event	#Pkt Lost	Packet Type	APID	Remark
12:31:14	Data Loss: Failed RS decoding	33	Super Packet Ch. B	1979	Link degradation
12:31:48	Data Loss: Failed RS decoding	6	Super Packet Ch. B	1979	Link degradation
12:31:59	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:32:03	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:32:09	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:47:38	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:47:48	Data Loss: Failed RS decoding	7	Super Packet Ch. B	1979	Link degradation
12:47:56	Data Loss: Failed RS decoding	1	Super Packet Ch. B	1979	Link degradation
12:48:02	Data Loss: Failed RS decoding	66	Super Packet Ch. B	1979	Link degradation
12:49:07	Data Loss: Dump Super Packet replaced Probe Super Packet	1	Super Packet Ch. B	1979	Link degradation
12:49:13	Data Loss: Failed RS decoding (Last Probe Super packets)	6	Super Packet Ch. B	1979	Link degradation
12:50:18	Loss of Link (Carrier loss)	-	-	-	-
13:37:32	PSA's OFF	-	-	-	-

5.6 OVERVIEW OF THE HUYGENS PROBE-TO-CASSINI TELEMETRY LINK

During the Huygens Mission, the Probe telemetry is transmitted to the Cassini Orbiter via two 10-Watt S-band transmitters and two omni directional antennas, with no cross-coupling. These two independent telemetry links have the following basic characteristics:

- Channel A – 2040.000 MHz carrier frequency with LHC polarization;
- Channel B – 2097.916 MHz carrier frequency with RHC polarization.

Each transmitter is fed with digital telemetry (NRZ) from a Command & Data Management Unit (CDMU) at 8192 bps, with multiples of this basic rate being used to modulate (BPSK) the sub-carrier. The CDMU itself builds a telemetry frame every second that contains packets from the five science instruments (ACP, DISR, GCMS, HASI & SSP) plus, every forth frame, one housekeeping packet.



The telemetry architecture, illustrated in the above figure, shows that the Huygens Receiver Front End (RFE) is connected to the Cassini High Gain Antenna (HGA) and that two parallel chains process the received signals from the Probe in several steps: low noise amplification followed by a sophisticated, software controlled, receiver digital section including digital frame restitution. Each received frame is contained within a Probe Super Packet, which is stored aboard Cassini before being downlink to Earth.

The two Huygens receivers, located within the Probe Support Avionics (PSA) units, can operate in two different modes: Doppler and BITE. In Doppler mode, which is the start-up default that supported the original mission, the receiver's initial search for the carrier is pre-centred around

the expected Doppler shifted frequency (2040.0385 MHz for Channel A and 2097.9555 MHz for Channel B). During in-flight checkouts and for the new mission, both receivers must be commanded into BITE mode to pre-centre their initial search for the carrier about the transmitter's rest frequency. For the new mission, the BITE mode commands are issued by Cassini software every 12 seconds throughout the Mission phase.

Both transmitter and receiver units use temperature controlled crystal oscillators (TCXOs) to generate a reference frequency. However, the Chain-A units contain additional reference sources, the Ultra-Stable Oscillators (USOs), to enable the Doppler Wind Experiment (DWE). If the USOs are to be used instead of the default TCXOs, they must first be selected and then powered on by specific commands before the link can be established – failure to power on either TUSO or RUSO after their selection will prevent the link from being established and result in the loss of all Probe telemetry on Chain-A.

The decision to use the USOs during the Huygens Mission was taken after analysis of data from the final in-flight checkout (F16), which was performed on 23 November 2004. Both the Probe and PSA-A were then configured to select their USOs during the Mission Timer Unit (MTU) Loading activities, which were performed four days prior to the Probe's release from Cassini on 25 December 2004.

The command to power-on of the transmitter's USO (TUSO) was performed via the Mission Timeline Table (MTT), which is an automated sequence run by the CDMU's software. The command to power-on the receiver's USO (RUSO) should have been included within the Cassini Critical Sequence but was omitted, which resulted in a failure to establish the Chain-A link and a subsequent loss of telemetry.

5.7 PLOTS

The following table gives the list of all plotted parameters (analogue values and analogue representation of certain statuses).

SYSTEM

W159, W164, W165, W167, W160, W163, W161, W162, W151, W166,

CDMS (oversampled)

W121, W194, W204, W205, W206, W101, W102, W122, PO01, PO02, W123, W103, W124, W200, W201, W202

EPSS

W104, W127, W128, W129, W130, W105, W106, W107, W108, EP01, EP02, EP03, EP04, EP05 W131, W132, W133, W134, W135, W109, EX01, EX02, EX03, EX04, EX05, EX06, W191, W196

PDRS

W171, W186, W169, W170, W187, W184, W168, W185, W172, PD01, PD02, PD03, PD04, PD05, PD06, PD07

PDRS (oversampled)

W173, W174, W175, W176, A-1147, A-1148, A-1149, W179, W192, W180, W193, W177, W178, W197, W198, w020Bz [where 'A' indicates a Cassini attitude parameter – Sun direction angles, which are of relevance to AGC noise issues]

THSS

Probe Temperatures:

W181, W182, W183, W110, W111, W136, W137, W138, W139, W140, W141, W112, W142, W143, W144, W145

Cassini Temperatures:

P-2101, P-2102, P-2103, P-2104, P-3303, P-3403, P-4001, P-4002, S-2001

EXPERIMENTS

W146, W147, W148, W149, W150

SASW

W113, W114, W115, W116, W188, W117, W118, W189, W119, W120, W190

POSW

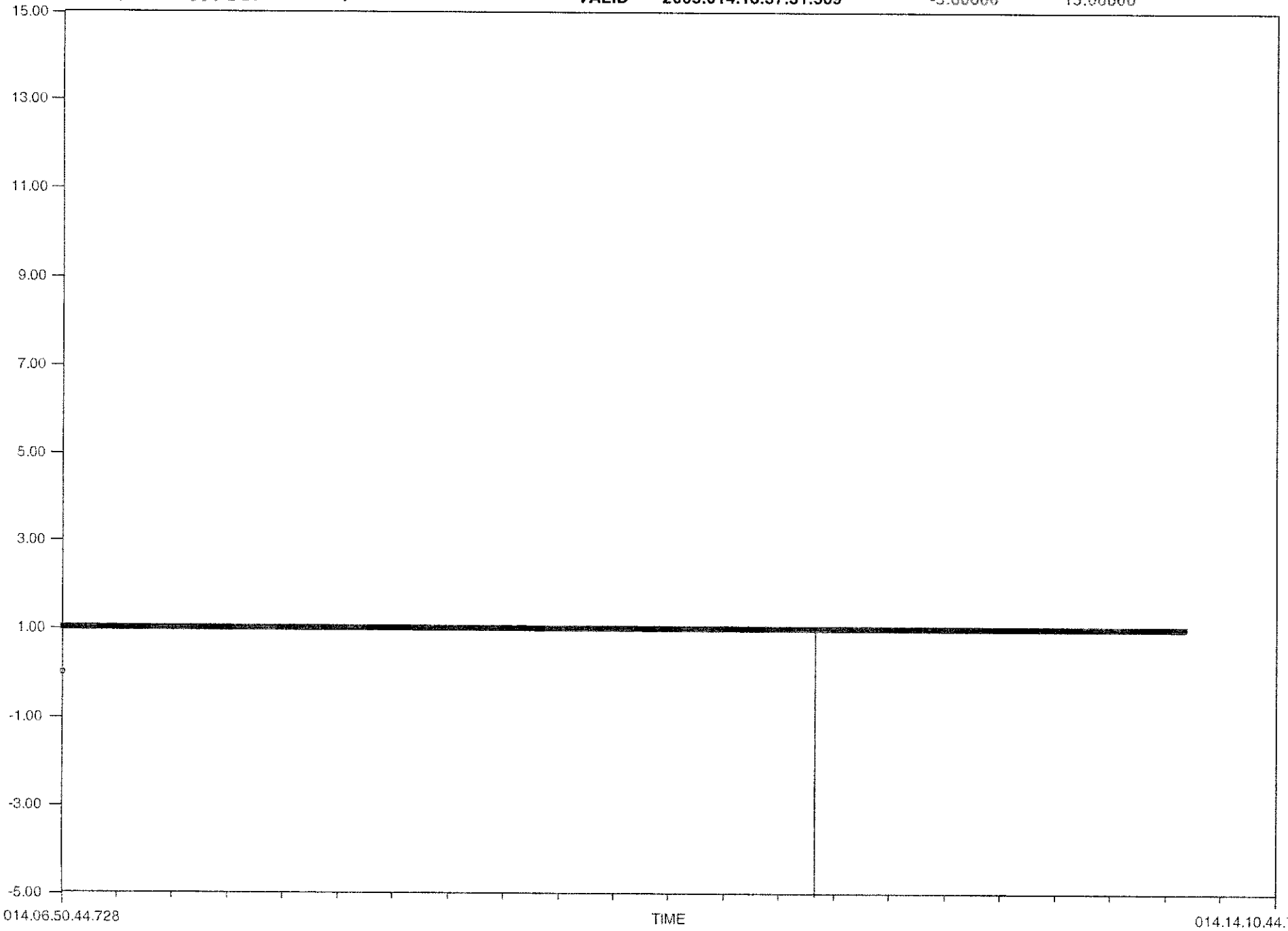
W125, W126

5.7.1 HUYGENS PROBE SYSTEM

DS: 524 ID: W159P Title: [PKT HDR] PSA DELTA SEQ COUNTER Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

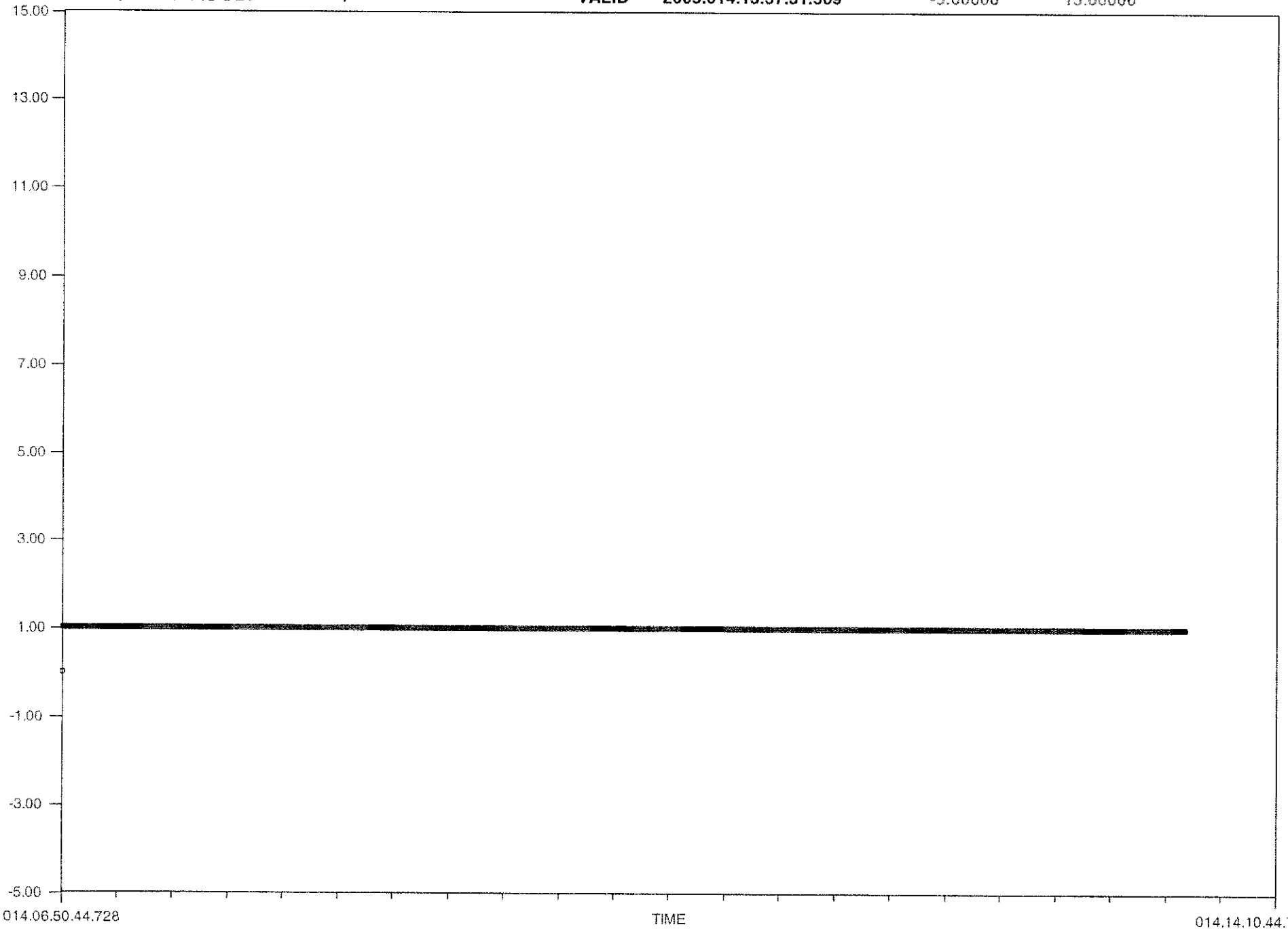
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZAPHK2	PSE A HK SSC DLT	1		VALID	2005.014.13.37.31.569	-5.00000	15.00000	
ZBPHK2	PSE B HK SSC DLT	1		VALID	2005.014.13.37.31.569	-5.00000	15.00000	



DS: 524 ID: W164P Title: [PKT HDR] PSA DELTA SCT Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

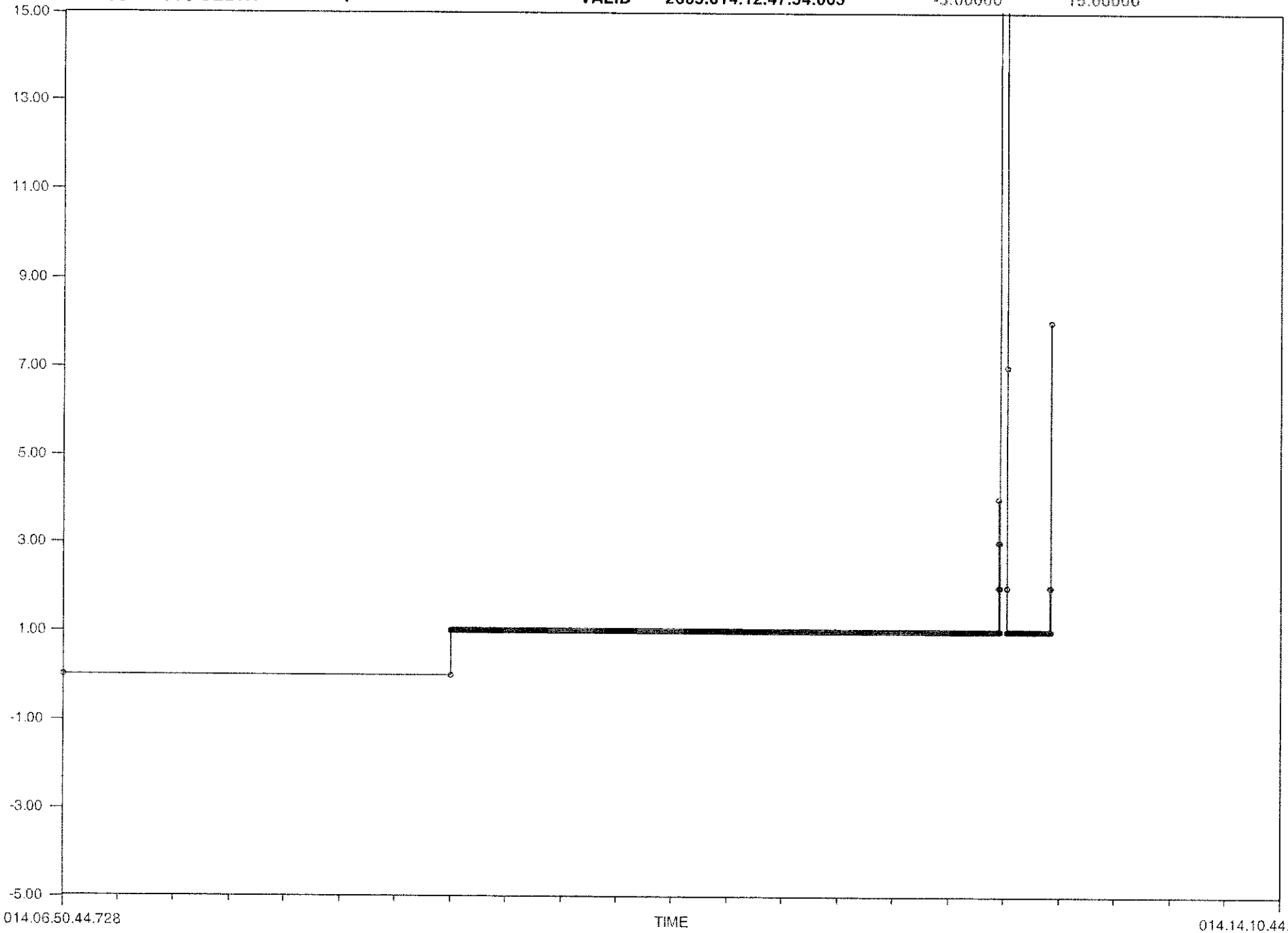
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZAPHK4	PSE A HK BIU DLT	1		VALID	2005.014.13.37.31.569	-5.00000	15.00000	
ZBPHK4	PSE B HK BIU DLT	1		VALID	2005.014.13.37.31.569	-5.00000	15.00000	



DS: 524 ID: W165P Title: [PKT HDR] SUPER PKT DELTA SCT Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

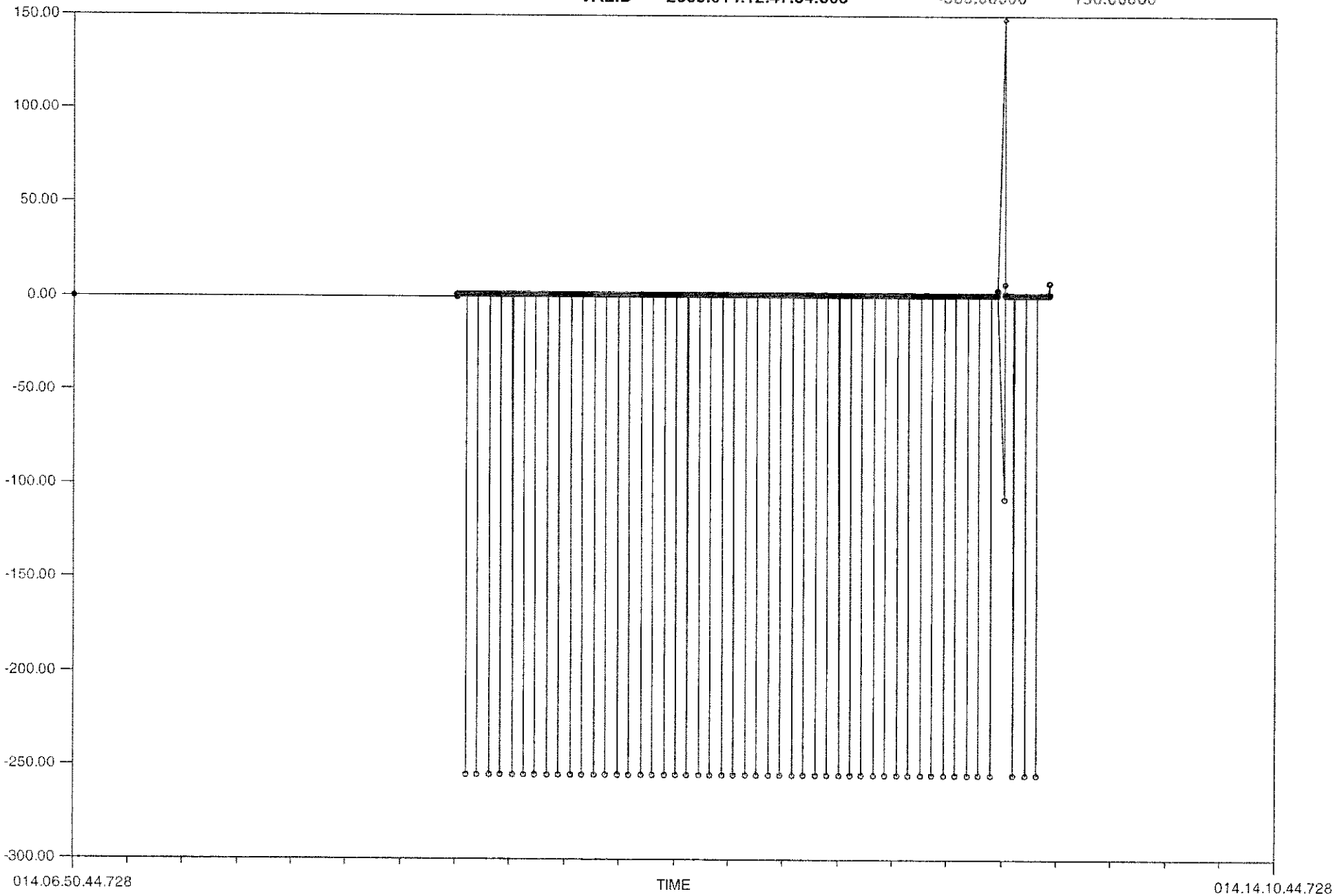
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZASUP1	SUP A SSC DELTA					-5.00000	15.00000	
ZBSUP1	SUP B SSC DELTA	1		VALID	2005.014.12.47.54.005	-5.00000	15.00000	



DS: 524 ID: W167P Title: [PKT HDR] SUP PKT DELTA MC/VC Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

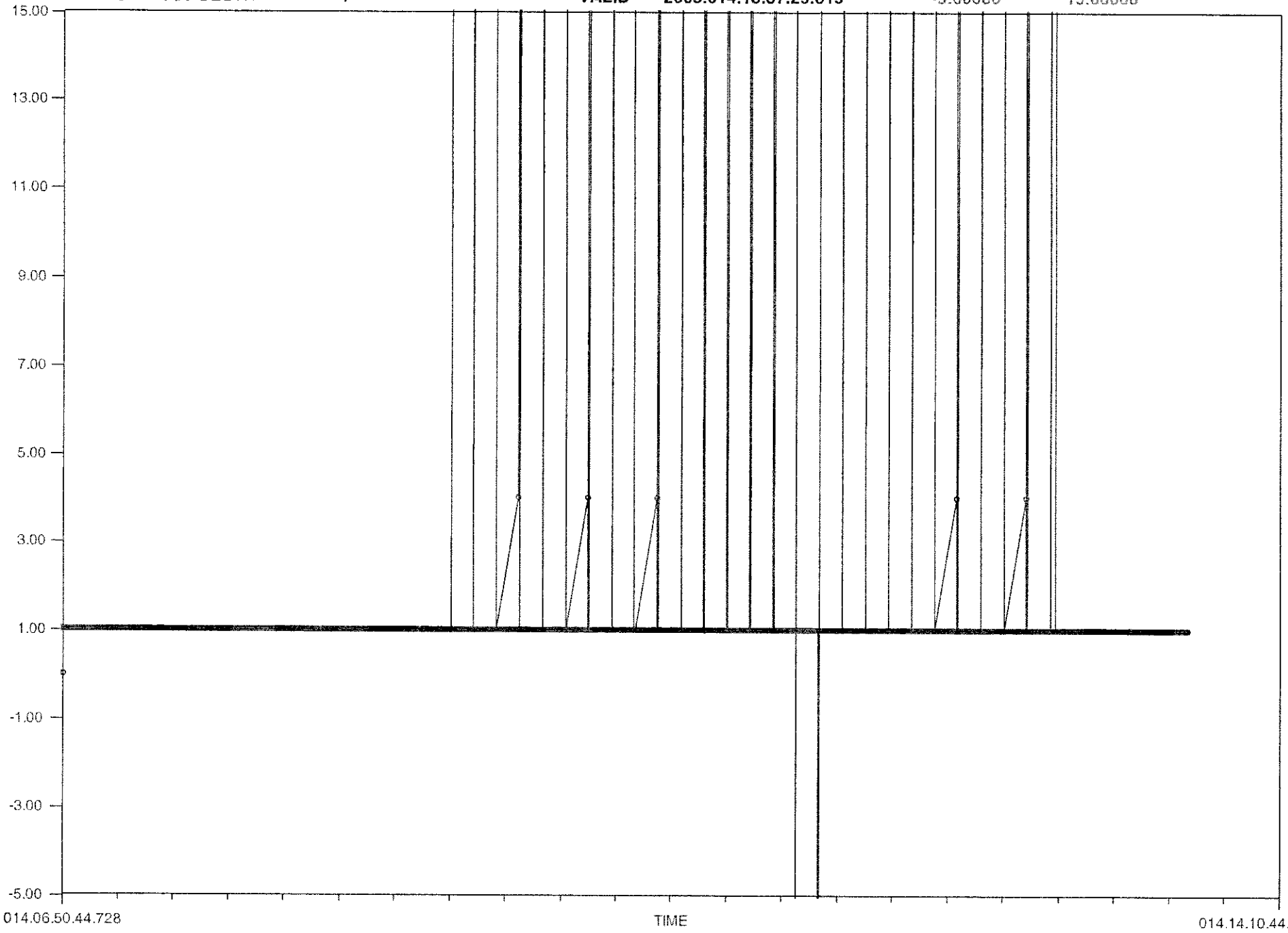
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZASUP5	SUP A MCFC DELTA					-300.00000	150.00000	
ZBSUP5	SUP B MCFC DELTA	1		VALID	2005.014.12.47.54.005	-300.00000	150.00000	
ZASUP8	SUP PKT VC DLT A					-300.00000	150.00000	
ZBSUP8	SUP PKT VC DLT B	1		VALID	2005.014.12.47.54.005	-300.00000	150.00000	



DS: 524 ID: W160P Title: [PKT HDR] DUMP SUP DELTA SEQ CNT Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

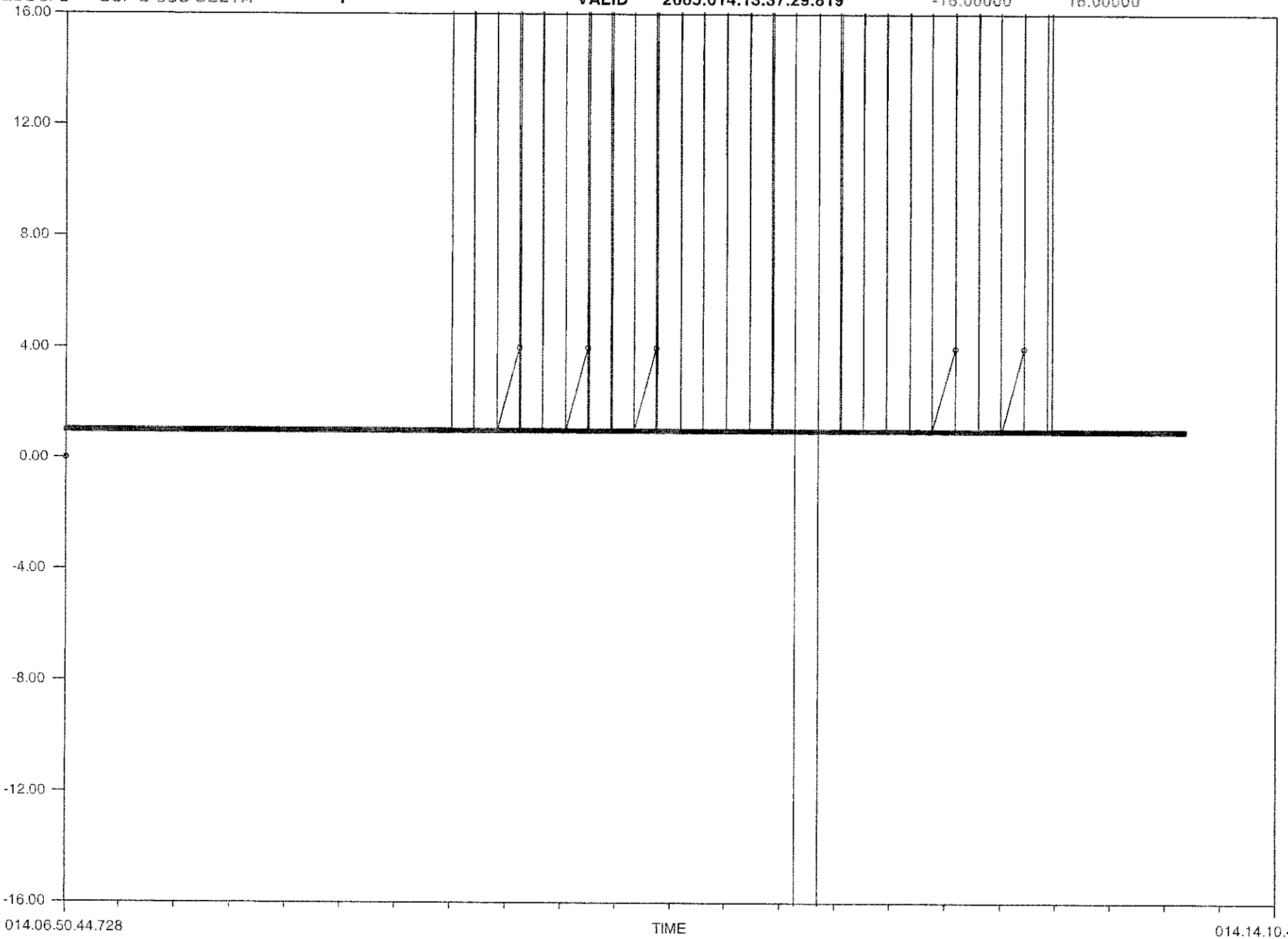
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZADSP2	DSP A SSC DELTA	1		VALID	2005.014.13.37.30.569	-5.00000	15.00000	
ZBDSP2	DSP B SSC DELTA	1		VALID	2005.014.13.37.29.819	-5.00000	15.00000	



DS: 524 ID: W163P Title: [PKT HDR] DUMP SUP DELTA SCT Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

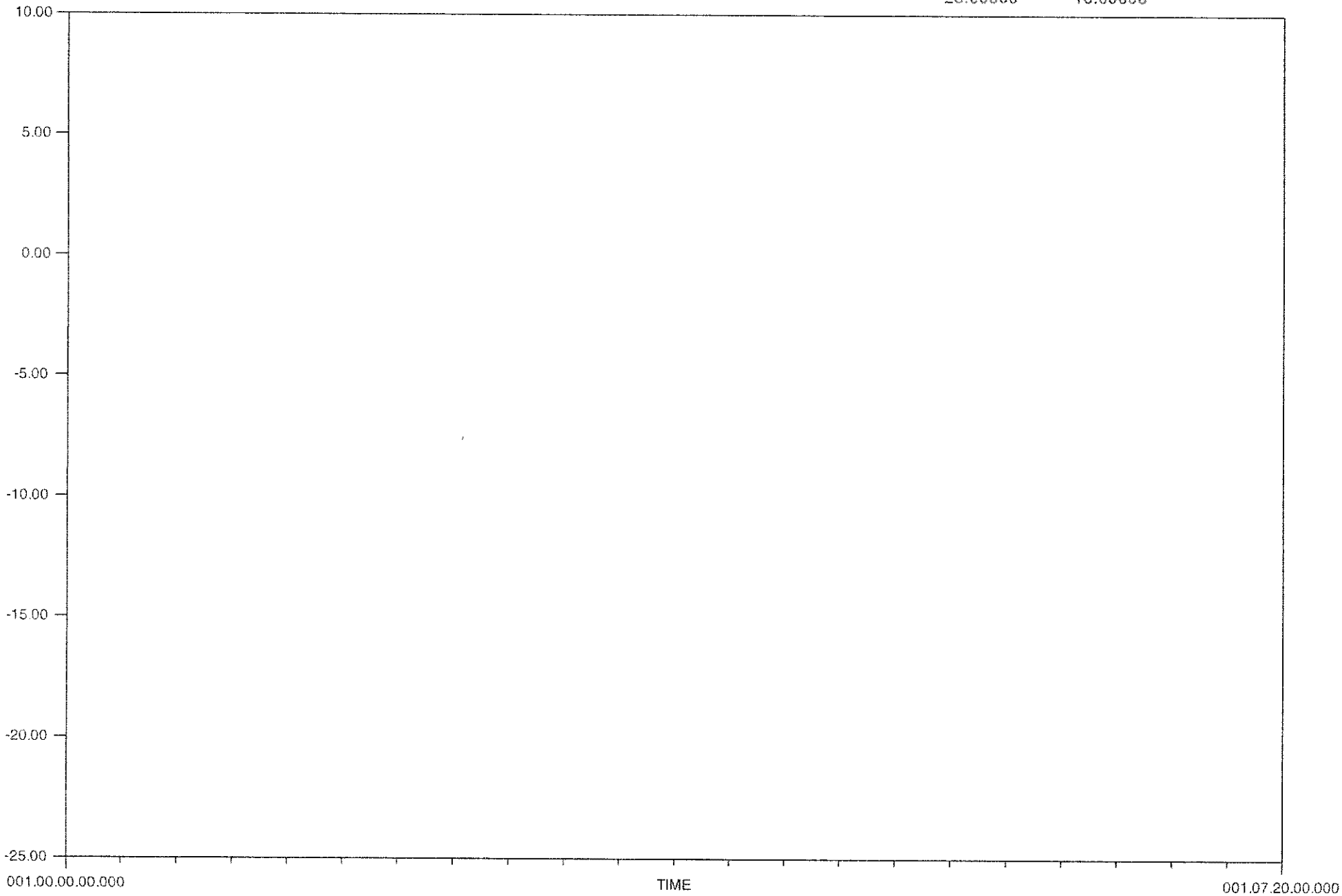
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZADSP4	DSP A BIU Tm DLT	1		VALID	2005.014.13.37.30.569	-16.00000	16.00000	
ZBDSP2	DSP B SSC DELTA	1		VALID	2005.014.13.37.29.819	-16.00000	16.00000	



DS: 524 ID: W161P Title: [PKT HDR] CDMU A DELTA SEQ CNT Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

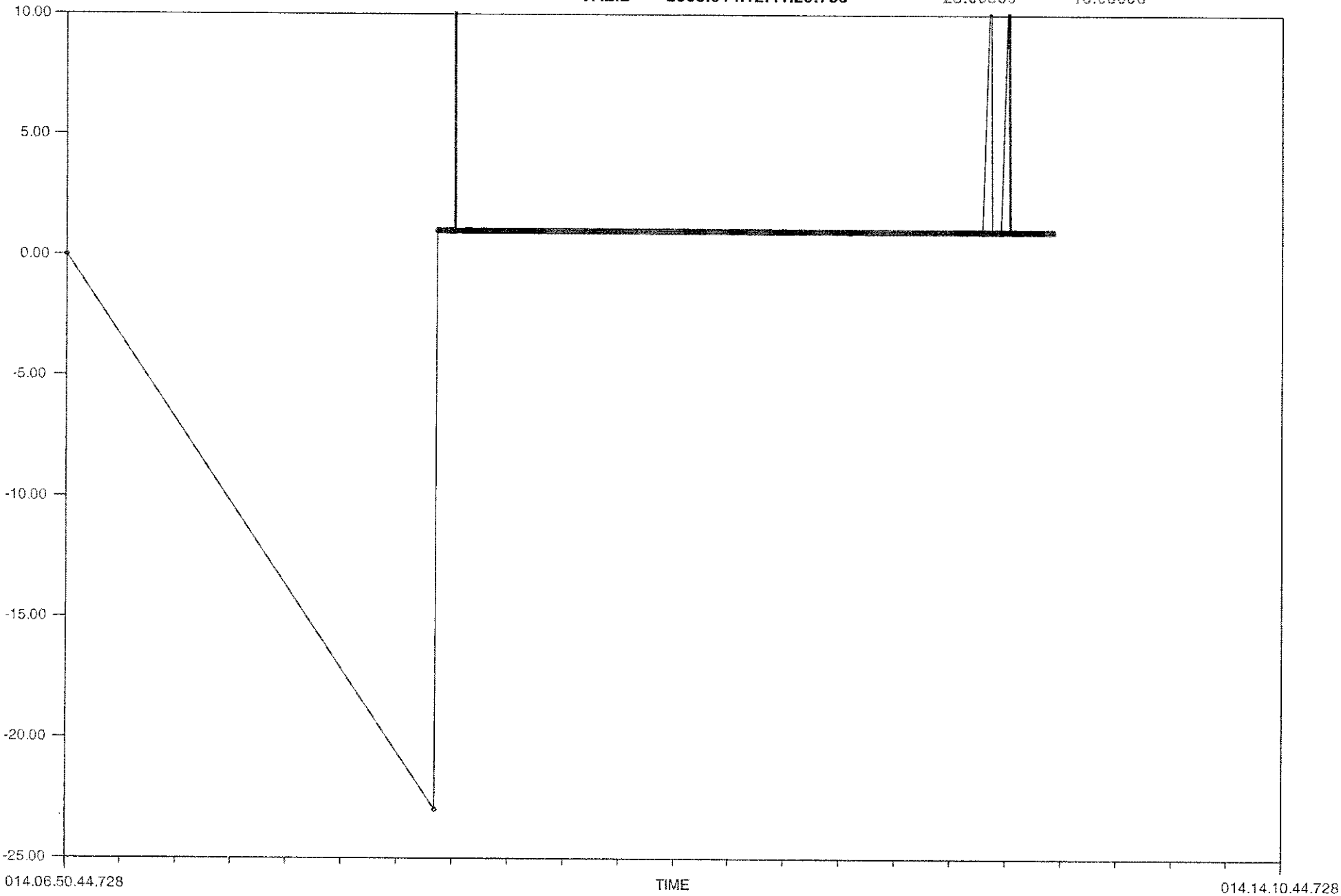
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZAHK12	HK 1A SSC DELTA					-25.00000	10.00000	
ZAHK22	HK 2A SSC DELTA					-25.00000	10.00000	
ZAHK32	HK 3A SSC DELTA					-25.00000	10.00000	
ZAHK42	HK 4A SSC DELTA					-25.00000	10.00000	



DS: 524 ID: W162P Title: [PKT HDR] CDMU B DELTA SEQ CNT Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

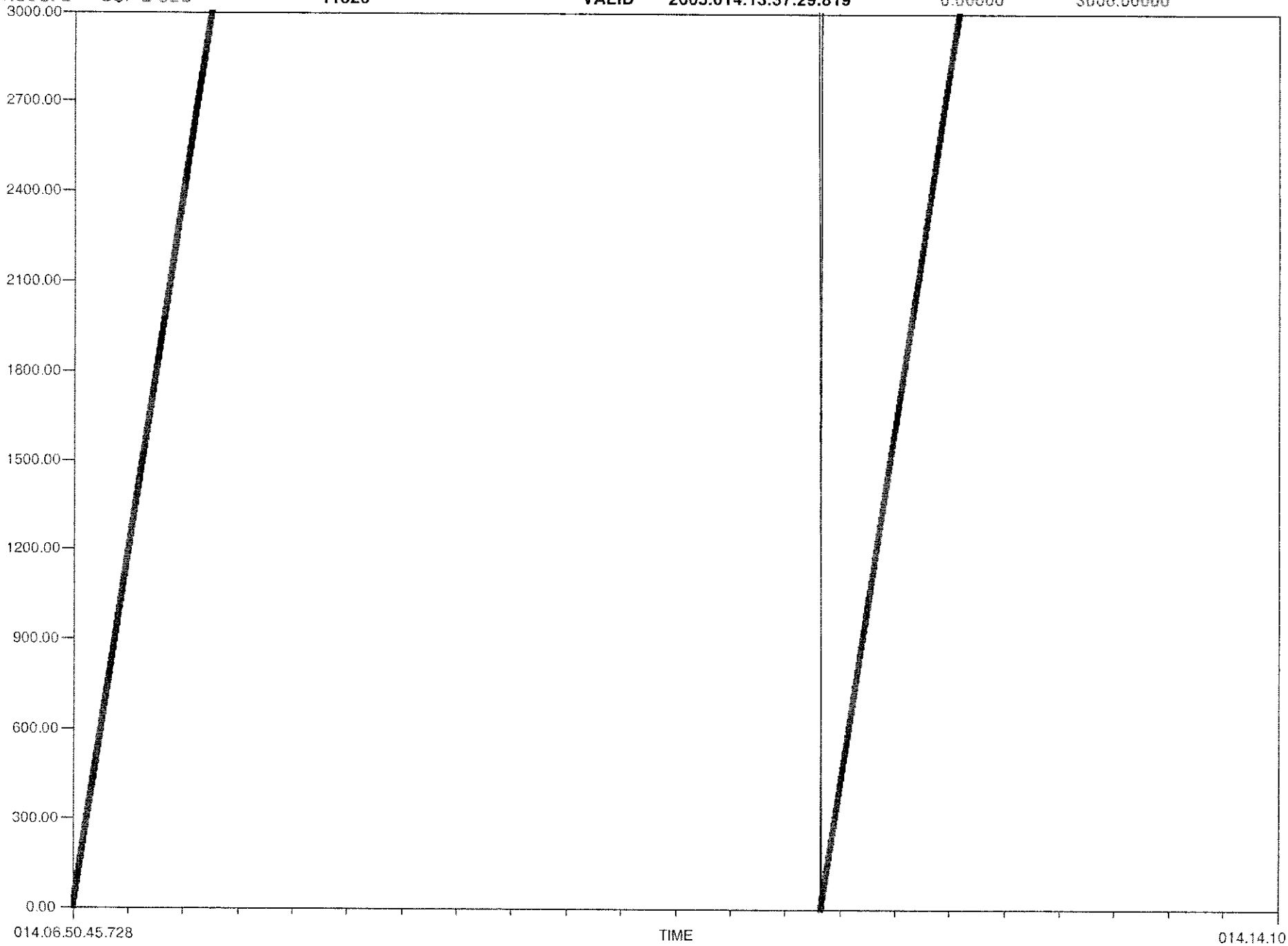
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZBHK12	HK 1B SSC DELTA	1		VALID	2005.014.12.47.25.755	-25.00000	10.00000	
ZBHK22	HK 2B SSC DELTA	1		VALID	2005.014.12.47.29.755	-25.00000	10.00000	
ZBHK32	HK 3B SSC DELTA	1		VALID	2005.014.12.47.49.755	-25.00000	10.00000	
ZBHK42	HK 4B SSC DELTA	1		VALID	2005.014.12.41.29.755	-25.00000	10.00000	



DS: 524 ID: W151P Title: [PKT HDR] DUMP SUPER SEQ COUNTER Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

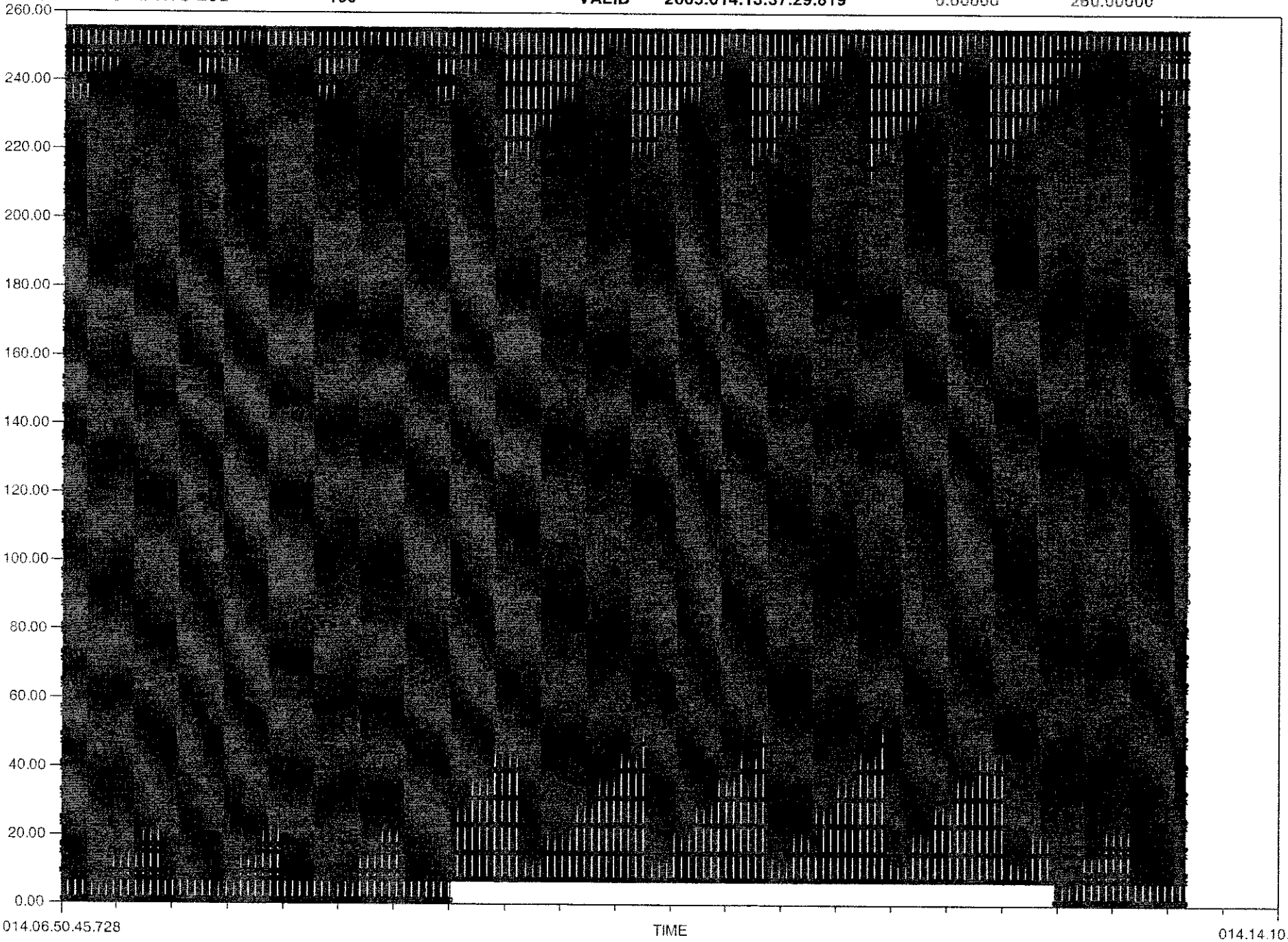
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
HADSP2	DSP A SSC	8025		VALID	2005.014.13.37.30.569	0.00000	3000.00000	
HBDSP2	DSP B SSC	11320		VALID	2005.014.13.37.29.819	0.00000	3000.00000	



DS: 524 ID: W166P Title: [PKT HDR] DUMP SUP PKT RT (lsb) Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
HADSP5	DSP A RTC LSB	183		VALID	2005.014.13.37.30.569	0.00000	260.00000	
HBDSP5	DSP B RTC LSB	153		VALID	2005.014.13.37.29.819	0.00000	260.00000	

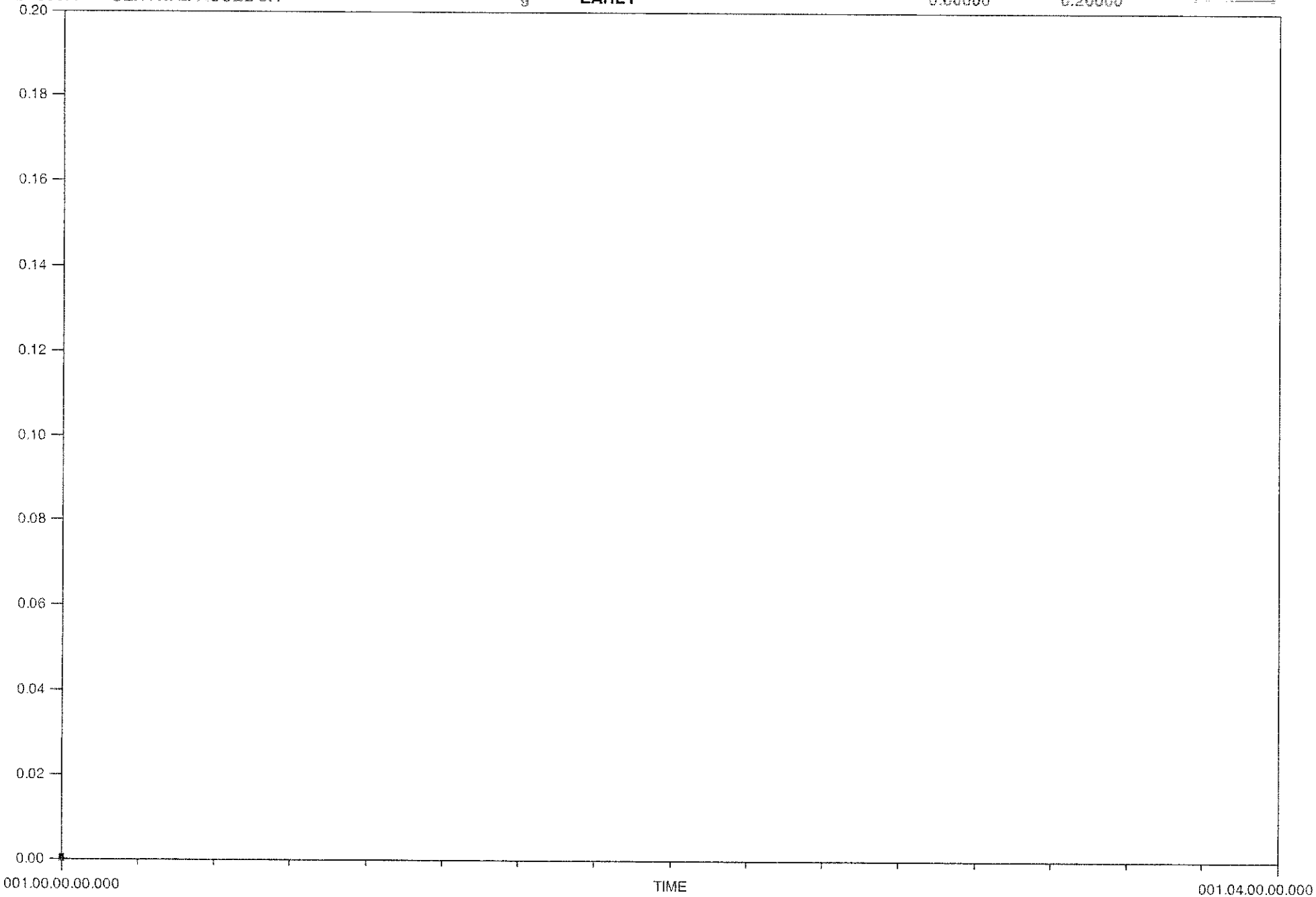


5.7.2 COMMAND & DATA MANAGEMENT SUBSYSTEM (CDMS)

DS: 524 ID: W121h Title: [CDMS] CASU A Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

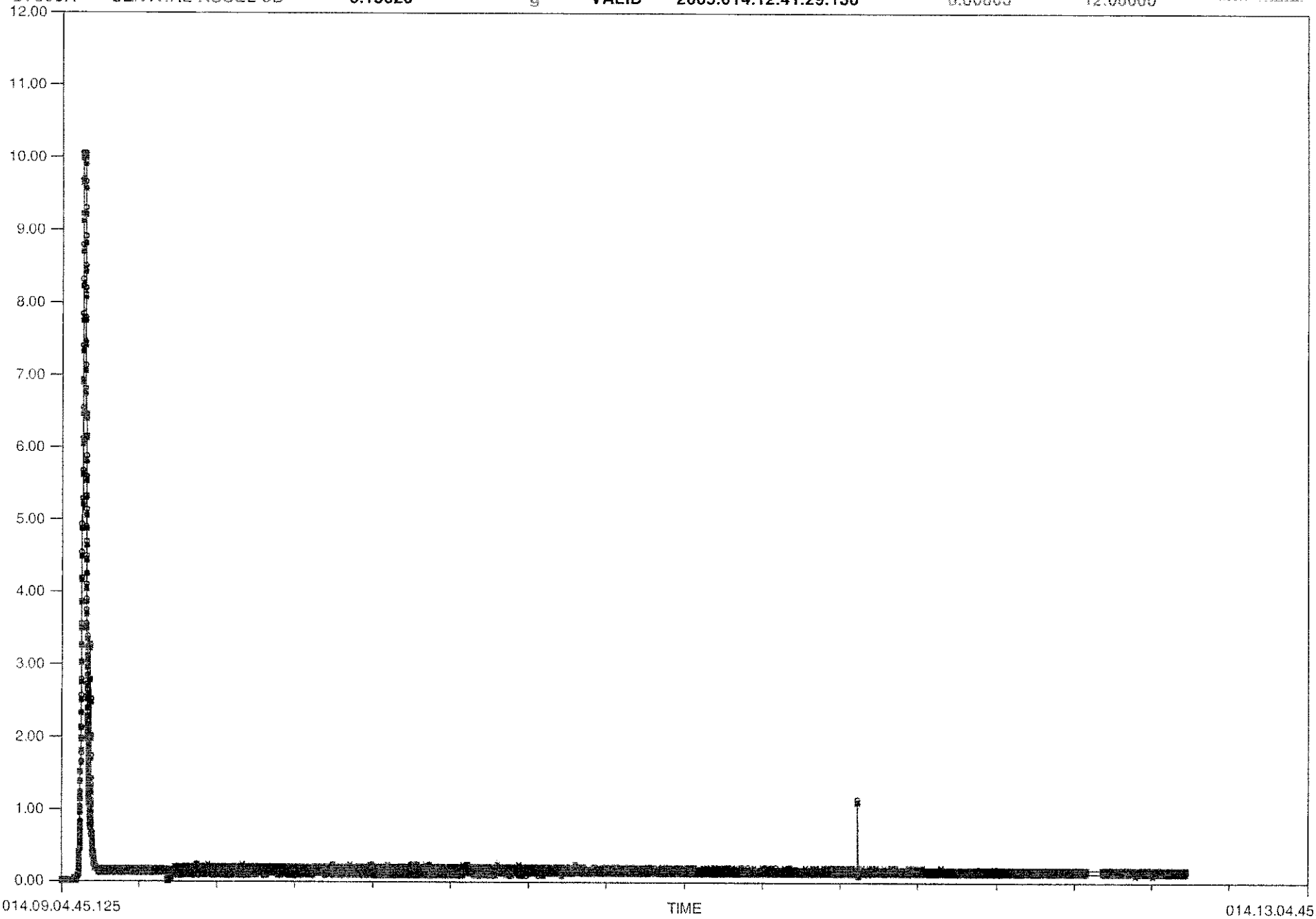
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D7001A	CENTRAL ACCEL 1A		g	EARLY		0.00000	0.20000	
D7002A	CENTRAL ACCEL 2A		g	EARLY		0.00000	0.20000	
D7003A	CENTRAL ACCEL 3A		g	EARLY		0.00000	0.20000	



DS: 524 ID: W194ha Title: [CDMS] CASU B Sample Time: 2005.014.12.41.29.130 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

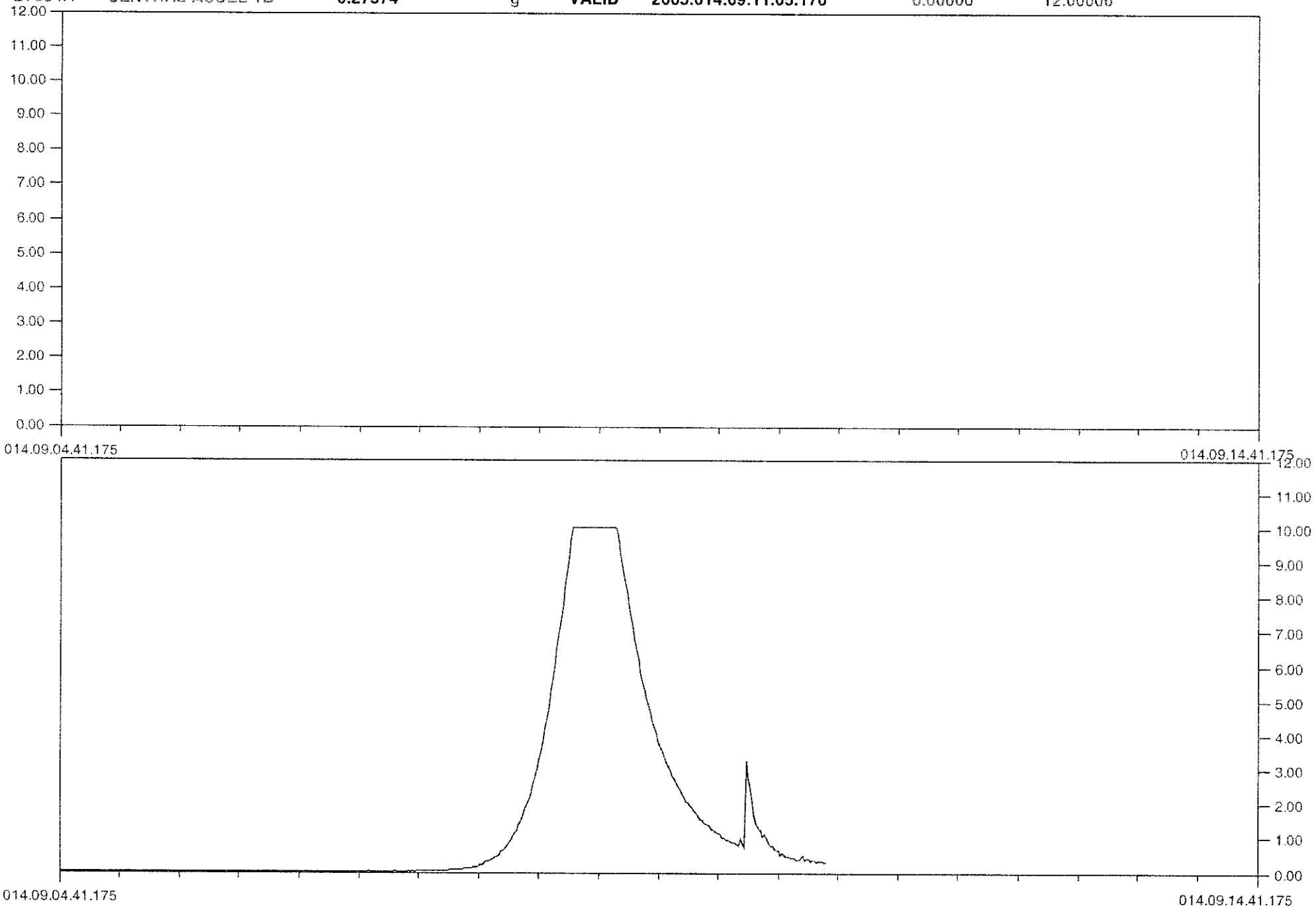
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D7004A	CENTRAL ACCEL 1B	0.11834	g	VALID	2005.014.12.41.29.130	0.00000	12.00000	
D7005A	CENTRAL ACCEL 2B	0.15764	g	VALID	2005.014.12.41.29.130	0.00000	12.00000	
D7006A	CENTRAL ACCEL 3B	0.15626	g	VALID	2005.014.12.41.29.130	0.00000	12.00000	



DS: 524 ID: W204a Title: CASU 1A & 1B Non 0 Jitter Monit. Sample Time: 2005.014.09.11.05.170 Workstation: huyg2

X-GRID INTERVAL 000.00.10.00 **AUTO HARD COPY** OFF

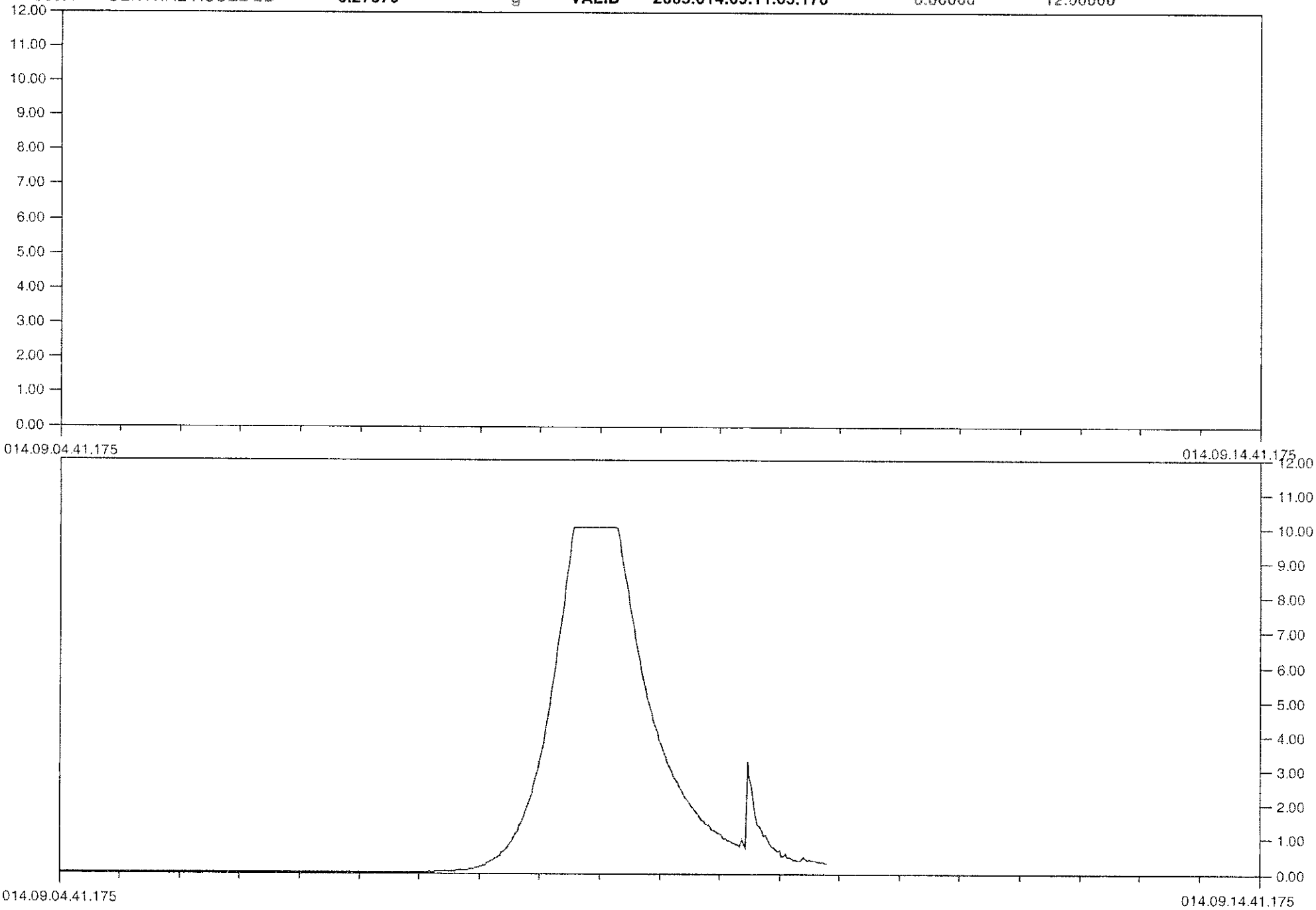
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D7001A	CENTRAL ACCEL 1A		g	EARLY		0.00000	12.00000	
D7004A	CENTRAL ACCEL 1B	0.27574	g	VALID	2005.014.09.11.05.170	0.00000	12.00000	



DS: 524 ID: W205a Title: CASU 2A & 2B Non 0 Jitter Monit. Sample Time: 2005.014.09.11.05.170 Workstation: huyg2

X-GRID INTERVAL 000.00.10.00 **AUTO HARD COPY** OFF

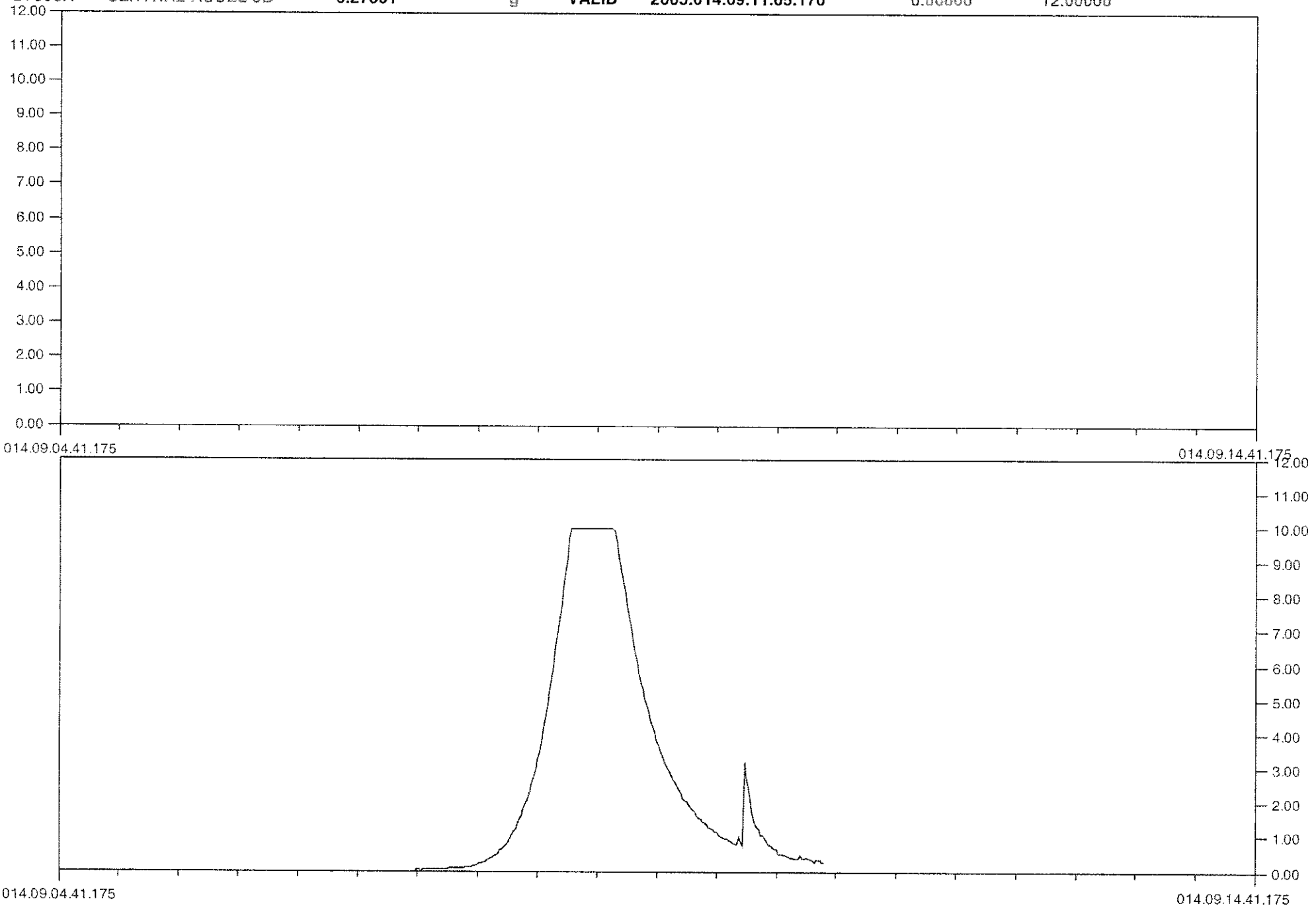
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D7002A	CENTRAL ACCEL 2A		g	EARLY		0.00000	12.00000	
D7005A	CENTRAL ACCEL 2B	0.27576	g	VALID	2005.014.09.11.05.170	0.00000	12.00000	



DS: 524 ID: W206a Title: CASU 3A & 3B Non 0 Jitter Monit. Sample Time: 2005.014.09.11.05.170 Workstation: huyg2

X-GRID INTERVAL 000.00.10.00 **AUTO HARD COPY** OFF

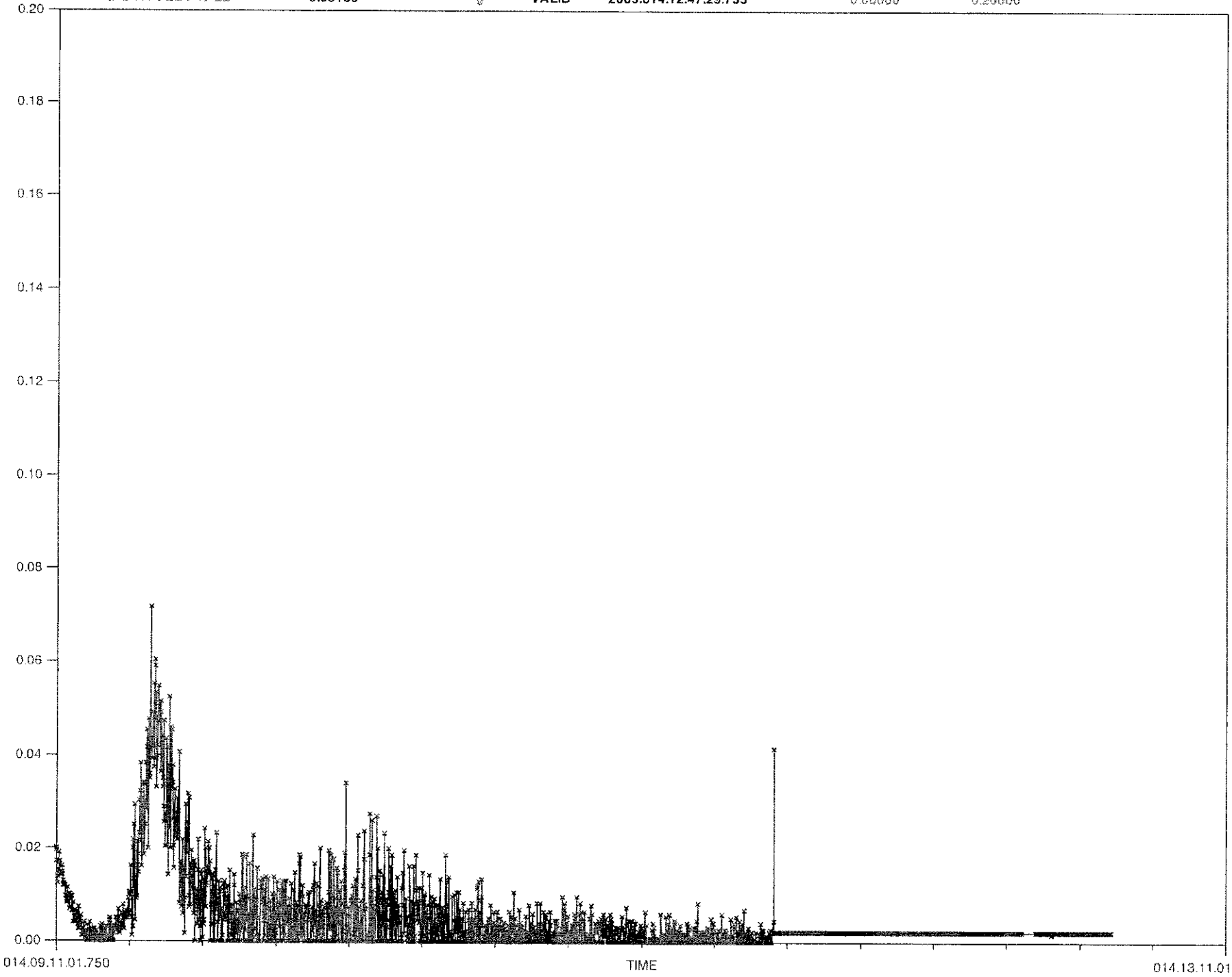
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D7003A	CENTRAL ACCEL 3A		g	EARLY		0.00000	12.00000	
D7006A	CENTRAL ACCEL 3B	0.27361	g	VALID	2005.014.09.11.05.170	0.00000	12.00000	



DS: 524 ID: W101n Title: [CDMS] RASU Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

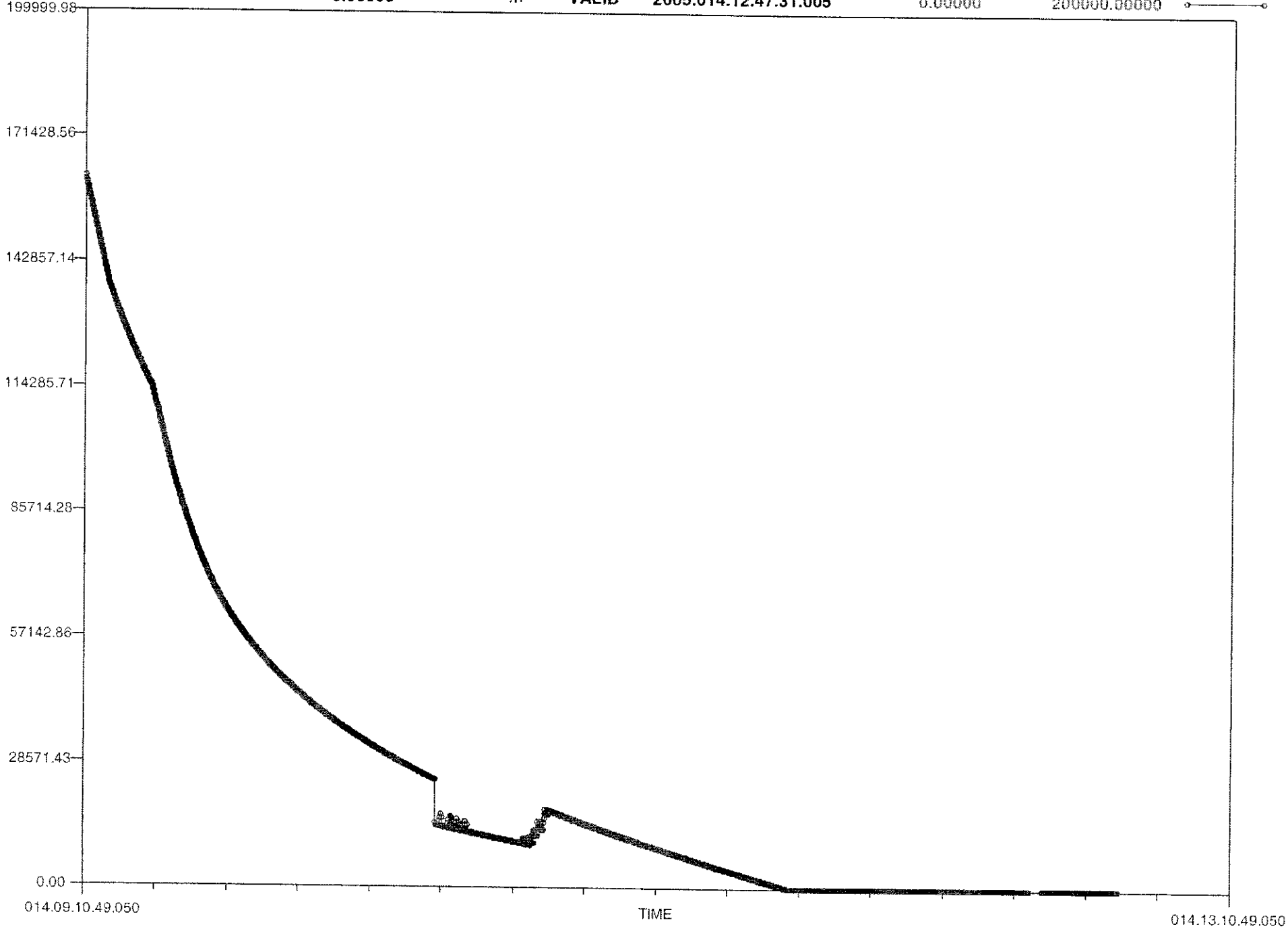
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D8005A	RAD ACCEL 3 VALB	0.00189	0	VALID	2005.014.12.47.29.755	0.00000	0.20000	



DS: 524 ID: W102h Title: [CDMS]DDB ALTITUDE Sample Time: 2005.014.12.47.31.005 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

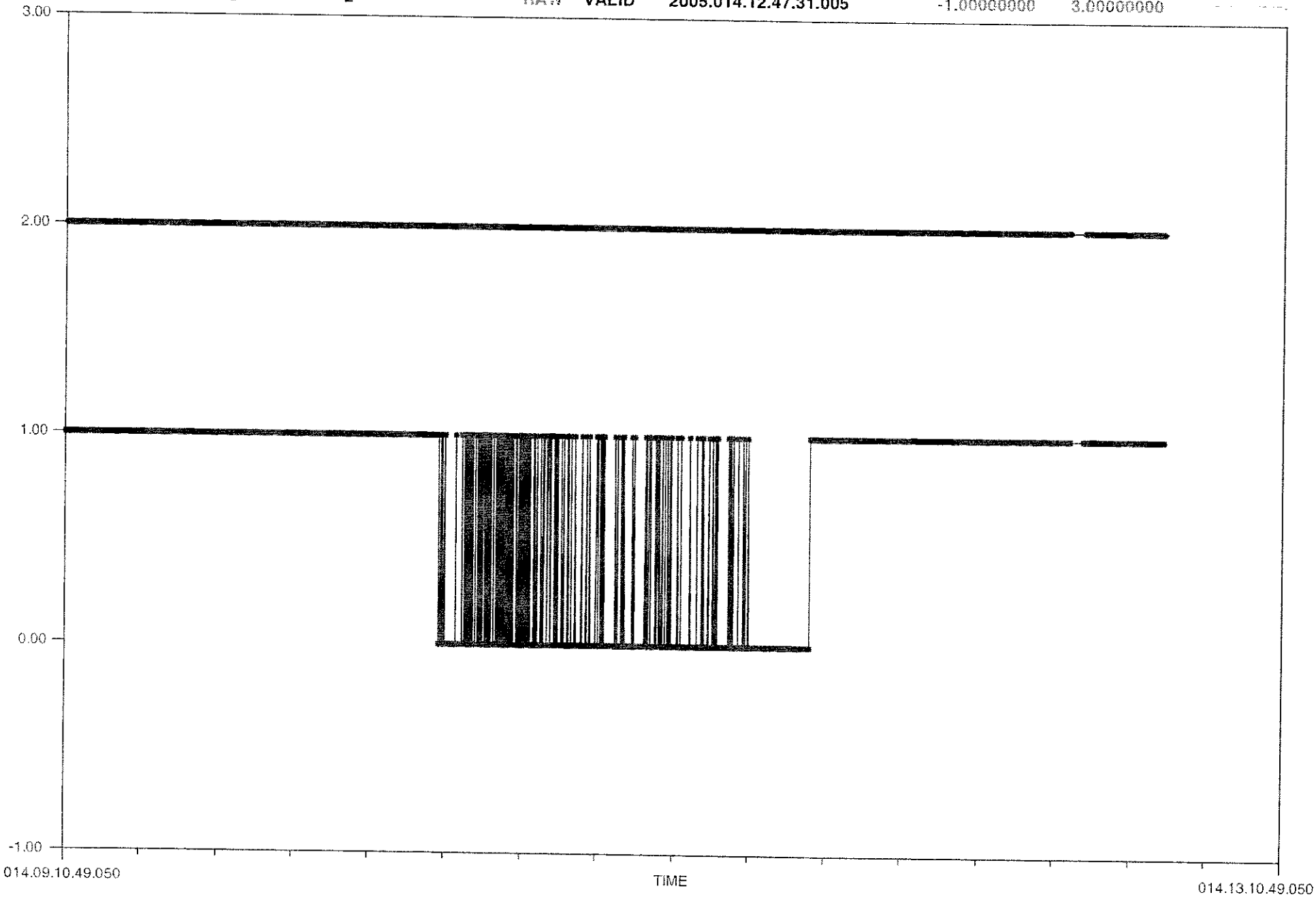
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1013E	DDB ALTITUDE A		m			0.00000	200000.00000	
S2013E	DDB ALTITUDE B	0.00000	m	VALID	2005.014.12.47.31.005	0.00000	200000.00000	



DS: 524 ID: W122n Title: [CDMS] DDB FLAGS Sample Time: 2005.014.12.47.31.005 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

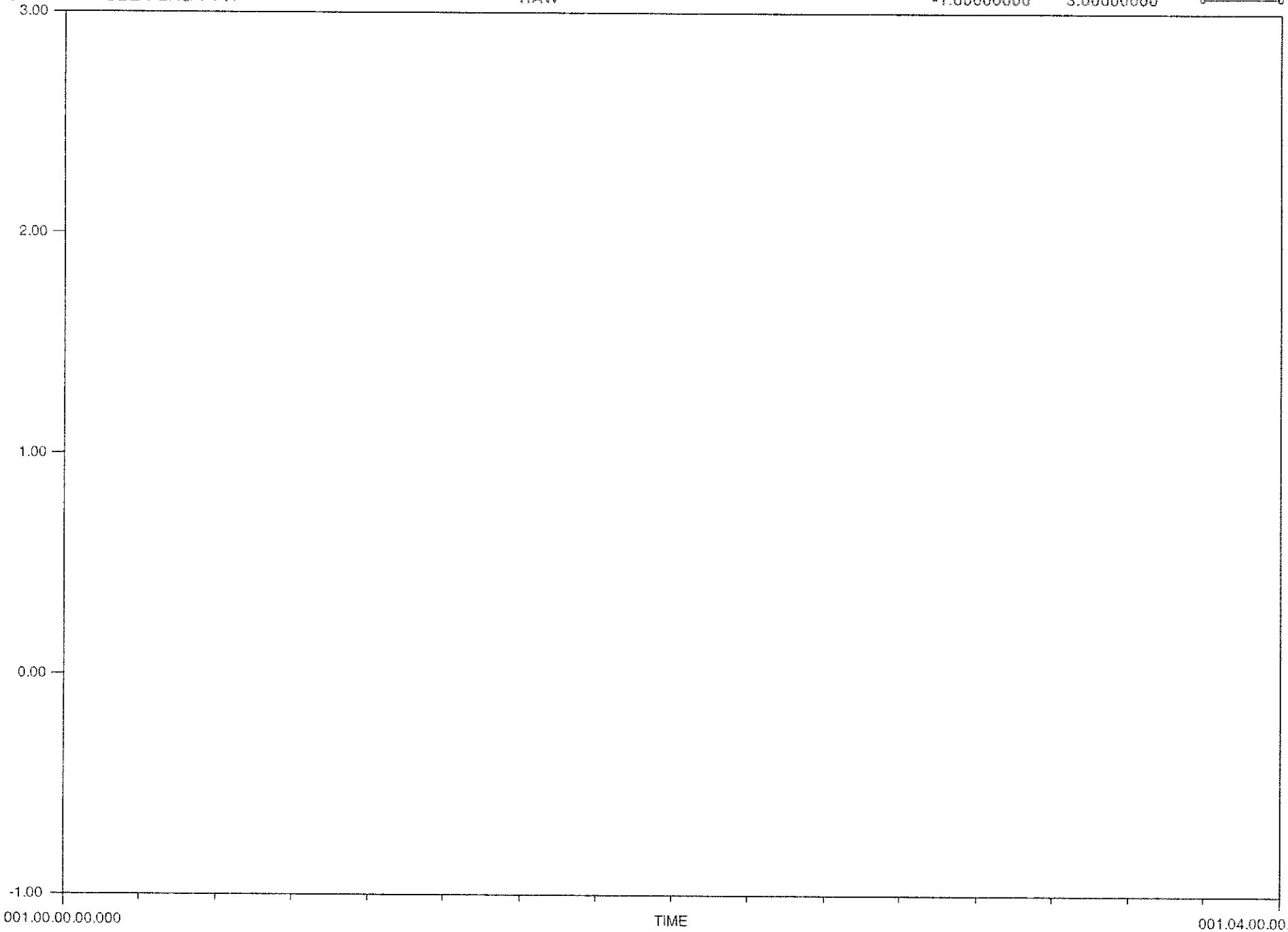
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1013F	DDB FLAG F2 A		RAW			-1.00000000	3.00000000	
S1014F	DDB FLAG F1 A		RAW			-1.00000000	3.00000000	
S2013F	DDB FLAG F2 B	1	RAW	VALID	2005.014.12.47.31.005	-1.00000000	3.00000000	
S2014F	DDB FLAG F1 B	2	RAW	VALID	2005.014.12.47.31.005	-1.00000000	3.00000000	



DS: 524 ID: PO01h Title: [CDMS] DDB FLAGS A Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

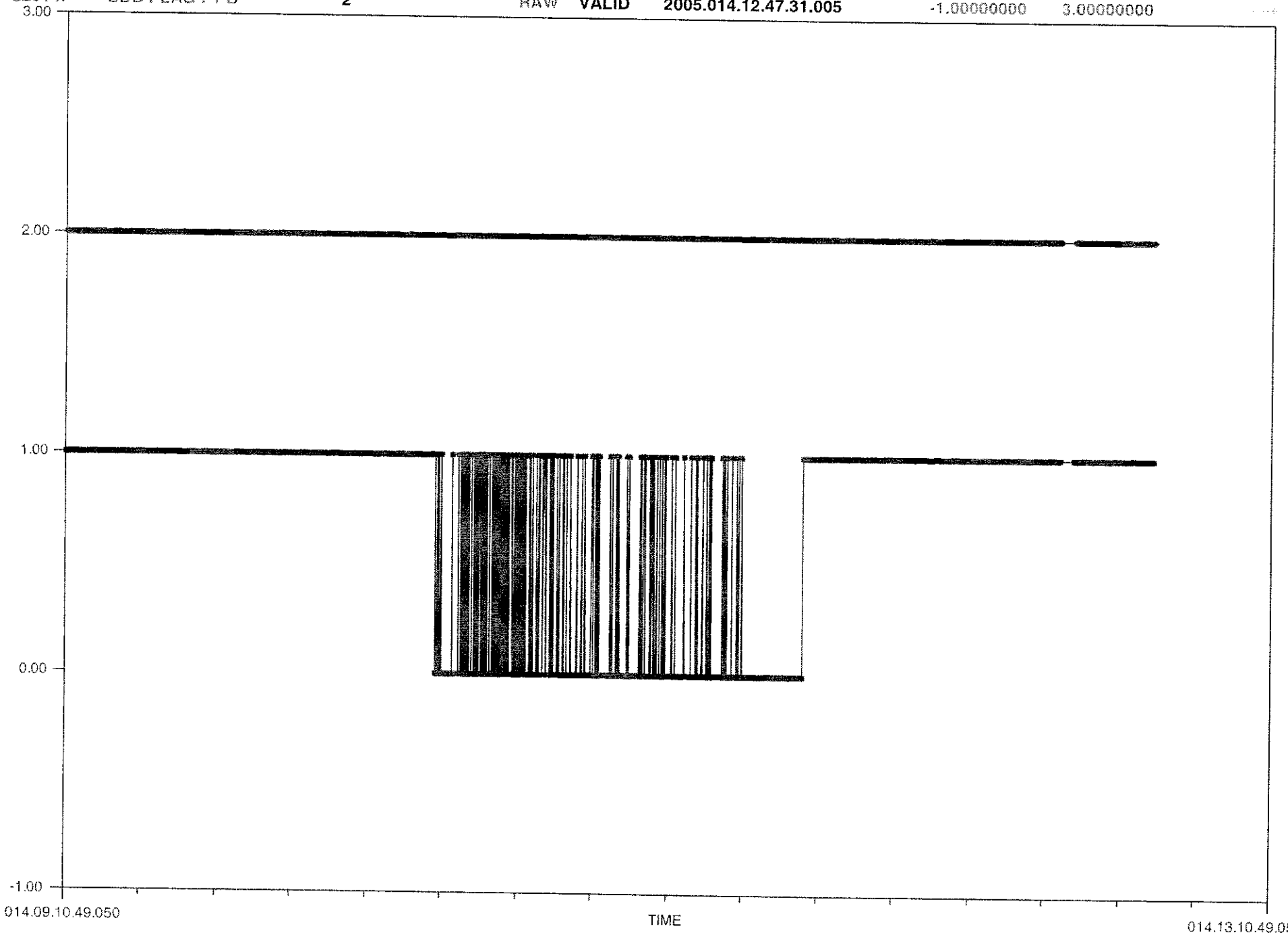
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1013F	DDB FLAG F2 A		RAW			-1.00000000	3.00000000	
S1014F	DDB FLAG F1 A		RAW			-1.00000000	3.00000000	



DS: 524 ID: PO02h Title: [CDMS] DDB FLAGS B Sample Time: 2005.014.12.47.31.005 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

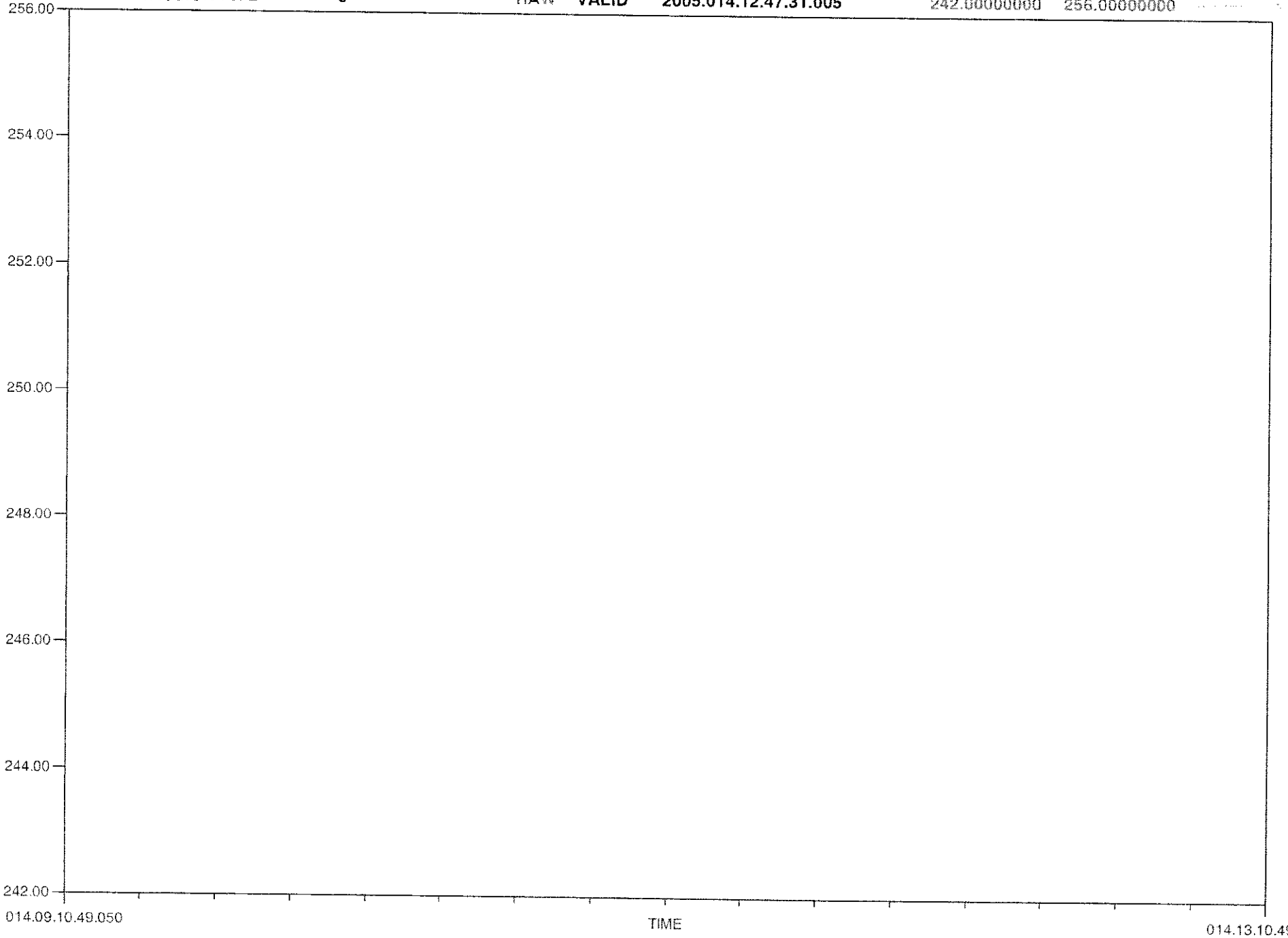
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S2013F	DDB FLAG F2 B	1	RAW	VALID	2005.014.12.47.31.005	-1.00000000	3.00000000	
S2014F	DDB FLAG F1 B	2	RAW	VALID	2005.014.12.47.31.005	-1.00000000	3.00000000	



DS: 524 ID: W123h Title: [CDMS] DDB MISSION PHASE Sample Time: 2005.014.12.47.31.005 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

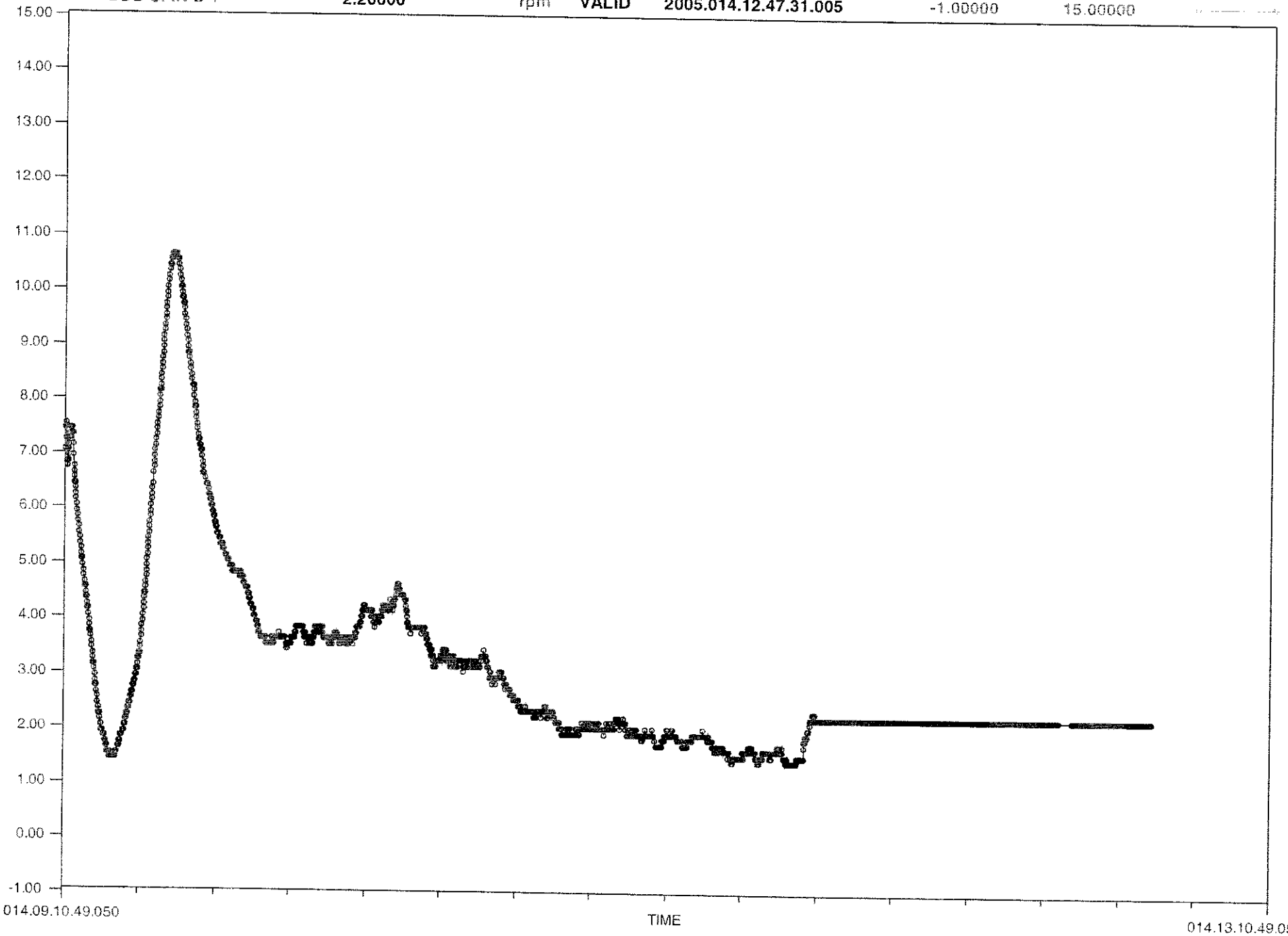
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1012H	DDB MISSION PH A		RAW			242.00000000	256.00000000	
S2012H	DDB MISSION PH B	0	RAW	VALID	2005.014.12.47.31.005	242.00000000	256.00000000	



DS: 524 ID: W103h Title: [CDMS] DDB SPIN - Scenario 2 Sample Time: 2005.014.12.47.31.005 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

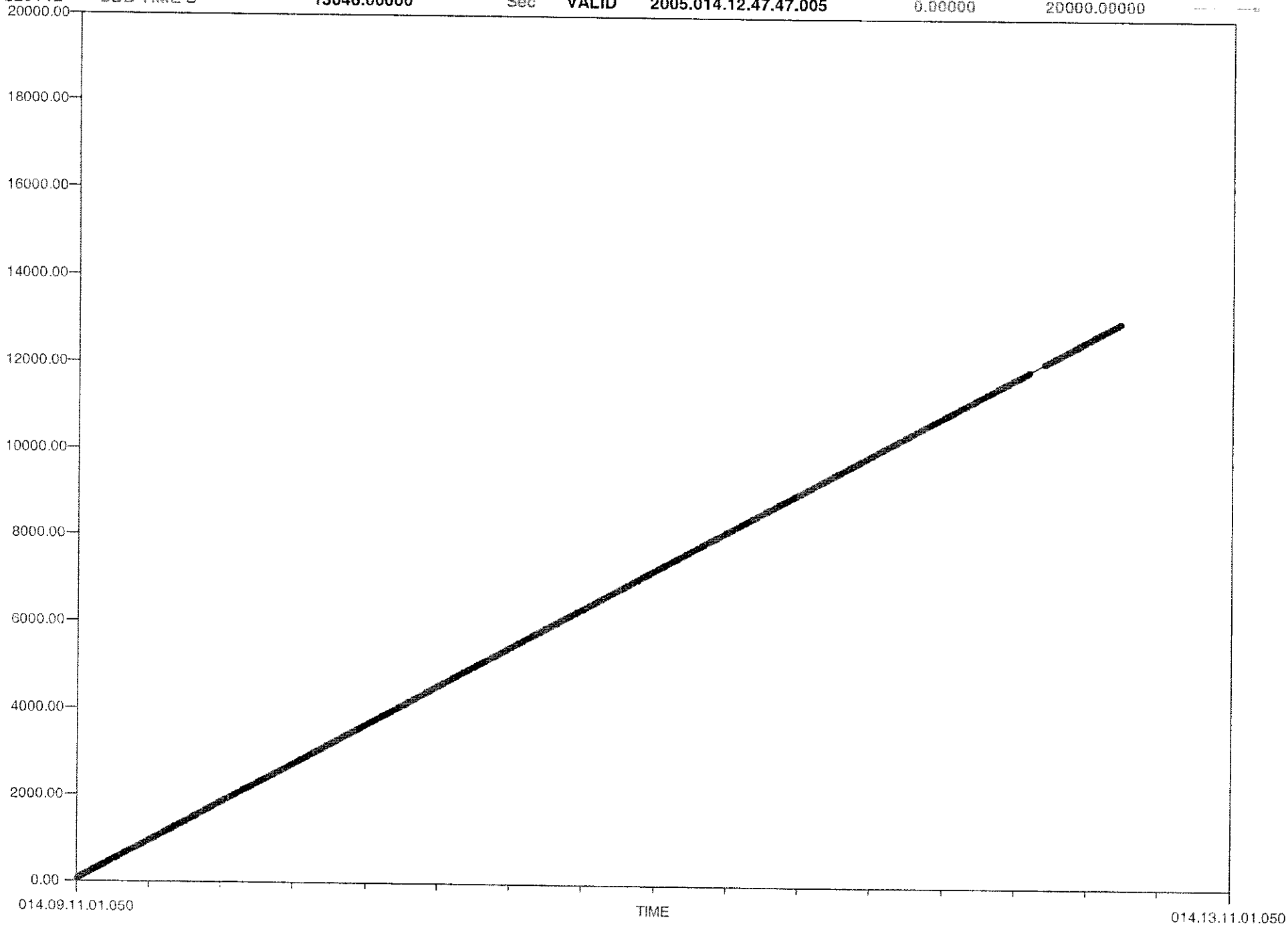
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1011H	DDB SPIN A 1		rpm			-1.00000	15.00000	
S2011H	DDB SPIN B 1	2.20000	rpm	VALID	2005.014.12.47.31.005	-1.00000	15.00000	



DS: 524 ID: W124h Title: [CDMS] DDB TIME Sample Time: 2005.014.12.47.47.005 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

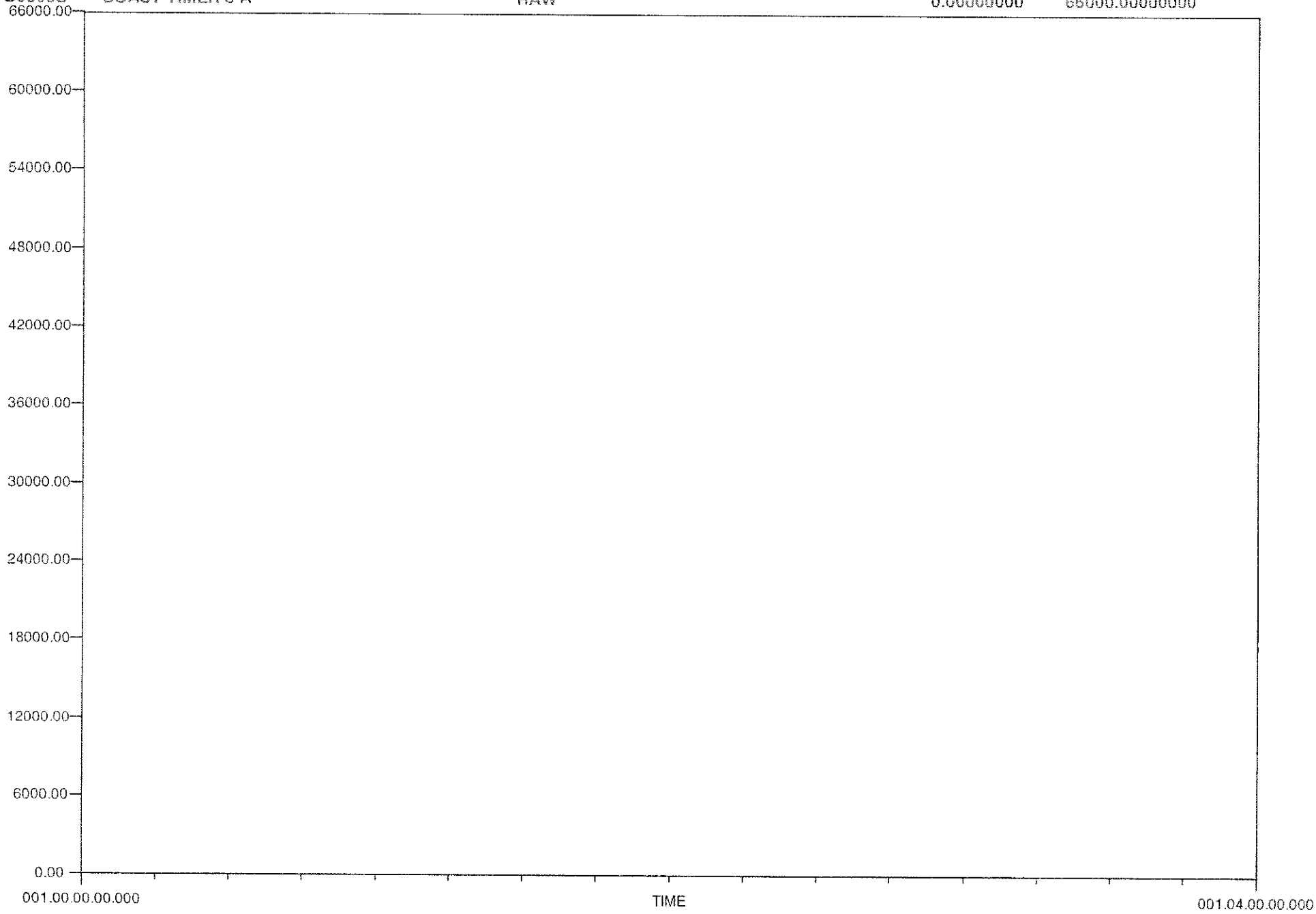
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1014D	DDB TIME A		Sec			0.00000	20000.00000	
S2014D	DDB TIME B	13046.00000	Sec	VALID	2005.014.12.47.47.005	0.00000	20000.00000	



DS: 524 ID: W200h Title: [CDMS] MTU A VALUE Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

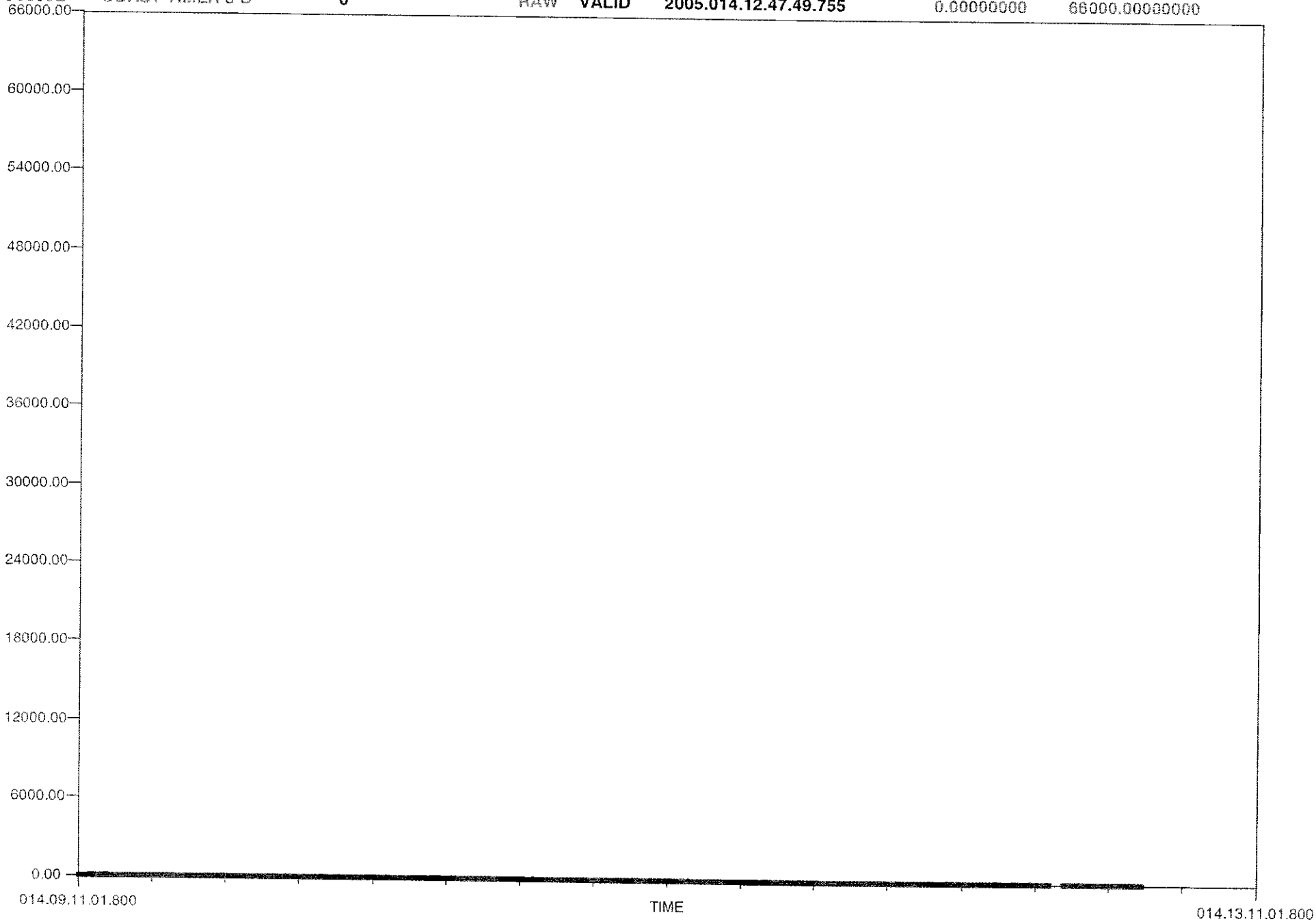
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D6001S	COAST TIMER 1 A		RAW			0.00000000	66000.00000000	
D6003S	COAST TIMER 2 A		RAW			0.00000000	66000.00000000	
D6005S	COAST TIMER 3 A		RAW			0.00000000	66000.00000000	



DS: 524 ID: W201h Title: [CDMS] MTU B VALUE Sample Time: 2005.014.12.47.49.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

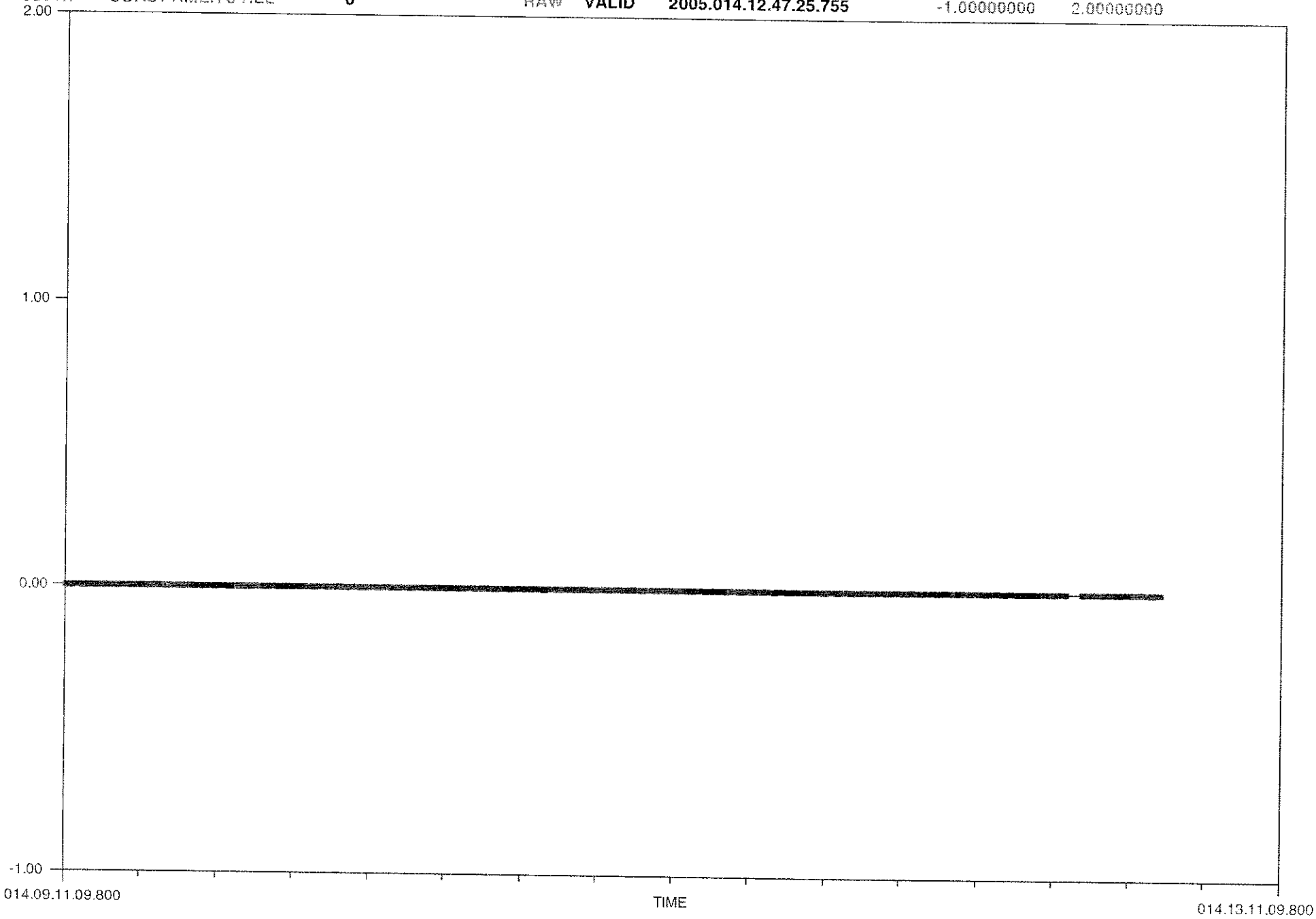
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D6002S	COAST TIMER 1 B	0	RAW	VALID	2005.014.12.47.49.755	0.00000000	66000.00000000	
D6004S	COAST TIMER 2 B	0	RAW	VALID	2005.014.12.47.49.755	0.00000000	66000.00000000	
D6006S	COAST TIMER 3 B	0	RAW	VALID	2005.014.12.47.49.755	0.00000000	66000.00000000	



DS: 524 ID: W202h Title: [CDMS] Coast Timer Relays Sample Time: 2005.014.12.47.25.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5078R	COASTTIMER 1 REL		RAW			-1.00000000	2.00000000	
P5079R	COASTTIMER 2 REL		RAW			-1.00000000	2.00000000	
P5081R	COASTTIMER 3 REL	0	RAW	VALID	2005.014.12.47.25.755	-1.00000000	2.00000000	

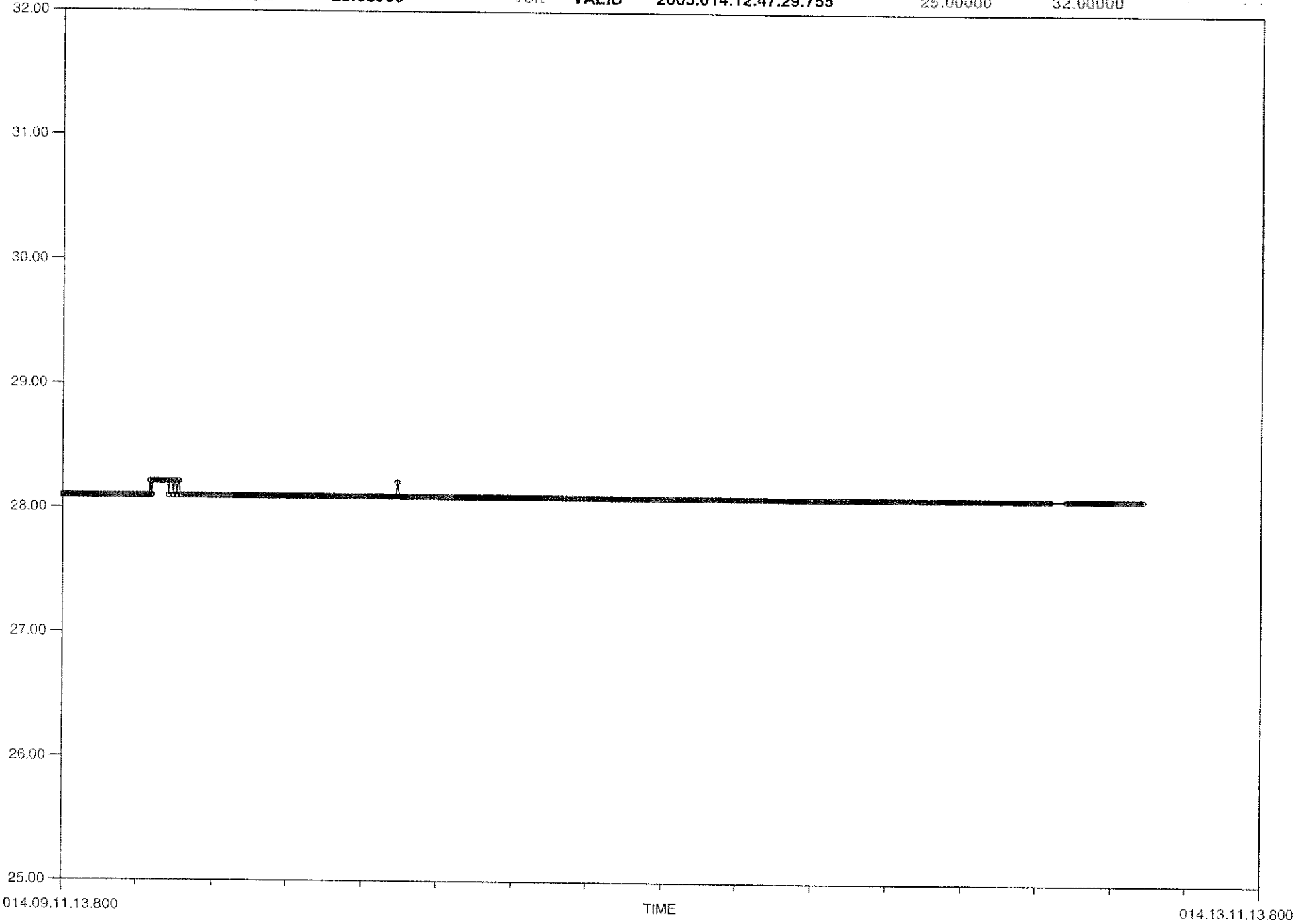


5.7.3 ELECTRICAL POWER SUBSYSTEM (EPSS)

DS: 524 ID: W104h Title: [EPSS] PCDU BUS Volt Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 AUTO HARD COPY OFF

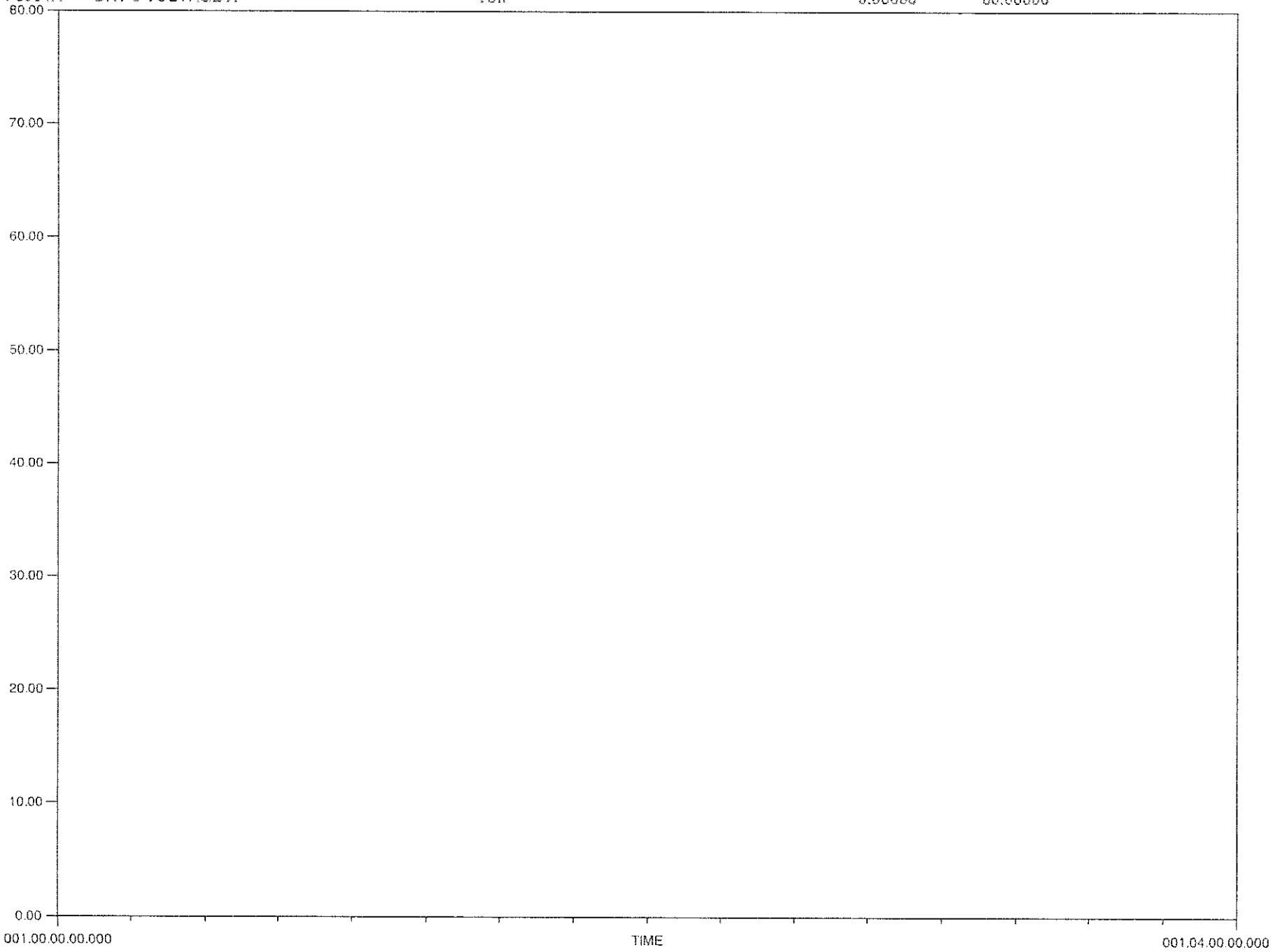
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5020A	MAIN BUS VOLTAGE		Volt			25.00000	32.00000	
P5021A	MAIN BUS VOLTAGE	28.08960	Volt	VALID	2005.014.12.47.29.755	25.00000	32.00000	



DS: 524 ID: W127h Title: [EPSS] BATTERY VOLT A Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

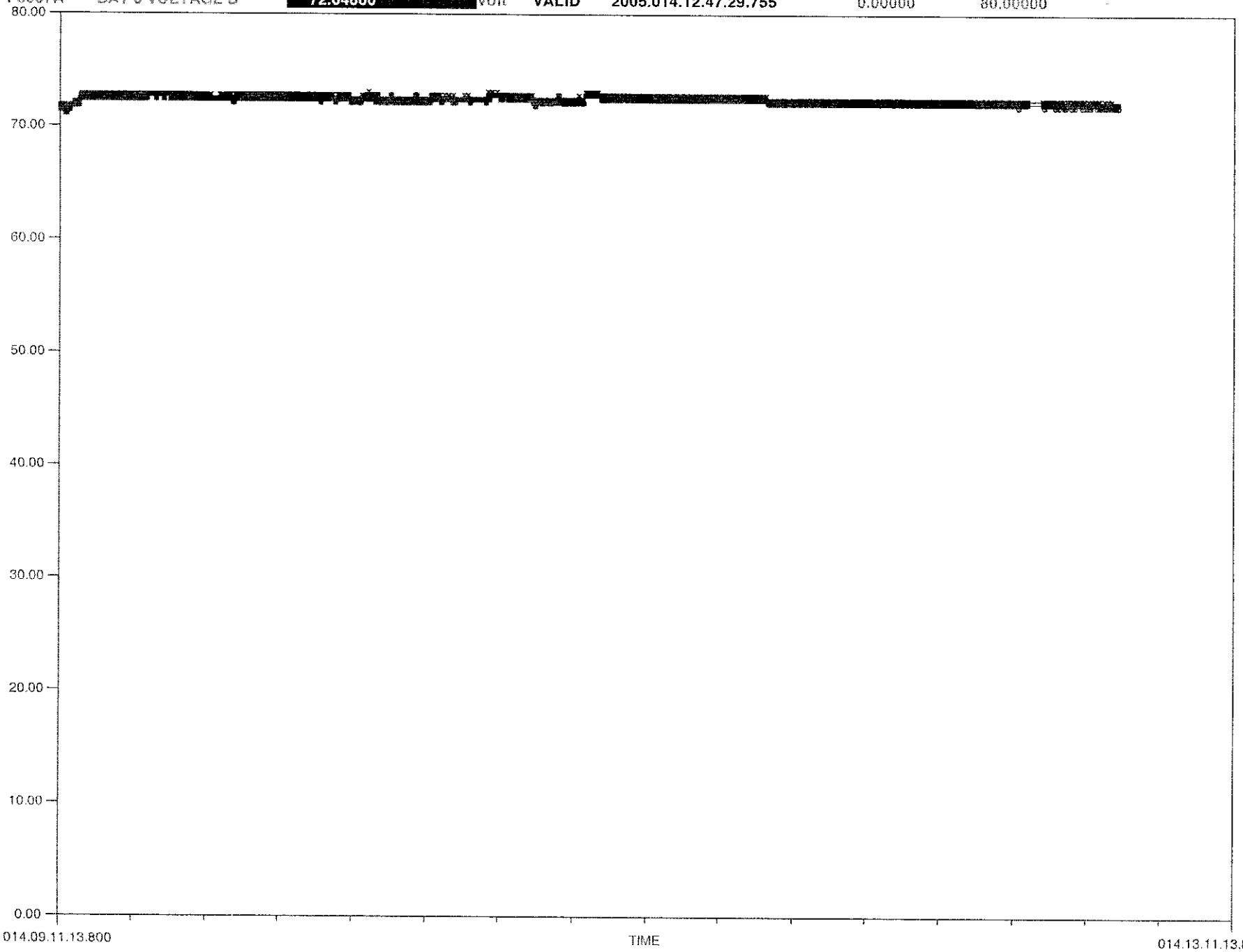
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5002A	BAT 1 VOLTAGE A		Volt			0.00000	80.00000	
P5003A	BAT 2 VOLTAGE A		Volt			0.00000	80.00000	
P5004A	BAT 3 VOLTAGE A		Volt			0.00000	80.00000	



DS: 524 ID: W128h Title: [EPSS] BATTERY VOLT B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

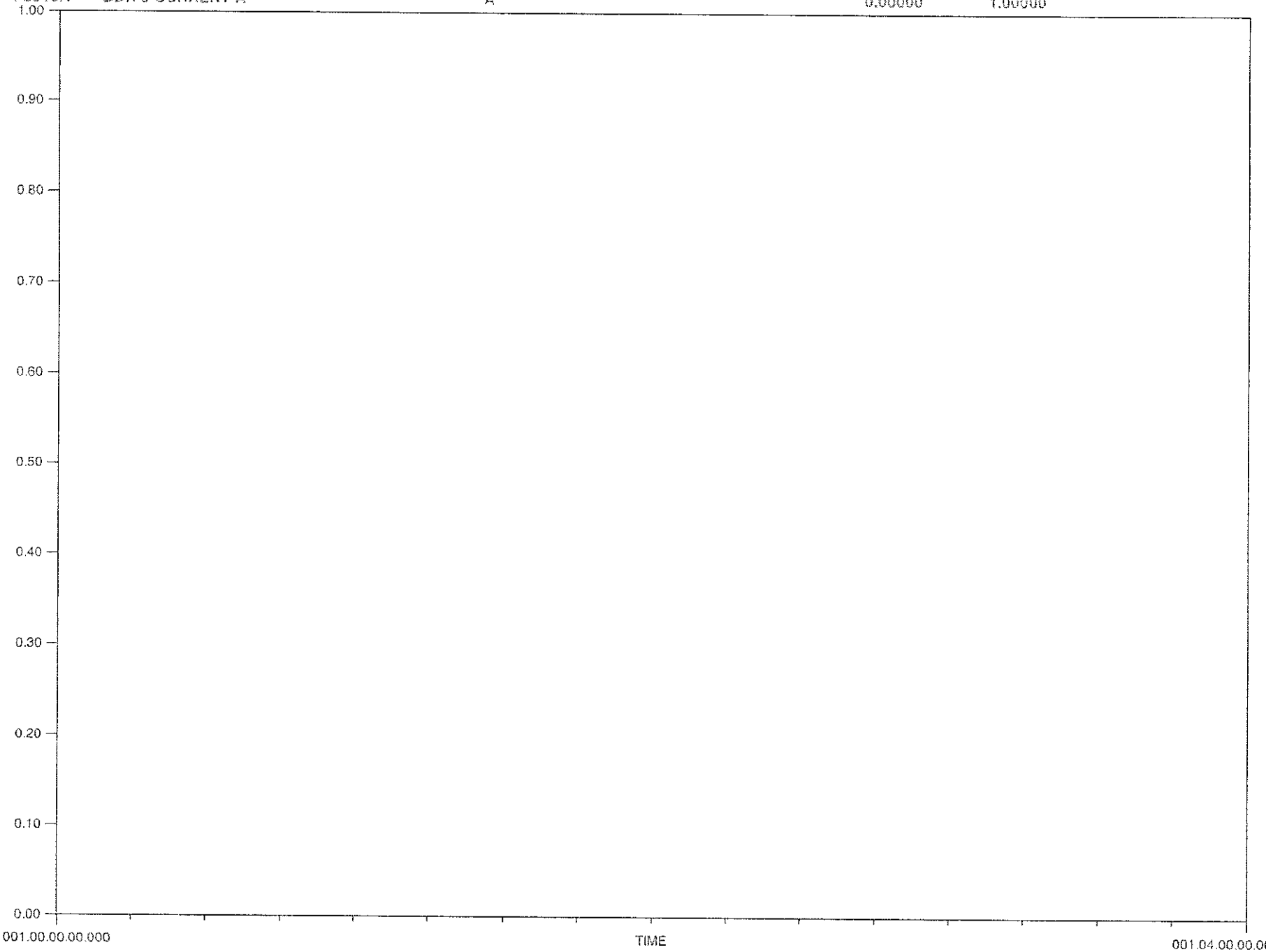
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5005A	BAT 3 VOLTAGE B	72.04600	Volt	VALID	2005.014.12.47.29.755	0.00000	80.00000	
P5006A	BAT 4 VOLTAGE B	71.72000	Volt	VALID	2005.014.12.47.29.755	0.00000	80.00000	
P5007A	BAT 5 VOLTAGE B	72.04600	Volt	VALID	2005.014.12.47.29.755	0.00000	80.00000	



DS: 524 ID: W129h Title: [EPSS] BDR CURRENTS A Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

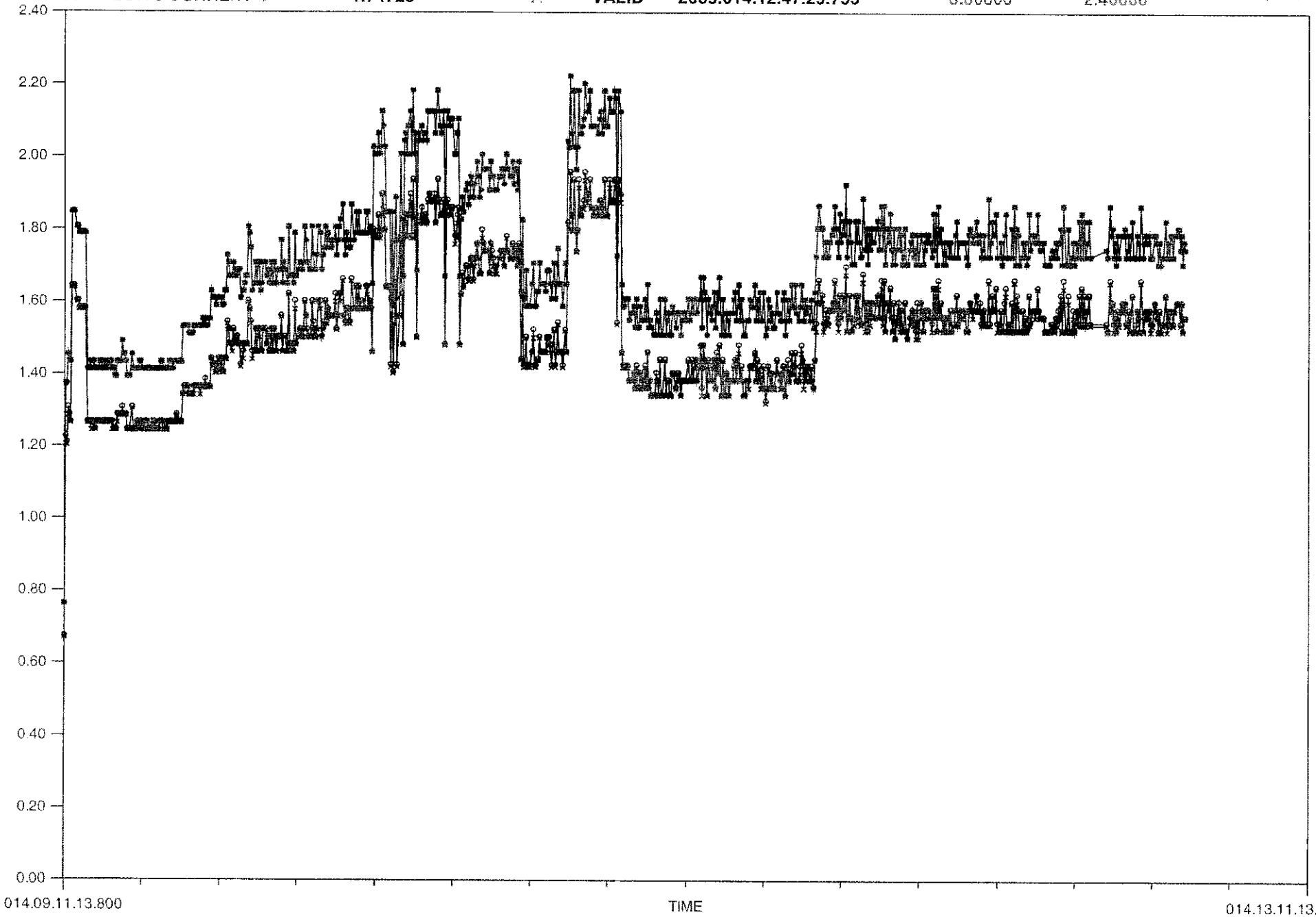
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5008A	BDR 1 CURRENT A		A			0.00000	1.00000	
P5009A	BDR 2 CURRENT A		A			0.00000	1.00000	
P5010A	BDR 3 CURRENT A		A			0.00000	1.00000	



DS: 524 ID: W130h Title: [EPSS] BDR CURRENTS B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

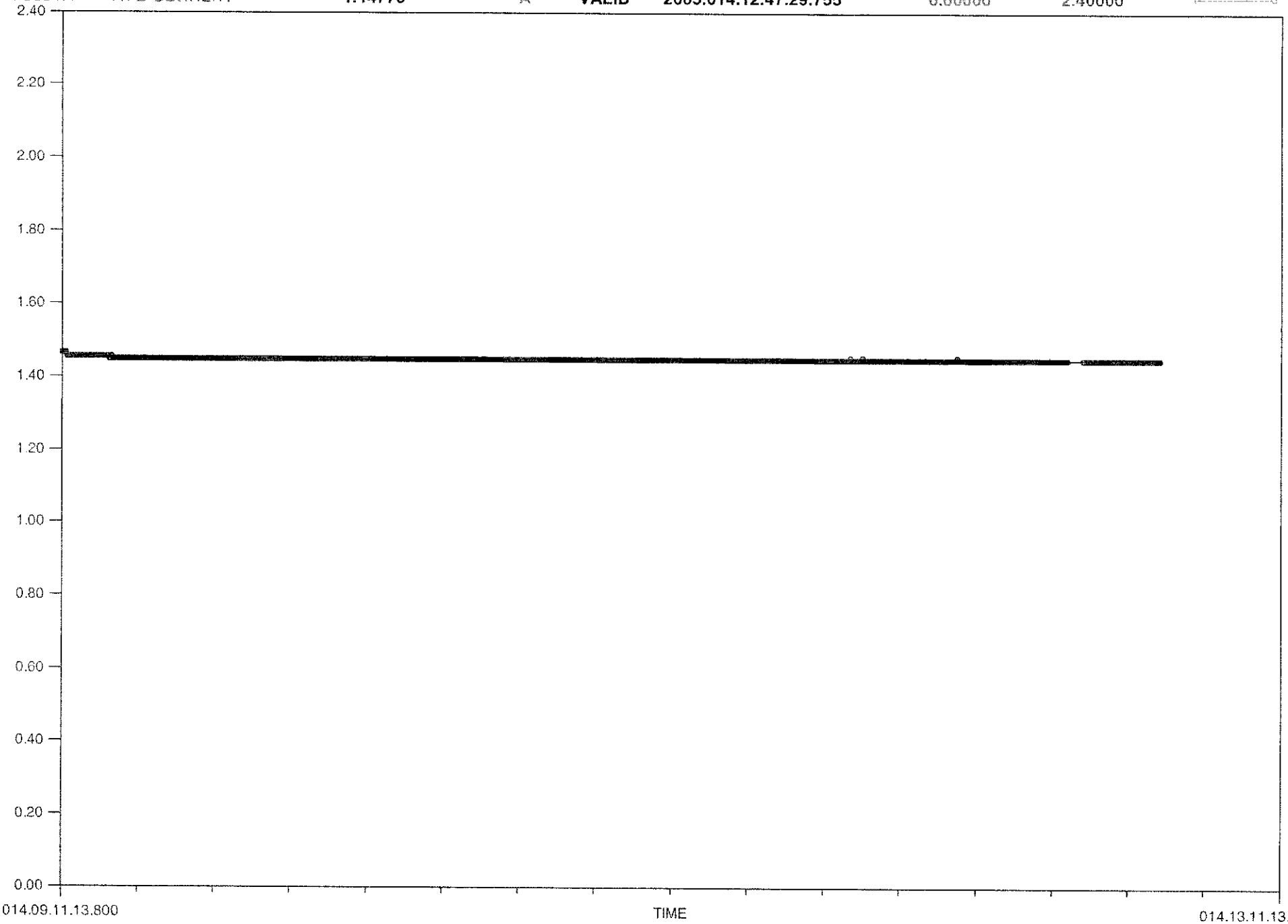
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5011A	BDR 3 CURRENT B	1.55850	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	
P5012A	BDR 4 CURRENT B	1.56250	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	
P5013A	BDR 5 CURRENT B	1.74725	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	



DS: 524 ID: W105h Title: [EPSS] TRANSMITTER CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

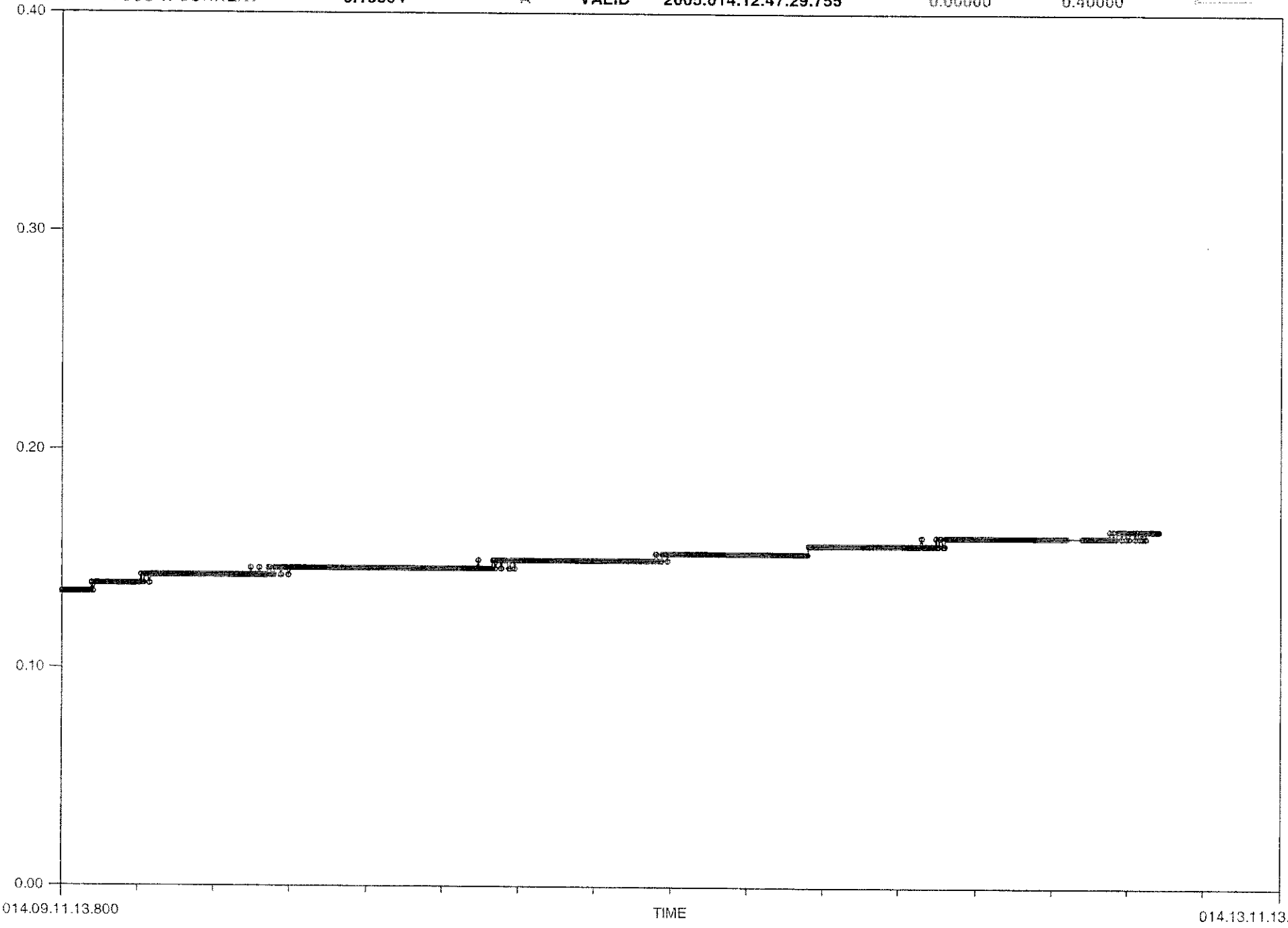
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5023A	TX A CURRENT		A			0.00000	2.40000	
P5051A	TX B CURRENT	1.44776	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	



DS: 524 ID: W106h Title: [EPSS] TUSO CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

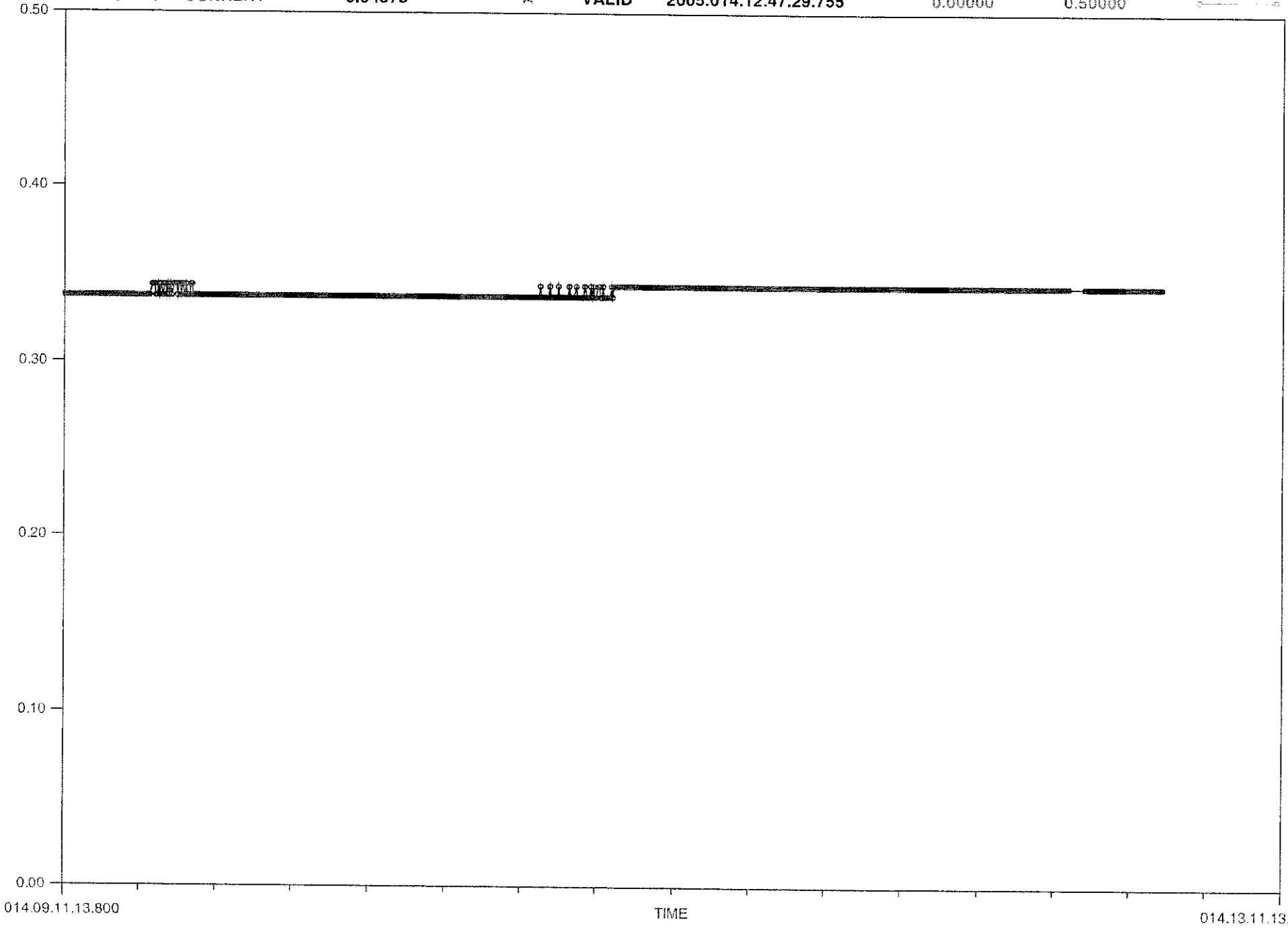
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5029A	TUSO N CURRENT		A			0.00000	0.40000	
P5057A	TUSO R CURRENT	0.16364	A	VALID	2005.014.12.47.29.755	0.00000	0.40000	



DS: 524 ID: W107h Title: [EPSS] CDMU CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

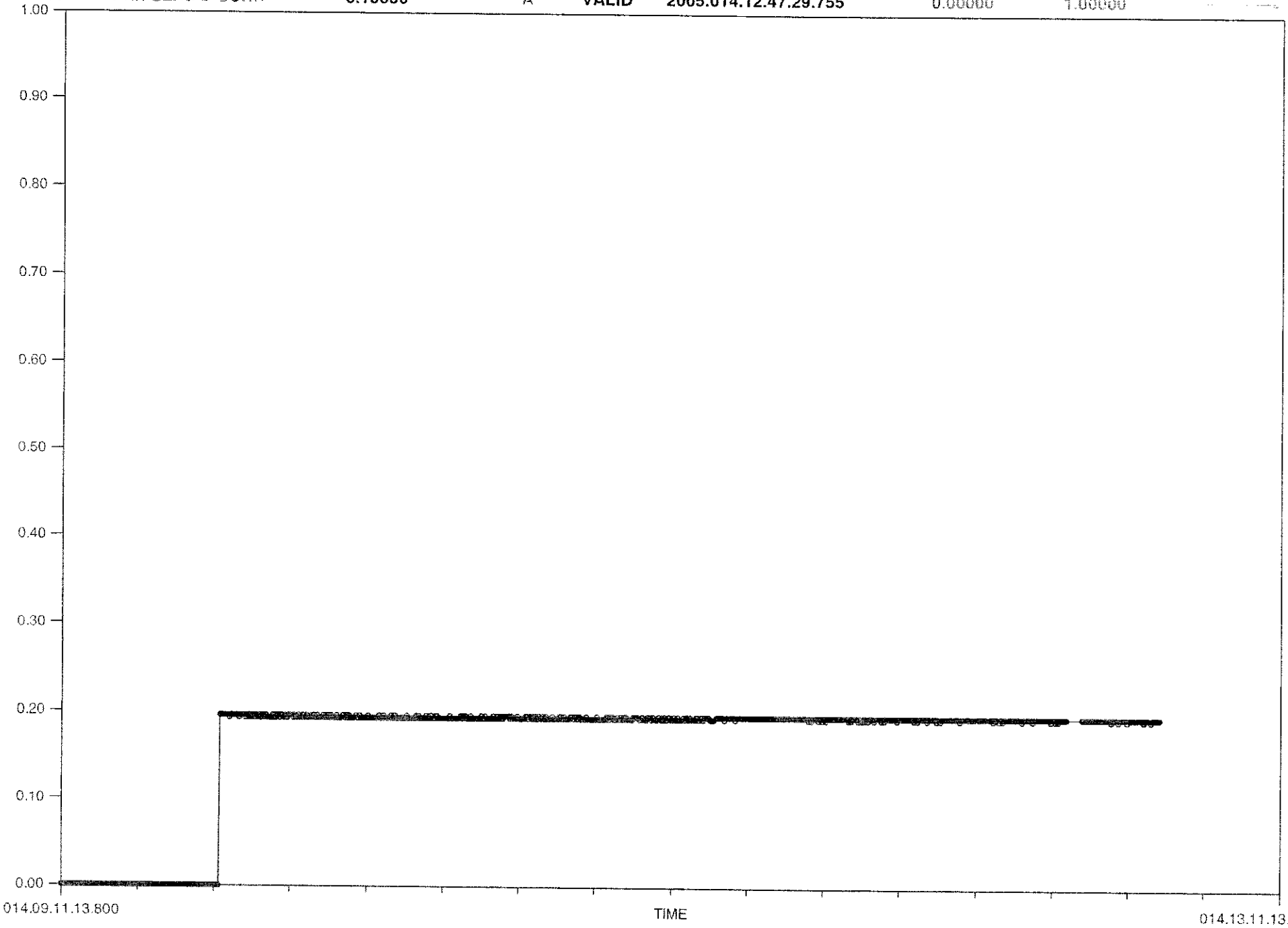
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5022A	CDMU A CURRENT		A			0.00000	0.50000	
P5050A	CDMU B CURRENT	0.34375	A	VALID	2005.014.12.47.29.755	0.00000	0.50000	



DS: 524 ID: W108h Title: [EPSS] PROXIMITY SENSOR CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

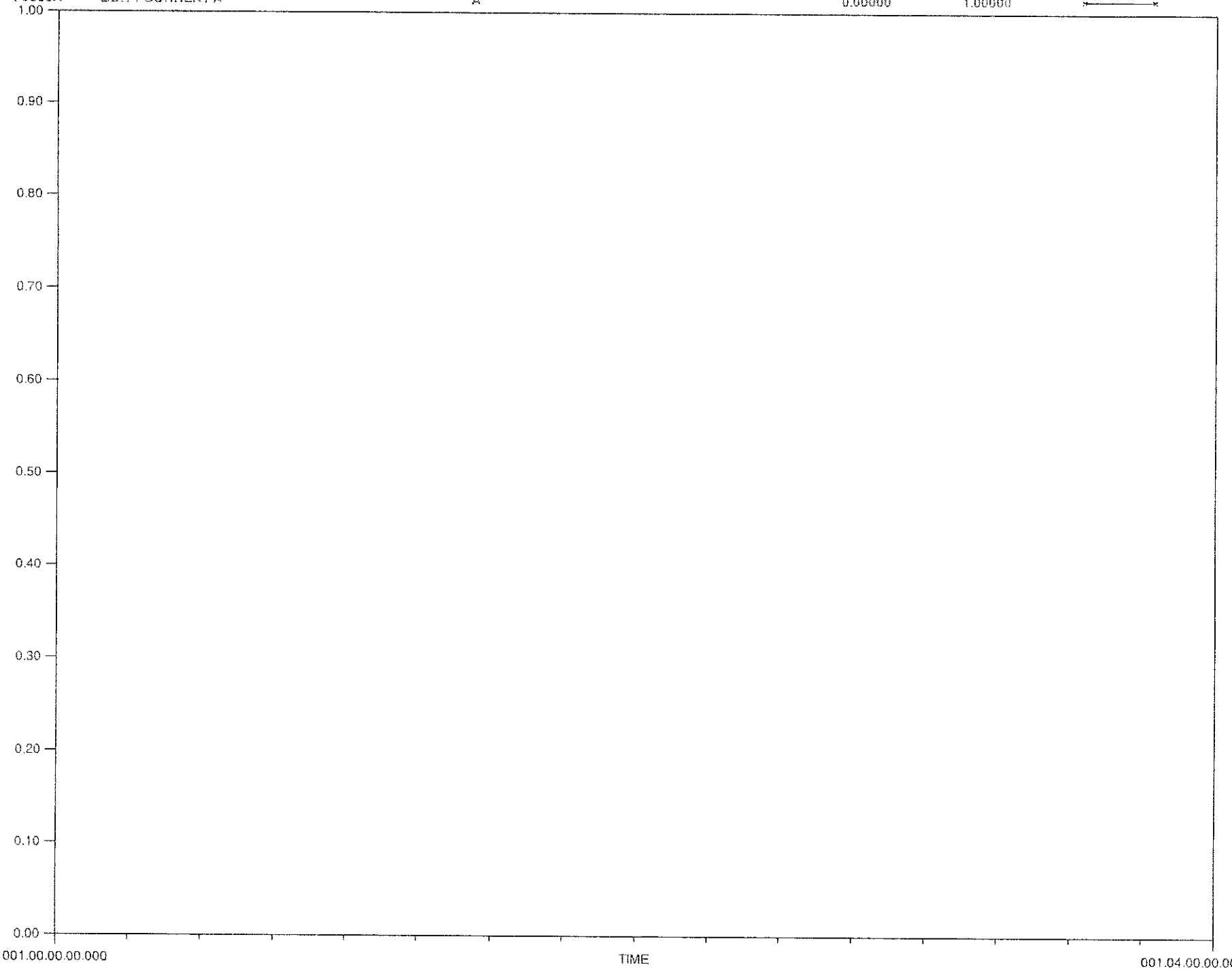
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5035A	PRX SENS A CURR		A			0.00000	1.00000	
P5063A	PRX SENS B CURR	0.19556	A	VALID	2005.014.12.47.29.755	0.00000	1.00000	



DS: 524 ID: EP01h Title: [EPSS] BDR CURRENTS 1 A Sample Time: Workstation: nuyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

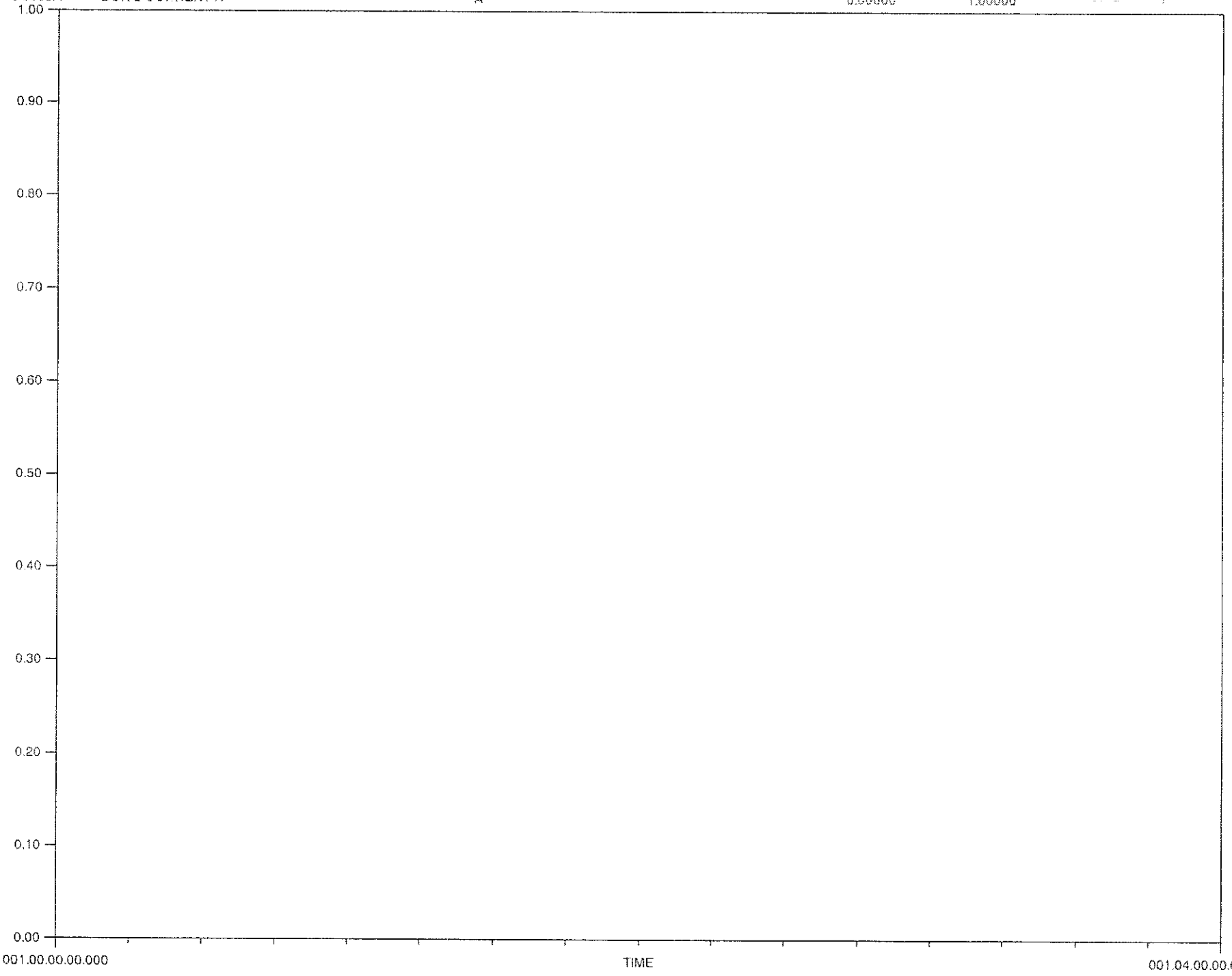
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5006A	BDR 1 CURRENT A		A			0.00000	1.00000	



DS: 524 ID: EP02h Title: [EPSS] BDR CURRENTS 2 A Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

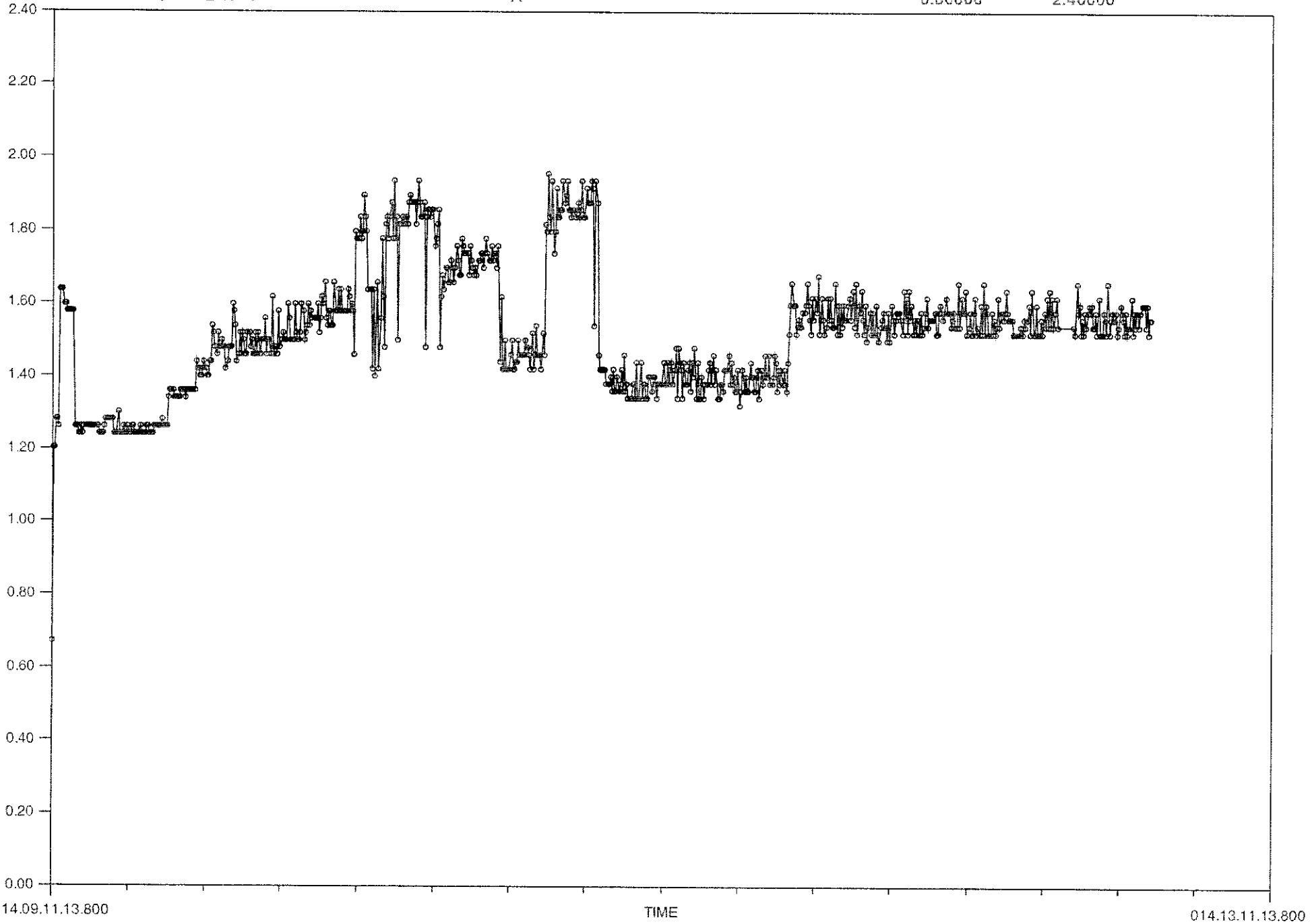
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5009A	BDR 2 CURRENT A		A			0.00000	1.00000	



DS: 524 ID: EP03h Title: [EPSS] BDR CURRENTS 3 A/B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

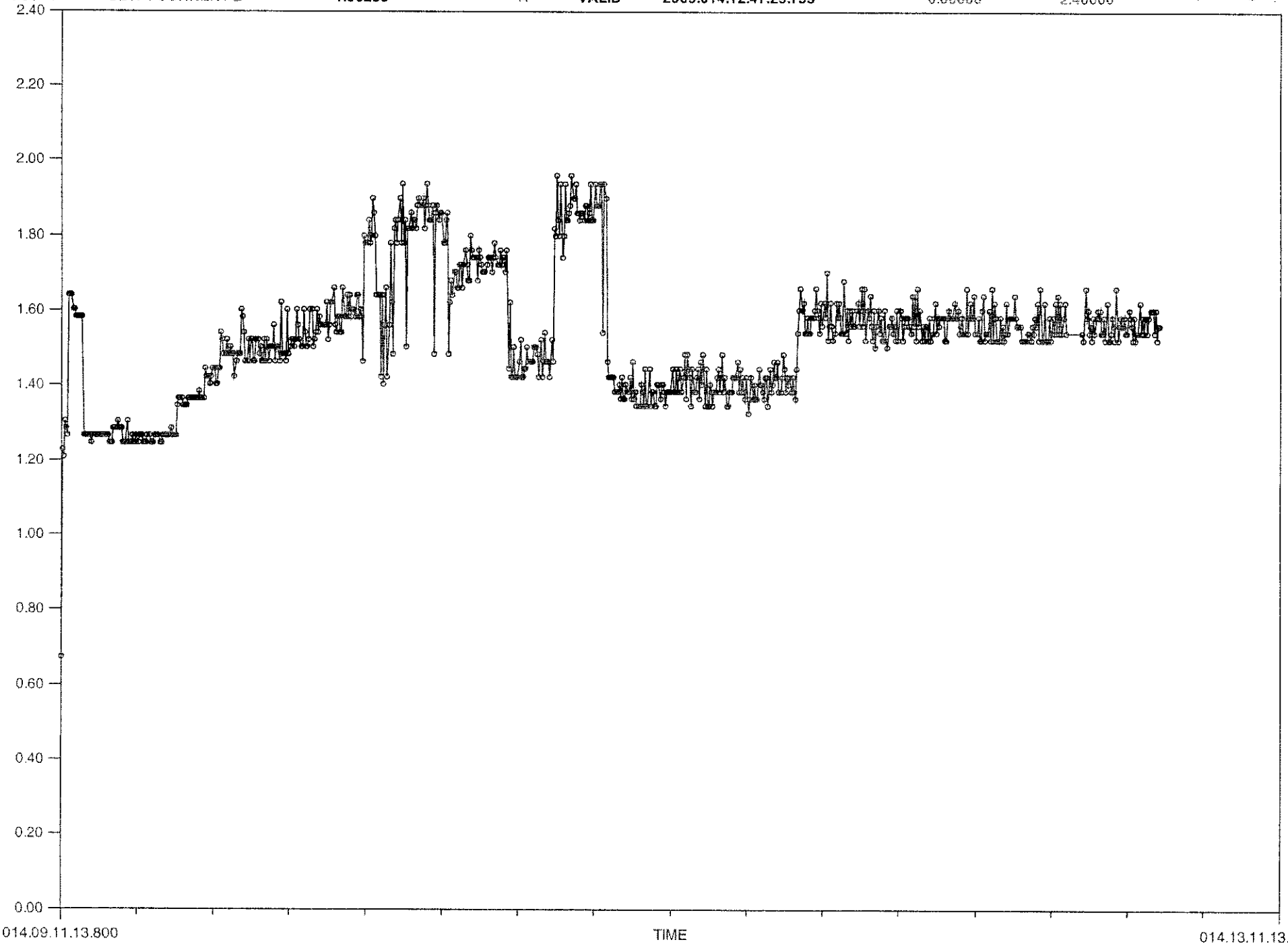
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5011A	BDR 3 CURRENT B	1.55850	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	
P5010A	BDR 3 CURRENT A		A			0.00000	2.40000	



DS: 524 ID: EP04h Title: [EPSS] BDR CURRENTS 4 B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

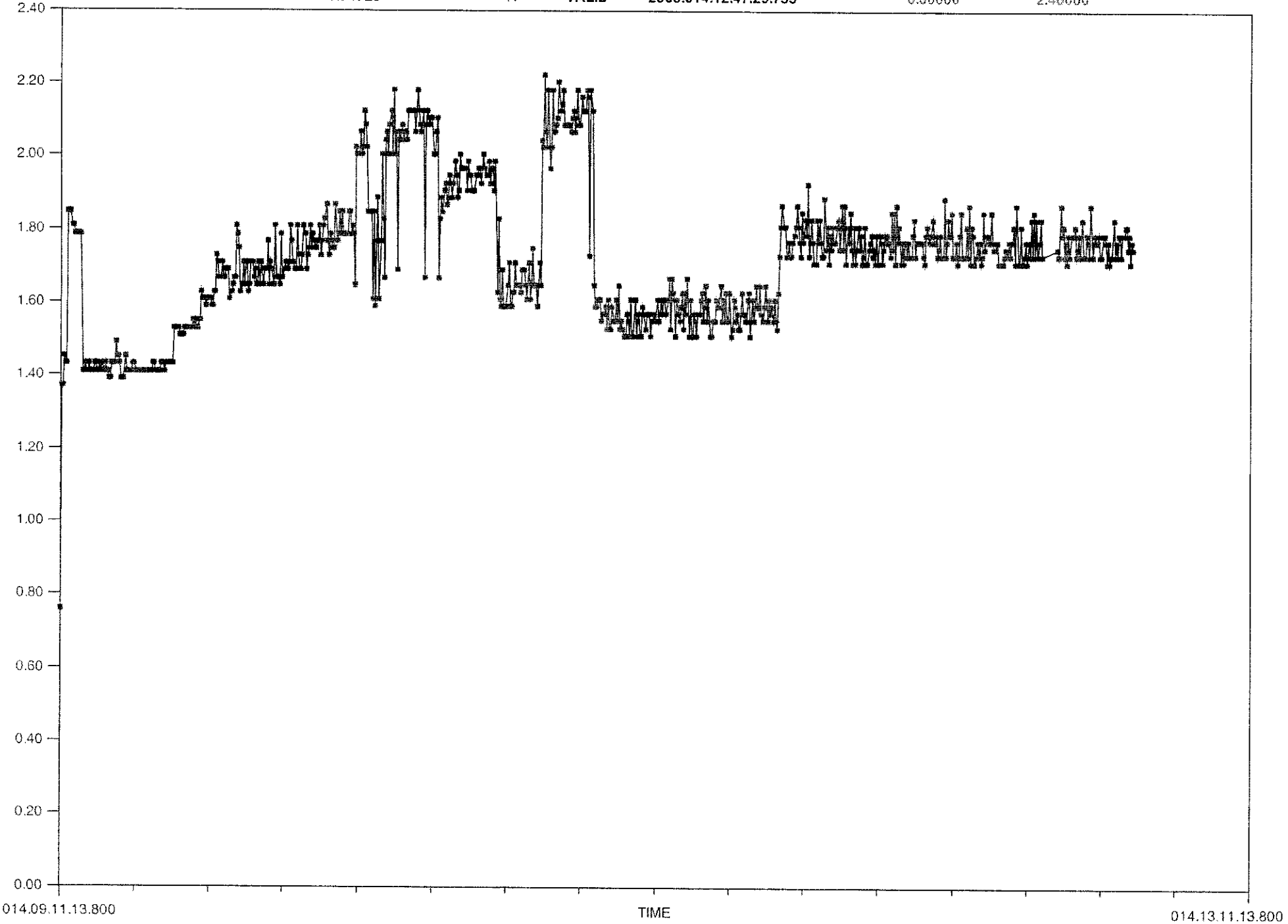
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5012A	BDR 4 CURRENT B	1.56250	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	



DS: 524 ID: EP05h Title: [EPSS] BDR CURRENTS 5 B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

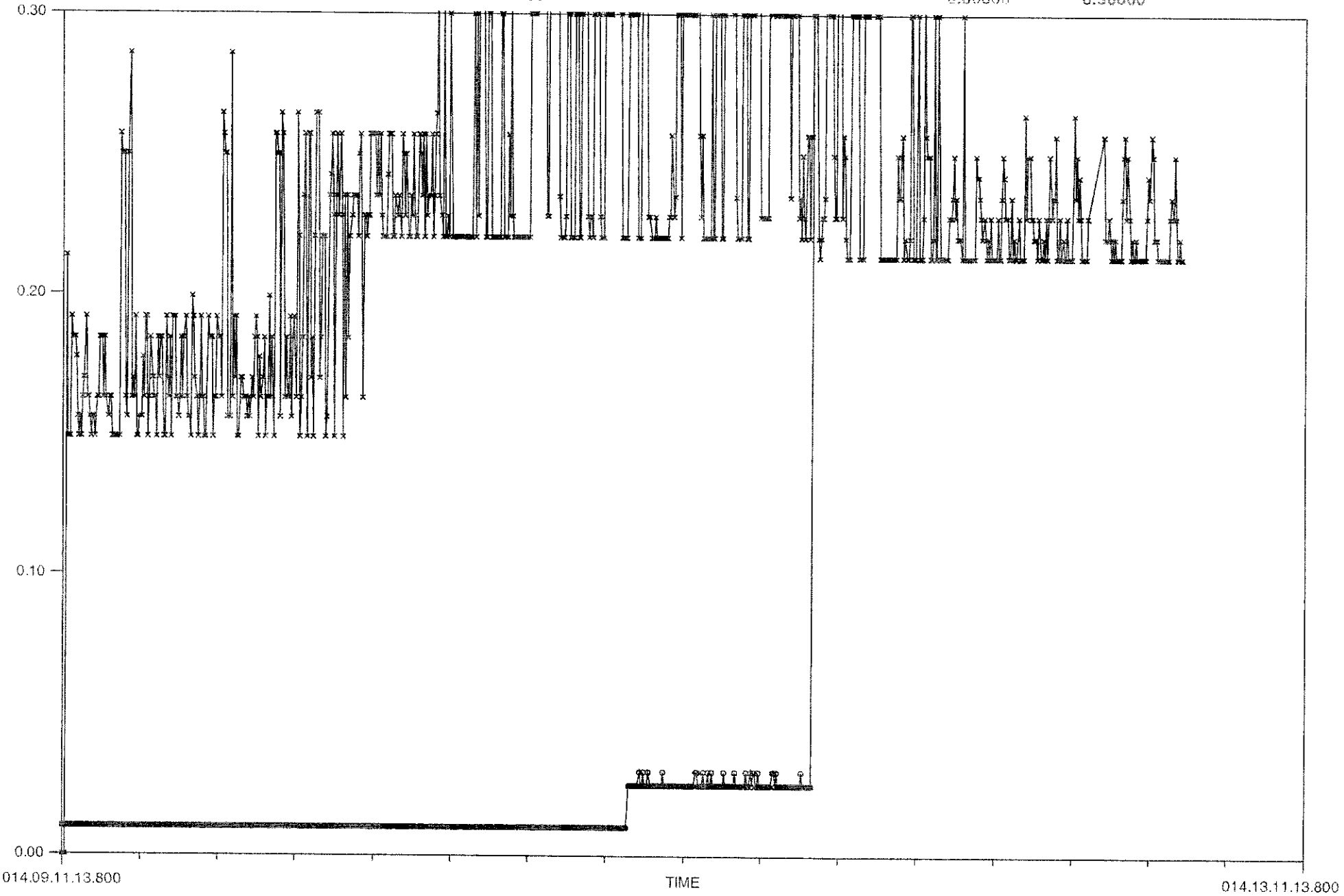
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5013A	BDR 5 CURRENT B	1.74725	A	VALID	2005.014.12.47.29.755	0.00000	2.40000	



DS: 524 ID: W131h Title: [EPSS] DISR CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

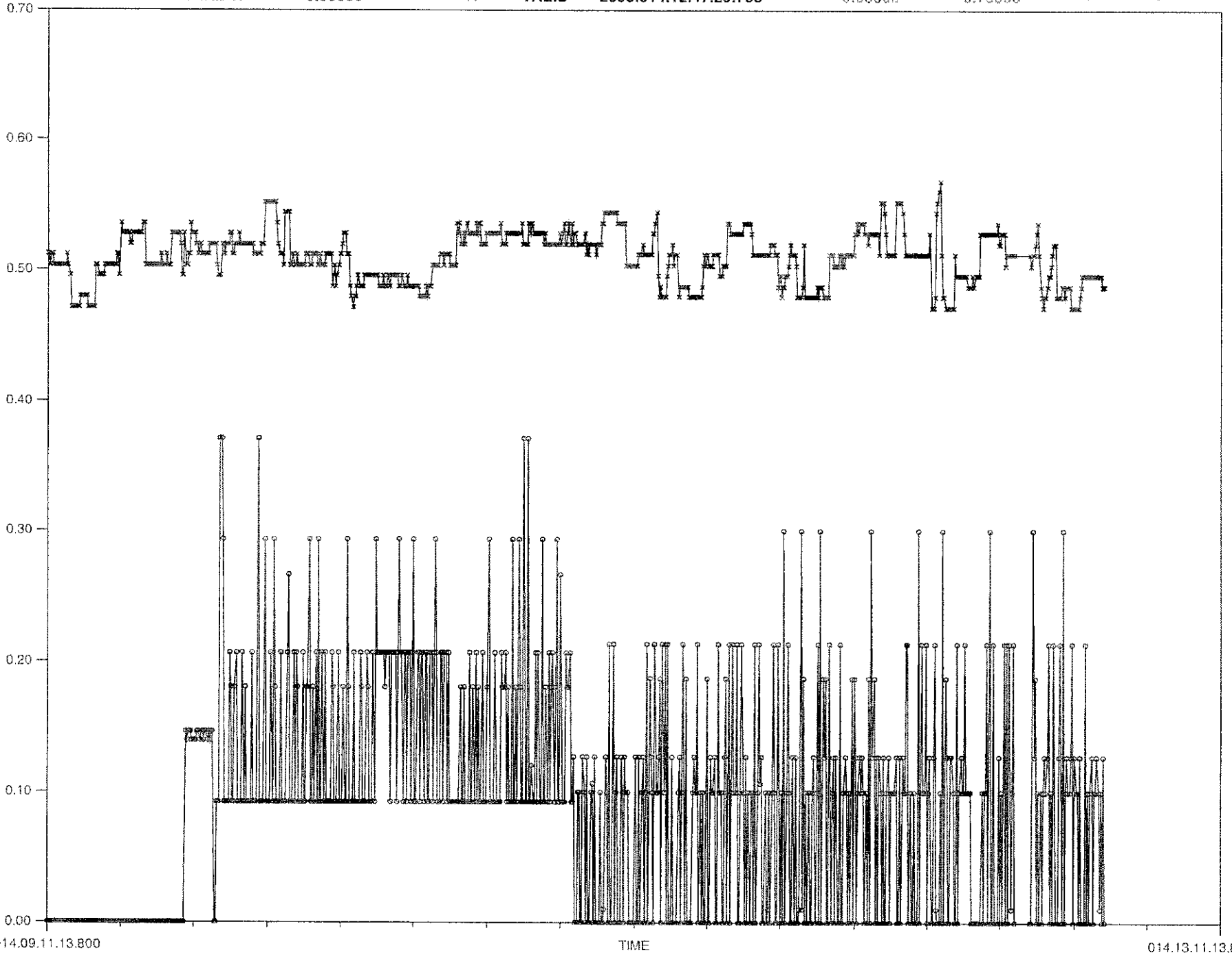
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5053A	DISR 1 R CURRENT	0.21333	A	VALID	2005.014.12.47.29.755	0.00000	0.30000	
P5060A	DISR 2 R CURRENT	0.47059	A	VALID	2005.014.12.47.29.755	0.00000	0.30000	
P5025A	DISR 1 N CURRENT		A			0.00000	0.30000	
P5032A	DISR 2 N CURRENT		A			0.00000	0.30000	



DS: 524 ID: W132H Title: [EPSS] GCMS CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 AUTO HARD COPY OFF

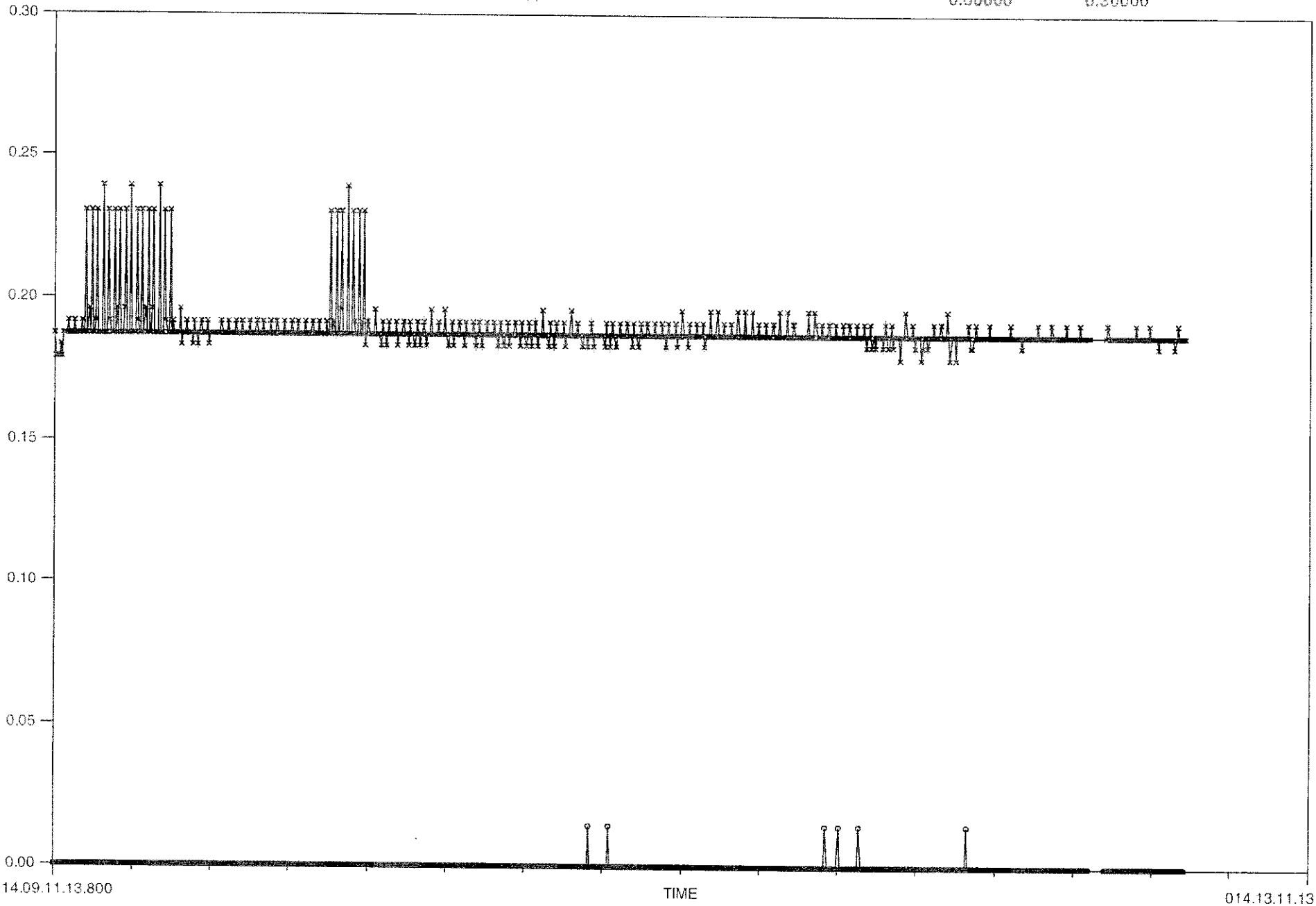
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5052A	GCMS 1 R CURRENT	0.48800	A	VALID	2005.014.12.47.29.755	0.00000	0.70000	
P5054A	GCMS 2 R CURRENT	0.00000	A	VALID	2005.014.12.47.29.755	0.00000	0.70000	



DS: 524 ID: W133h Title: [EPSS] HASI CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

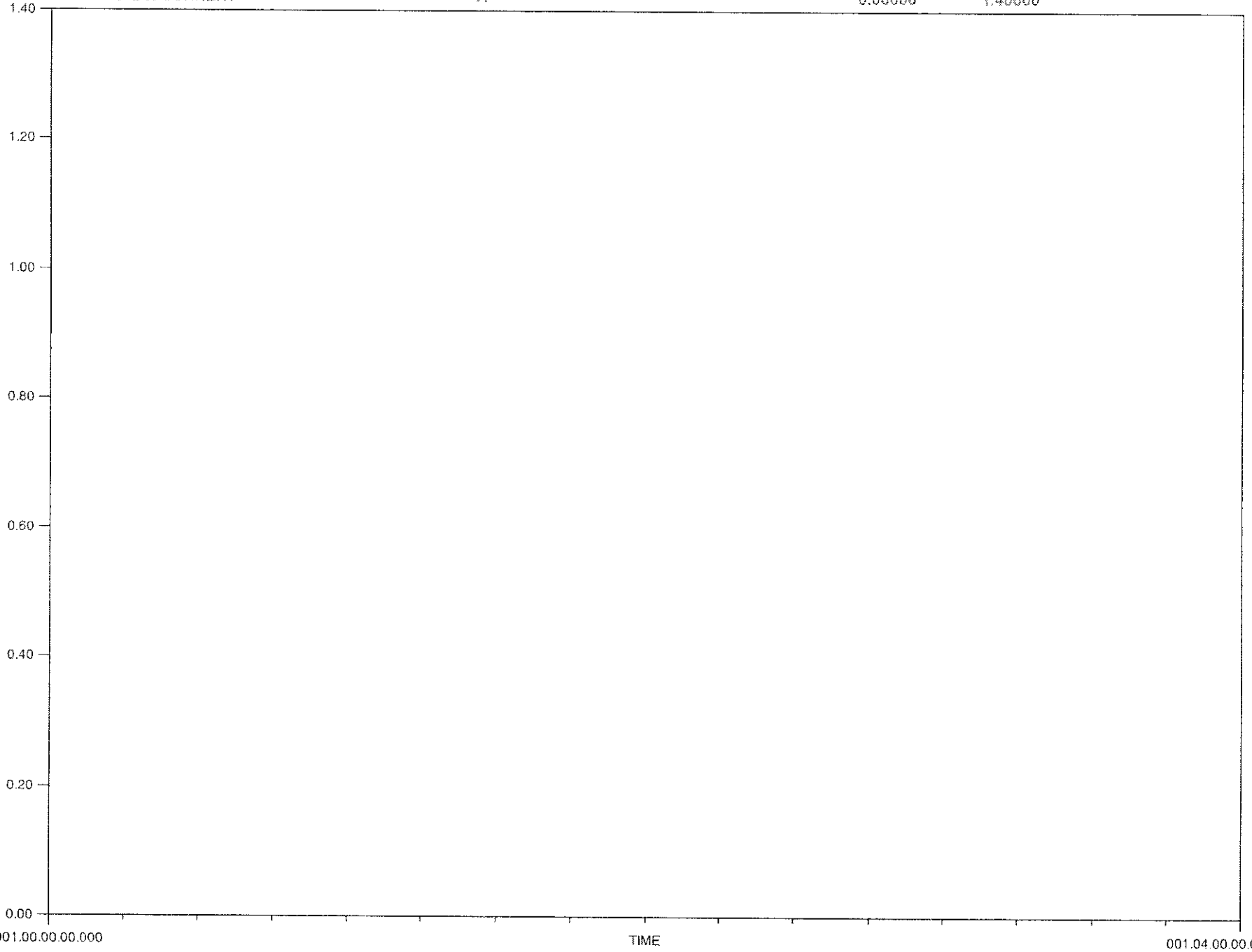
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5058A	HASI 1 R CURRENT	0.18750	A	VALID	2005.014.12.47.29.755	0.00000	0.30000	
P5062A	HASI 2 R CURRENT	0.00000	A	STATE	2005.014.12.47.29.755	0.00000	0.30000	
P5030A	HASI 1 N CURRENT		A			0.00000	0.30000	
P5034A	HASI 2 N CURRENT		A			0.00000	0.30000	



DS: 524 ID: W134H Title: [EPSS] ACP CURRENTS A Sample Time: Workstation: nuygz

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

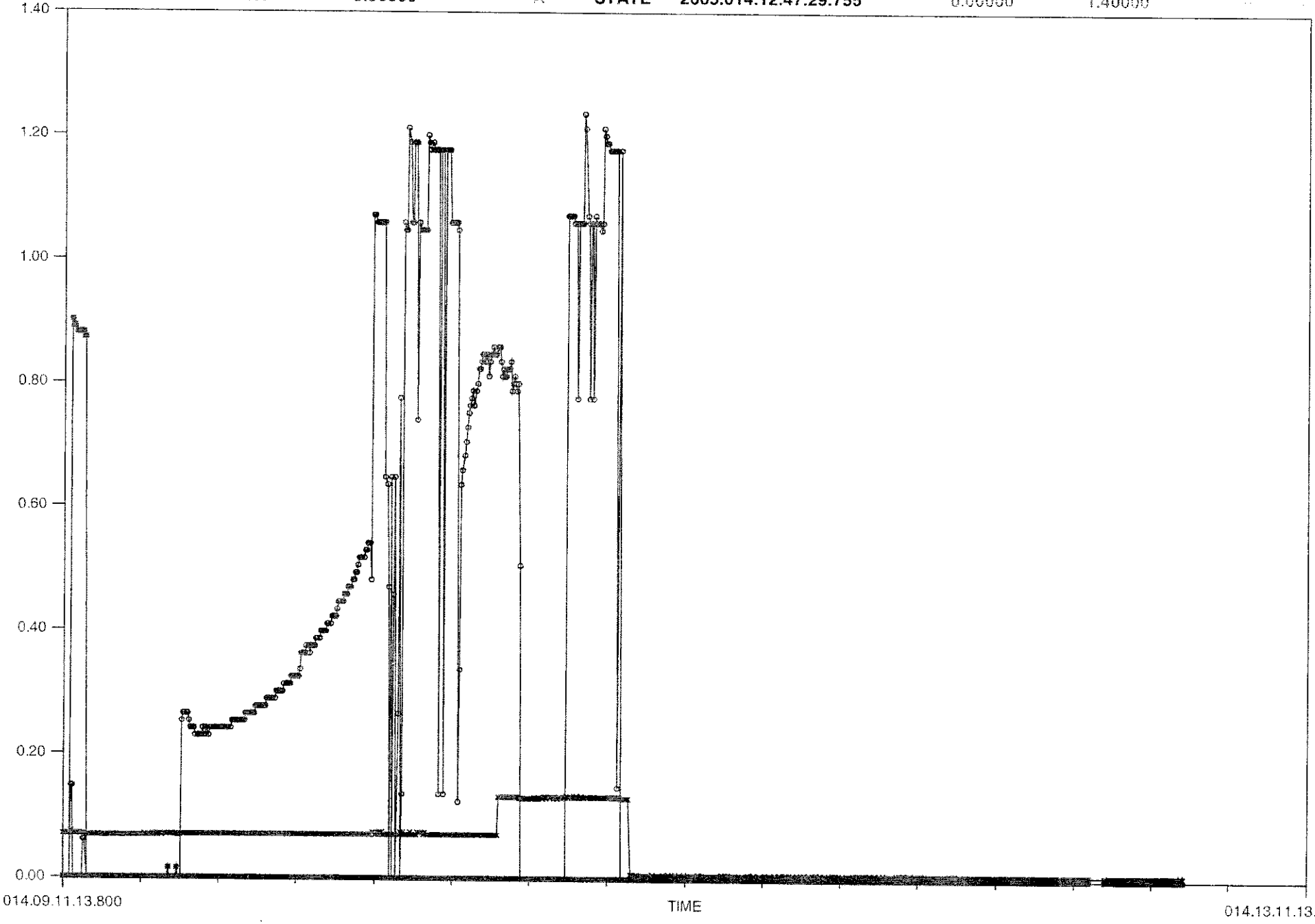
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5027A	ACP 1 N CURRENT		A			0.00000	1.40000	
P5028A	ACP 3 N CURRENT		A			0.00000	1.40000	
P5033A	ACP 2 N CURRENT		A			0.00000	1.40000	



DS: 524 ID: W135h Title: [EPSS] ACP CURRENTS B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

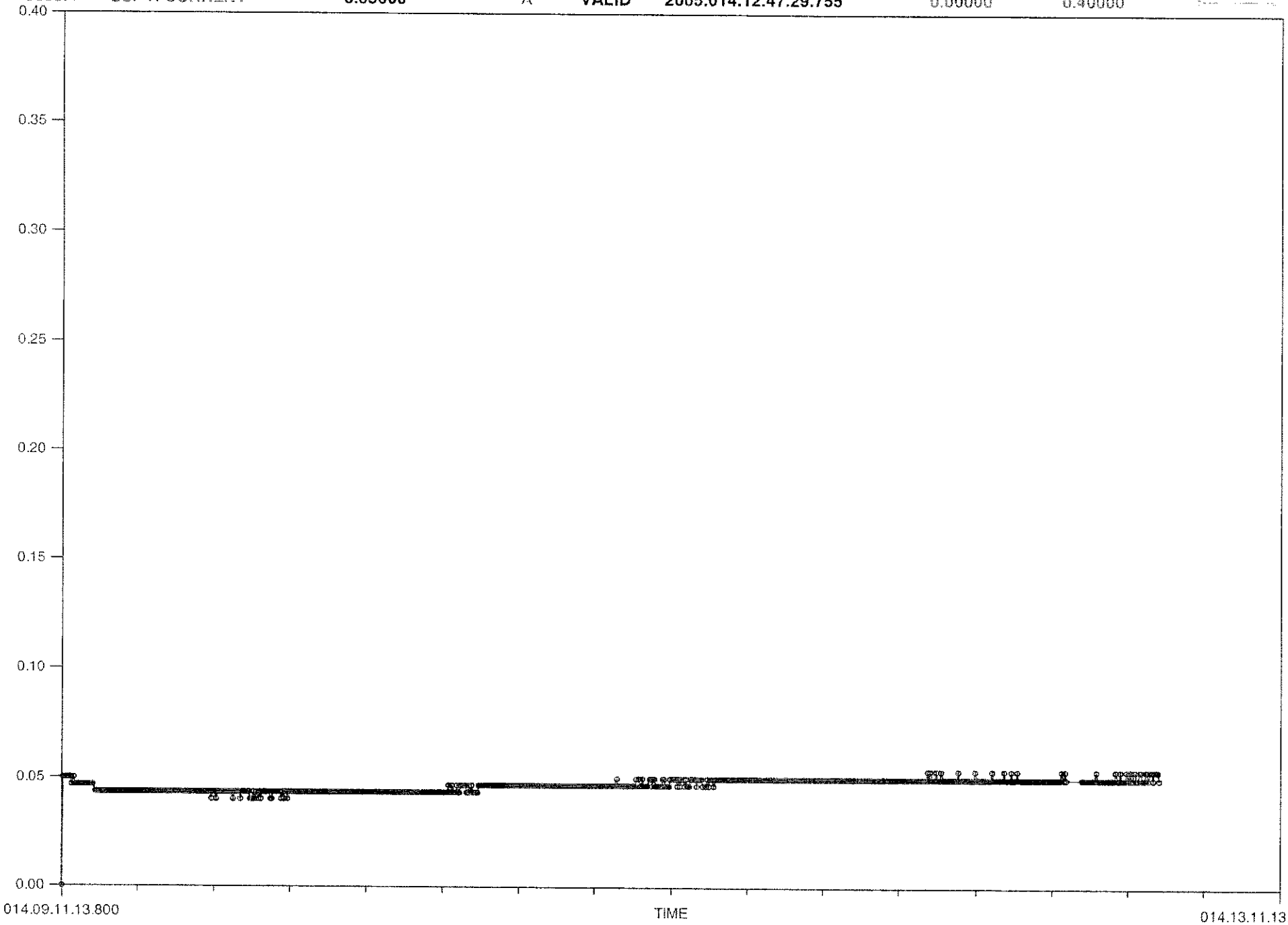
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5055A	ACP 1 R CURRENT	0.00545	A	STATE	2005.014.12.47.29.755	0.00000	1.40000	
P5056A	ACP 3 R CURRENT	0.00000	A	STATE	2005.014.12.47.29.755	0.00000	1.40000	
P5061A	ACP 2 R CURRENT	0.00000	A	STATE	2005.014.12.47.29.755	0.00000	1.40000	



DS: 524 ID: W109h Title: [EPSS] SSP CURRENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

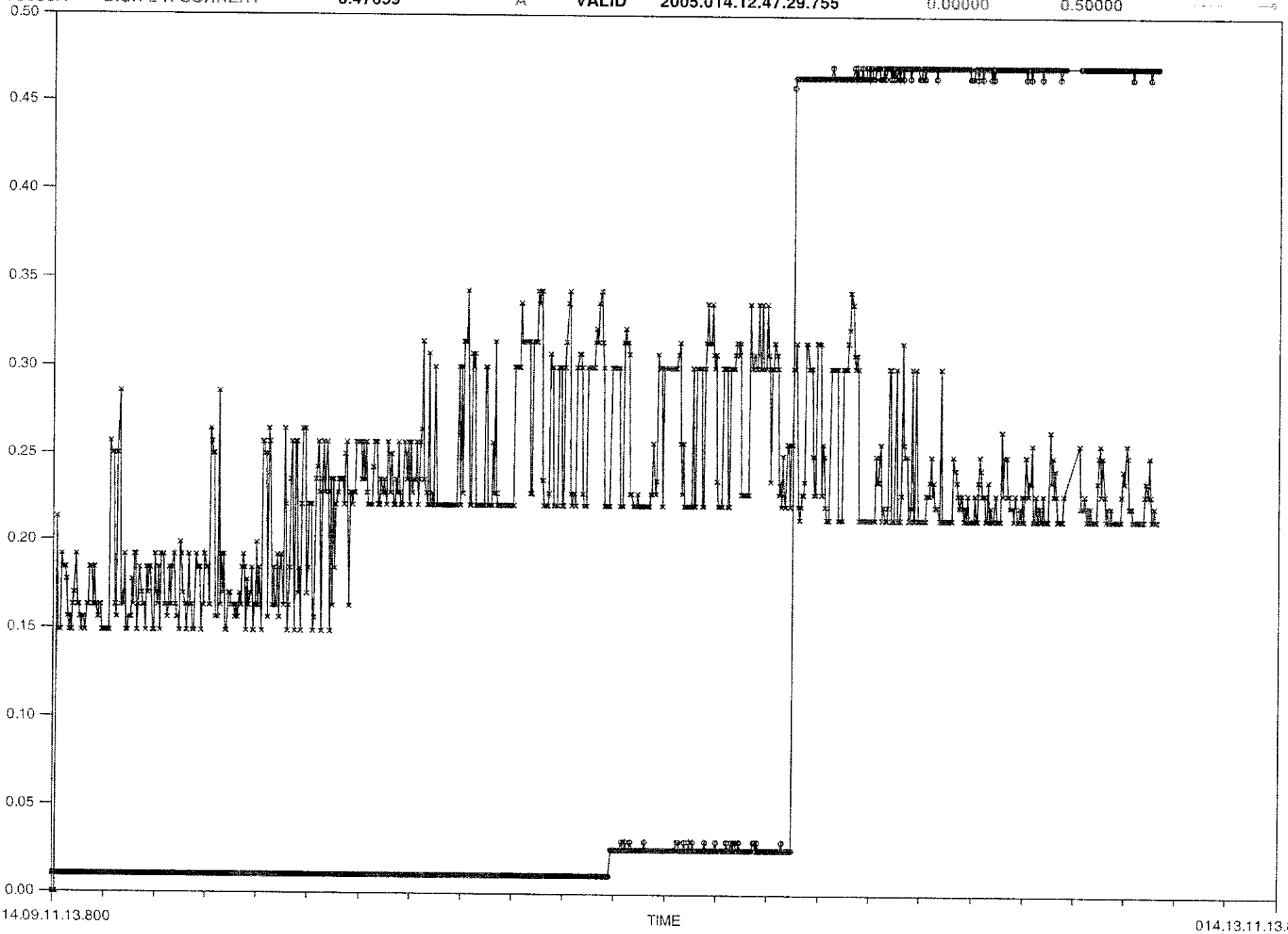
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5031A	SSP N CURRENT		A			0.00000	0.40000	
P5059A	SSP R CURRENT	0.05000	A	VALID	2005.014.12.47.29.755	0.00000	0.40000	



DS: 524 ID: EX01h Title: [EPSS] DISR CURRENTS 1/2 A Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

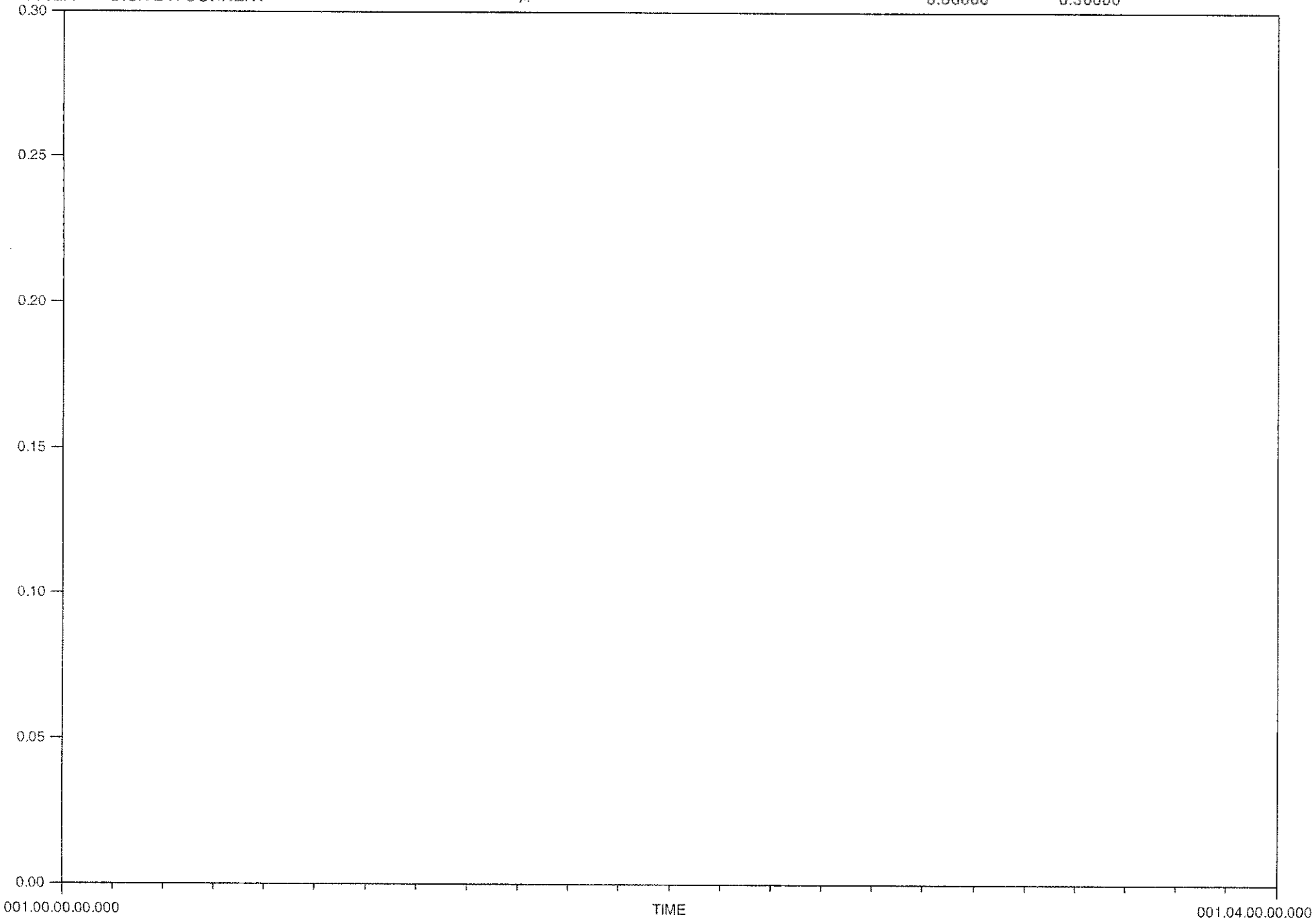
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5053A	DISR 1 R CURRENT	0.21333	A	VALID	2005.014.12.47.29.755	0.00000	0.50000	
P5060A	DISR 2 R CURRENT	0.47059	A	VALID	2005.014.12.47.29.755	0.00000	0.50000	



DS: 524 ID: EX02h Title: [EPSS] DISR CURRENTS 1/2 B Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

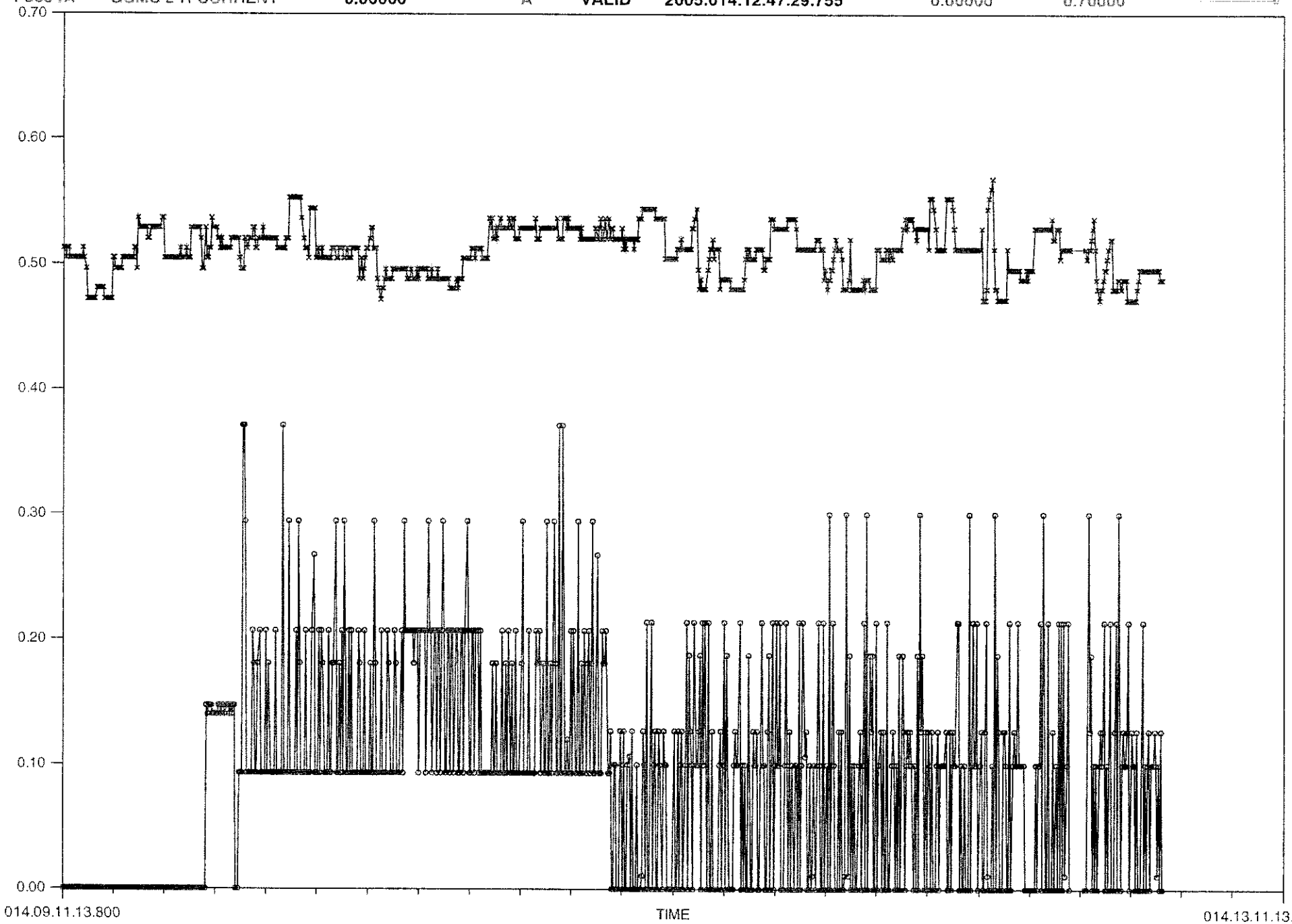
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5025A	DISR 1 N CURRENT		A			0.00000	0.30000	
P5032A	DISR 2 N CURRENT		A			0.00000	0.30000	



DS: 524 ID: EX03h Title: [EPSS] GCMS CURRENTS 1/2 A Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

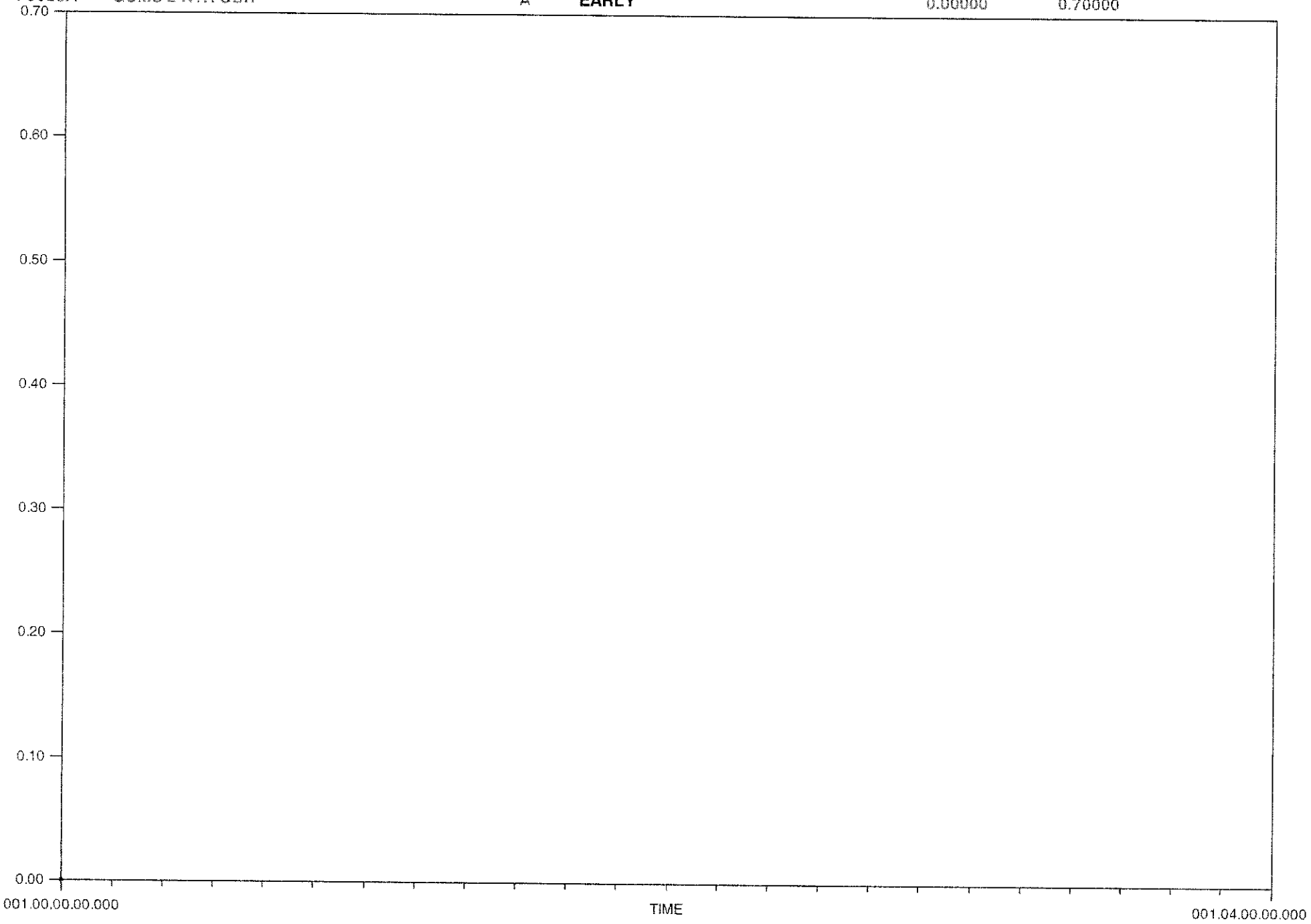
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5052A	GCMS 1 R CURRENT	0.48800	A	VALID	2005.014.12.47.29.755	0.00000	0.70000	
P5054A	GCMS 2 R CURRENT	0.00000	A	VALID	2005.014.12.47.29.755	0.00000	0.70000	



DS: 524 ID: EX04h Title: [EPSS] GCMS CURRENTS 1/2 B Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

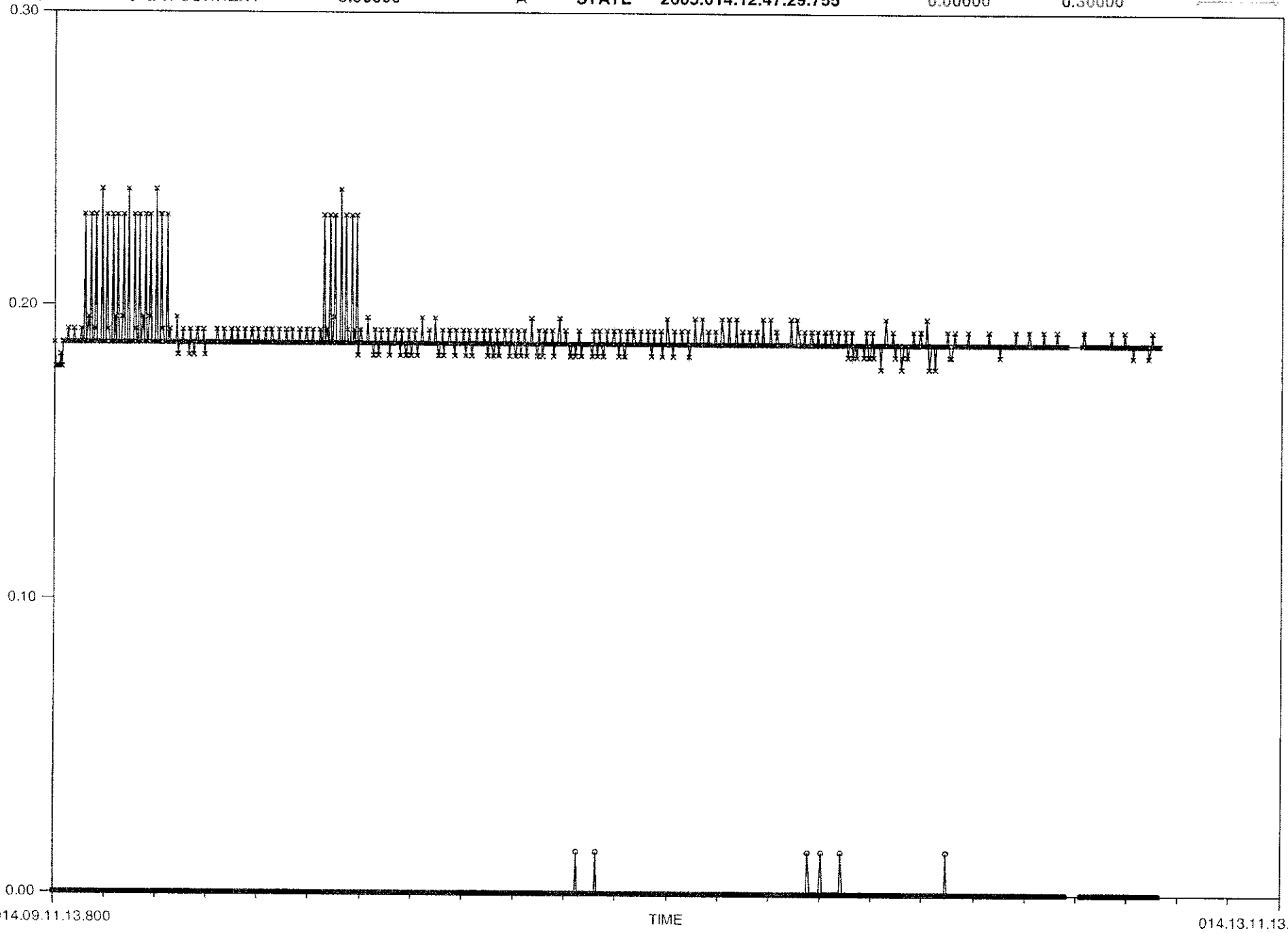
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5024A	GCMS 1 N CURRENT		A			0.00000	0.70000	
P5026A	GCMS 2 N+R CUR		A	EARLY		0.00000	0.70000	



DS: 524 ID: EX05h Title: [EPSS] HASI CURRENTS 1/2 A Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

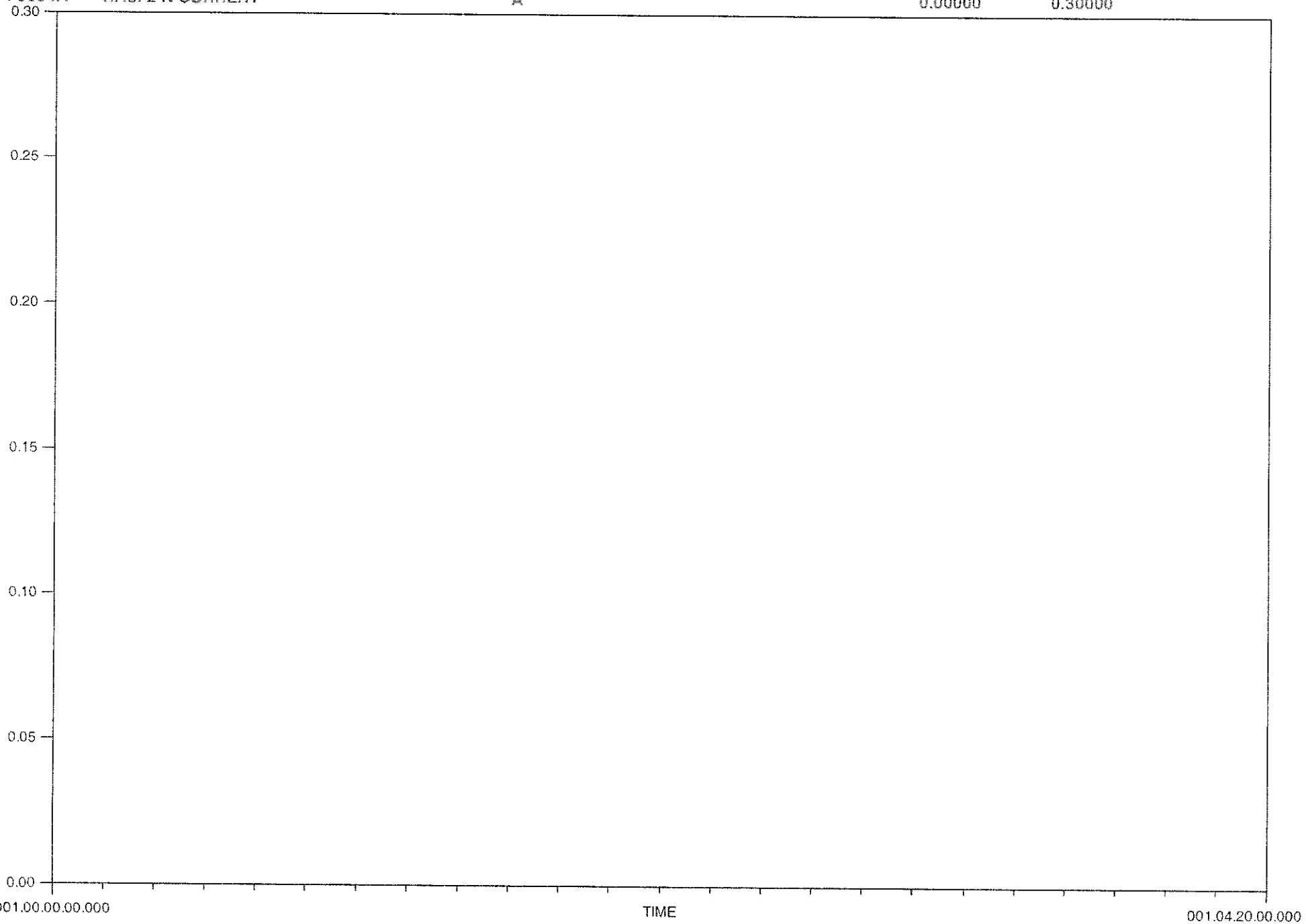
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5058A	HASI 1 R CURRENT	0.18750	A	VALID	2005.014.12.47.29.755	0.00000	0.30000	
P5062A	HASI 2 R CURRENT	0.00000	A	STATE	2005.014.12.47.29.755	0.00000	0.30000	



DS: 524 ID: EX06h Title: [EPSS] HASI CURRENTS 1/2 B Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.20.00 **AUTO HARD COPY** OFF

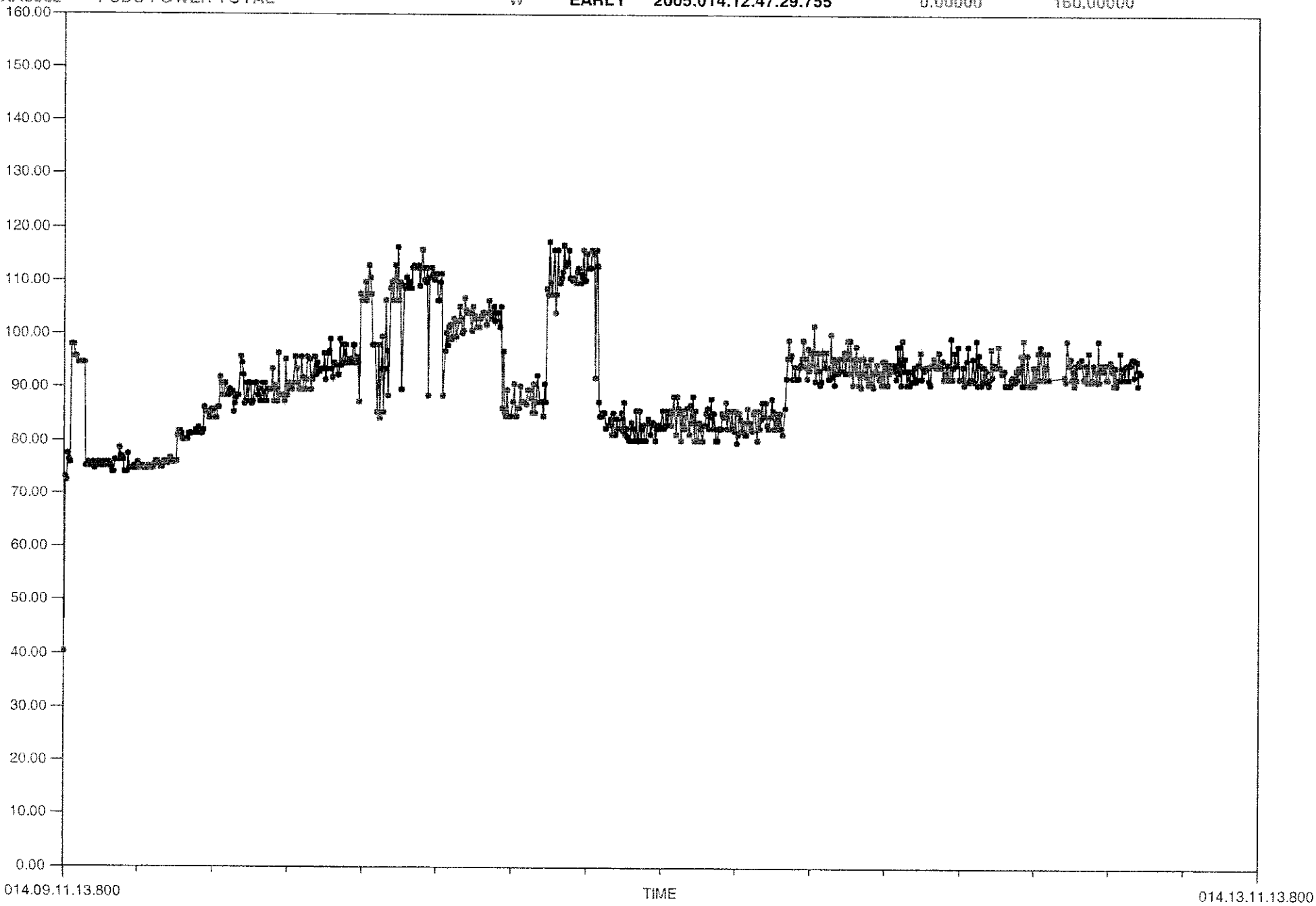
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
P5030A	HASI 1 N CURRENT		A			0.00000	0.30000	
P5034A	HASI 2 N CURRENT		A			0.00000	0.30000	



DS: 524 ID: W191h Title: [PWR] PROBE BDR POWER Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

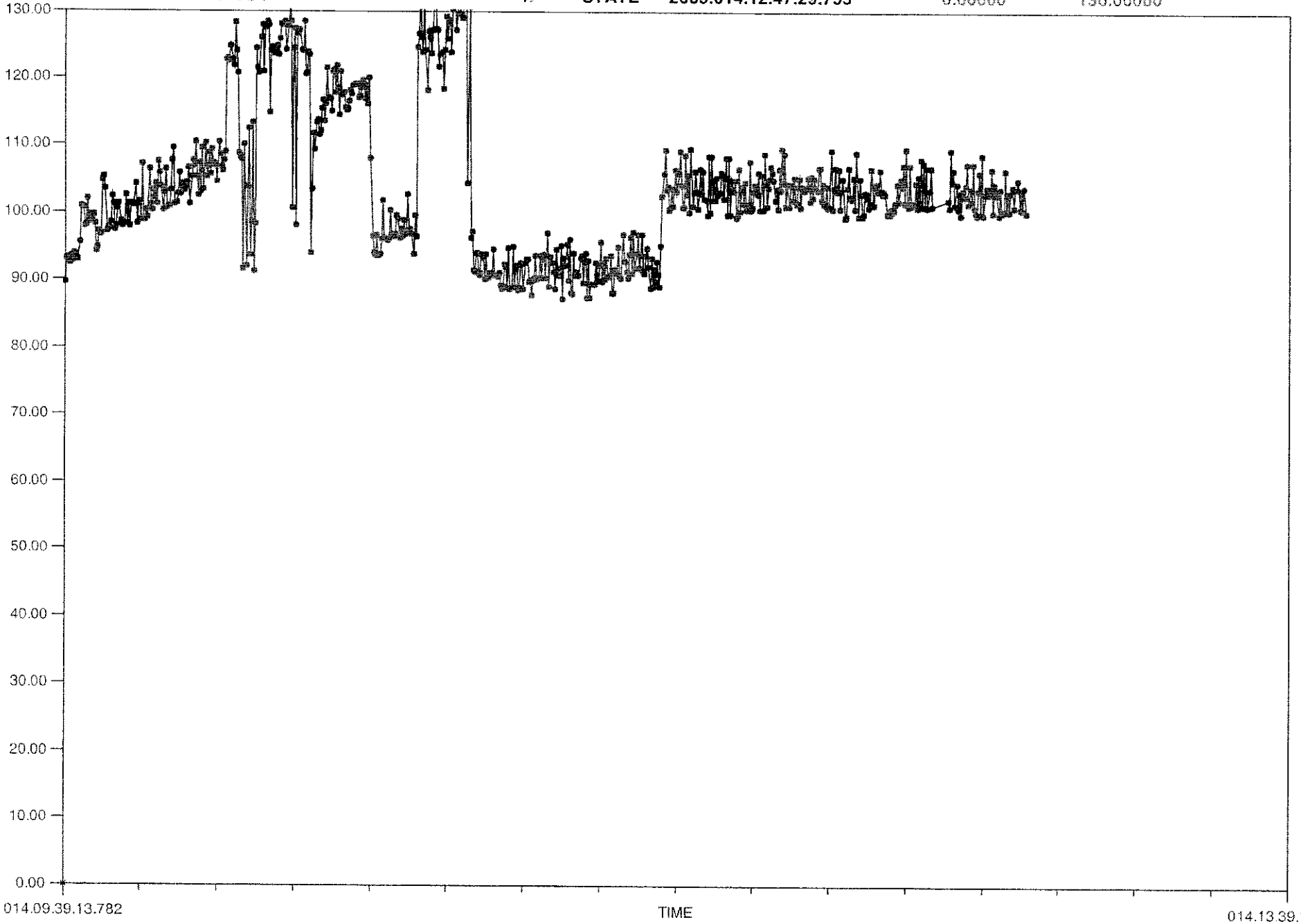
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA0001	PCDU POWER A		W			0.00000	160.00000	
XB0001	PCDU POWER B	92.96956	W	VALID	2005.014.12.47.29.755	0.00000	160.00000	
XA0002	PCDU POWER TOTAL		W	EARLY	2005.014.12.47.29.755	0.00000	160.00000	



DS: 524 ID: W196h Title: [PWR] PCDU CURRENTS LIM POWER Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA0004	CURR LIM POWER A		W	STATE	2005.014.09.39.25.782	0.00000	130.00000	
XB0004	CURR LIM POWER B	100.15570	W	STATE	2005.014.12.47.29.755	0.00000	130.00000	
XA0005	CURR LIM PWR TOT		W	STATE	2005.014.12.47.29.755	0.00000	130.00000	

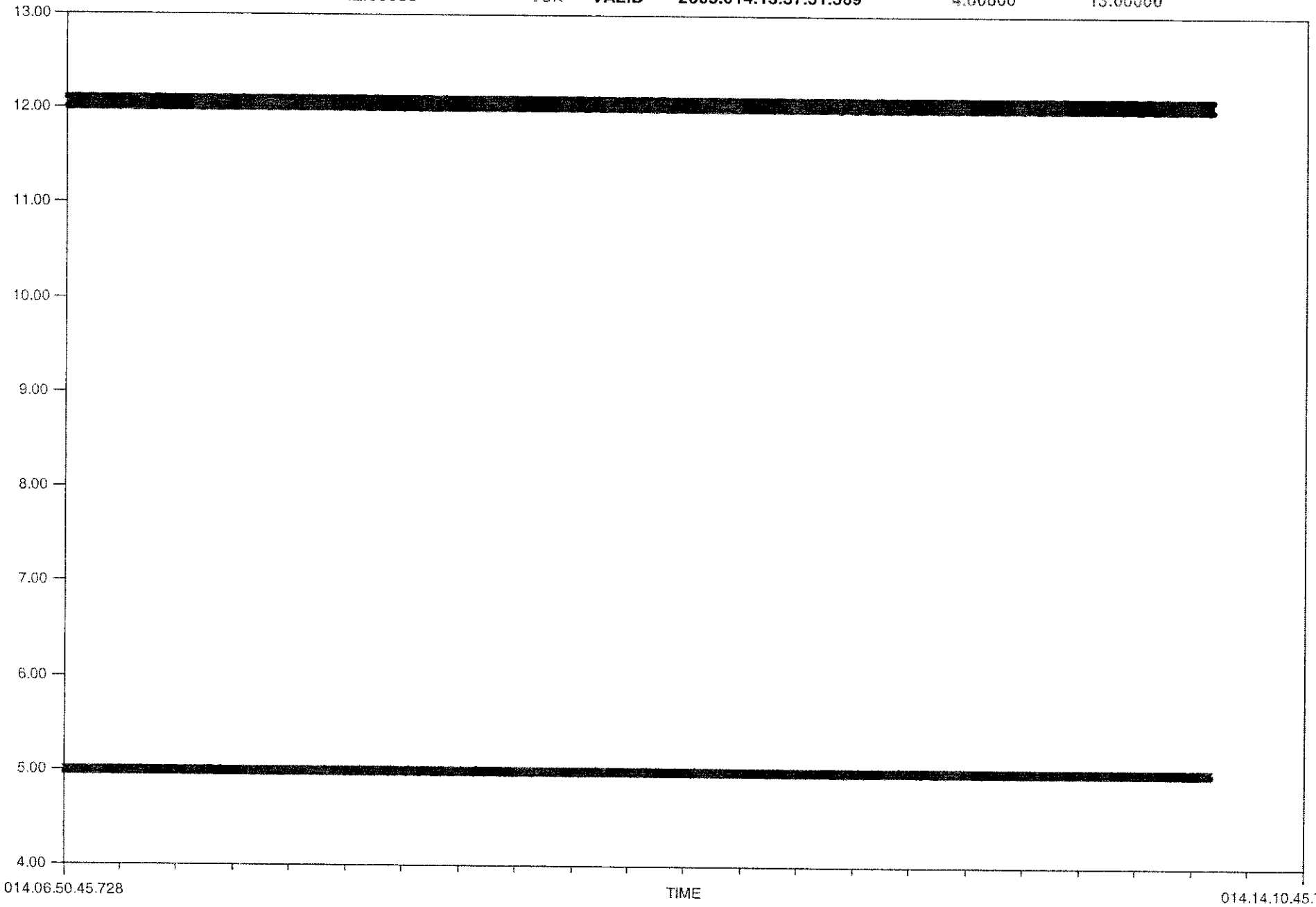


5.7.4 PROBE DATA RELAY SUBSYSTEM (PDRS)

DS: 524 ID: W171P Title: [PDRS] INTERNAL PSA VOLTAGES Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

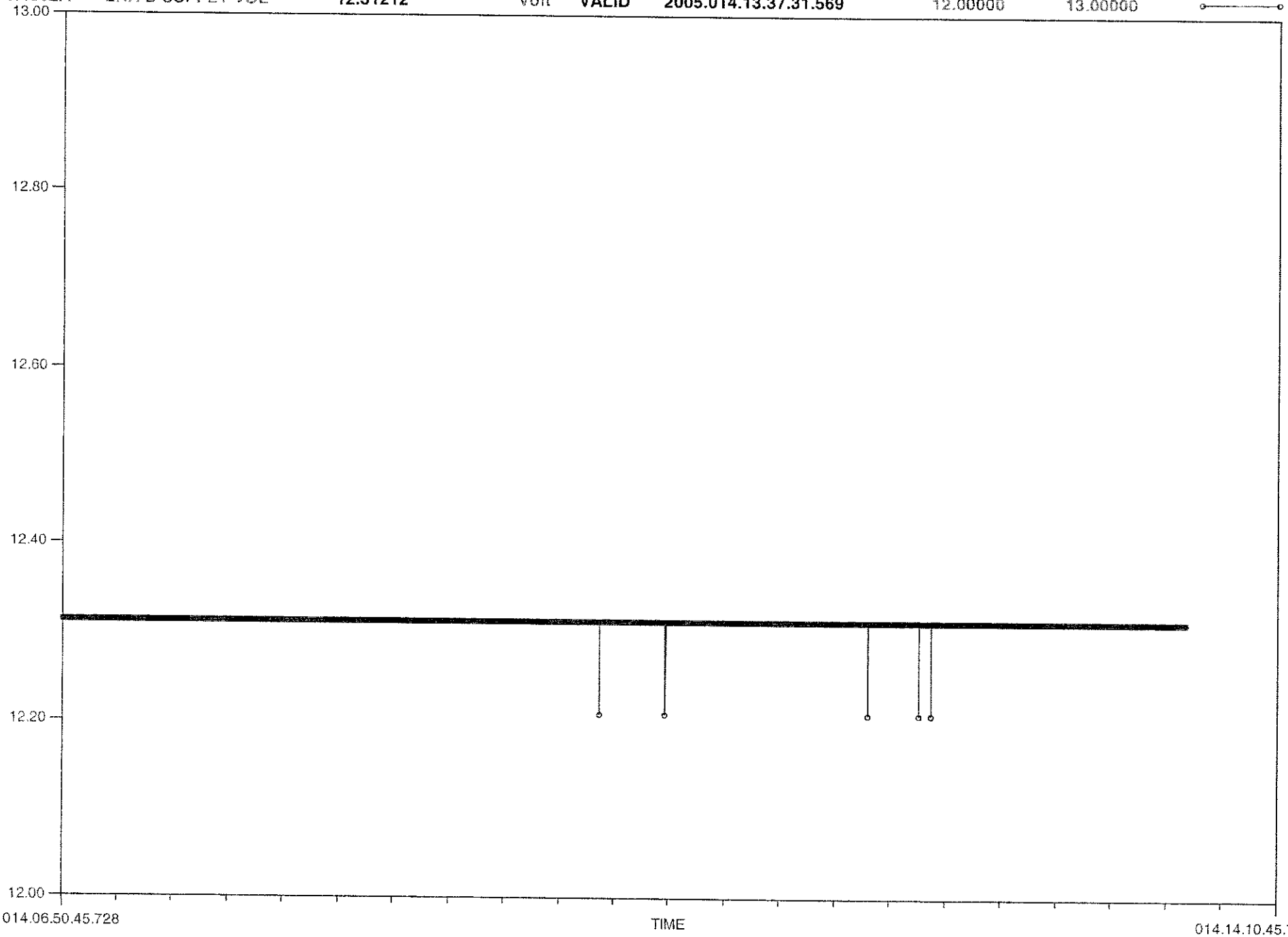
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5007A	PSA A SEC SUP V	5.01600	Volt	VALID	2005.014.13.37.31.569	4.00000	13.00000	
R5008A	PSA A RX SUPPLY	12.00000	Volt	VALID	2005.014.13.37.31.569	4.00000	13.00000	
R6007A	PSA B SEC SUP V	4.97200	Volt	VALID	2005.014.13.37.31.569	4.00000	13.00000	
R6008A	PSA B RX SUPPLY	12.00000	Volt	VALID	2005.014.13.37.31.569	4.00000	13.00000	



DS: 524 ID: W186P Title: [PDRS] RFE SUPPLY VOLTAGES Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

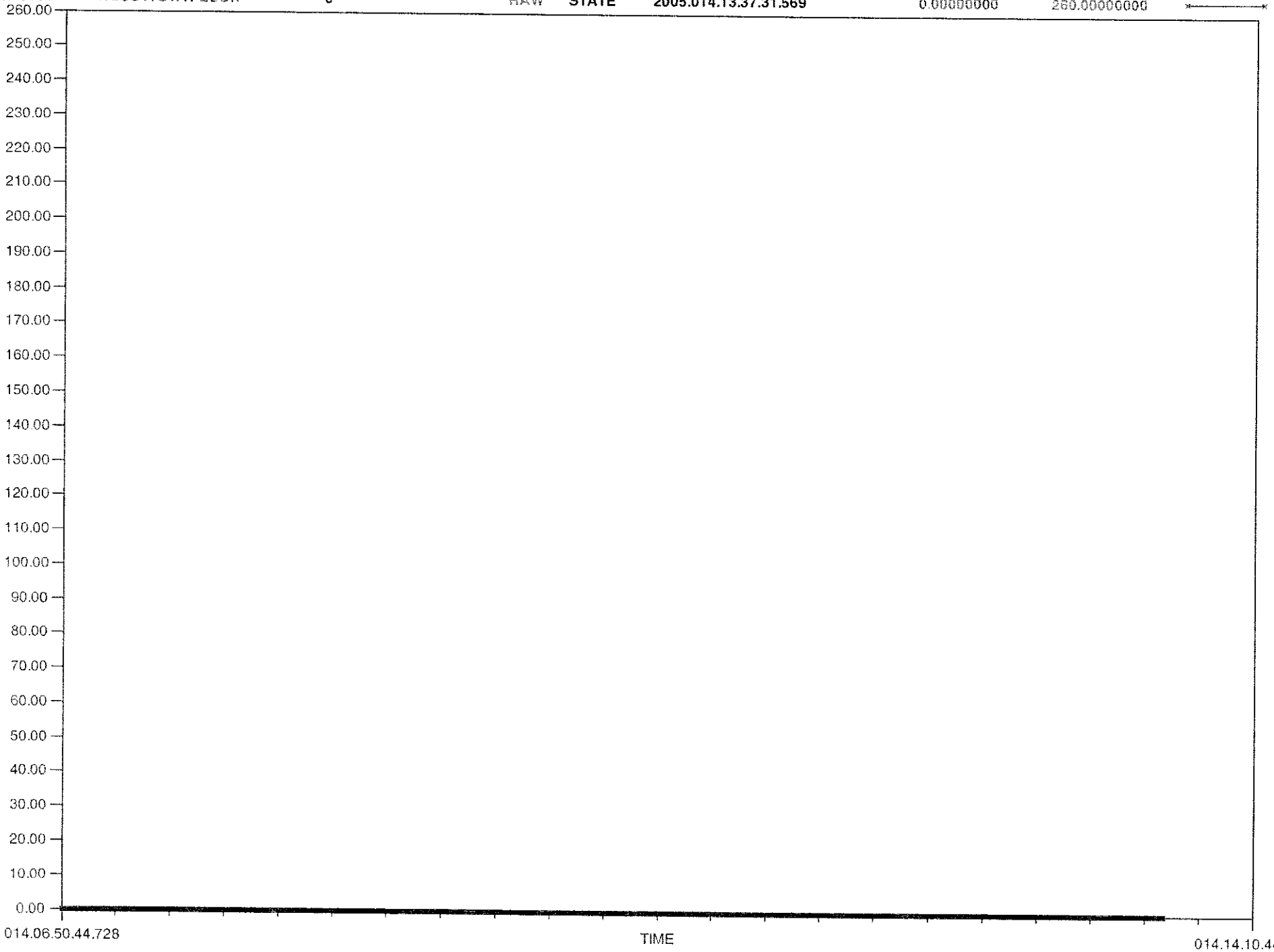
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R3002A	LNA A SUPPLY VOL	12.31212	Volt	VALID	2005.014.13.37.31.569	12.00000	13.00000	
R4002A	LNA B SUPPLY VOL	12.31212	Volt	VALID	2005.014.13.37.31.569	12.00000	13.00000	



DS: 524 ID: W169P Title: [PDRS] RUSO LOCK STATUS Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

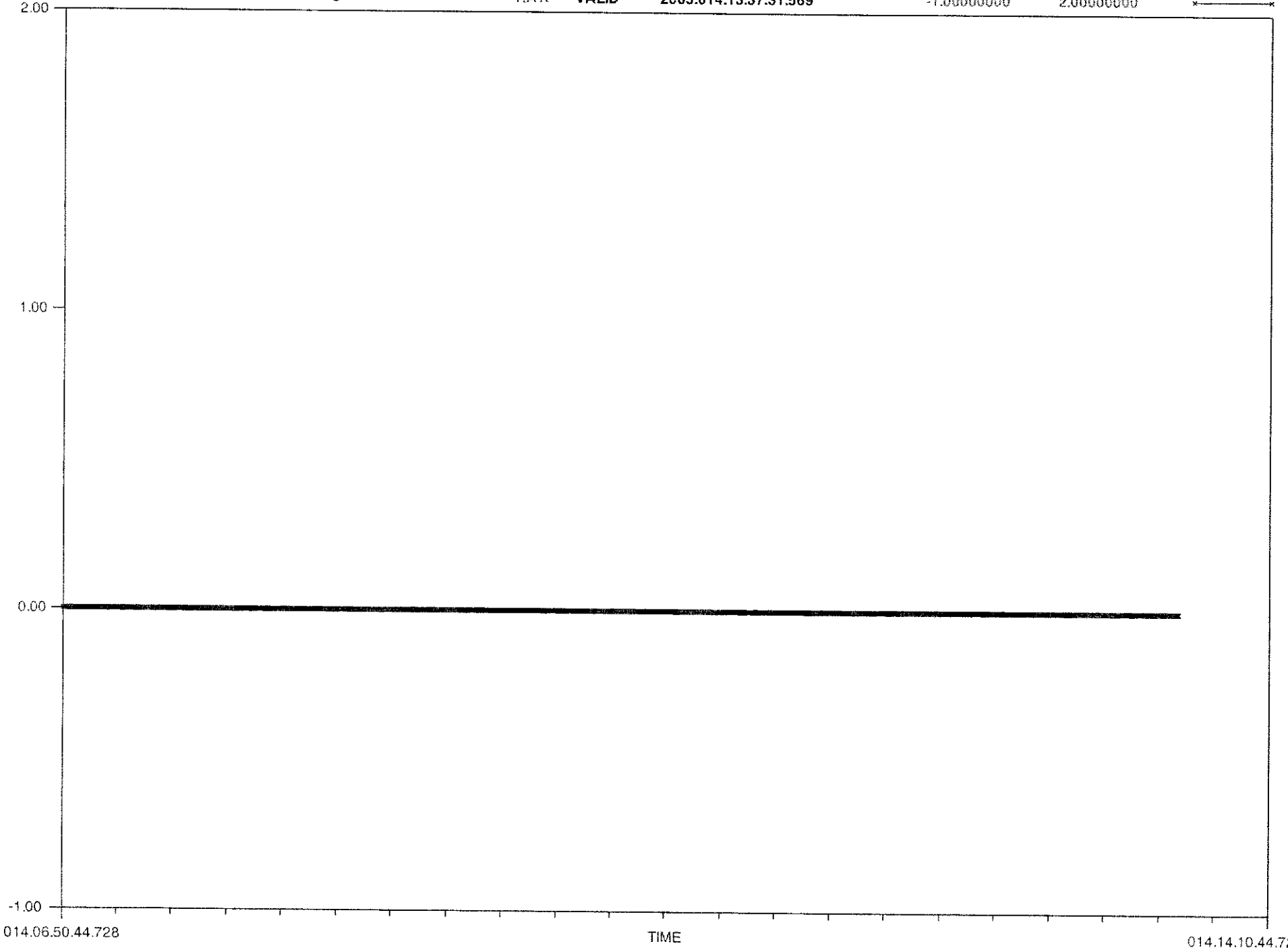
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E7003B	RUSO A STAT LOCK	0	RAW	STATE	2005.014.13.37.31.569	0.00000000	260.00000000	



DS: 524 ID: W170P Title: [PDRS] RUSO POWER STATUS Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

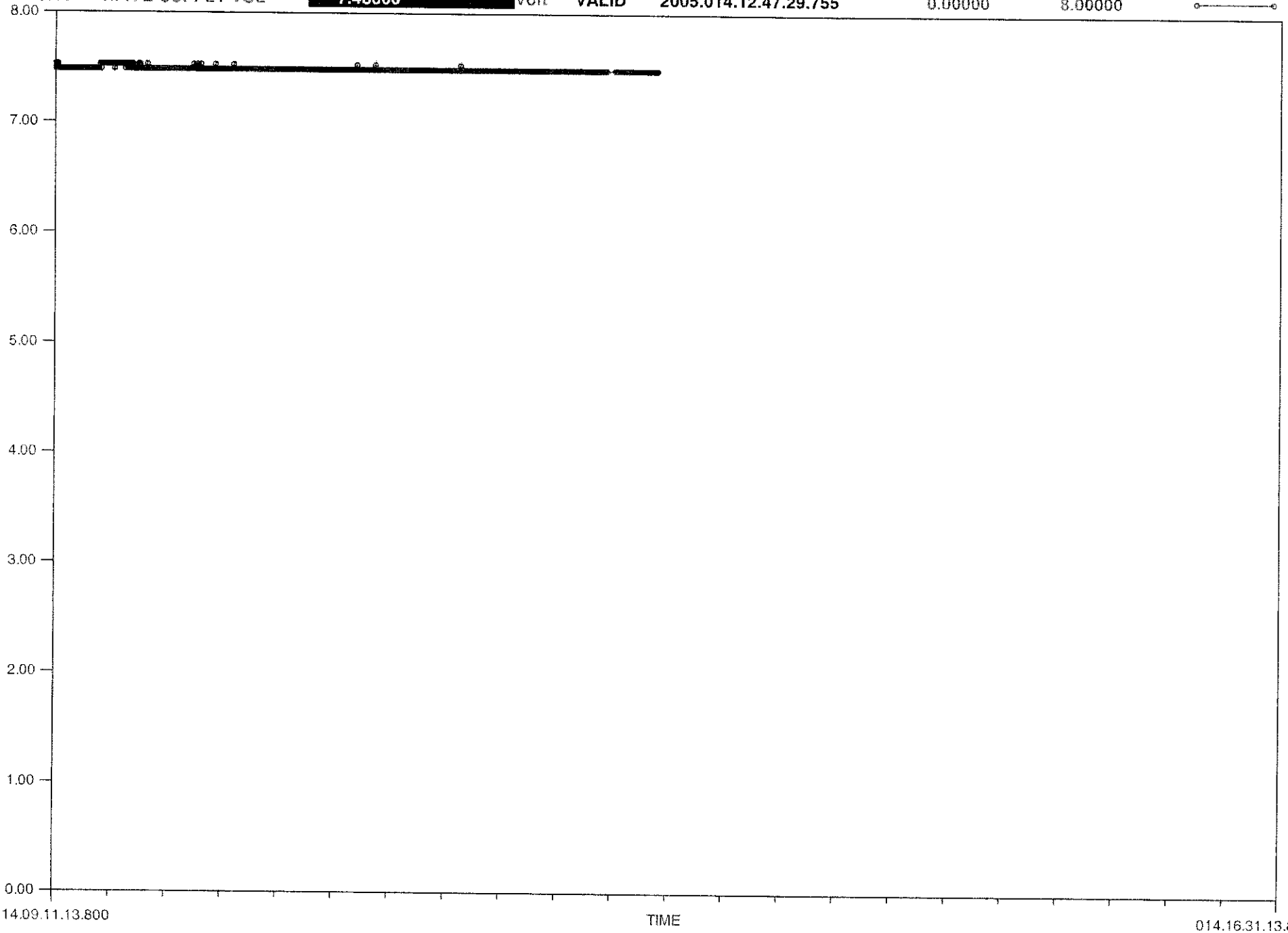
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5013R	RUSO POWER ST	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	



DS: 524 ID: W187P Title: [PDRS] HPA VOLTAGE Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

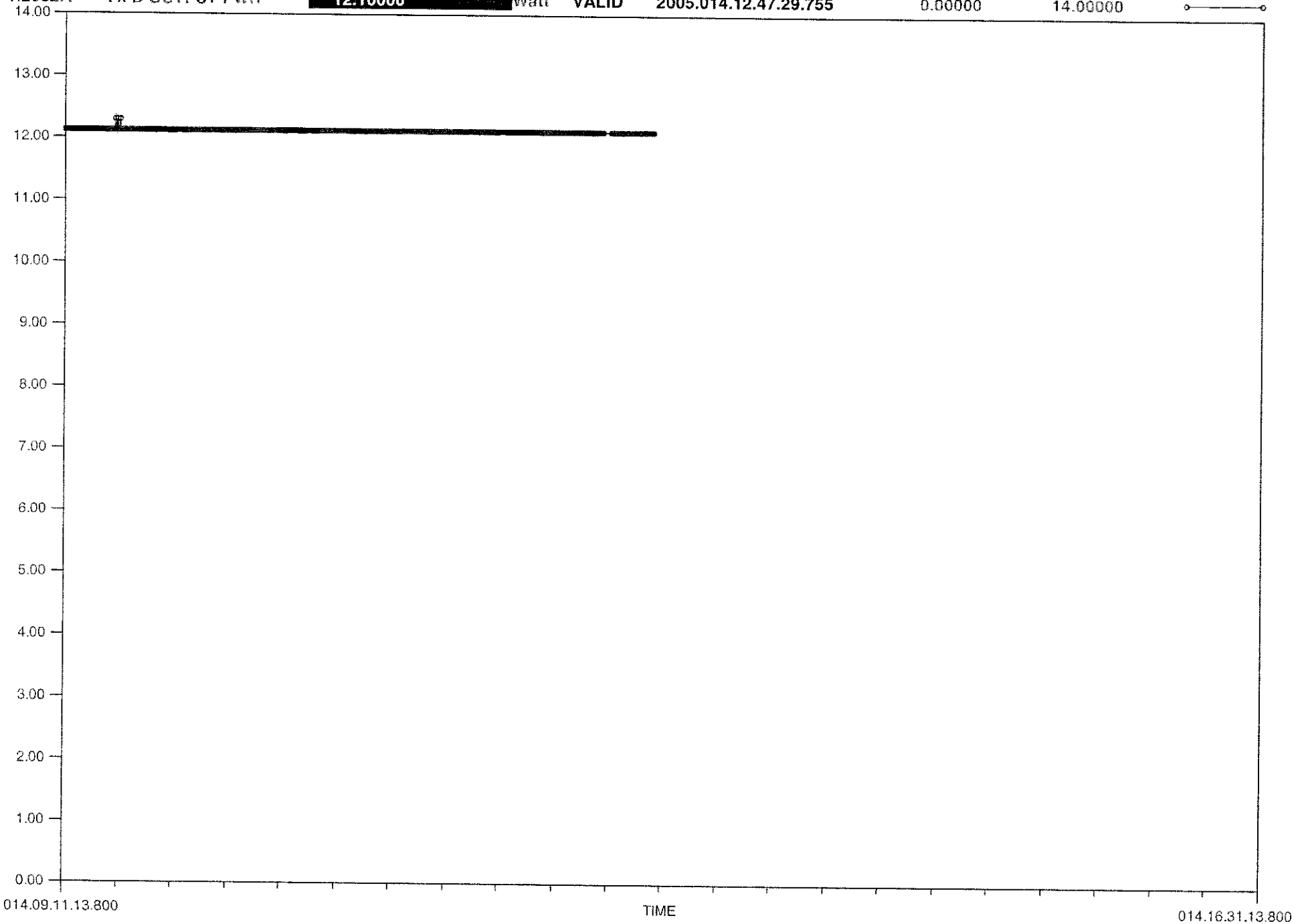
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R1007A	HPA A SUPPLY VOL		Volt			0.00000	8.00000	
R2007A	HPA B SUPPLY VOL	7.48000	Volt	VALID	2005.014.12.47.29.755	0.00000	8.00000	



DS: 524 ID: W184P Title: [PDRS] TRANSMITTER OUTPUT POWER Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

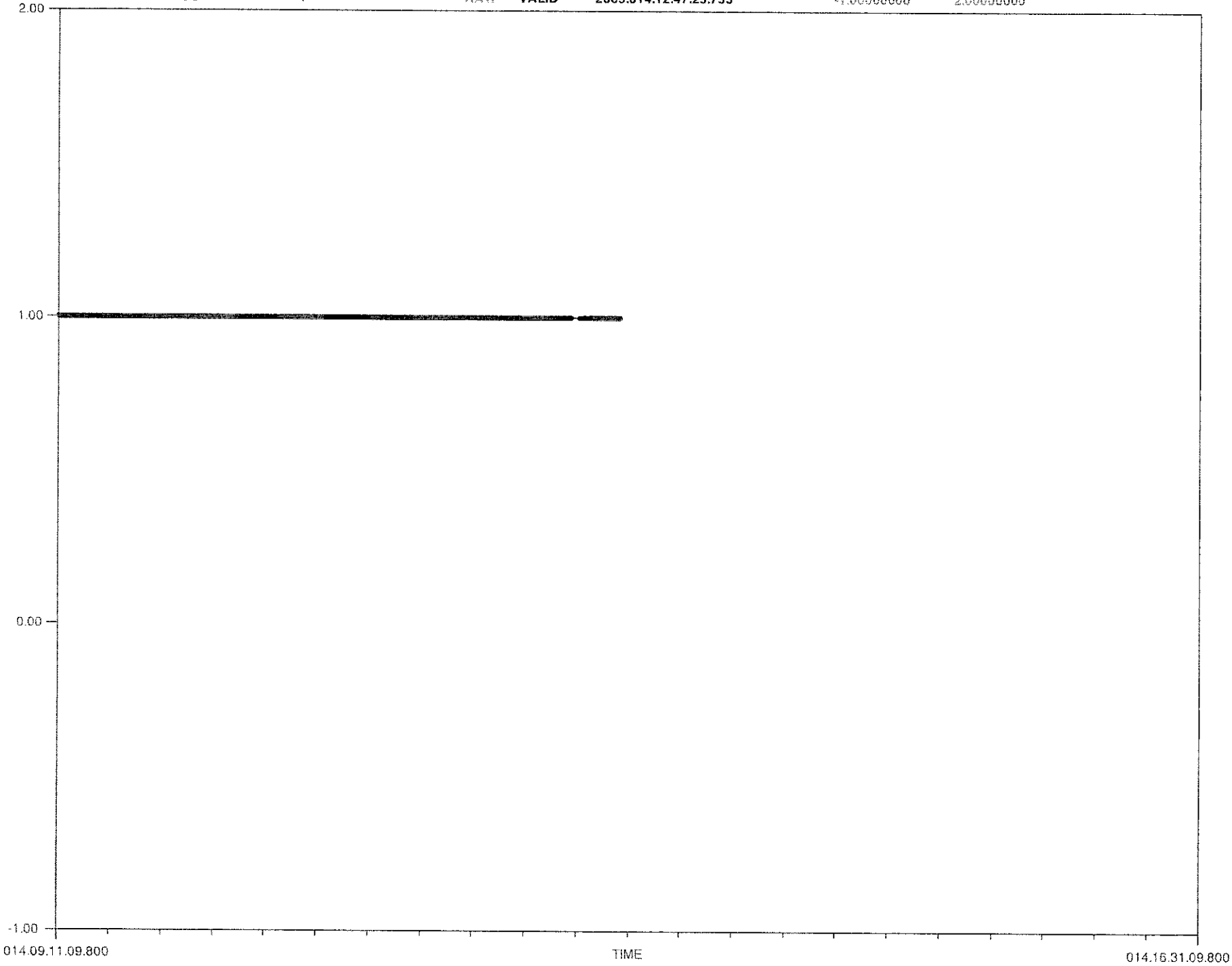
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R1002A	TX A OUTPUT PWR		Watt			0.00000	14.00000	
R2002A	TX B OUTPUT PWR	12.10000	Watt	VALID	2005.014.12.47.29.755	0.00000	14.00000	



DS: 524 ID: W168P Title: [PDRS] TUSO LOCK STATUS Sample Time: 2005.014.12.47.25.755 Workstation: nuyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

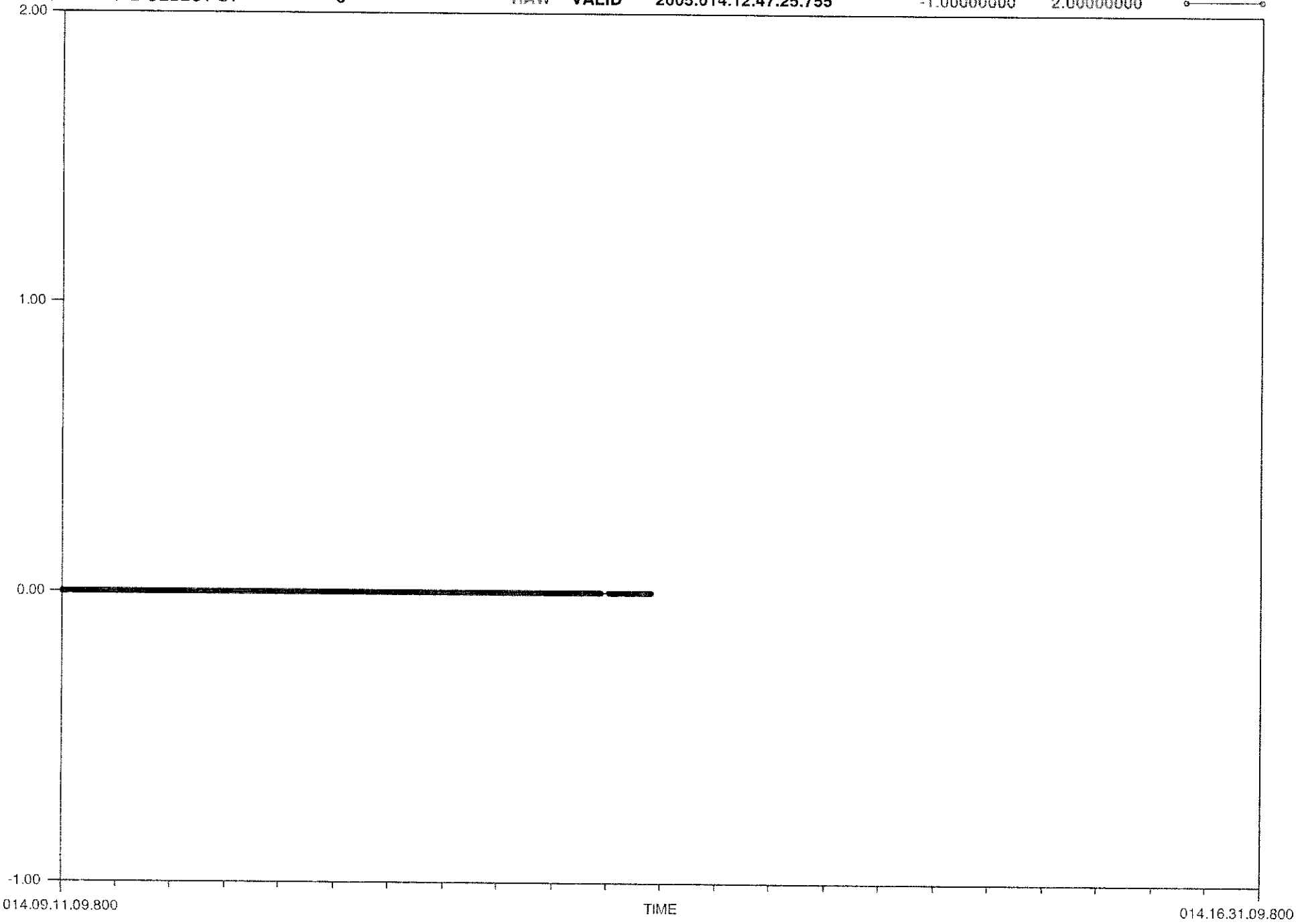
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E6006B	TUSO B STATUS	1	RAW	VALID	2005.014.12.47.25.755	-1.00000000	2.00000000	



DS: 524 ID: W185P Title: [PDRS] TRANSMITTER SELECTION Sample Time: 2005.014.12.47.25.755 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

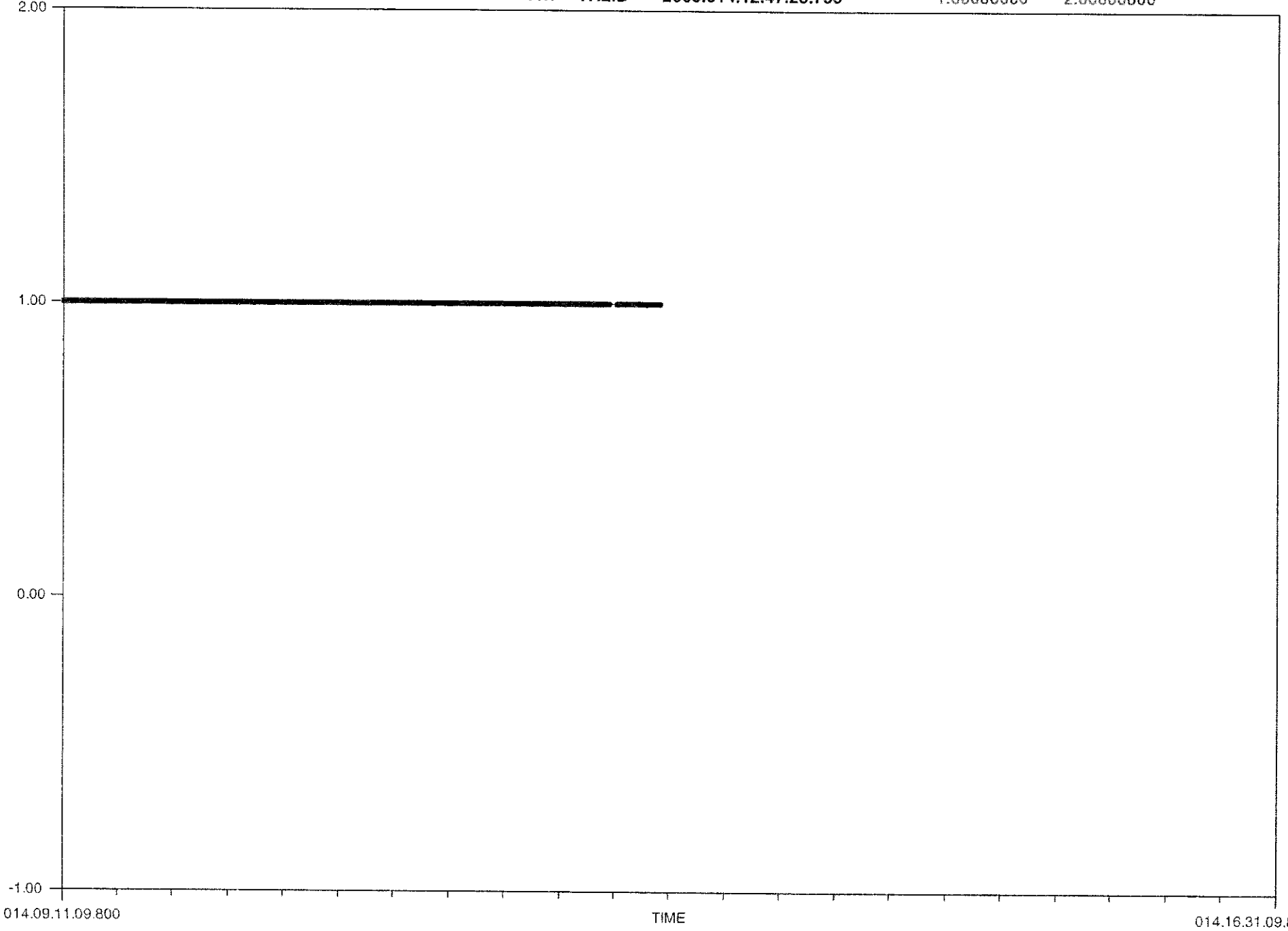
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R1005R	TX A SELECT ST		RAW			-1.00000000	2.00000000	
R2005R	TX B SELECT ST	0	RAW	VALID	2005.014.12.47.25.755	-1.00000000	2.00000000	



DS: 524 ID: W172P Title: [PDRS] TCXO OUTPUT LEVEL Sample Time: 2005.014.12.47.25.755 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

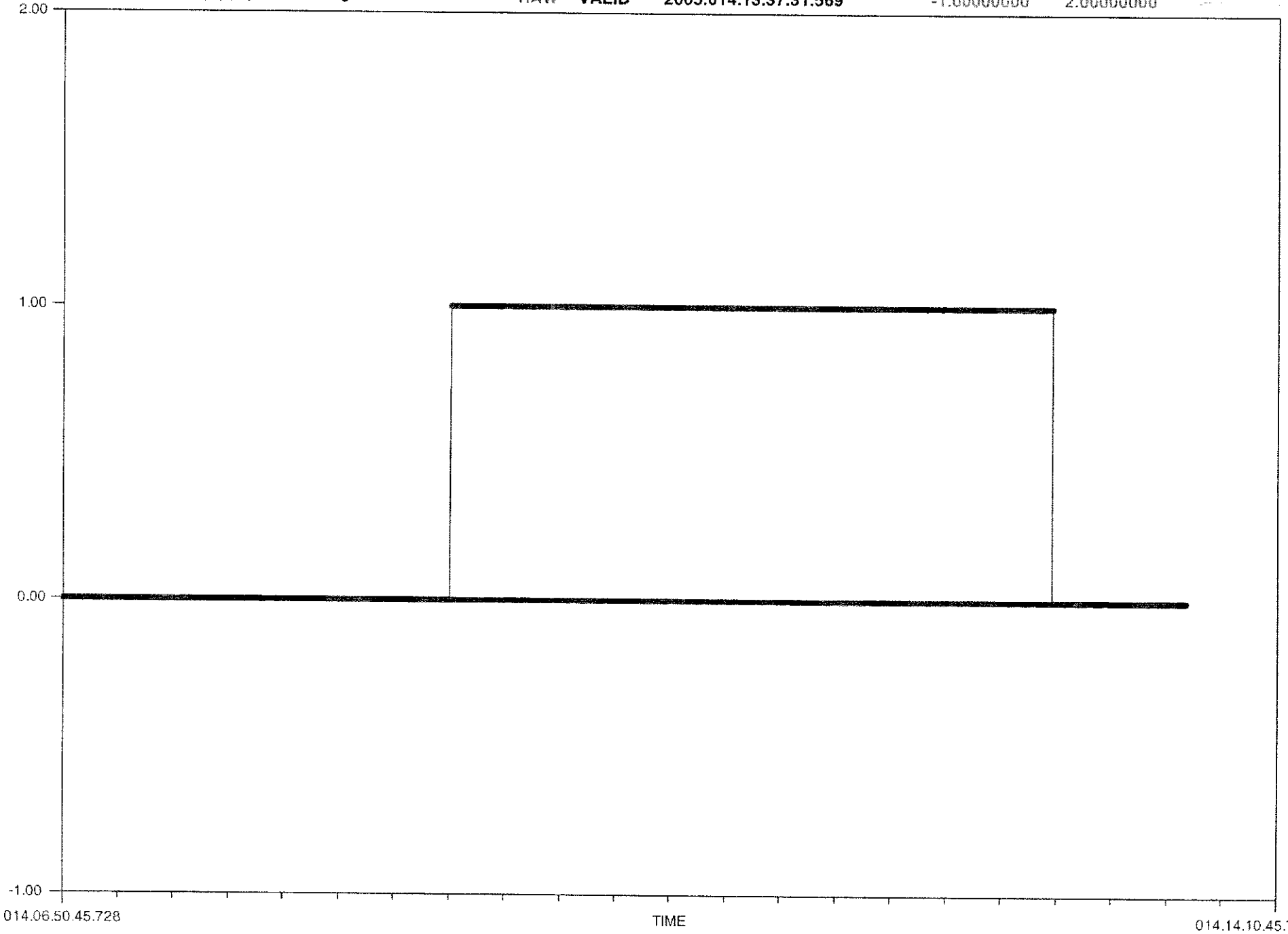
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R1006B	TCXO A OUT LEV		RAW			-1.00000000	2.00000000	
R2006B	TCXO B OUT LEV	1	RAW	VALID	2005.014.12.47.25.755	-1.00000000	2.00000000	



DS: 524 ID: PD01P Title: [PDRS] VITERBI DEC STATUS A/B Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

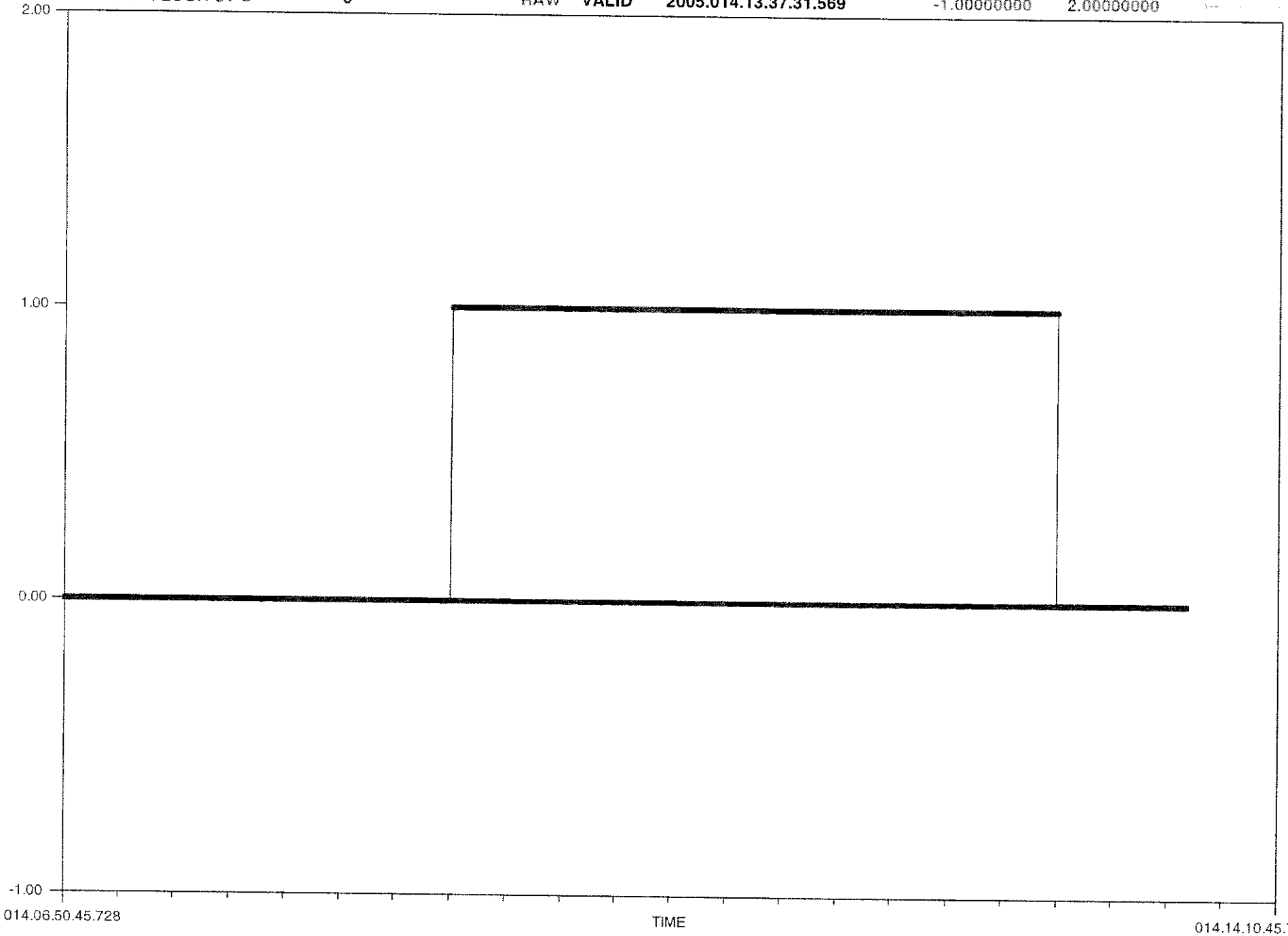
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R50018	VITERBI DEC ST A	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	
R60018	VITERBI DEC ST B	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	



DS: 524 ID: PD02P Title: [PDRS] CARRIER LOCK STATUS A/B Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

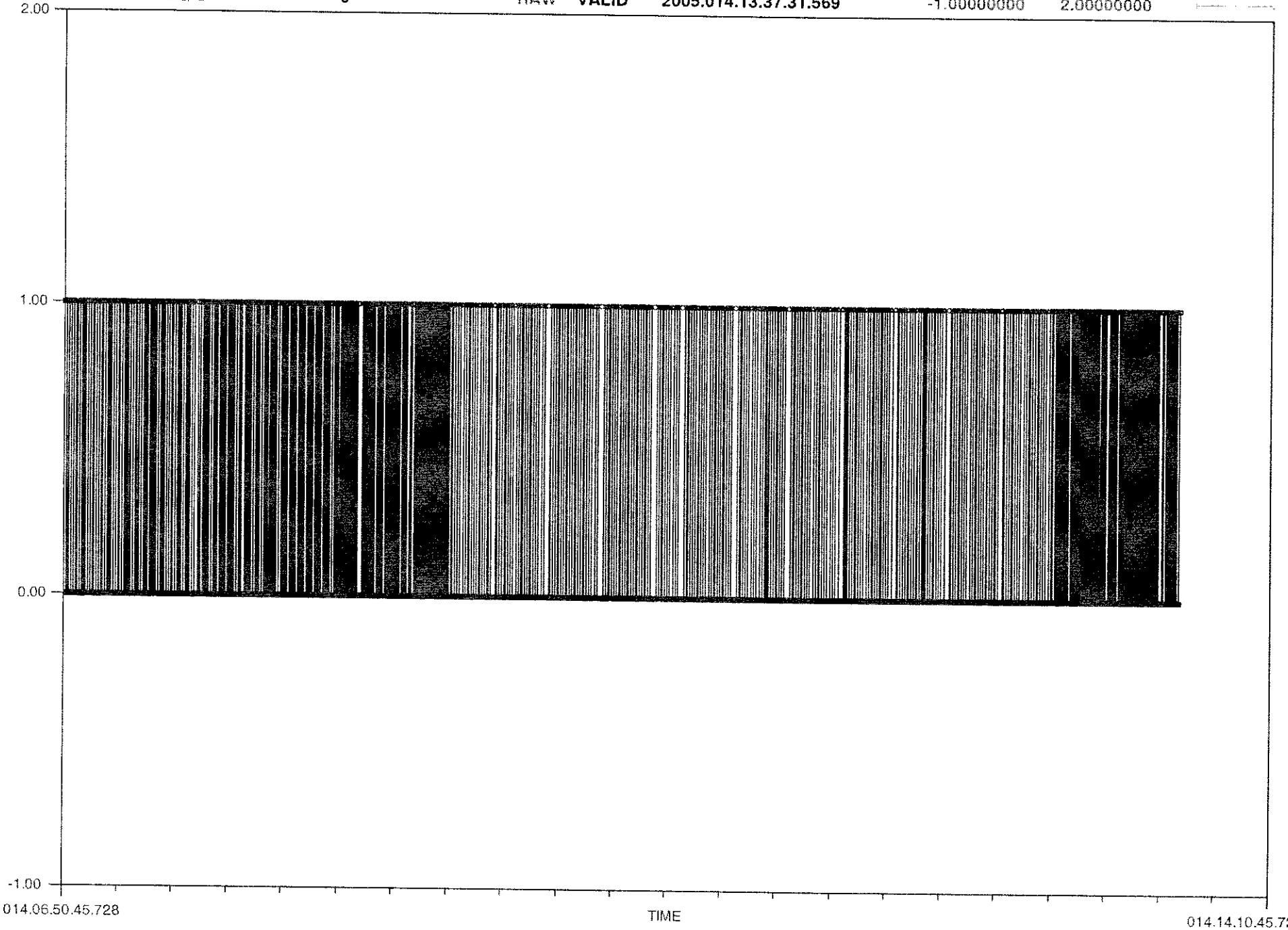
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R50019	CARR LOCK ST A	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	
R60019	CARR LOCK ST B	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	



DS: 524 ID: PD03P Title: [PDRS] SELECTED FREQUENCY A/B Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

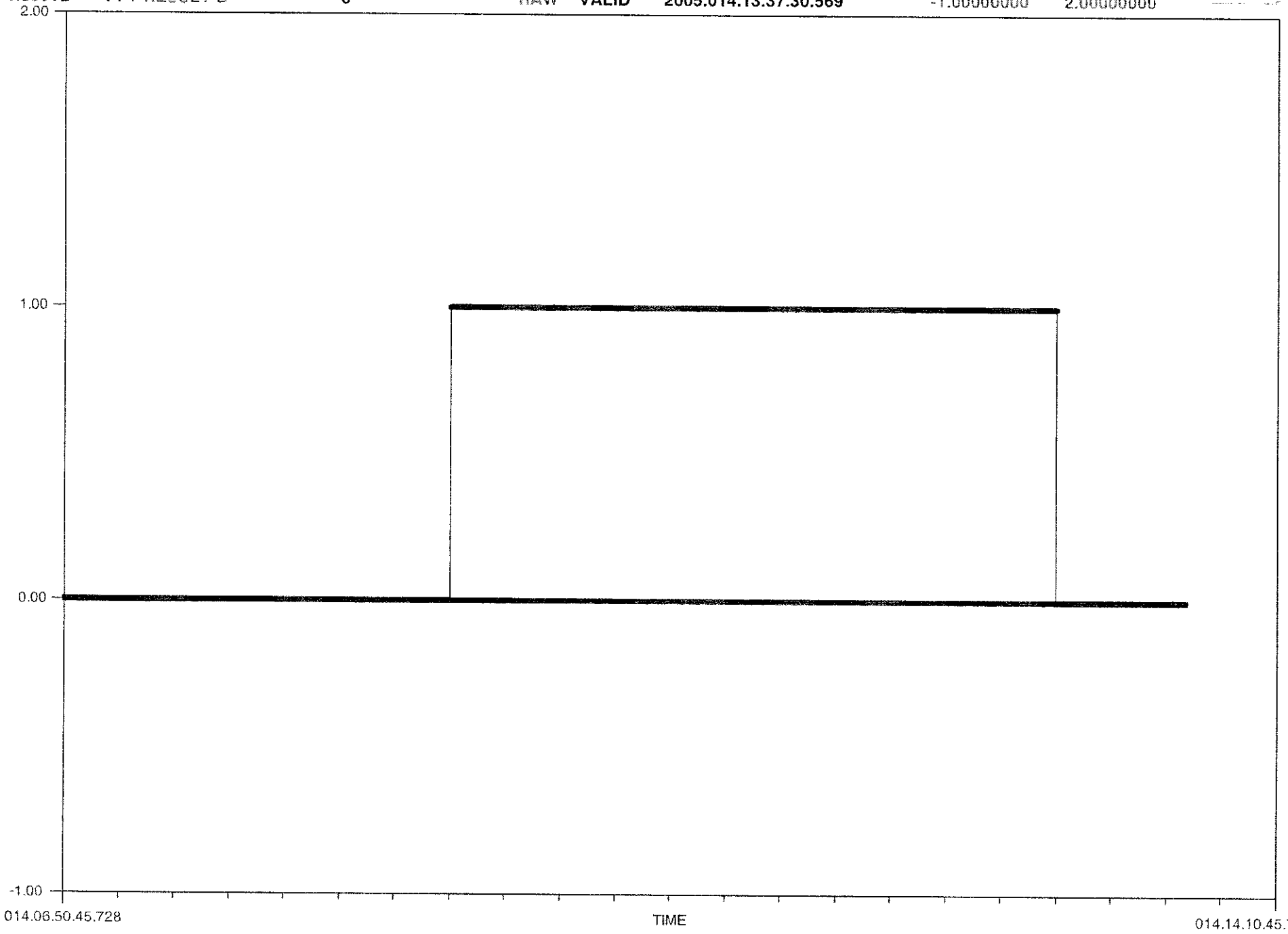
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5001A	SEL FREQ A	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	
R6001A	SEL FREQ B	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	



DS: 524 ID: PD04P Title: [PDRS] FFT RESULT A/B Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

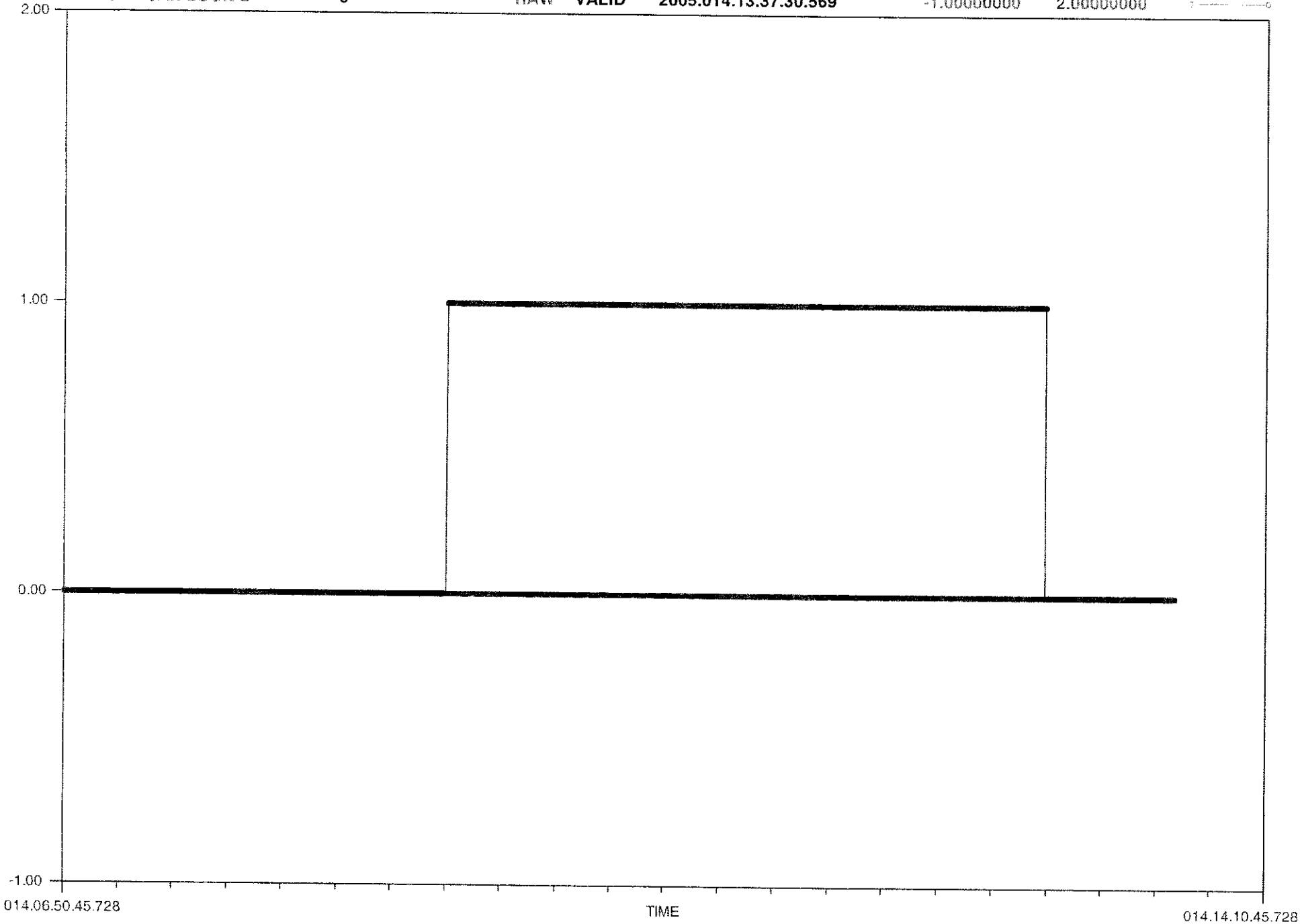
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5001B	FFT RESULT A	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	
R6001B	FFT RESULT B	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	



DS: 524 ID: PD05P Title: [PDRS] SUBCARRIER LOCK A/B Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

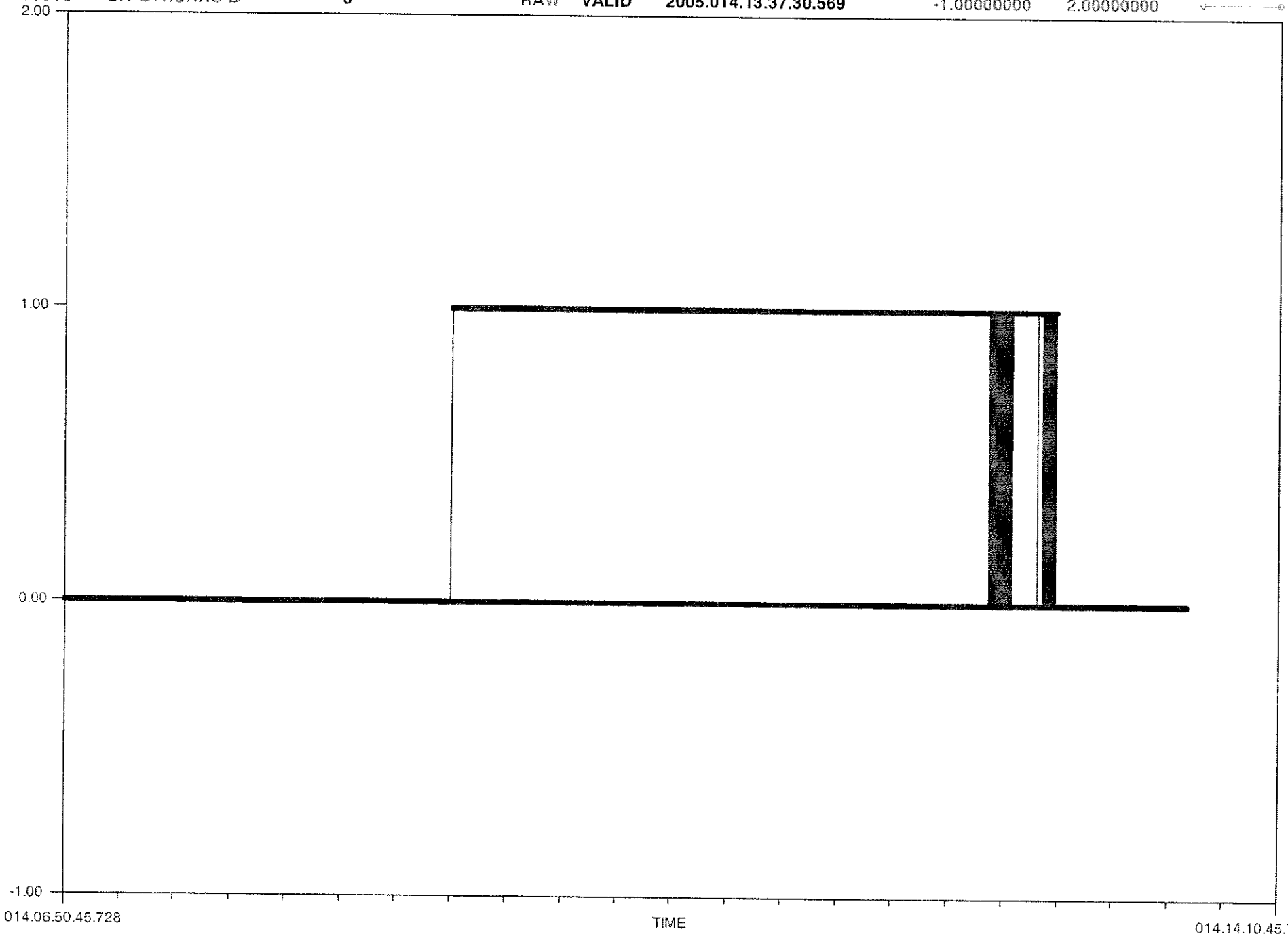
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5001C	SUB CARR LOCK A	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	
R6001C	SUB CAR LOCK B	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	



DS: 524 ID: PD06P Title: [PDRS] BIT SYNCHRO A/B Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

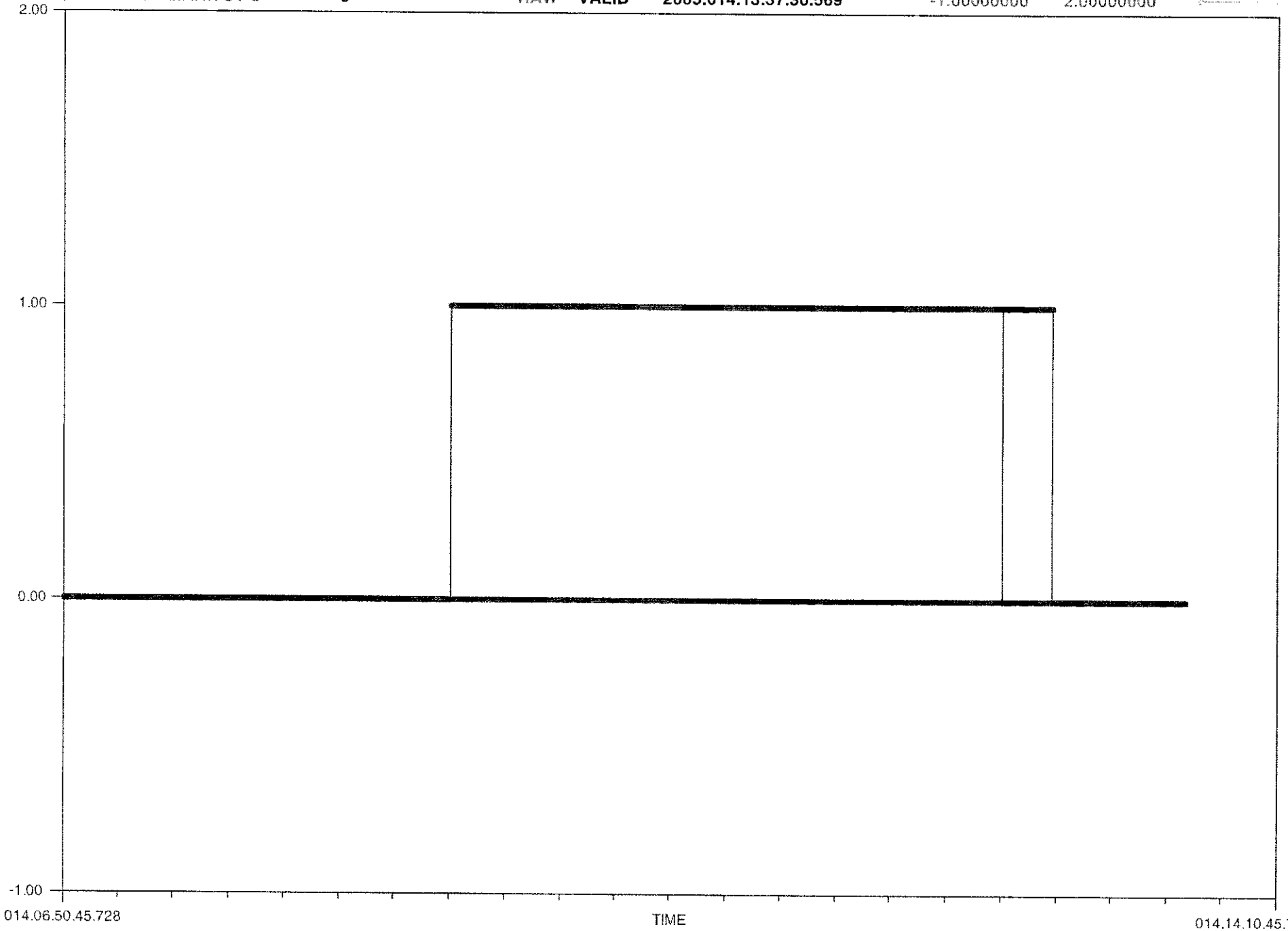
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5004C	BIT SYNCHRO A	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	
R6004C	BIT SYNCHRO B	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	



DS: 524 ID: PD07P Title: [PDRS] SYNCH MARKER A/B Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

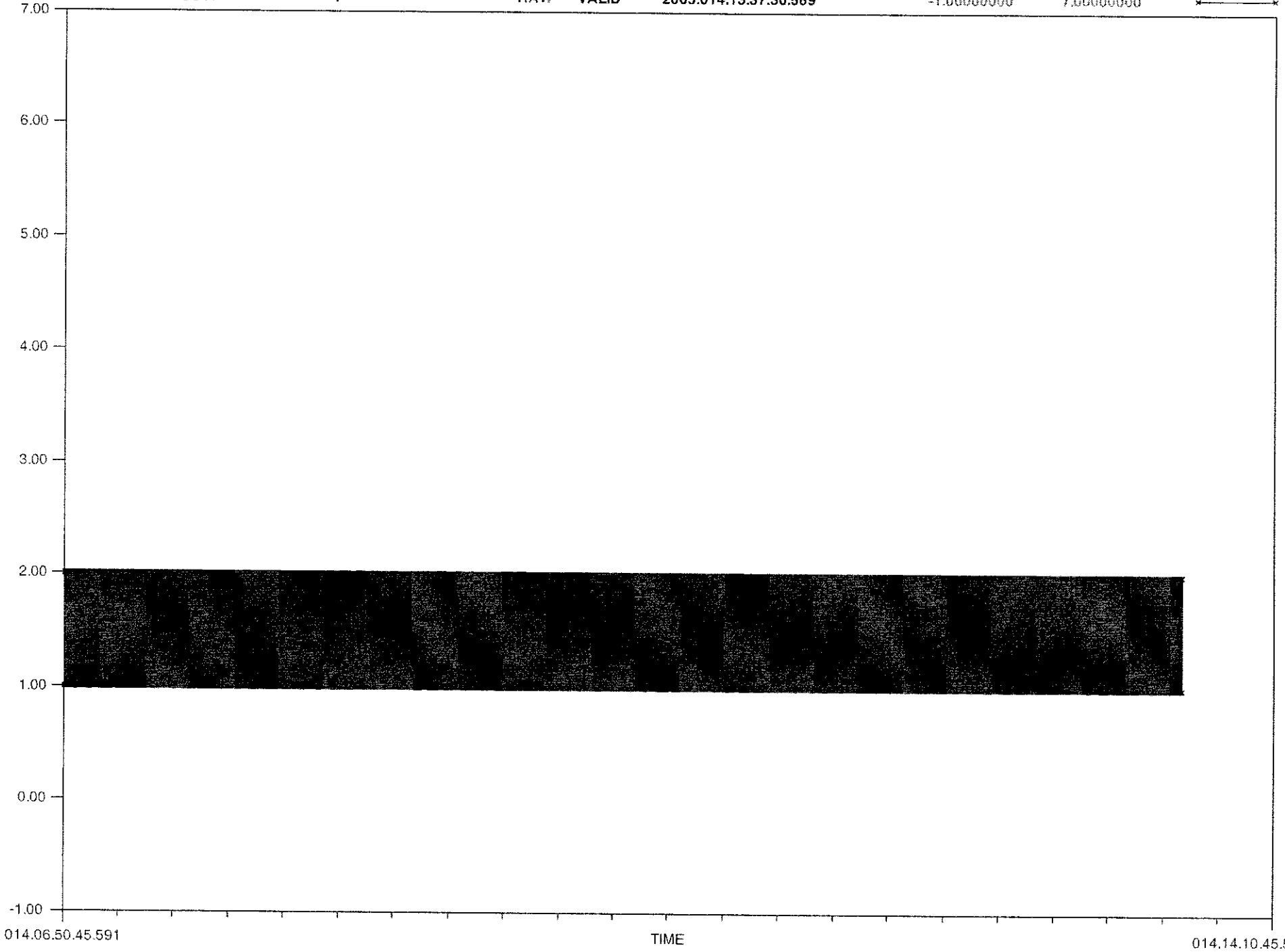
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5002C	SYNCH MARK ST A	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	
R6002C	SYNCH MARK ST B	0	RAW	VALID	2005.014.13.37.30.569	-1.00000000	2.00000000	



DS: 524 ID: W173P Title: [PDRS] PSA-A RX STATUS WORD Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

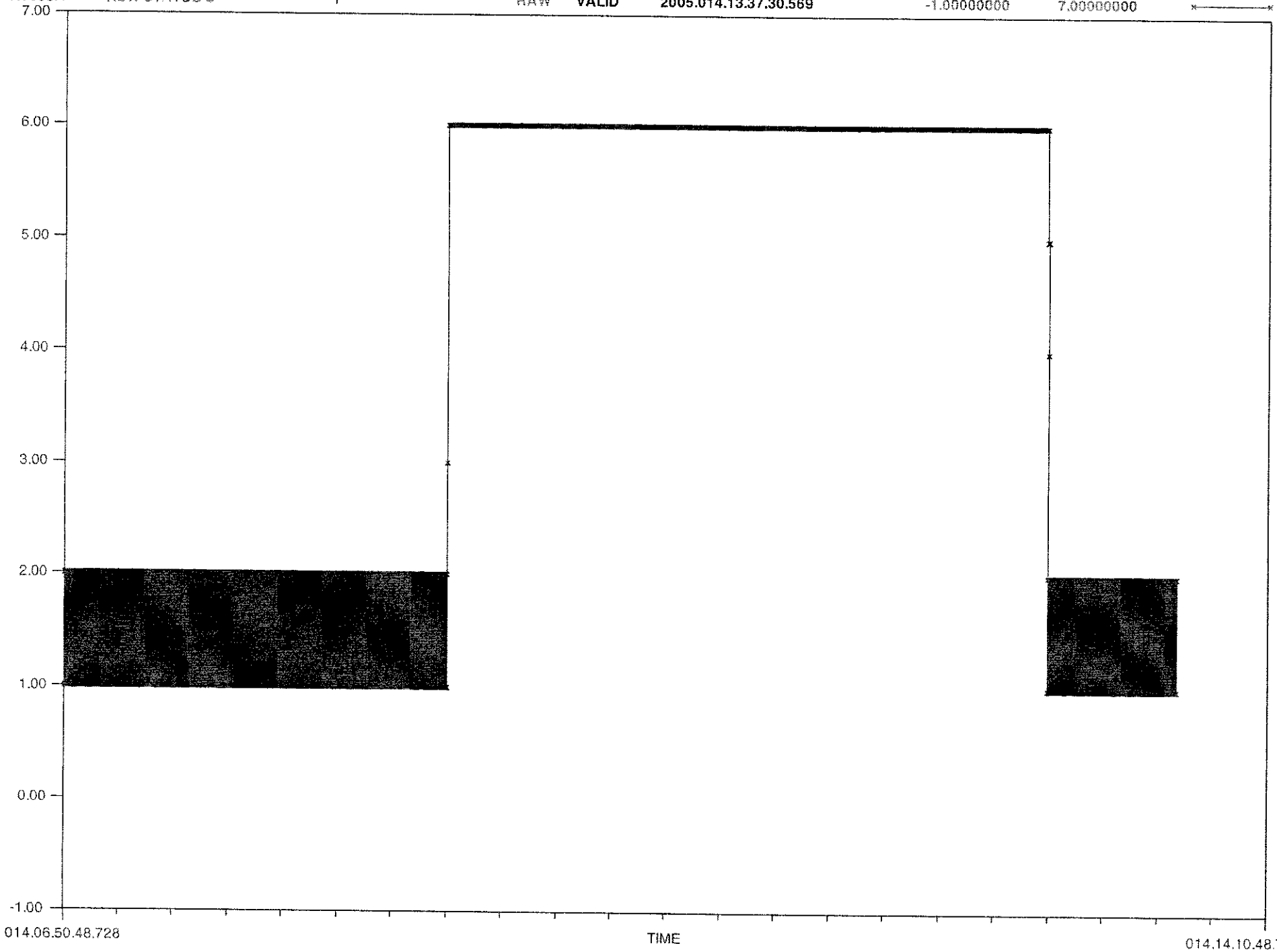
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5003A	RSW STATUS A	1	RAW	VALID	2005.014.13.37.30.569	-1.00000000	7.00000000	



DS: 524 ID: W174P Title: [PDRS] PSA-B RX STATUS WORD Sample Time: 2005.014.13.37.30.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

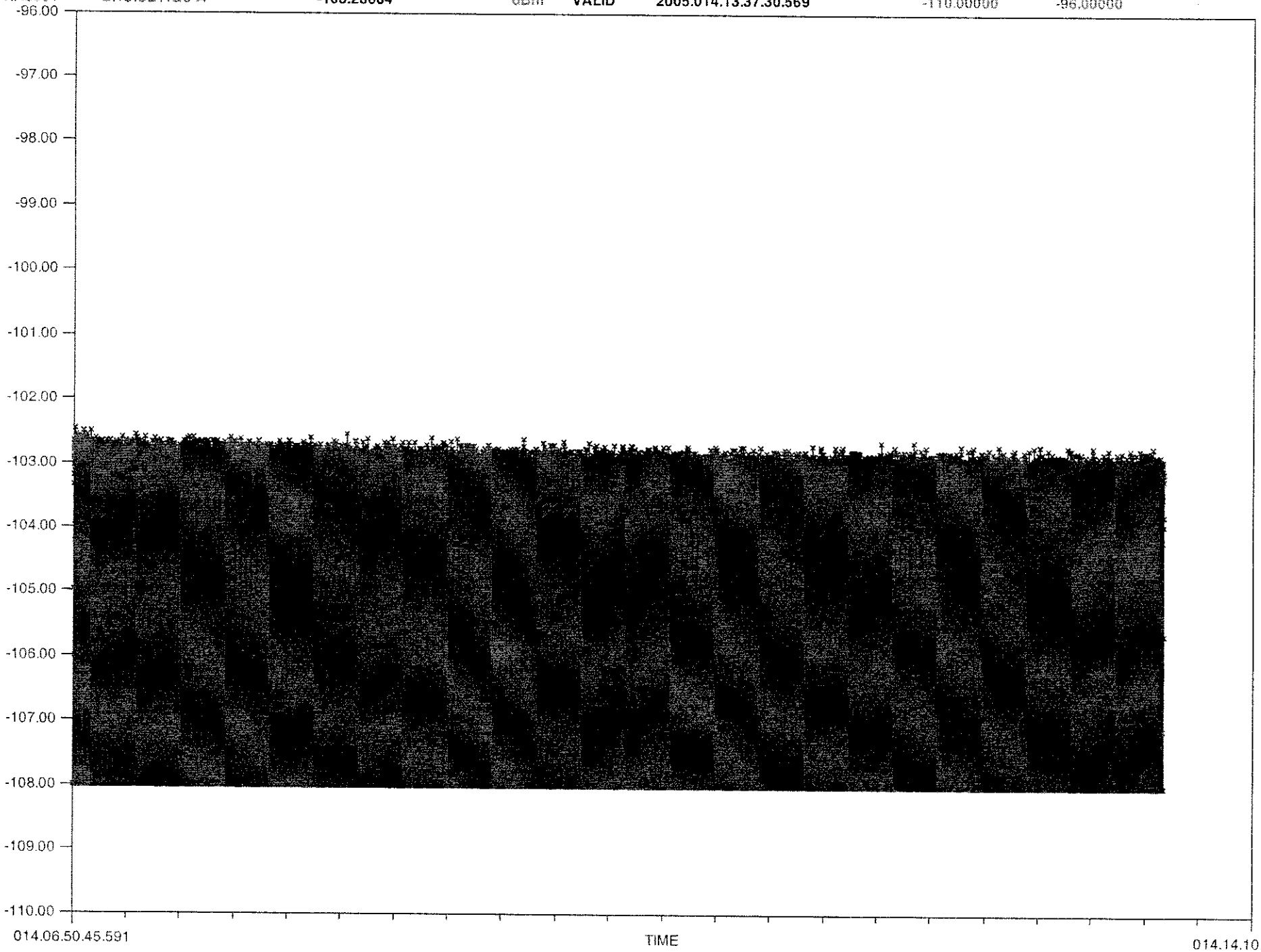
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R6003A	RSW STATUS B	1	RAW	VALID	2005.014.13.37.30.569	-1.00000000	7.00000000	



DS: 524 ID: W175P Title: [PDRS] PSA A AGC (BITE) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

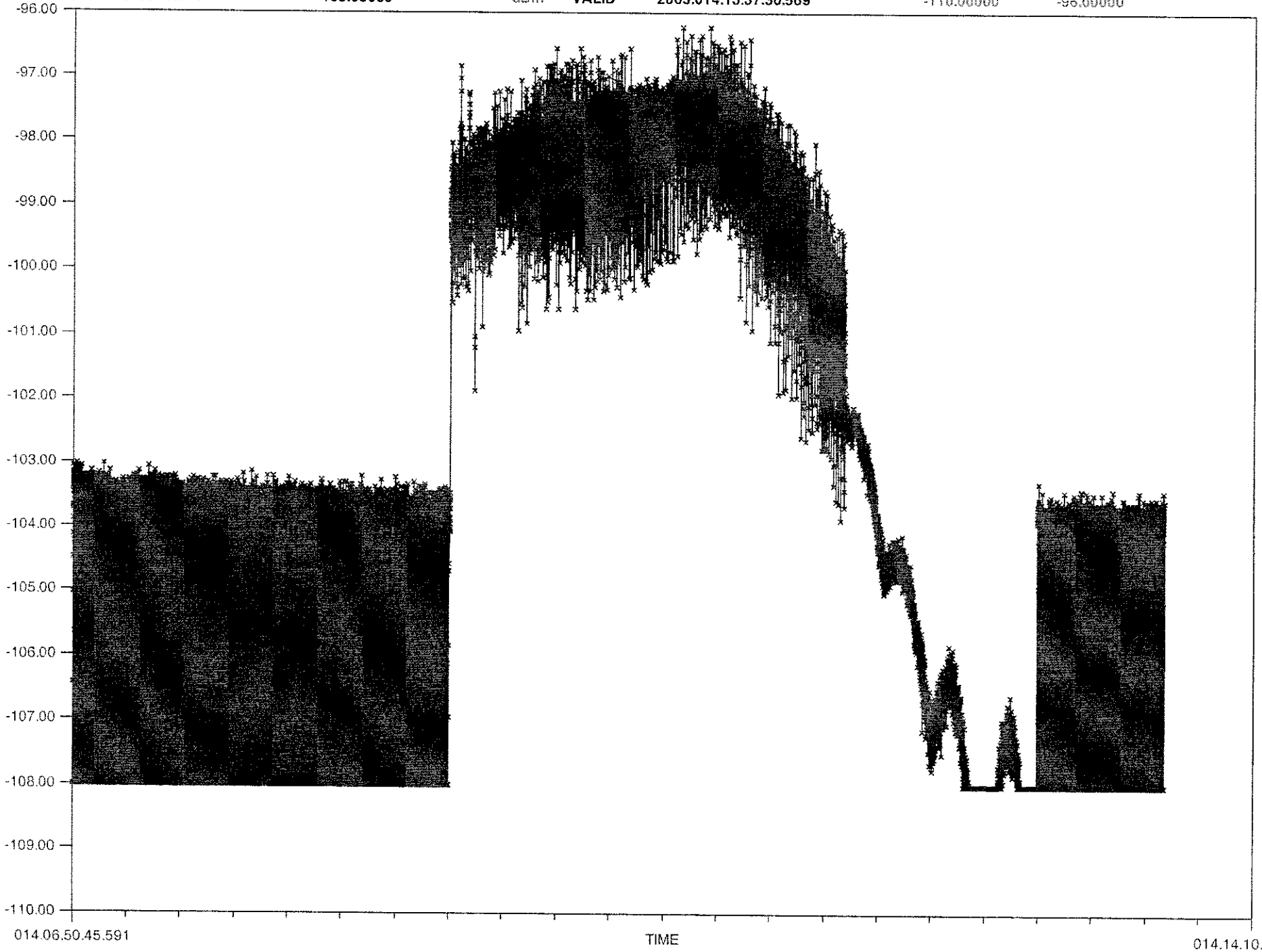
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA8001	CRUISE AGC A	-103.23684	dBm	VALID	2005.014.13.37.30.569	-110.00000	-96.00000	



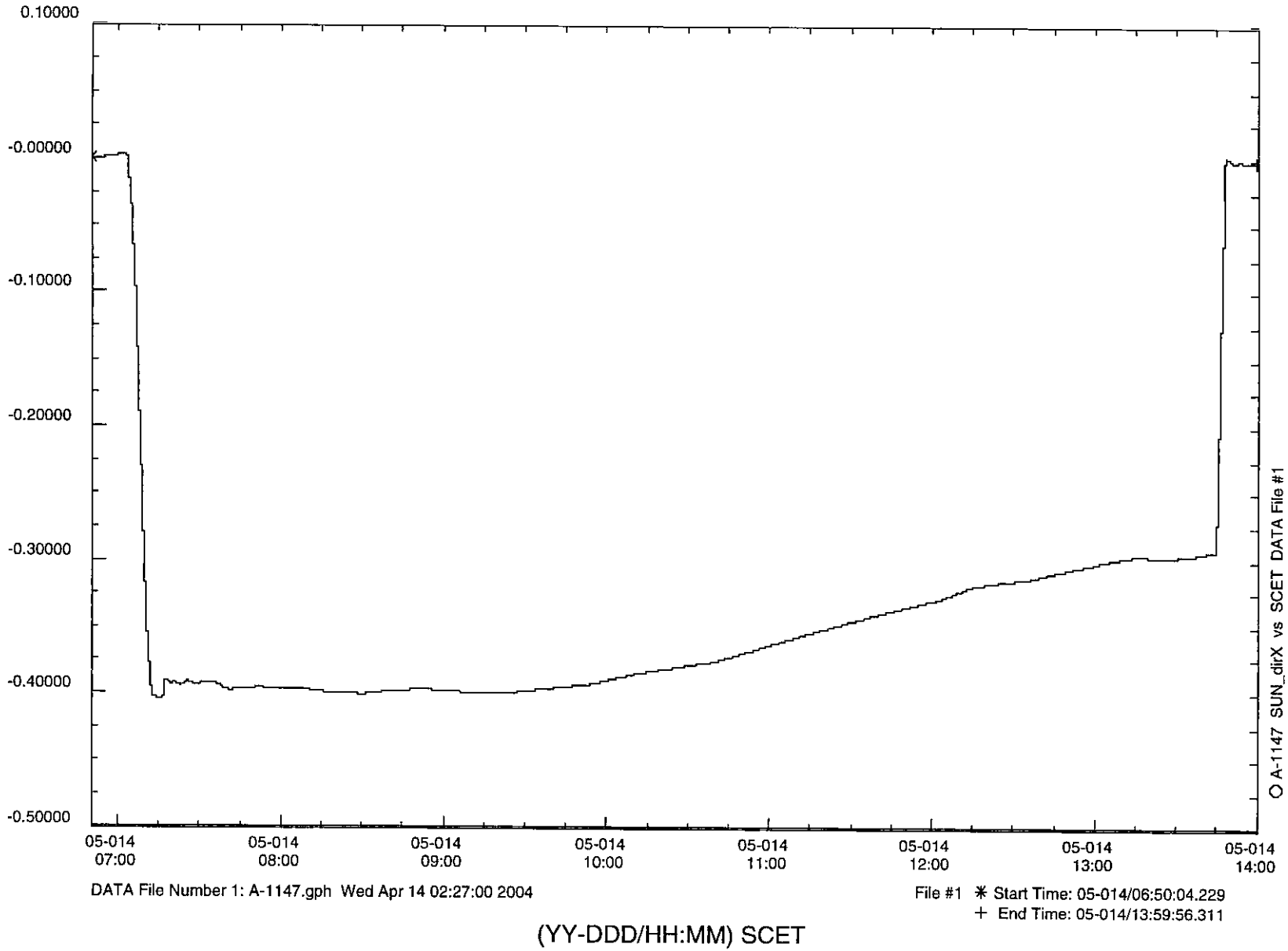
DS: 524 ID: W176P Title: [PDRS] PSA B AGC (BITE) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XB8001	CRUISE AGC B	-108.00000	dBm	VALID	2005.014.13.37.30.569	-110.00000	-96.00000	

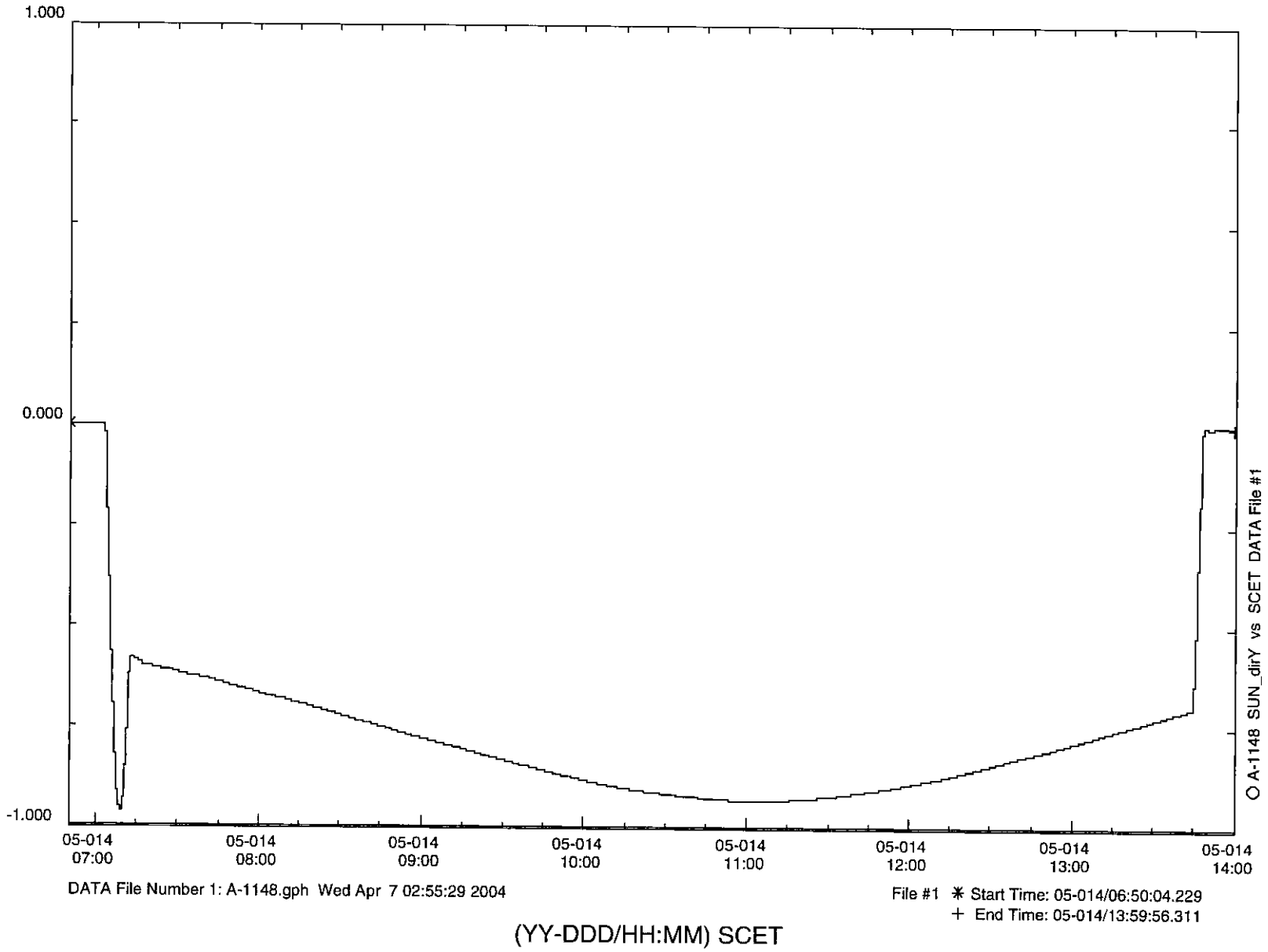


A-1147 (SUN_dirX) vs SCET



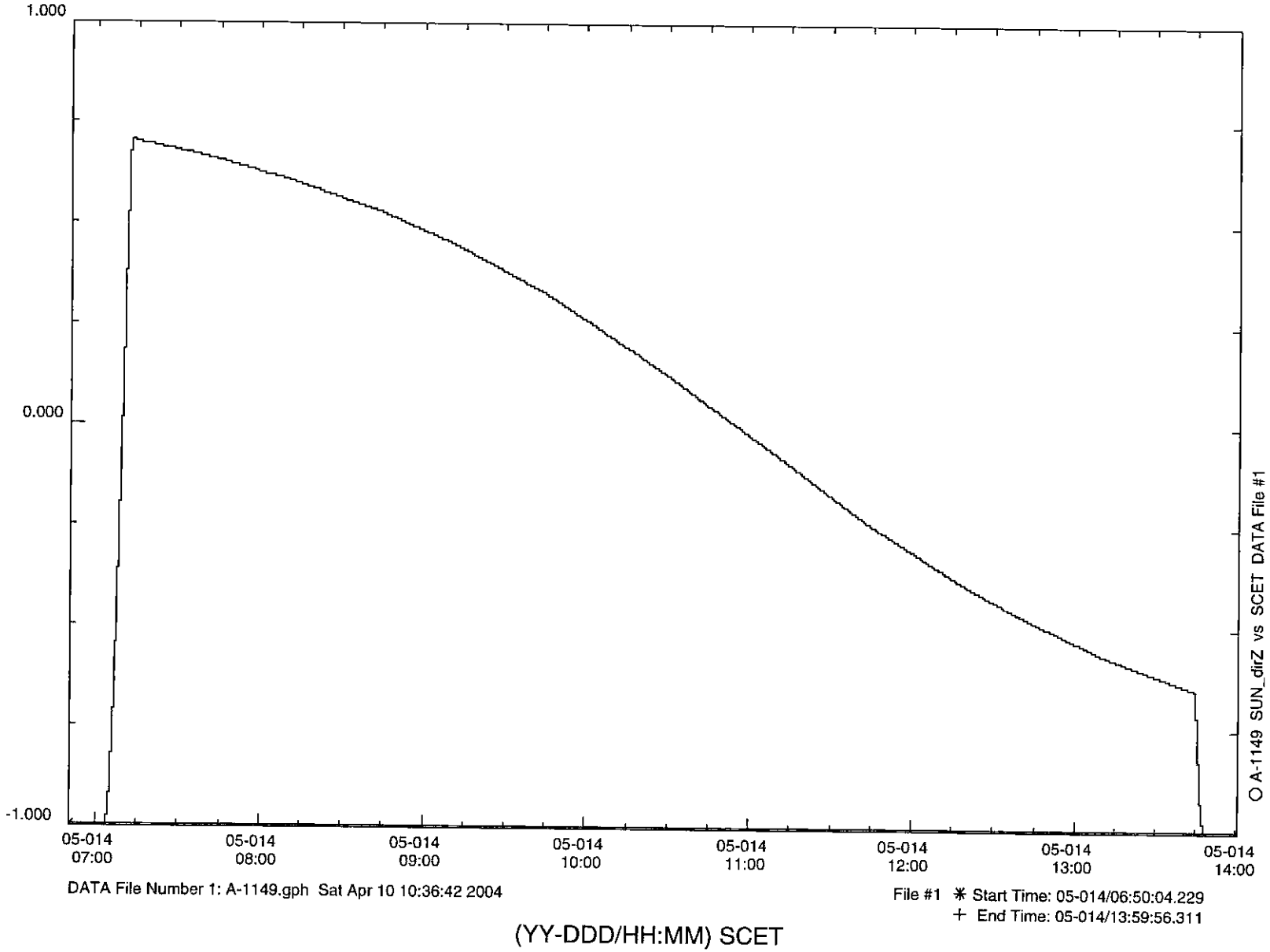
Date: Thu. Feb. 3, 2005 09:22:16

A-1148 (SUN_dirY) vs SCET



Date: Thu. Feb. 3, 2005 09:22:16

A-1149 (SUN_dirZ) vs SCET

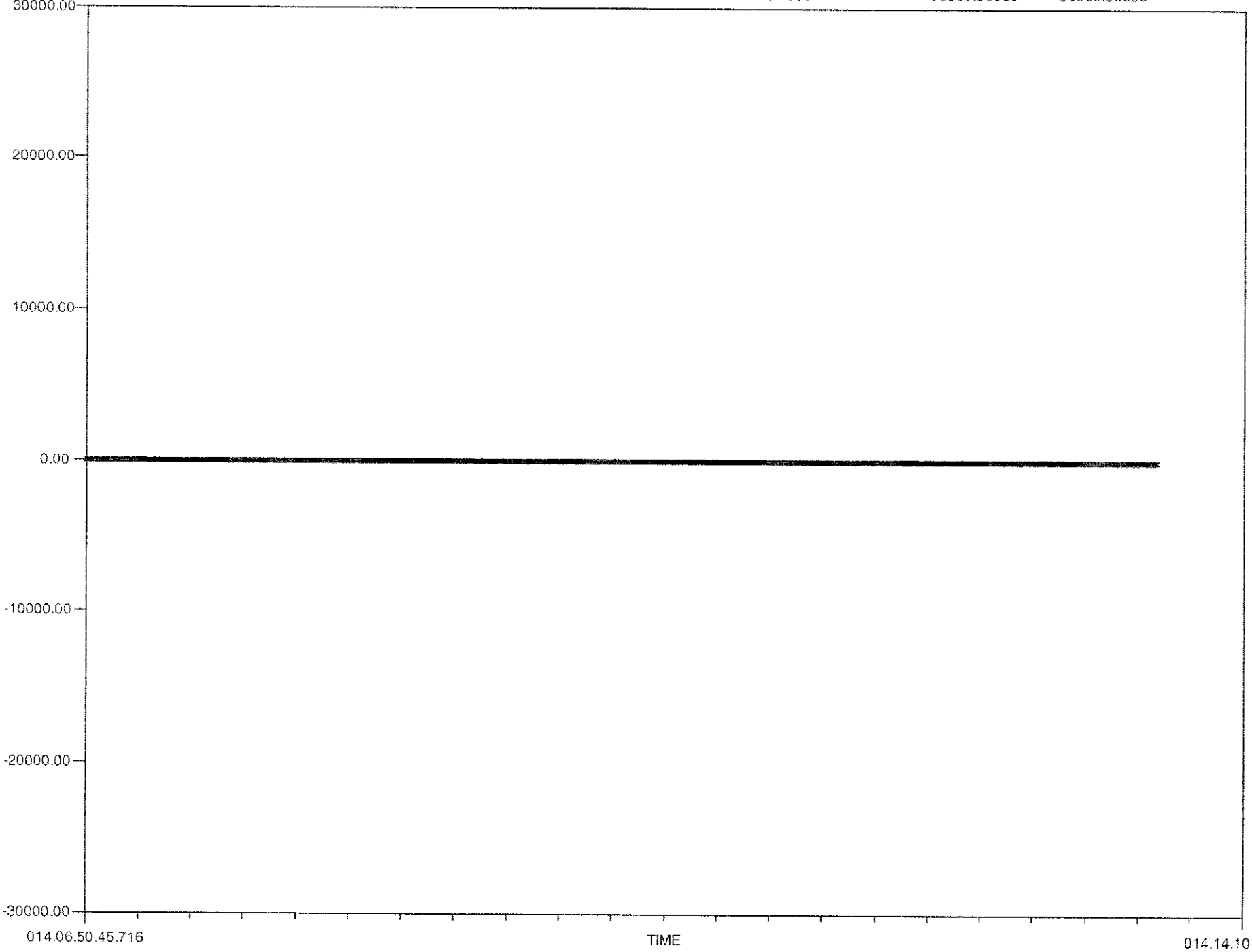


Date: Thu. Feb. 3, 2005 09:22:16

DS: 524 ID: W179P Title: [PDRS] PSA-A NCO Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

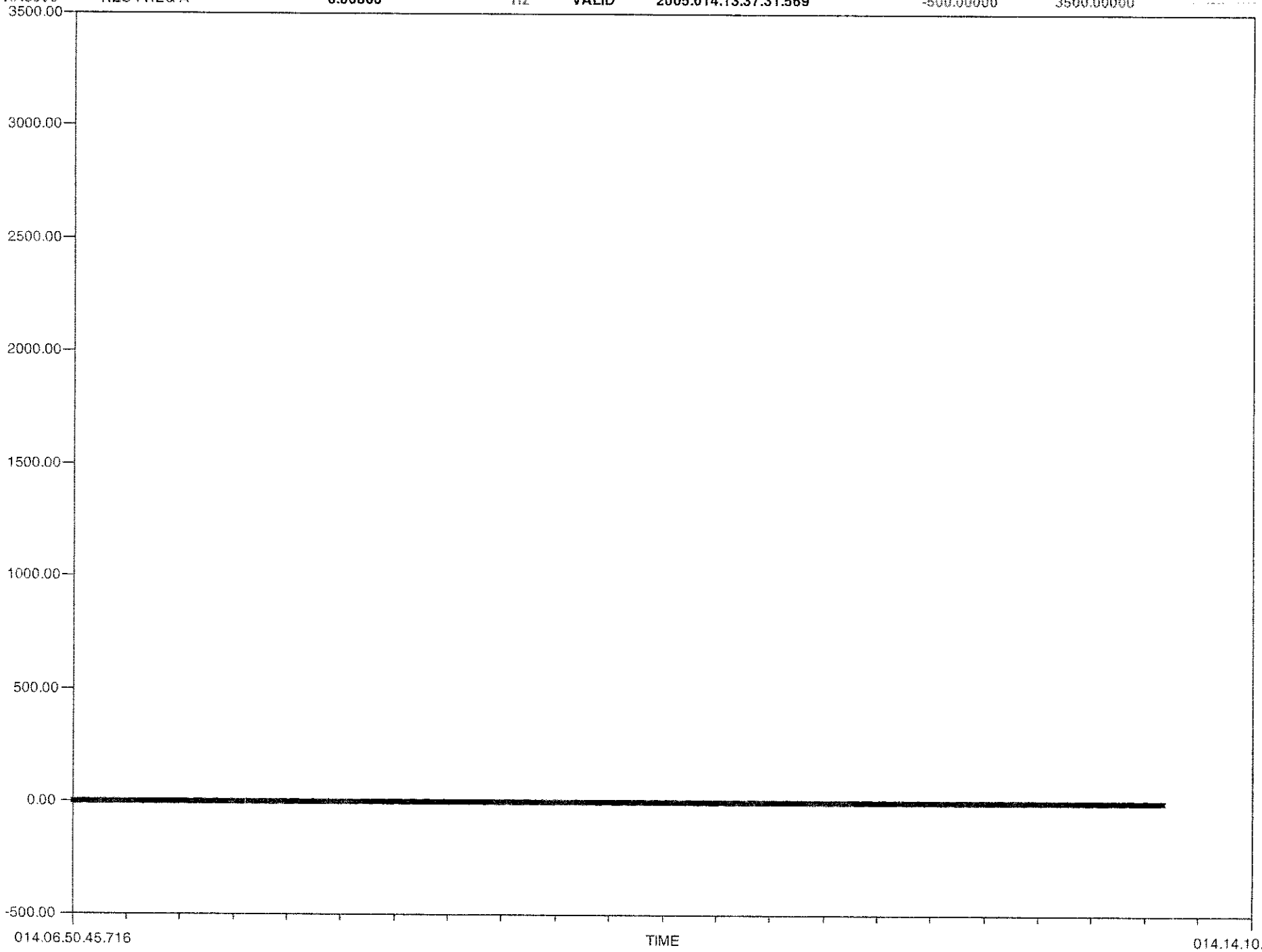
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA8000	REC FREQ A	0.00000	Hz	VALID	2005.014.13.37.31.569	-30000.00000	30000.00000	



DS: 524 ID: W192P Title: [PDRS] PSA-A NCO (zoom) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

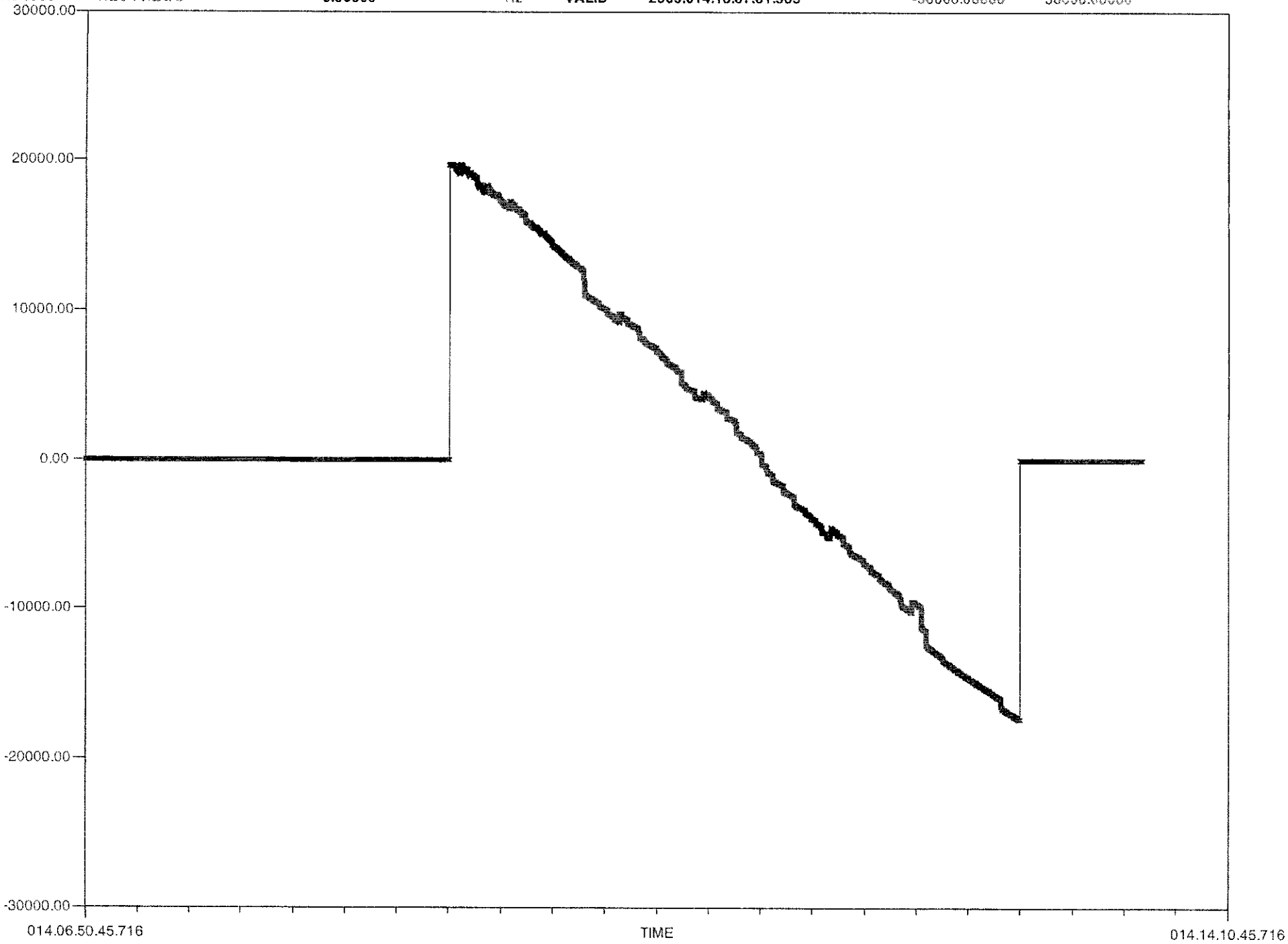
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA8000	REC FREQ A	0.00000	Hz	VALID	2005.014.13.37.31.569	-500.00000	3500.00000	



DS: 524 ID: W180P Title: [PDRS] PSA-B NCO Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

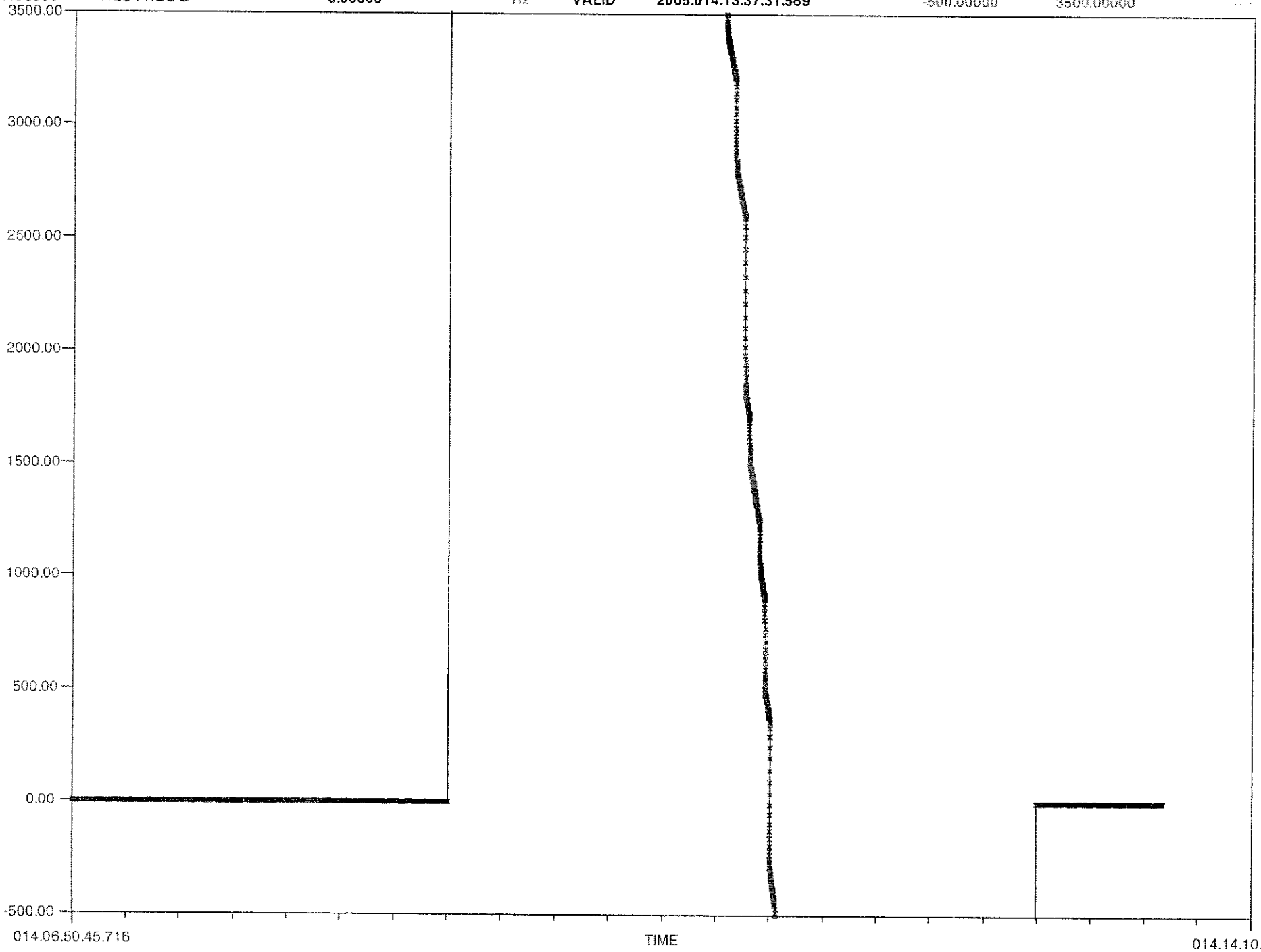
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XB8000	REC FREQ B	0.00000	Hz	VALID	2005.014.13.37.31.569	-30000.00000	30000.00000	



DS: 524 ID: W193P Title: [PDRS] PSA-B NCO (zoom) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

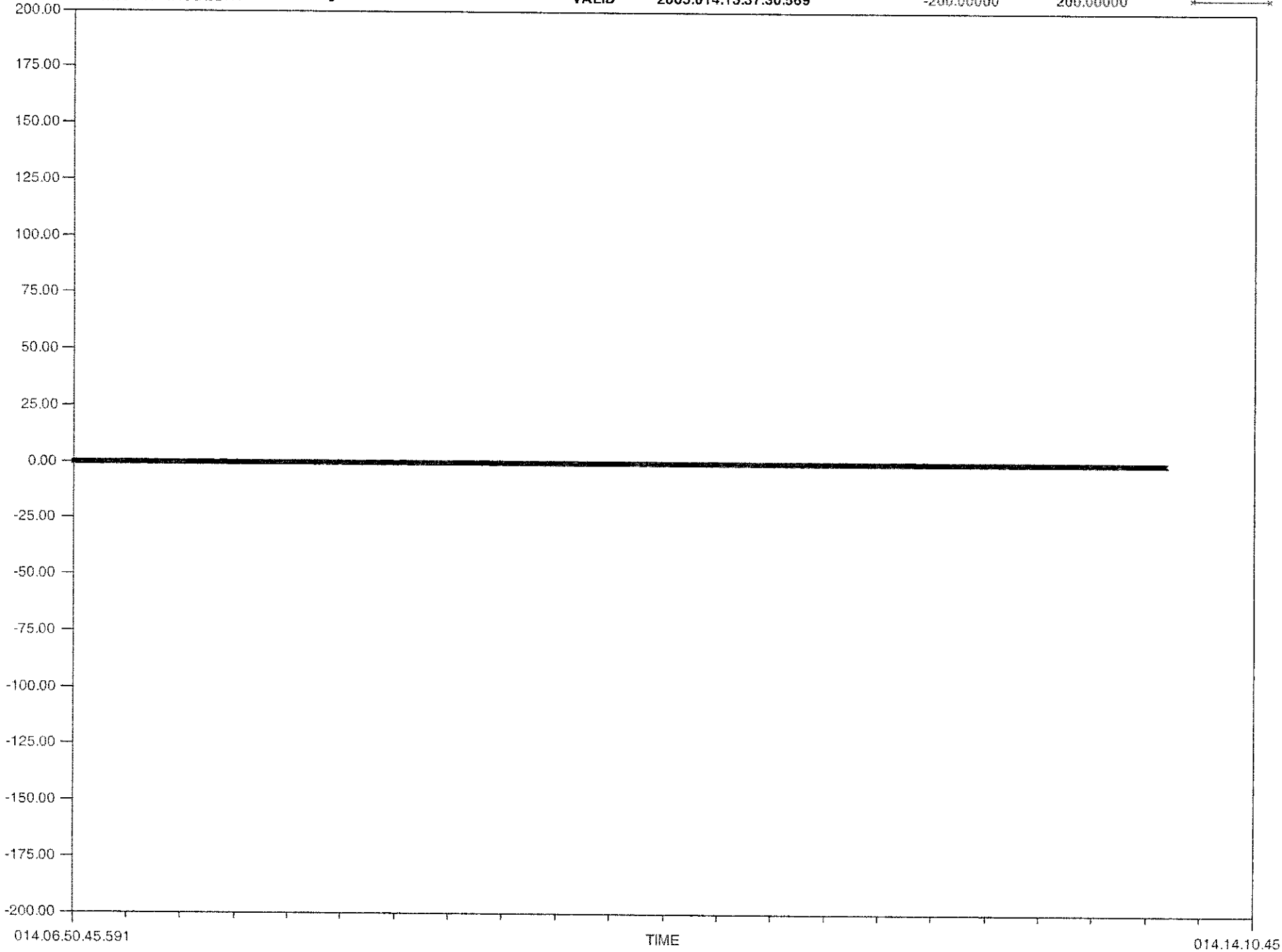
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XB8000	REC FREQ B	0.00000	Hz	VALID	2005.014.13.37.31.569	-500.00000	3500.00000	



DS: 524 ID: W177P Title: [PDRS] PSA-A NCO DELTA Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

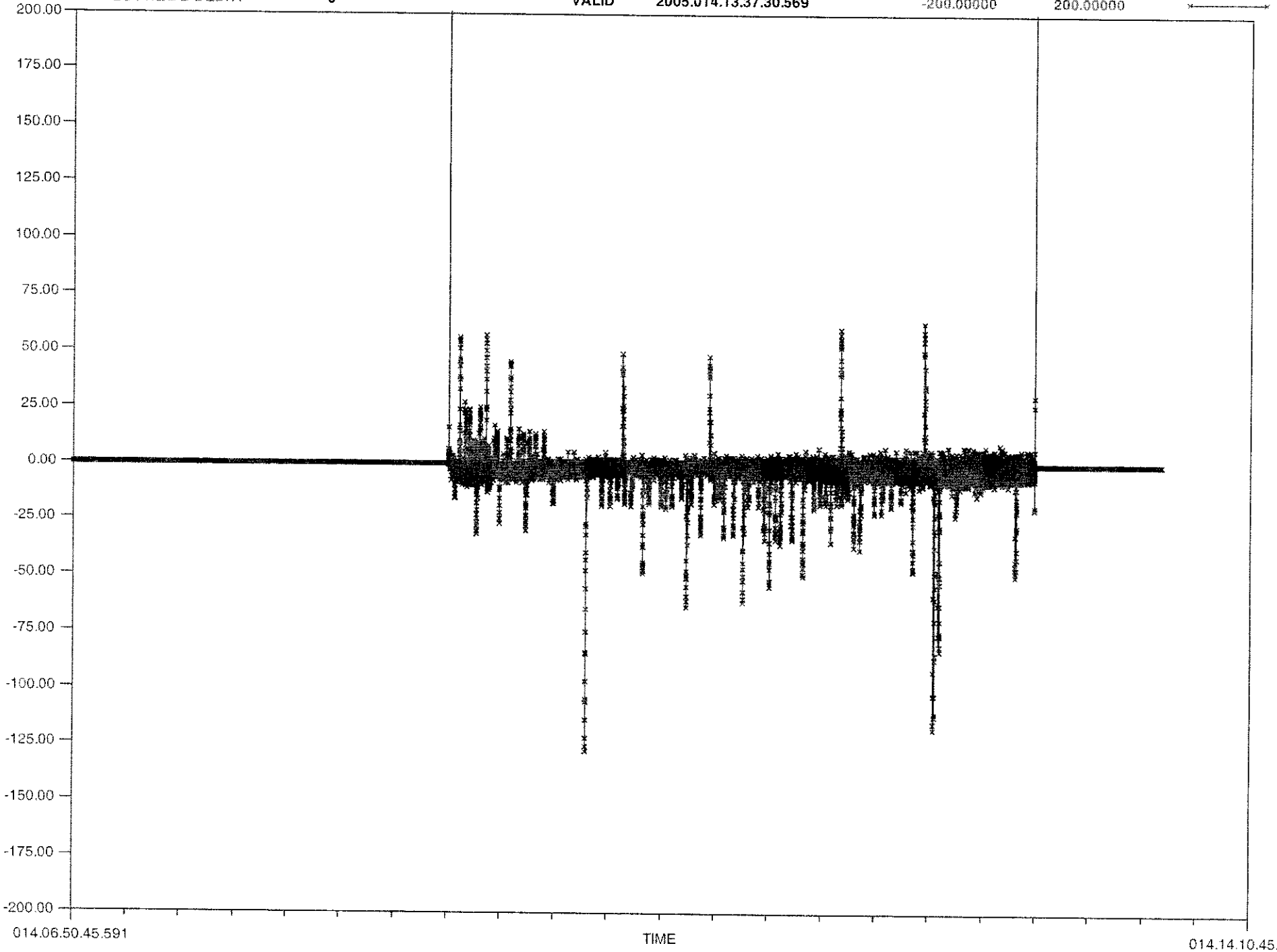
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZA8000	REC FREQ A DELTA	0		VALID	2005.014.13.37.30.569	-200.00000	200.00000	



DS: 524 ID: W178P Title: [PDRS] PSA-B NCO DELTA Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

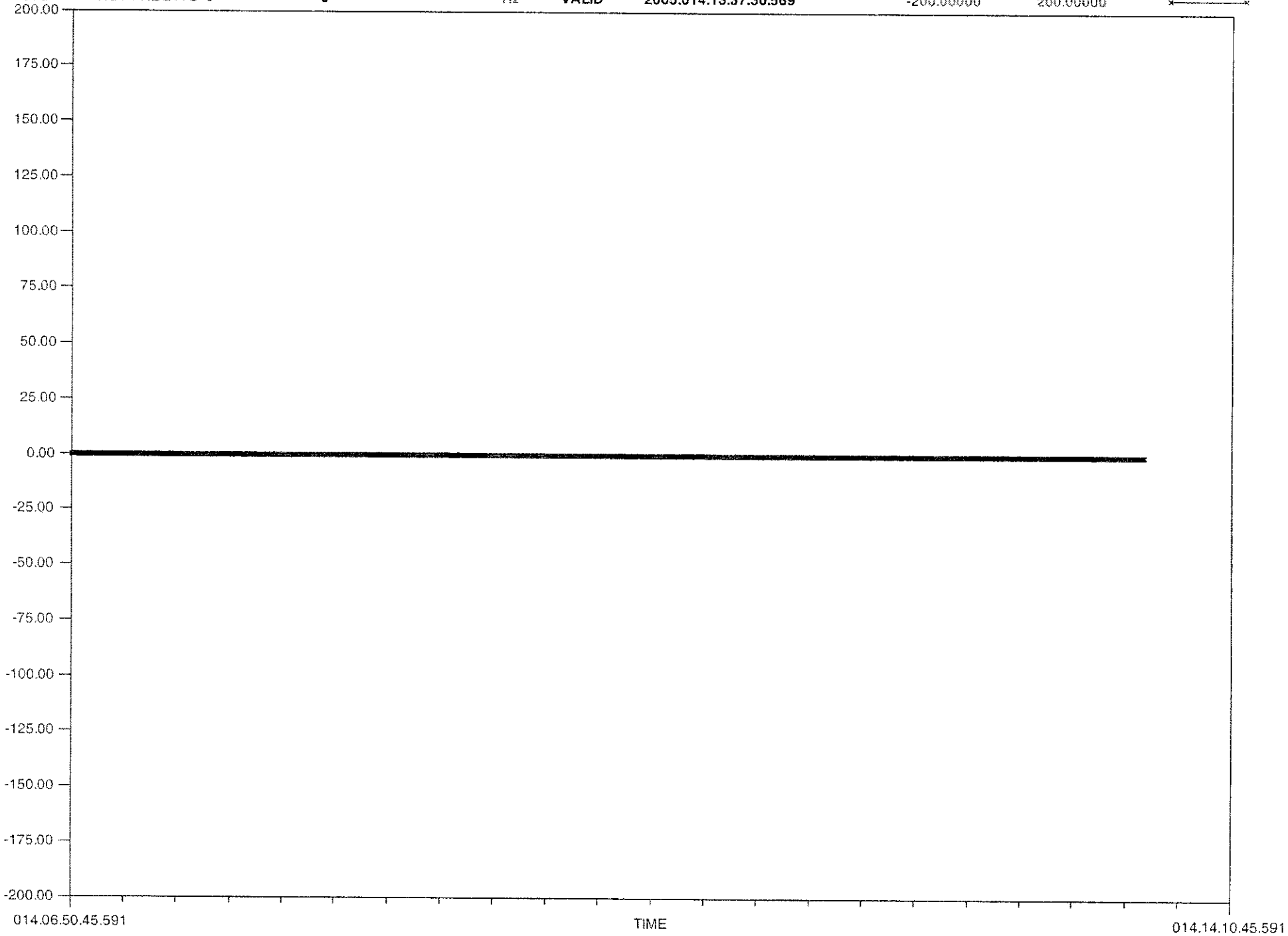
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ZB8000	REC FREQ B DELTA	0		VALID	2005.014.13.37.30.569	-200.00000	200.00000	



DS: 524 ID: W197P Title: [PDRS] PSA-A NCO DELTA * 8 Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

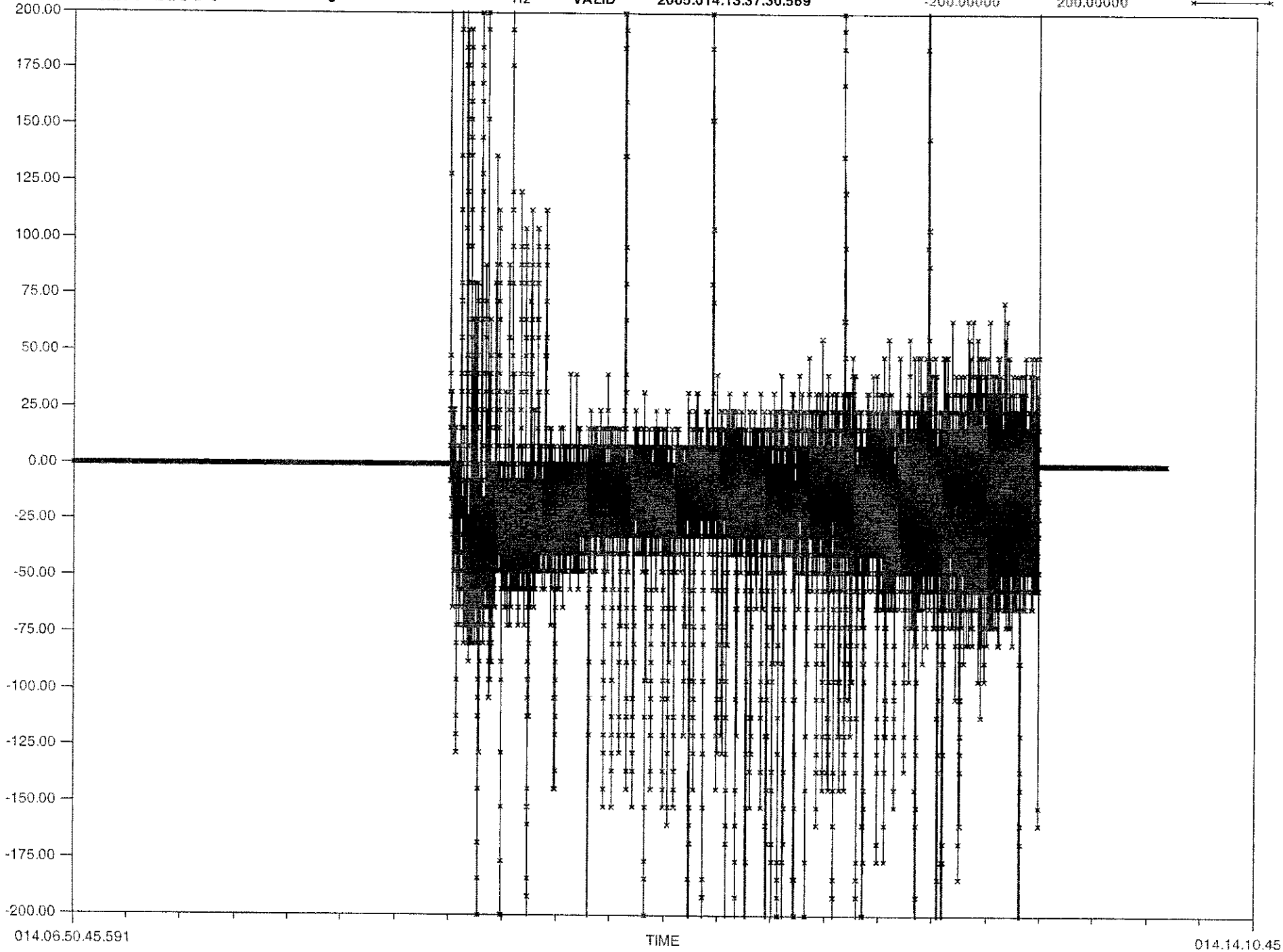
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA8021	REC FREQ A D*8	0	Hz	VALID	2005.014.13.37.30.569	-200.00000	200.00000	



DS: 524 ID: W198P Title: [PDRS] PSA-B NCO DELTA * 8 Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

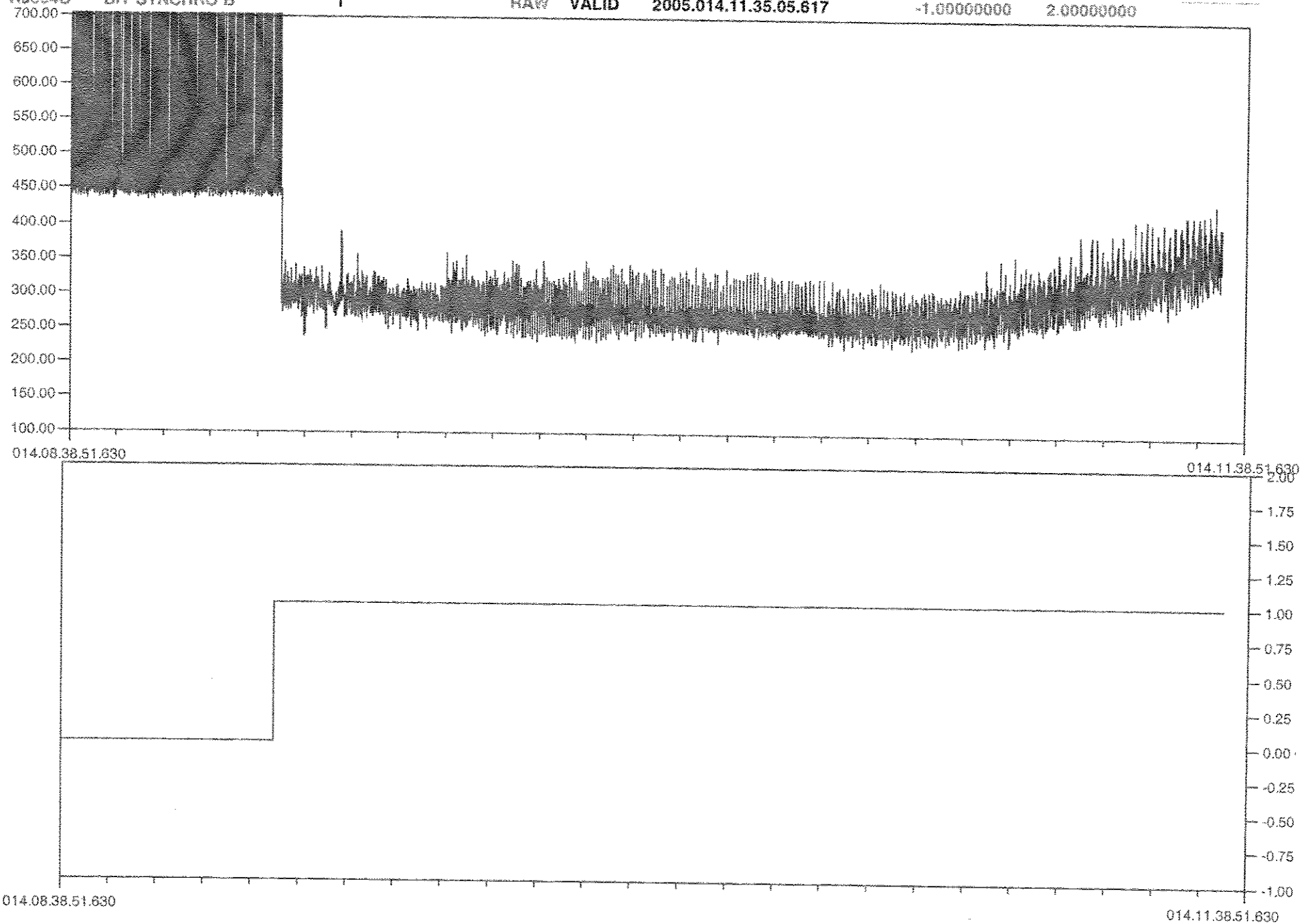
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XB8021	REC FREQ B D*8	0	Hz	VALID	2005.014.13.37.30.569	-200.00000	200.00000	



DS: 524 ID: w020Bz Title: PSA B AGC Raw (BITE) & Bit Sync Sample Time: 2005.014.11.35.05.617 Workstation: huyg2

X-GRID INTERVAL 000.03.00.00 AUTO HARD COPY OFF

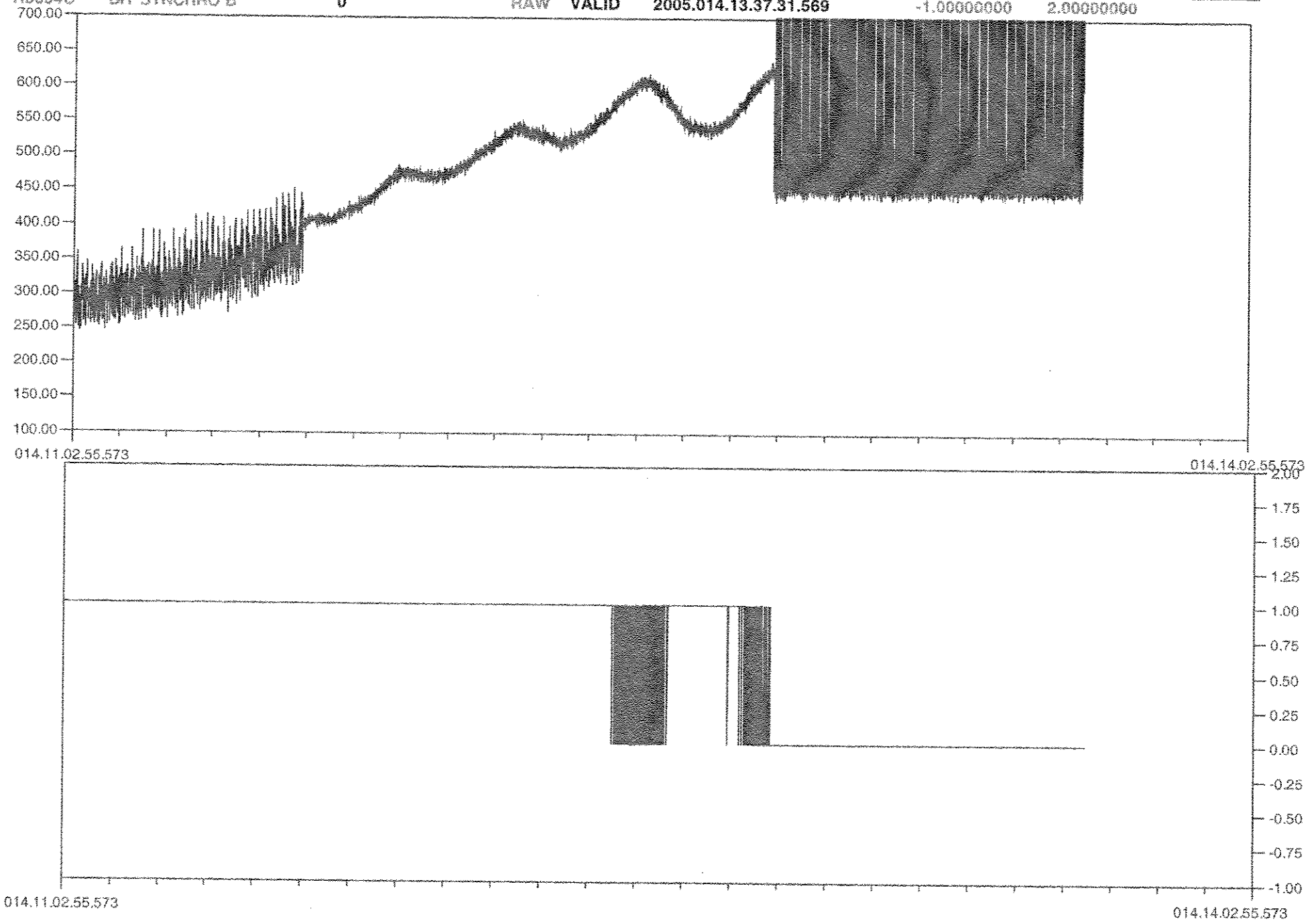
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XB6001	CRUISE AGC B	404	dBm	VALID	2005.014.11.35.05.617	100.00000000	700.00000000	
R6004C	BIT SYNCHRO B	1	RAW	VALID	2005.014.11.35.05.617	-1.00000000	2.00000000	



DS: 524 ID: w020Bz Title: PSA B AGC Raw (BITE) & Bit Sync Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.03.00.00 AUTO HARD COPY OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XB8001	CRUISE AGC B	596	dBm	VALID	2005.014.13.37.31.569	100.00000000	700.00000000	
R6004C	BIT SYNCHRO B	0	RAW	VALID	2005.014.13.37.31.569	-1.00000000	2.00000000	



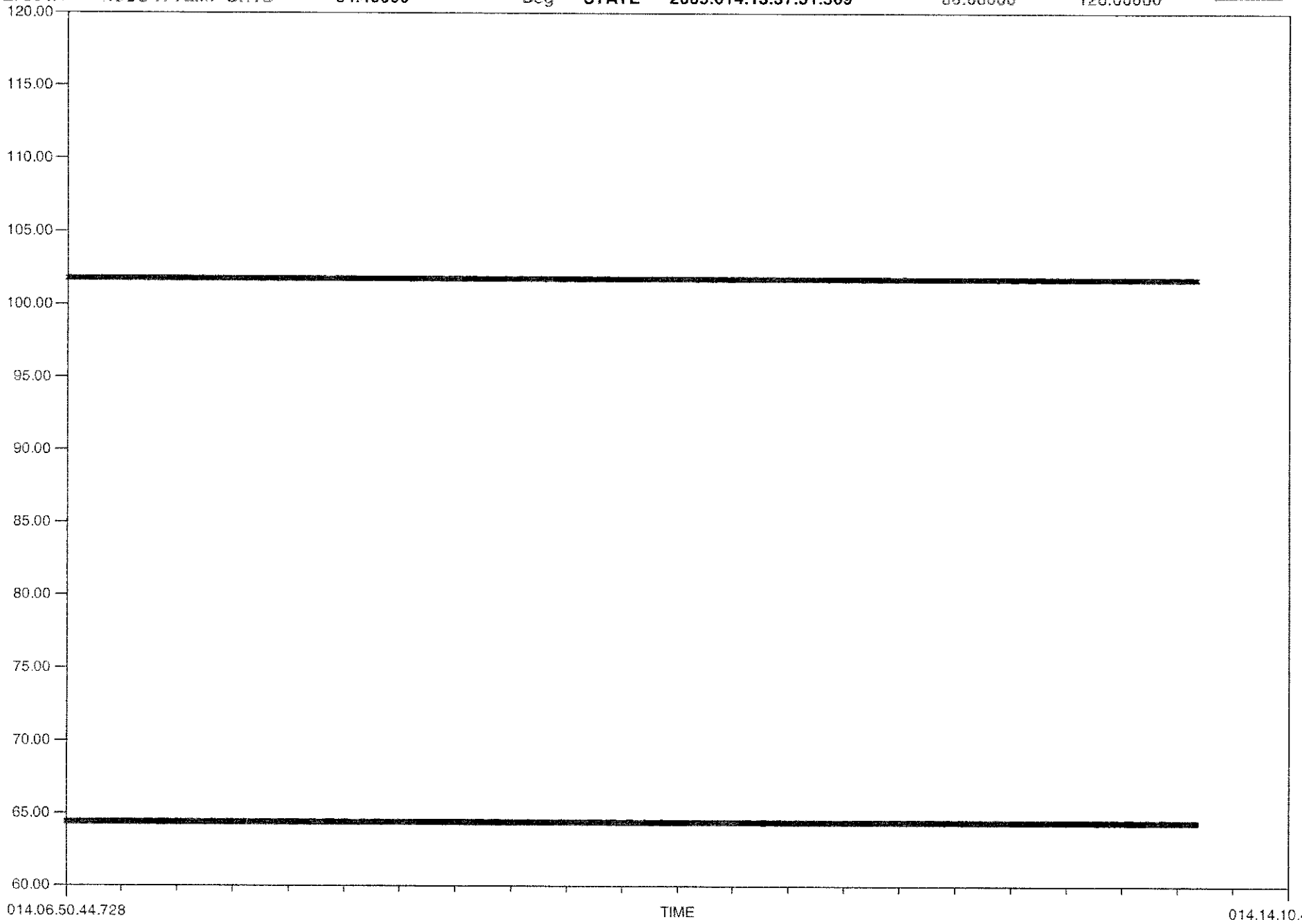
5.7.5 THERMAL CONTROL SUBSYSTEM (THSS)

5.7.5.1 Huygens Probe Temperature

DS: 524 ID: W181P Title: [INT TEMP] RUSO TEMP Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

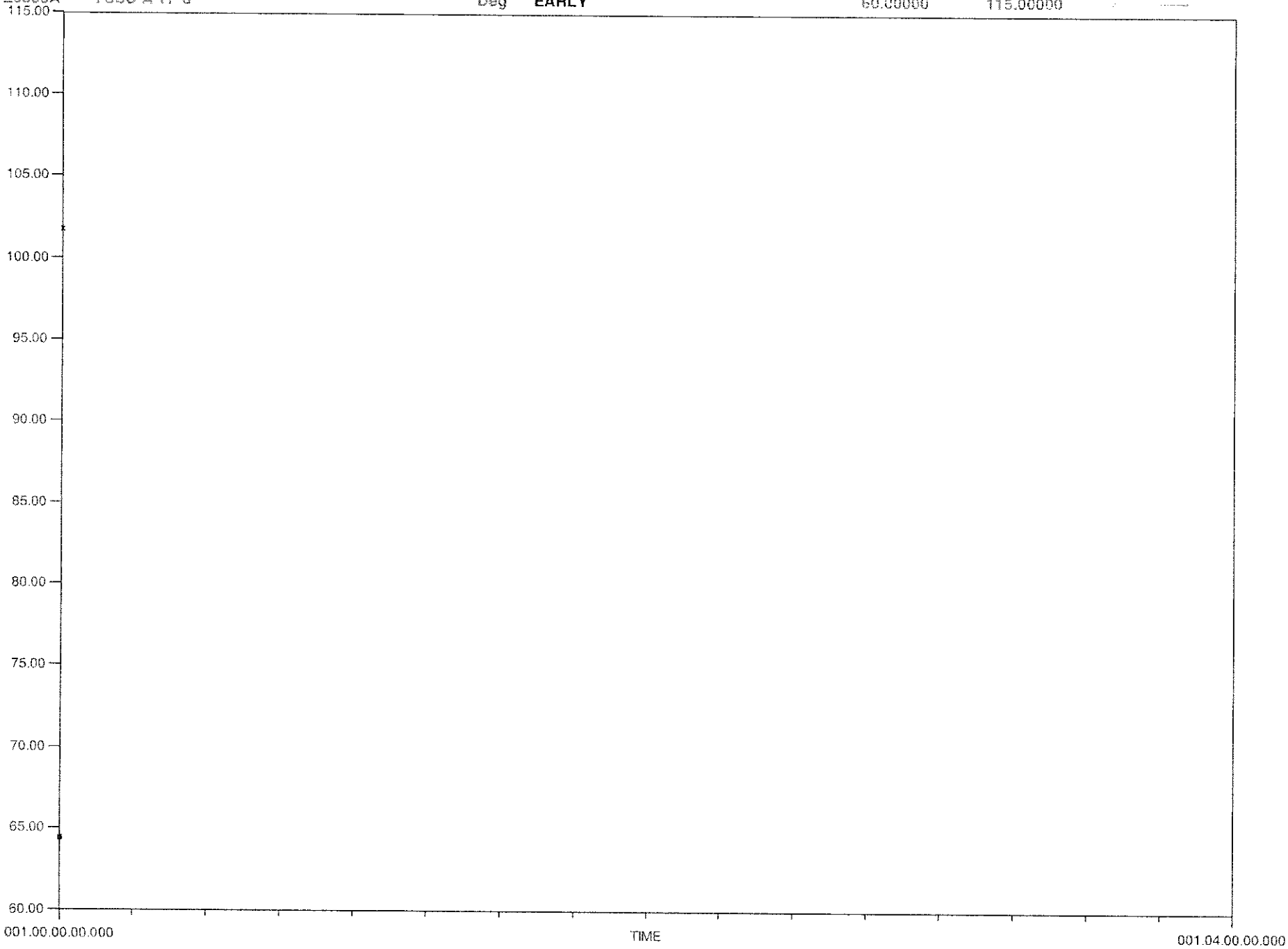
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E7001A	RUSO A TEMP LAMP	101.70000	Deg	STATE	2005.014.13.37.31.569	60.00000	120.00000	
E7002A	RUSO A TEMP RSNT	64.40000	Deg	STATE	2005.014.13.37.31.569	60.00000	120.00000	
E7004A	RUSO A TEMP CRYS	64.40000	Deg	STATE	2005.014.13.37.31.569	60.00000	120.00000	



DS: 524 ID: W182h Title: [INT TEMP] TUSO TEMP A Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

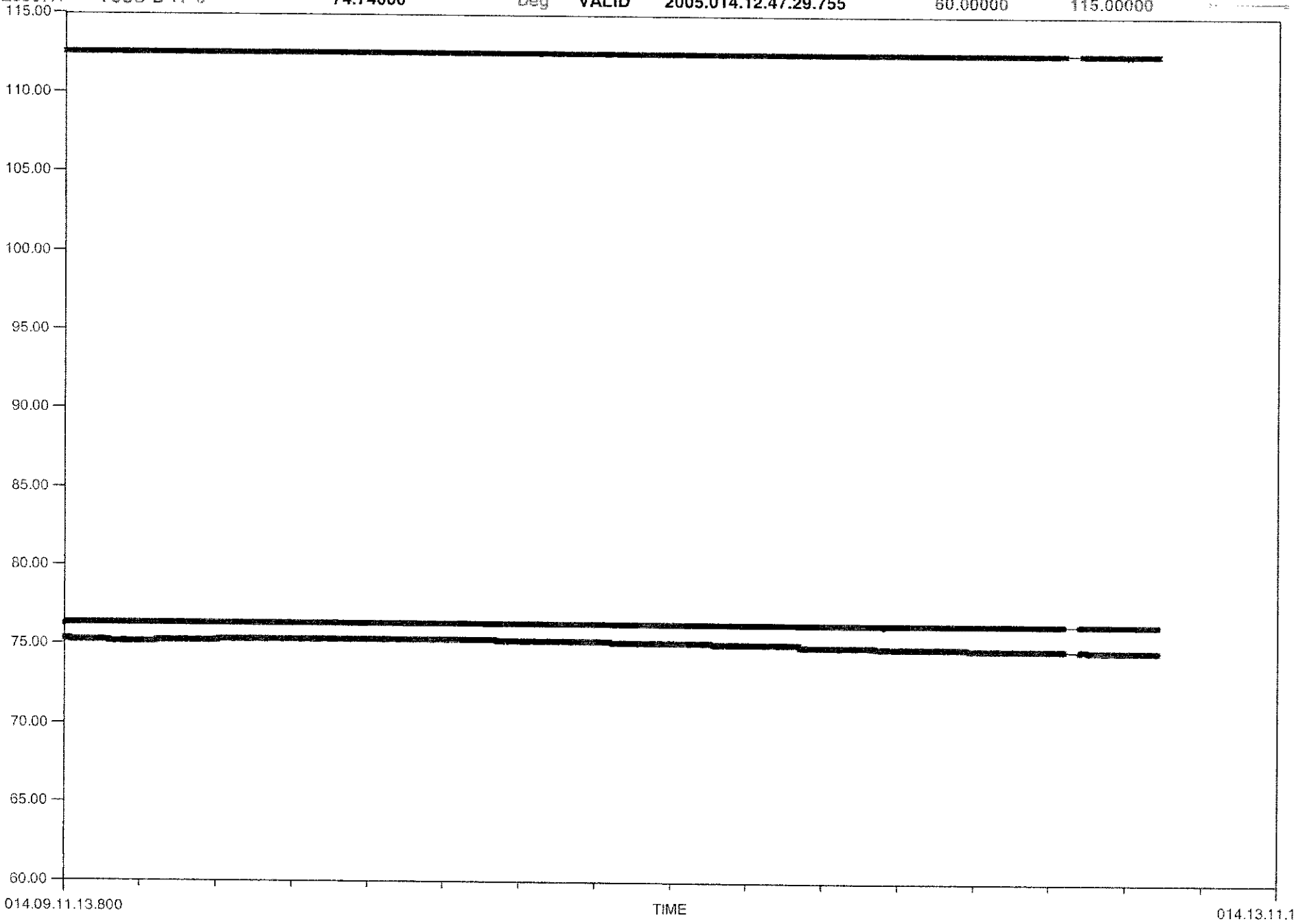
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E6001A	TUSO A TP 1		Deg	EARLY		60.00000	115.00000	
E6002A	TUSO A TP 2		Deg	EARLY		60.00000	115.00000	
E6003A	TUSO A TP 3		Deg	EARLY		60.00000	115.00000	



DS: 524 ID: W183h Title: [INT TEMP] TUSO TEMP B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

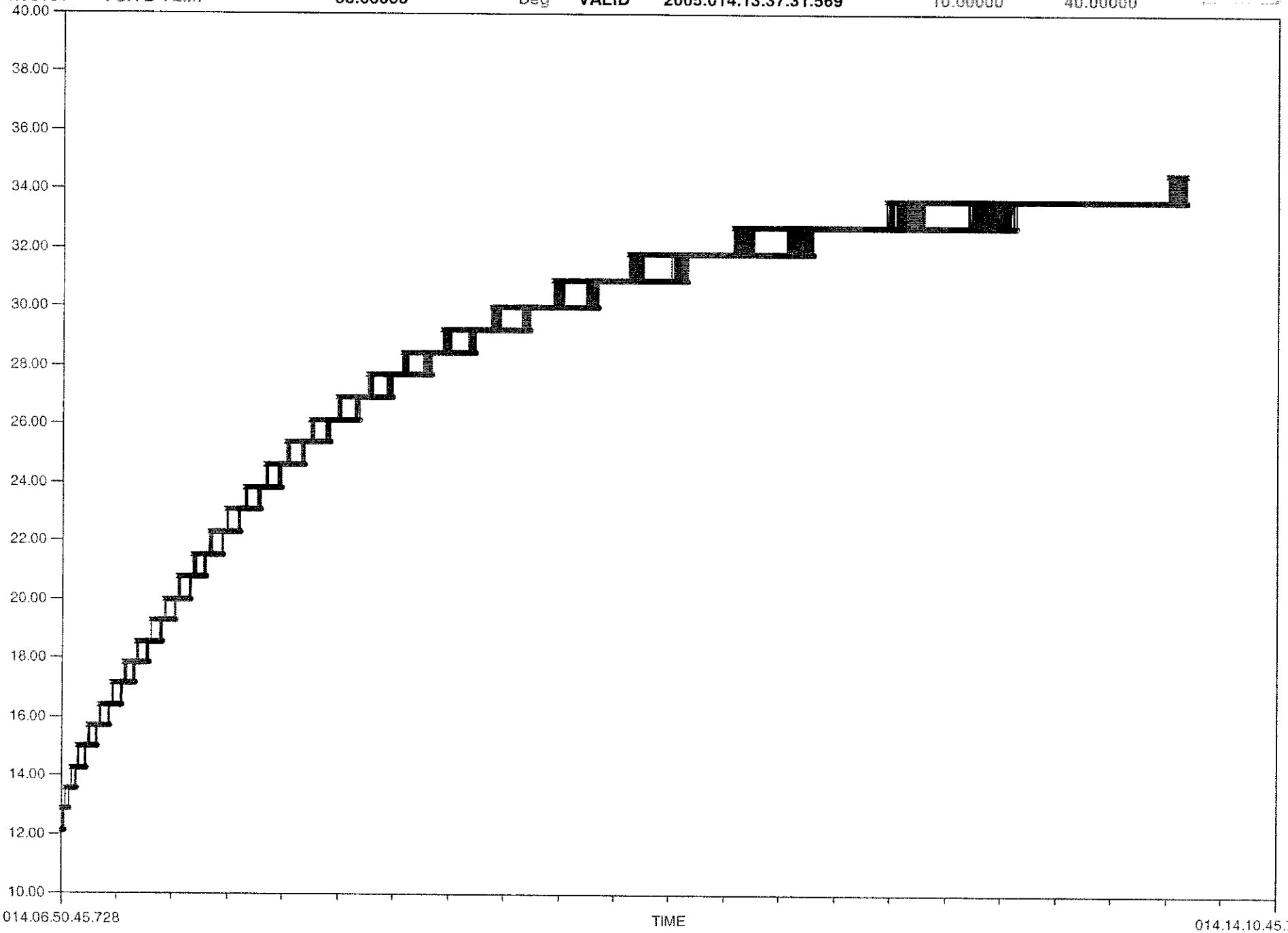
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E6005A	TUSO B TP 1	112.56400	Deg	VALID	2005.014.12.47.29.755	60.00000	115.00000	
E6006A	TUSO B TP 2	76.38000	Deg	VALID	2005.014.12.47.29.755	60.00000	115.00000	
E6007A	TUSO B TP 3	74.74000	Deg	VALID	2005.014.12.47.29.755	60.00000	115.00000	



DS: 524 ID: W110P Title: [INT TEMP] TEMPERATURE TCXO Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

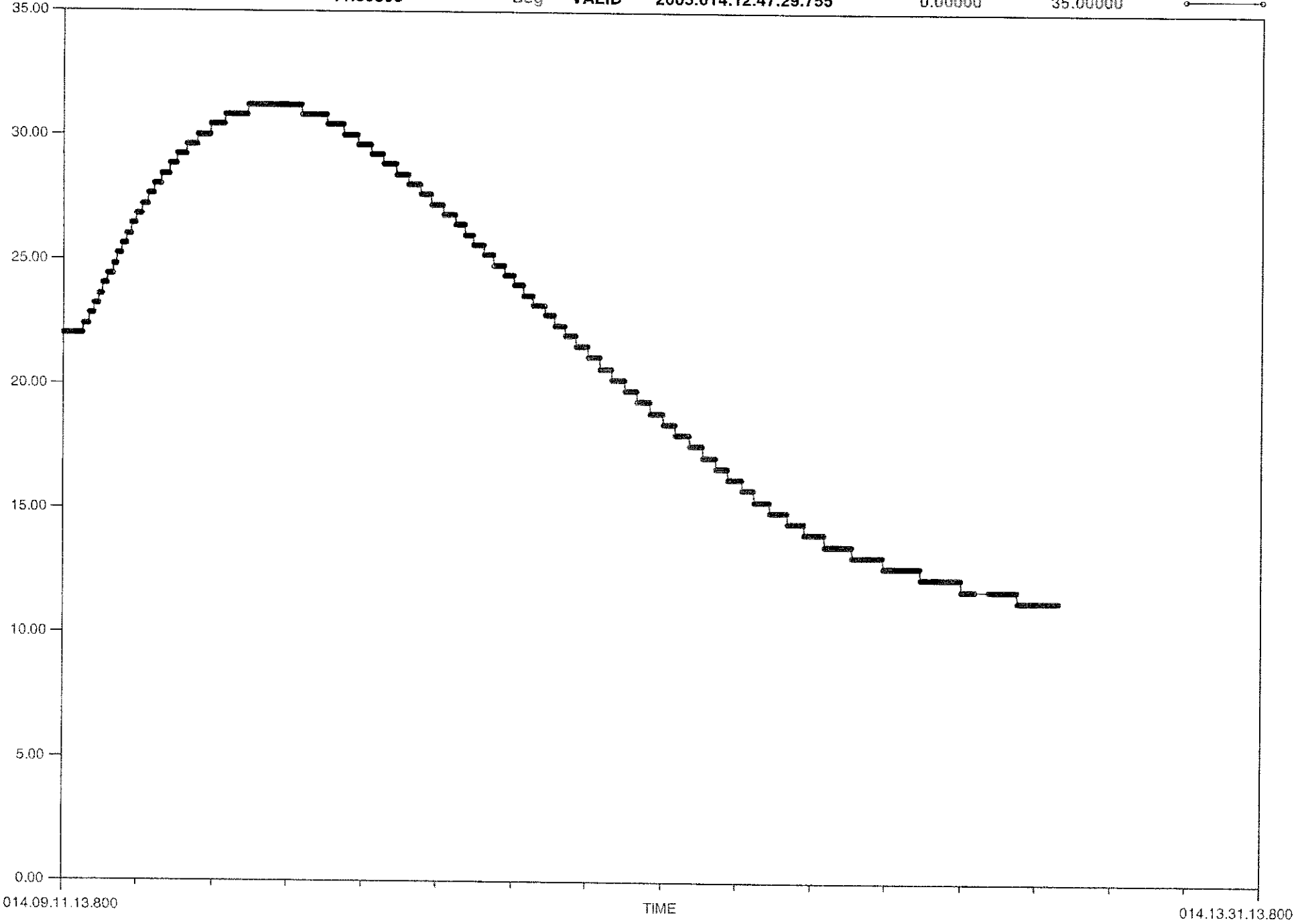
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R5010T	PSA A TEMP	33.63636	Deg	VALID	2005.014.13.37.31.569	10.00000	40.00000	
R6010T	PSA B TEMP	33.63636	Deg	VALID	2005.014.13.37.31.569	10.00000	40.00000	



DS: 524 ID: W111h Title: [INT TEMP] TEMPERATURE TX HPA Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.20.00 **AUTO HARD COPY** OFF

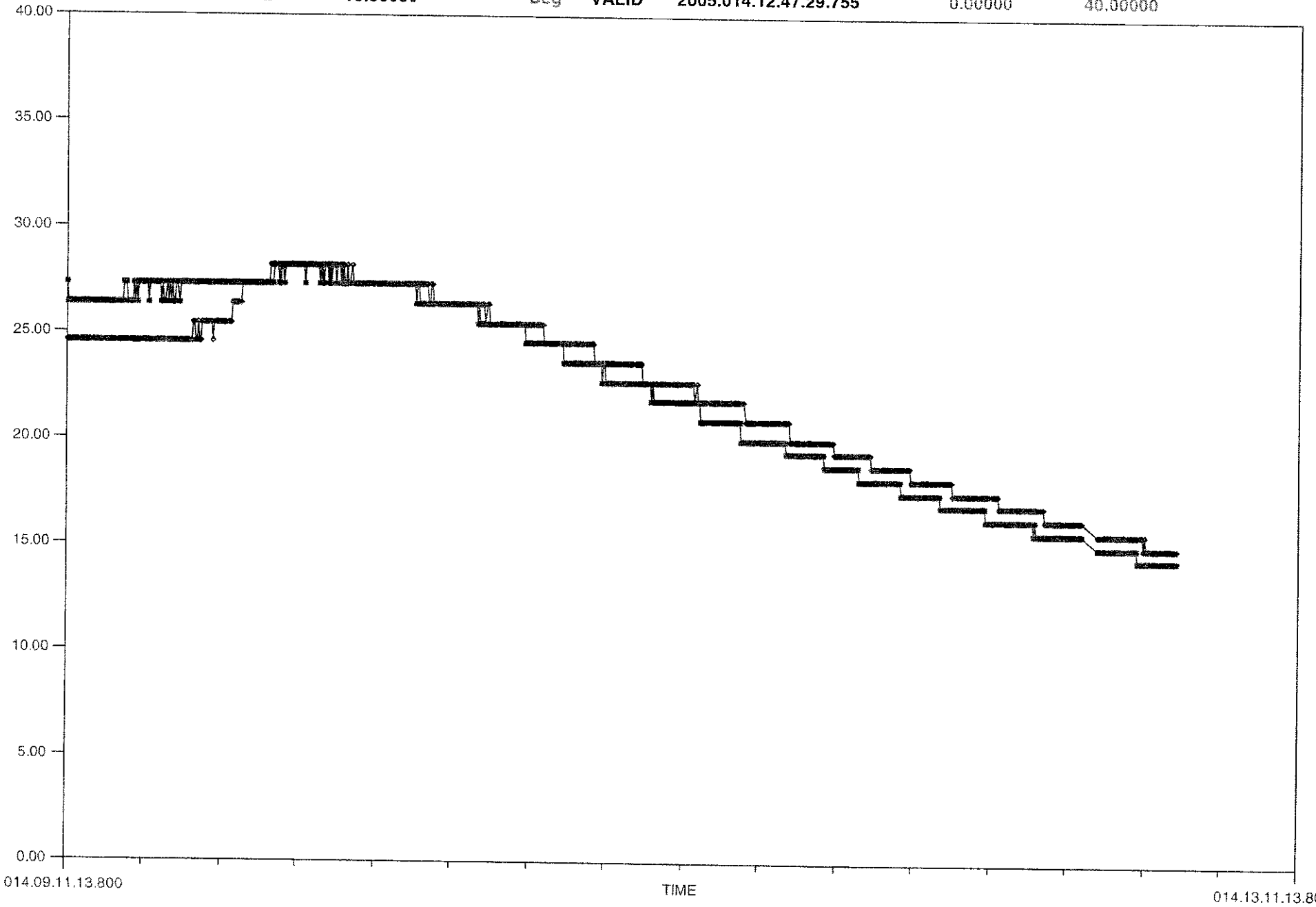
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
R1003A	TX A AMPLI TP		Deg			0.00000	35.00000	
R2003A	TX B AMPLI TP	11.33333	Deg	VALID	2005.014.12.47.29.755	0.00000	35.00000	



DS: 524 ID: W136h Title: [INT TEMP] TEMP CDMU DC/DC Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

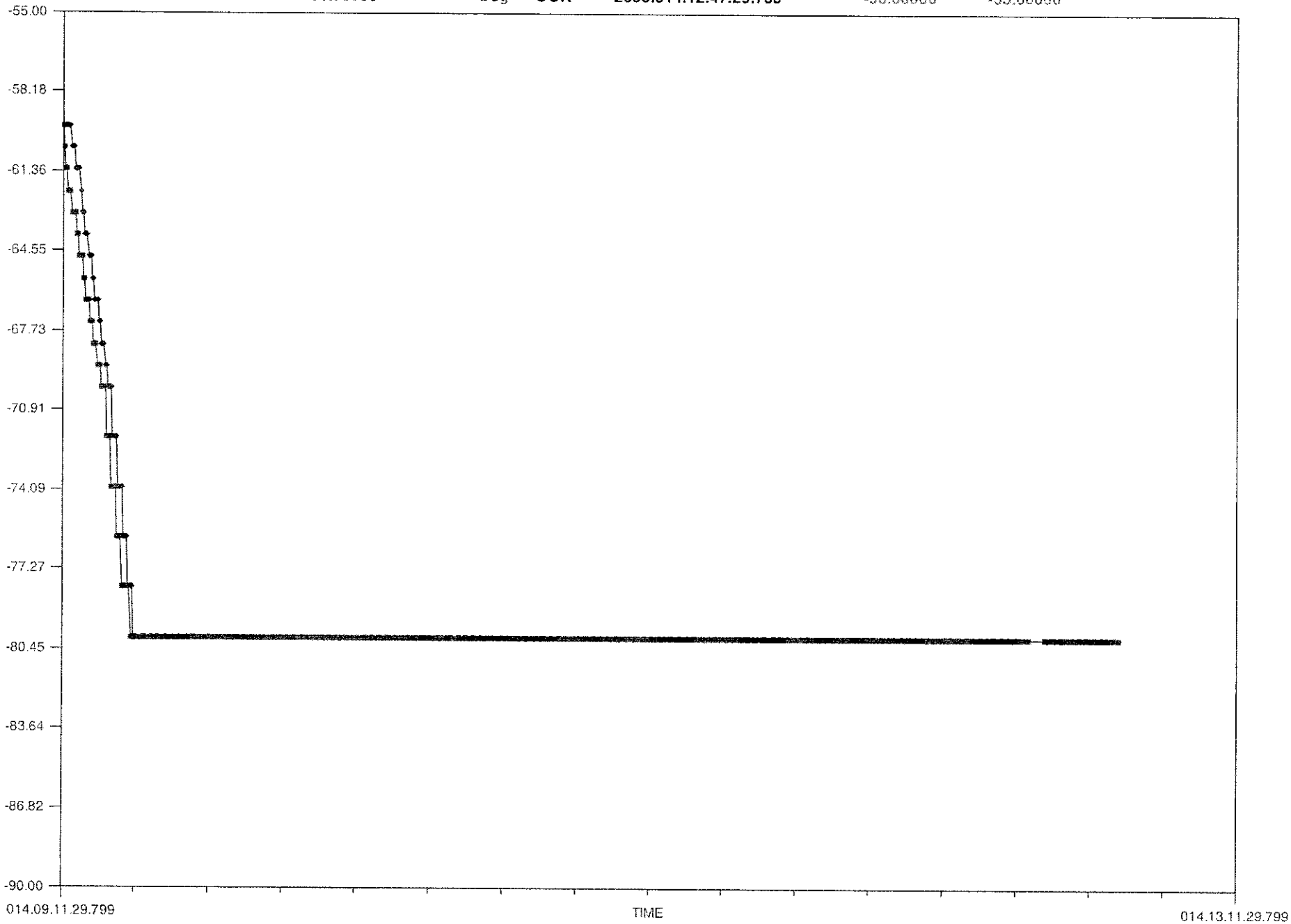
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D1008T	CDMS A DC/DC TP1		Deg			0.00000	40.00000	
D1009T	CDMS A DC/DC TP2		Deg			0.00000	40.00000	
D2008T	CDMS B DC/DC TP1	14.37500	Deg	VALID	2005.014.12.47.29.755	0.00000	40.00000	
D2009T	CDMS B DC/DC TP2	15.00000	Deg	VALID	2005.014.12.47.29.755	0.00000	40.00000	



DS: 524 ID: W137h Title: [THERM TEMP] TEMP SEPS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

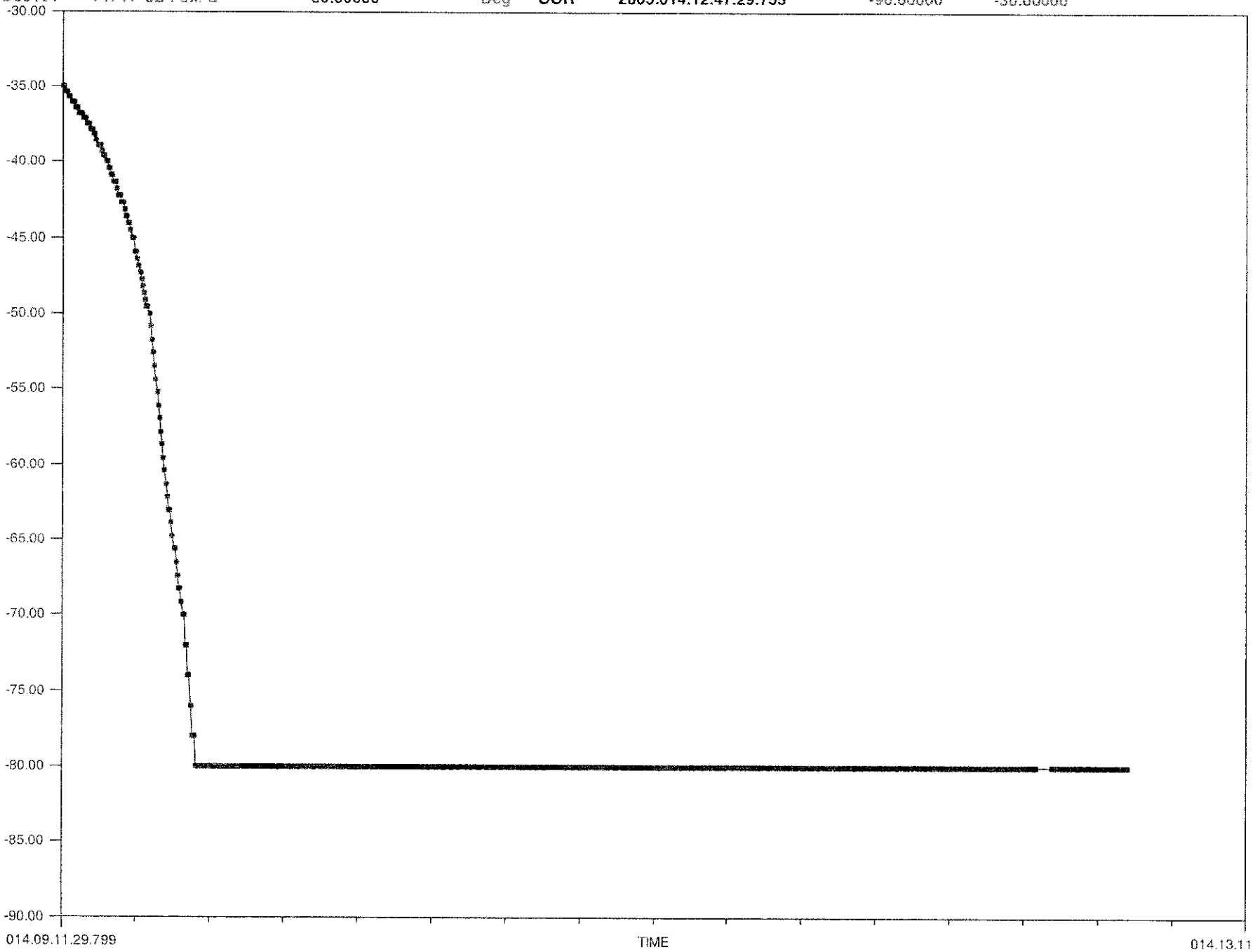
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5001T	PR TP 1A SEPS A		Deg			-90.00000	-55.00000	
D5002T	PR TP 2A SEPS C		Deg			-90.00000	-55.00000	
D5013T	PR TP 1B SEPS B	-80.00000	Deg	OOR	2005.014.12.47.29.755	-90.00000	-55.00000	
D5014T	PR TP 2B SEPS A	-80.00000	Deg	OOR	2005.014.12.47.29.755	-90.00000	-55.00000	



DS: 524 ID: W138h Title: [THERM TEMP] TEMP PJM Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

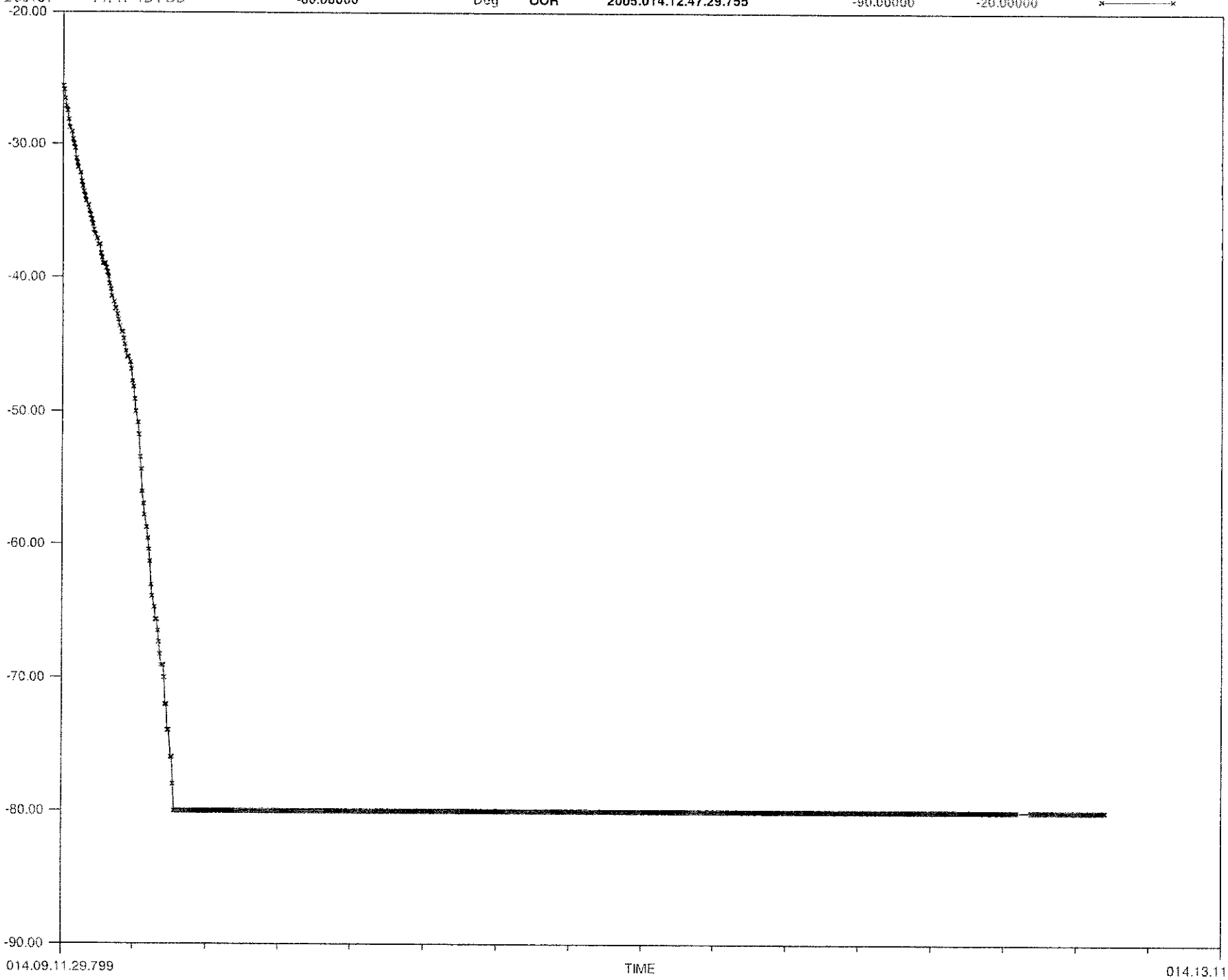
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5003T	PR TP 3A PJM A		Deg			-90.00000	-30.00000	
D5004T	PR TP 4A PJM C		Deg			-90.00000	-30.00000	
D5015T	PR TP 3B PJM B	-80.00000	Deg	OOR	2005.014.12.47.29.755	-90.00000	-30.00000	



DS: 524 ID: W139h Title: [THERM TEMP] TEMP PDD Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000,04,00.00 **AUTO HARD COPY** OFF

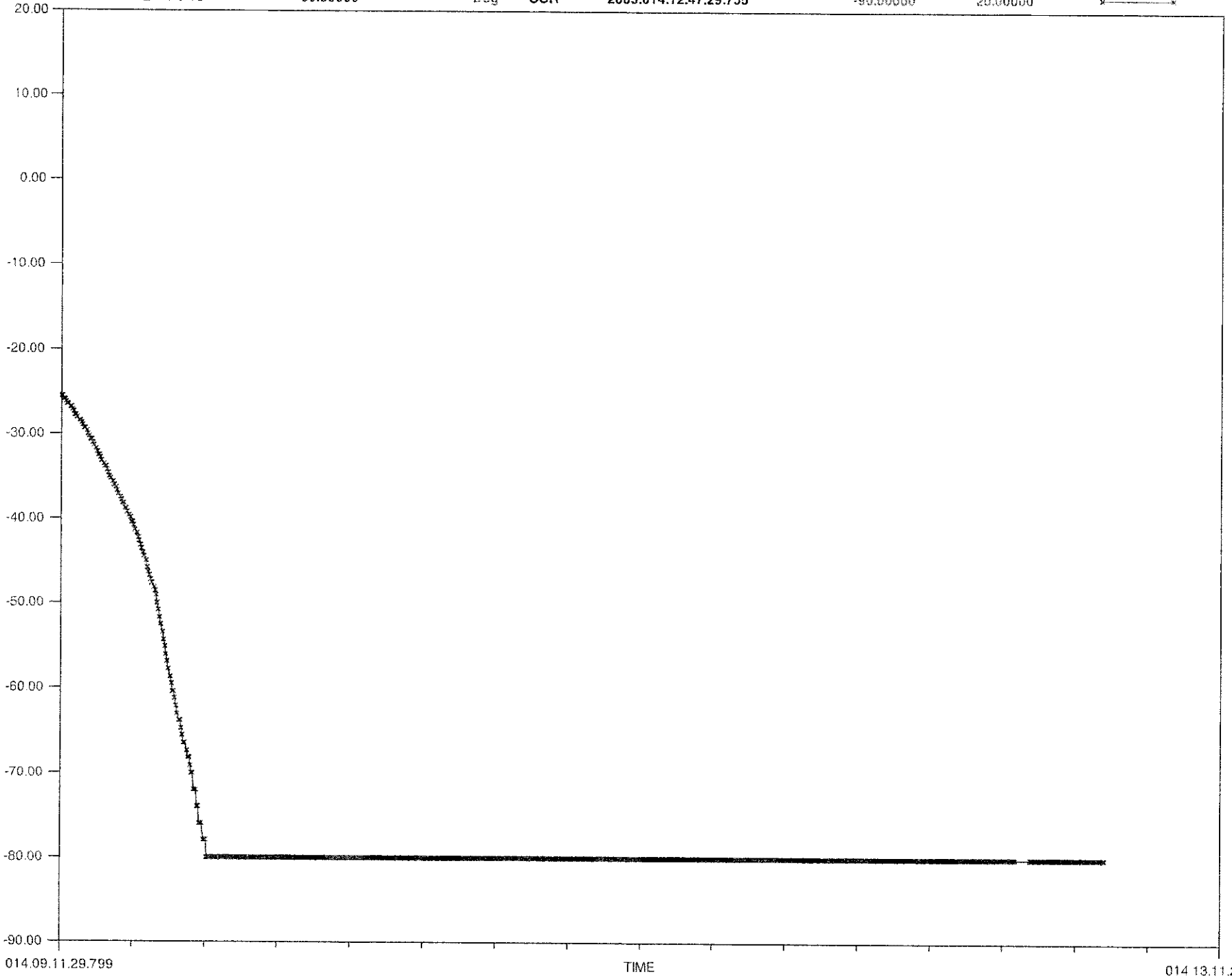
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5016T	PR TP 4B PDD	-80.00000	Deg	OOR	2005.014.12.47.29.755	-90.00000	-20.00000	



DS: 524 ID: W140h Title: [THERM TEMP] TEMP AFTER CONE Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

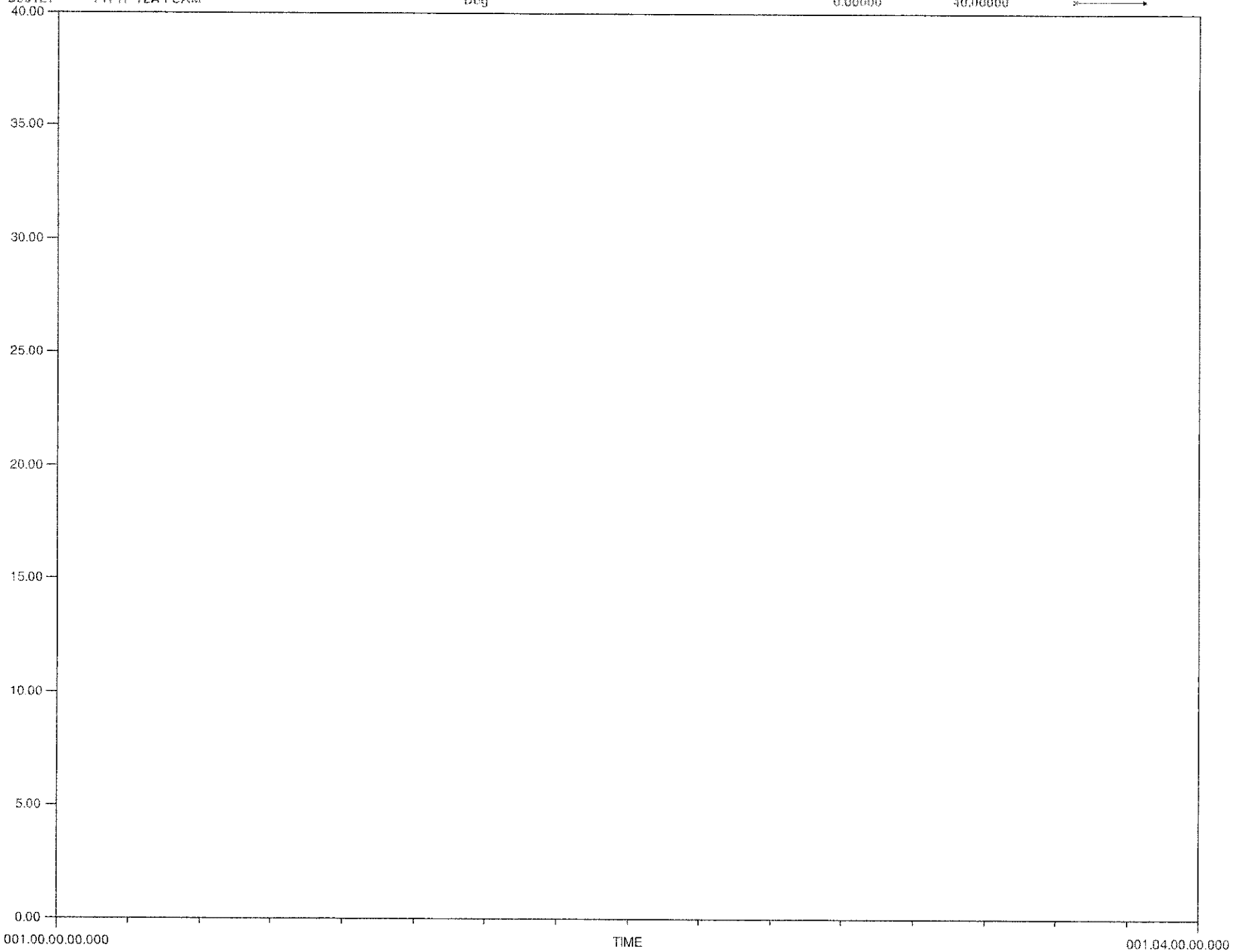
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5024T	PR TP 12B CONE	-80.00000	Deg	OOR	2005.014.12.47.29.755	-99.00000	20.00000	



DS: 524 ID: W141h Title: [THERM TEMP] TEMP INSIDE FOAM Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

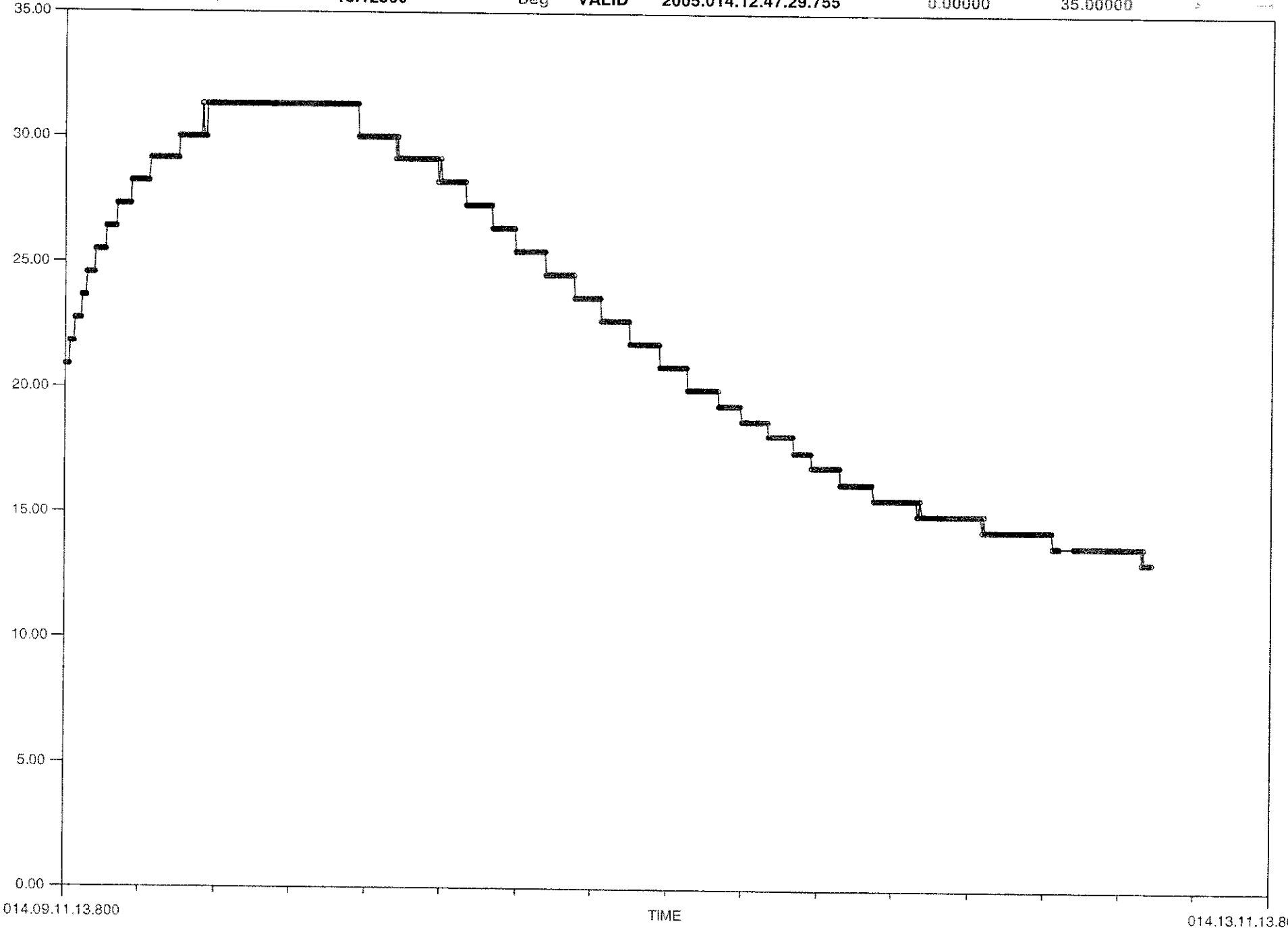
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5012T	PR TP 12A FOAM		Deg			0.00000	40.00000	



DS: 524 ID: W112h Title: [THERM T] TEMP TRANSMITTERS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

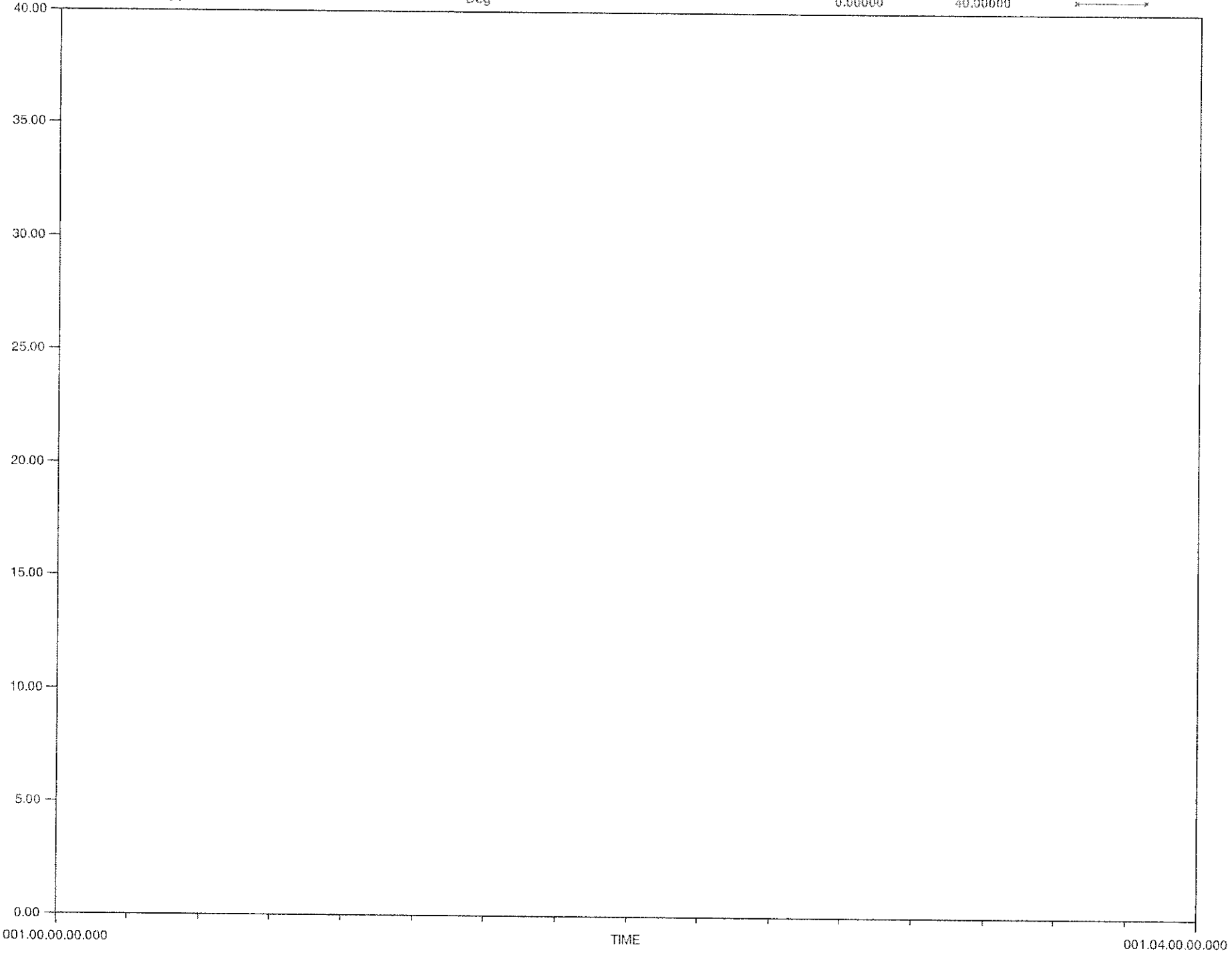
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5009T	PR TP 9A TX A		Deg			0.00000	35.00000	
D5021T	PR TP 9B TX B	13.12500	Deg	VALID	2005.014.12.47.29.755	0.00000	35.00000	



DS: 524 ID: W142h Title: [THERM TEMP] TEMP PCDU Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

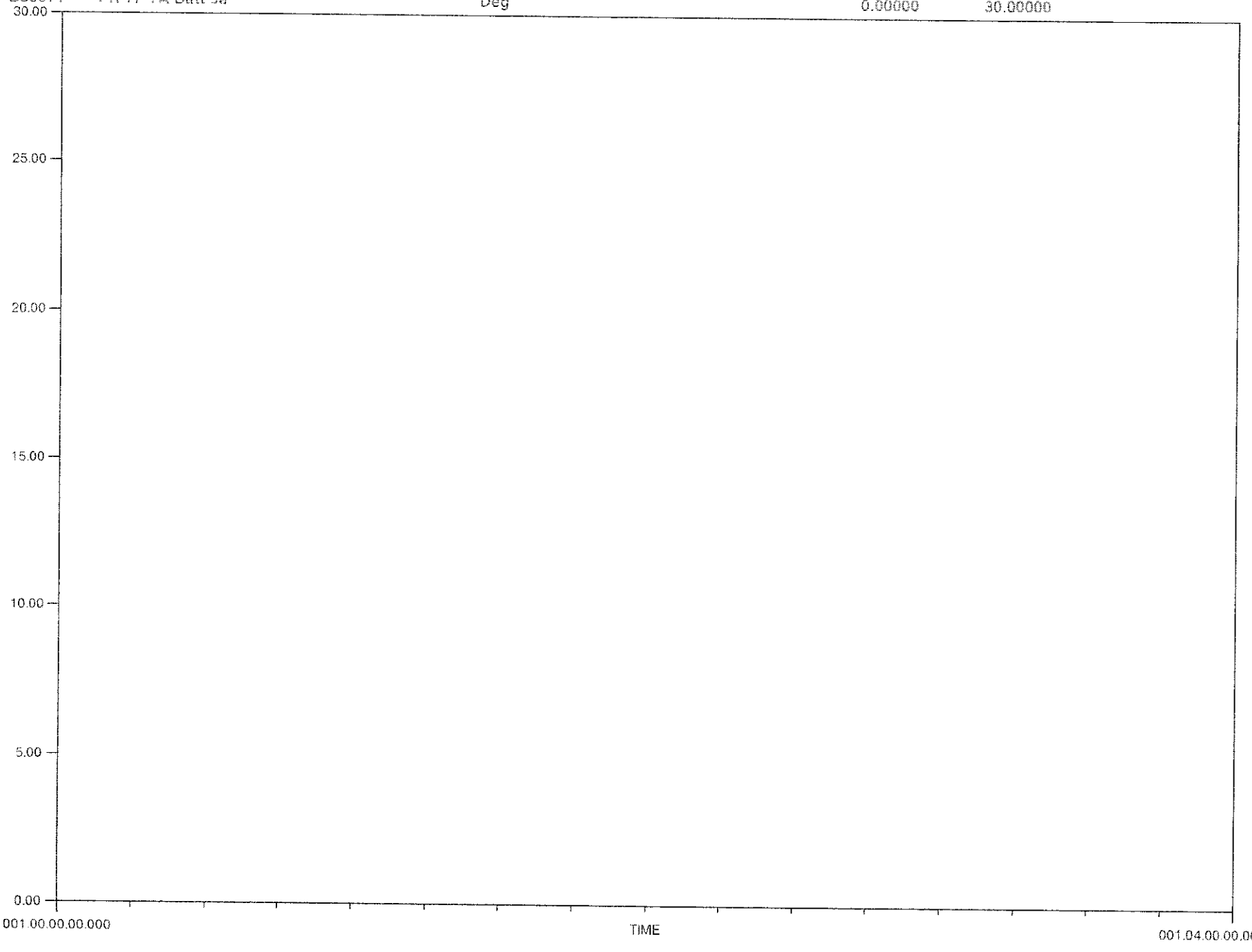
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5008T	PR TP 8A PCDU		Deg			0.00000	40.00000	



DS: 524 ID: W143h Title: [THERM TEMP] TEMP BATTERIES A Sample Time: Workstation: nuyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

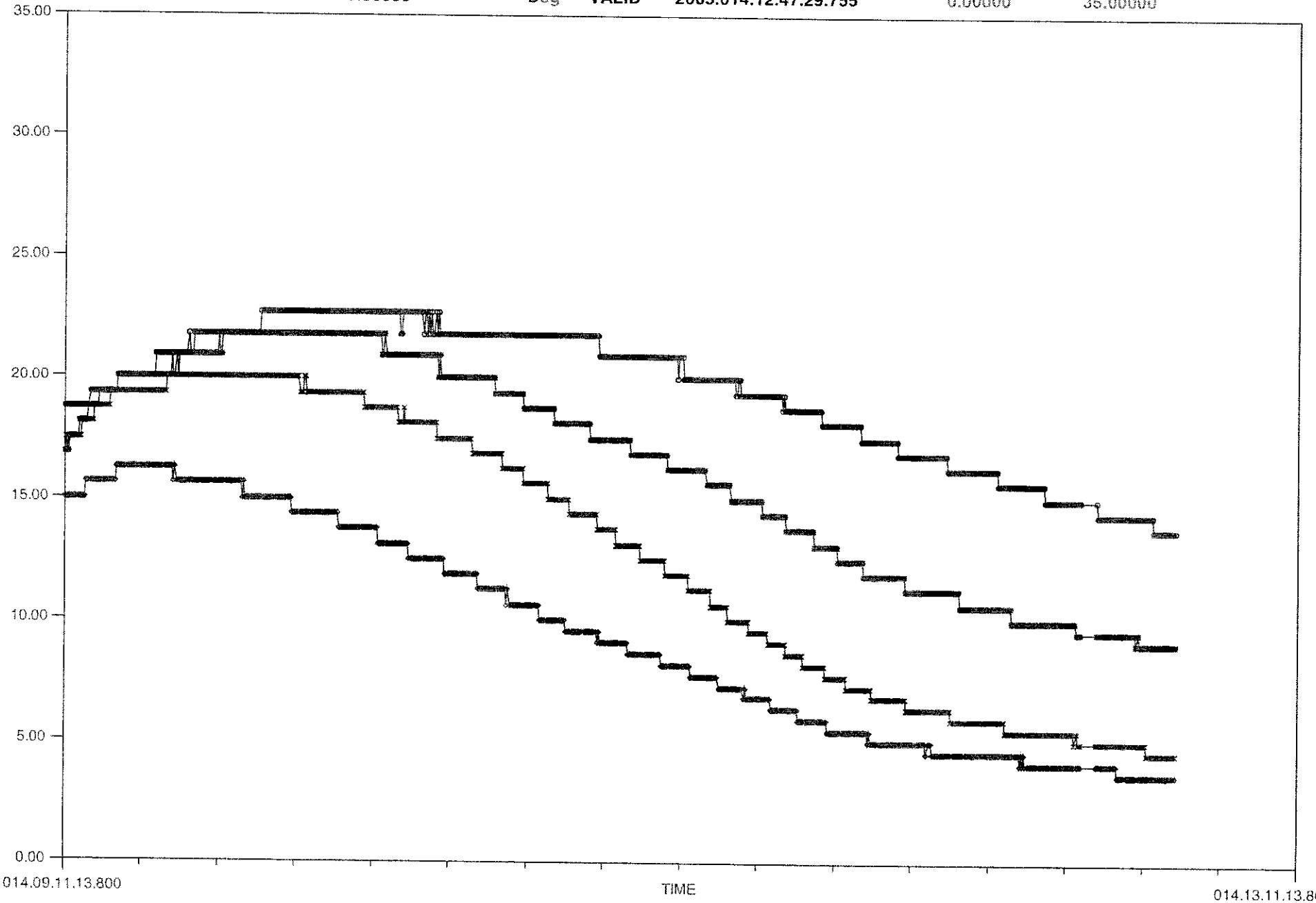
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5005T	PR TP 5A Batt 1a		Deg			0.00000	30.00000	
D5006T	PR TP 6A Batt 3b		Deg			0.00000	30.00000	
D5007T	PR TP 7A Batt 5a		Deg			0.00000	30.00000	



DS: 524 ID: W144h Title: [THERM TEMP] TEMP BATTERIES B Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

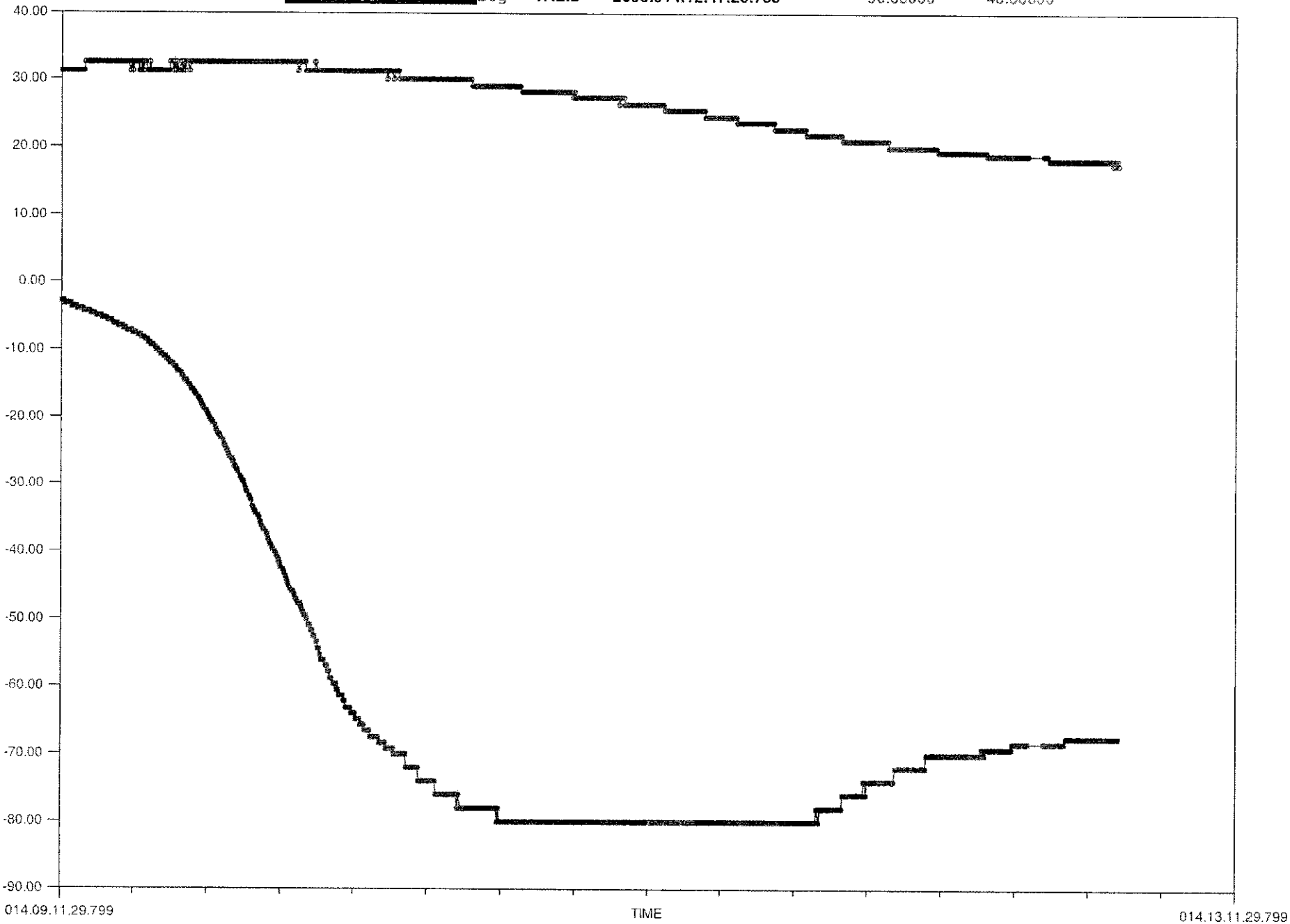
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5017T	PR TP 5B Batt 4b	4.54545	Deg	VALID	2005.014.12.47.29.755	0.00000	35.00000	
D5018T	PR TP 6B Batt 2a	13.75000	Deg	VALID	2005.014.12.47.29.755	0.00000	35.00000	
D5019T	PR TP 7B Batt 3a	9.09091	Deg	VALID	2005.014.12.47.29.755	0.00000	35.00000	
D5020T	PR TP 8B Batt 1b	3.63636	Deg	VALID	2005.014.12.47.29.755	0.00000	35.00000	



DS: 524 ID: W145h Title: [THERM TEMP] TEMP EXPERIMENTS Sample Time: 2005.014.12.47.29.755 Workstation: huyg2

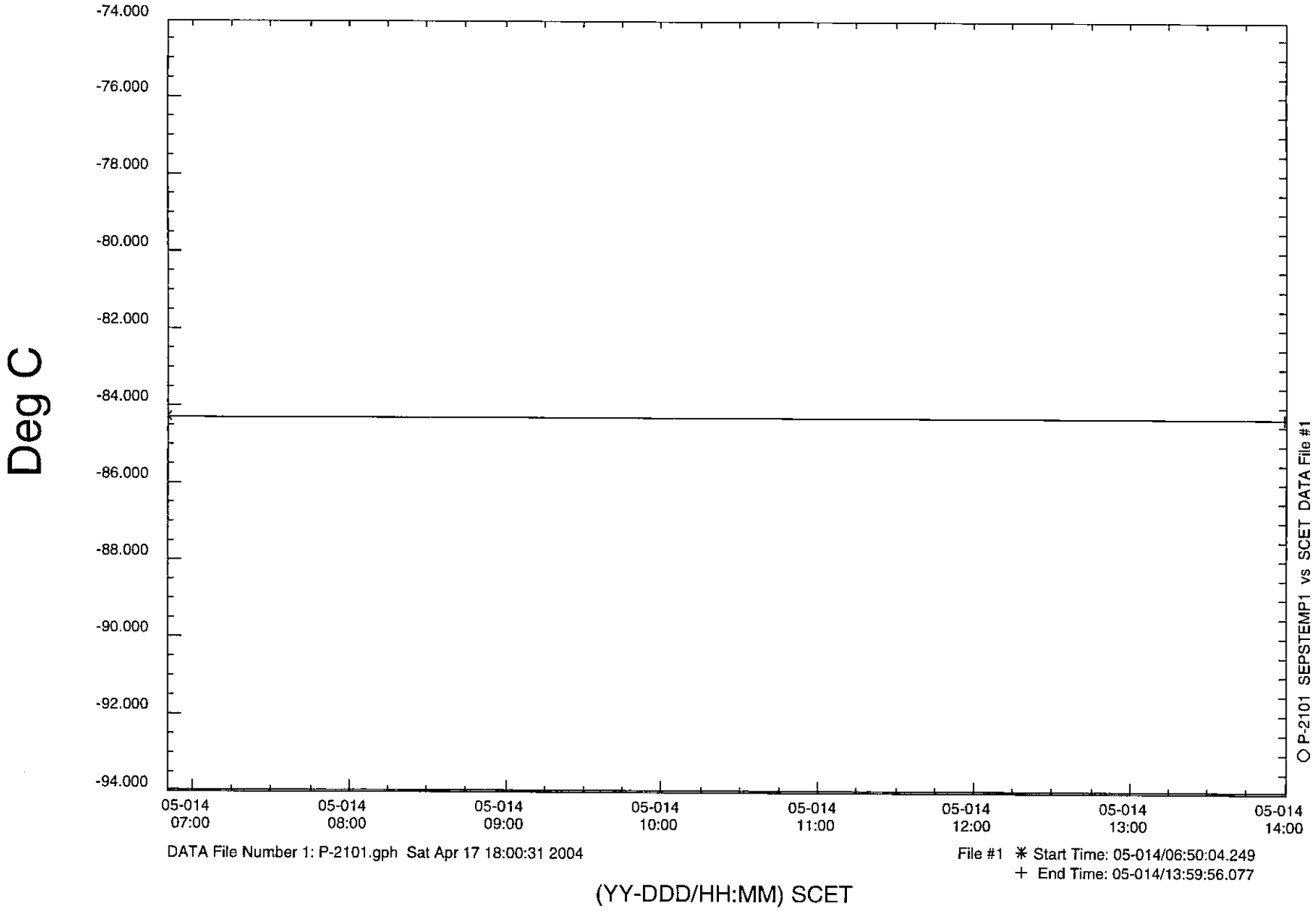
X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
D5010T	PR TP 10A GCMS		Deg			-90.00000	40.00000	
D5011T	PR TP 11A DISR		Deg			-90.00000	40.00000	
D5022T	PR TP 10B TUSO	17.50000	Deg	VALID	2005.014.12.47.29.755	-90.00000	40.00000	
D5023T	PR TP 11B DISR	-67.39130	Deg	VALID	2005.014.12.47.29.755	-90.00000	40.00000	



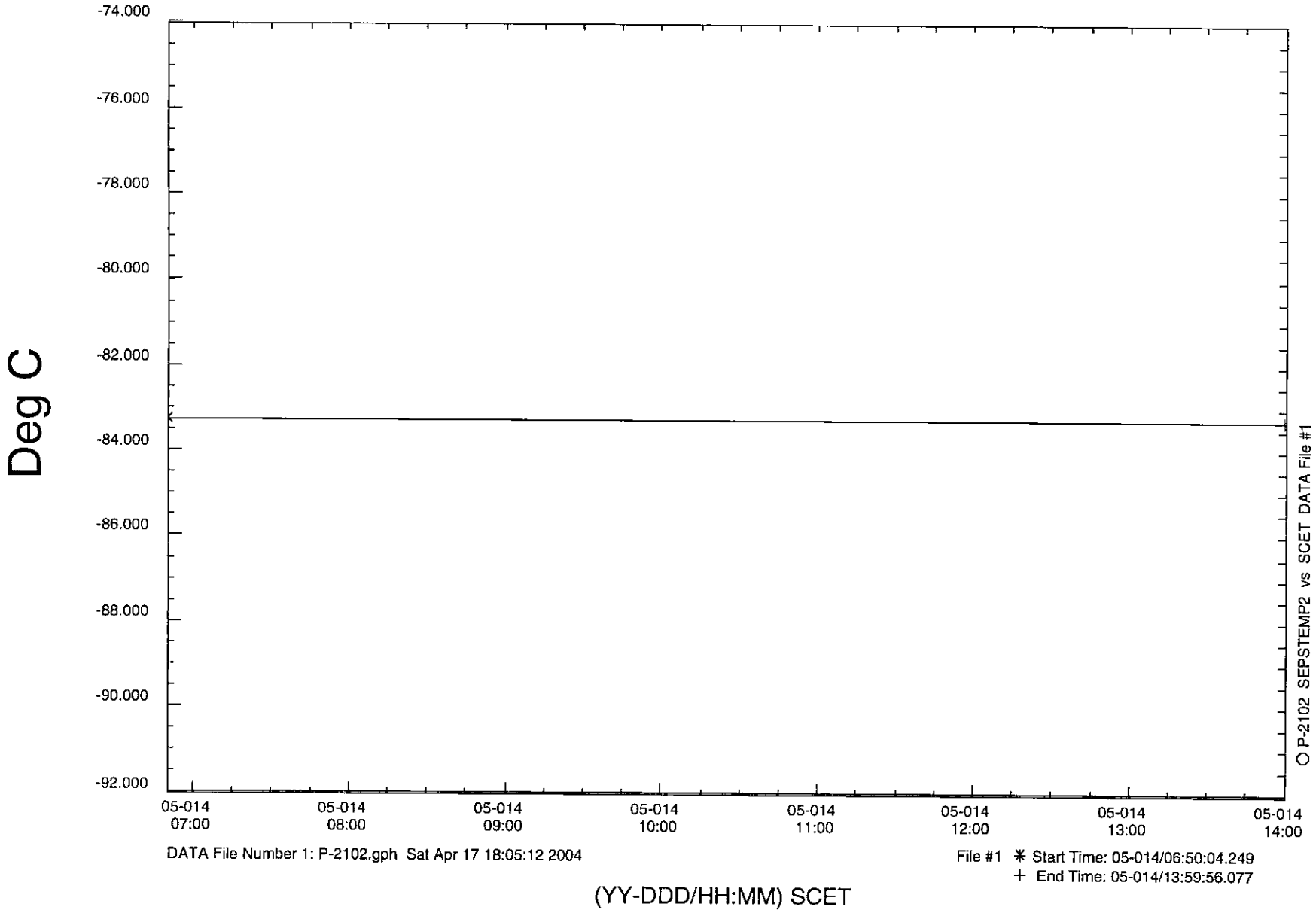
5.7.5.2 Cassini Temperatures

P-2101 (SEPSTEMP1) vs SCET



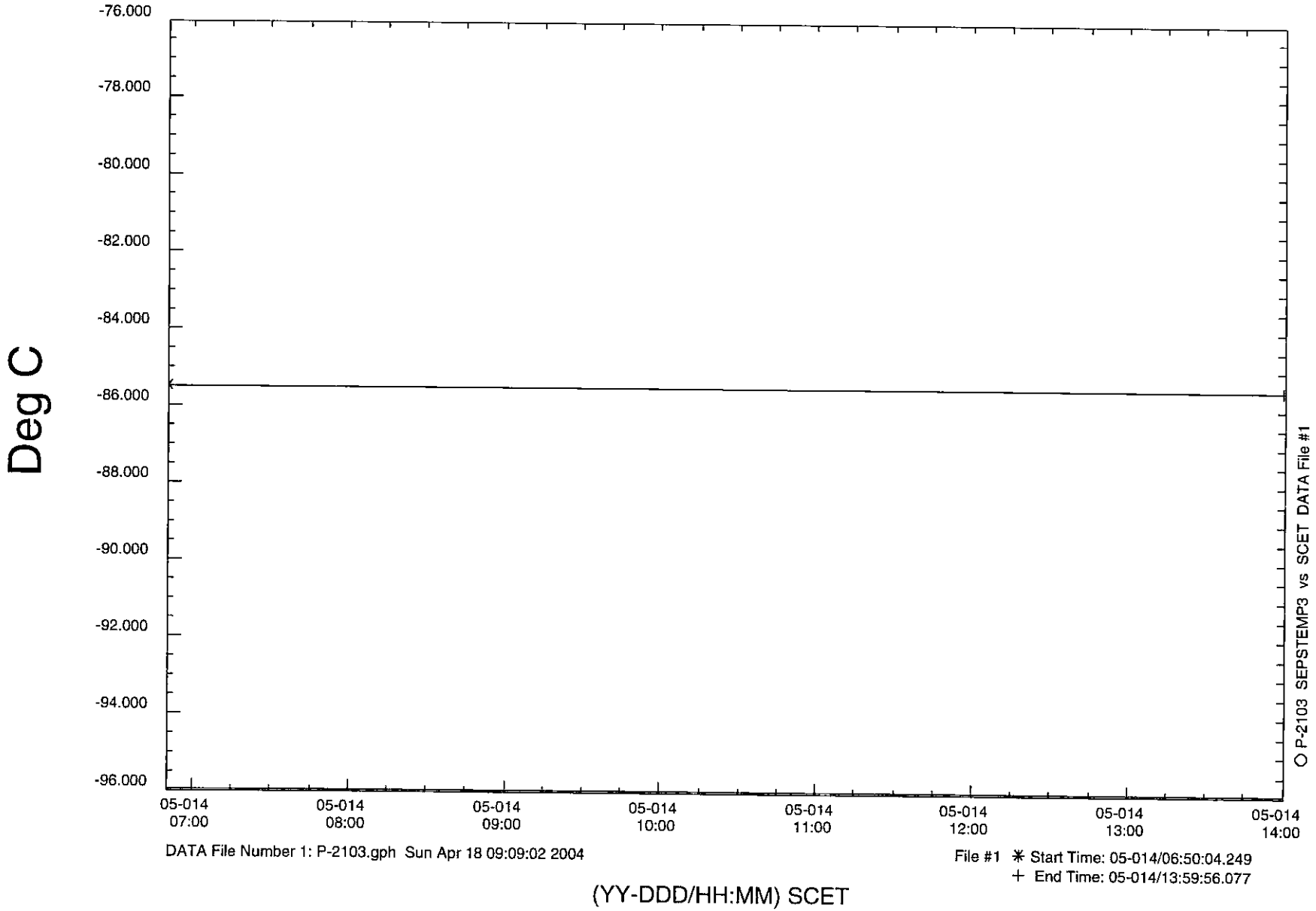
Date: Mon. Jan. 31, 2005 15:30:00

P-2102 (SEPSTEMP2) vs SCET



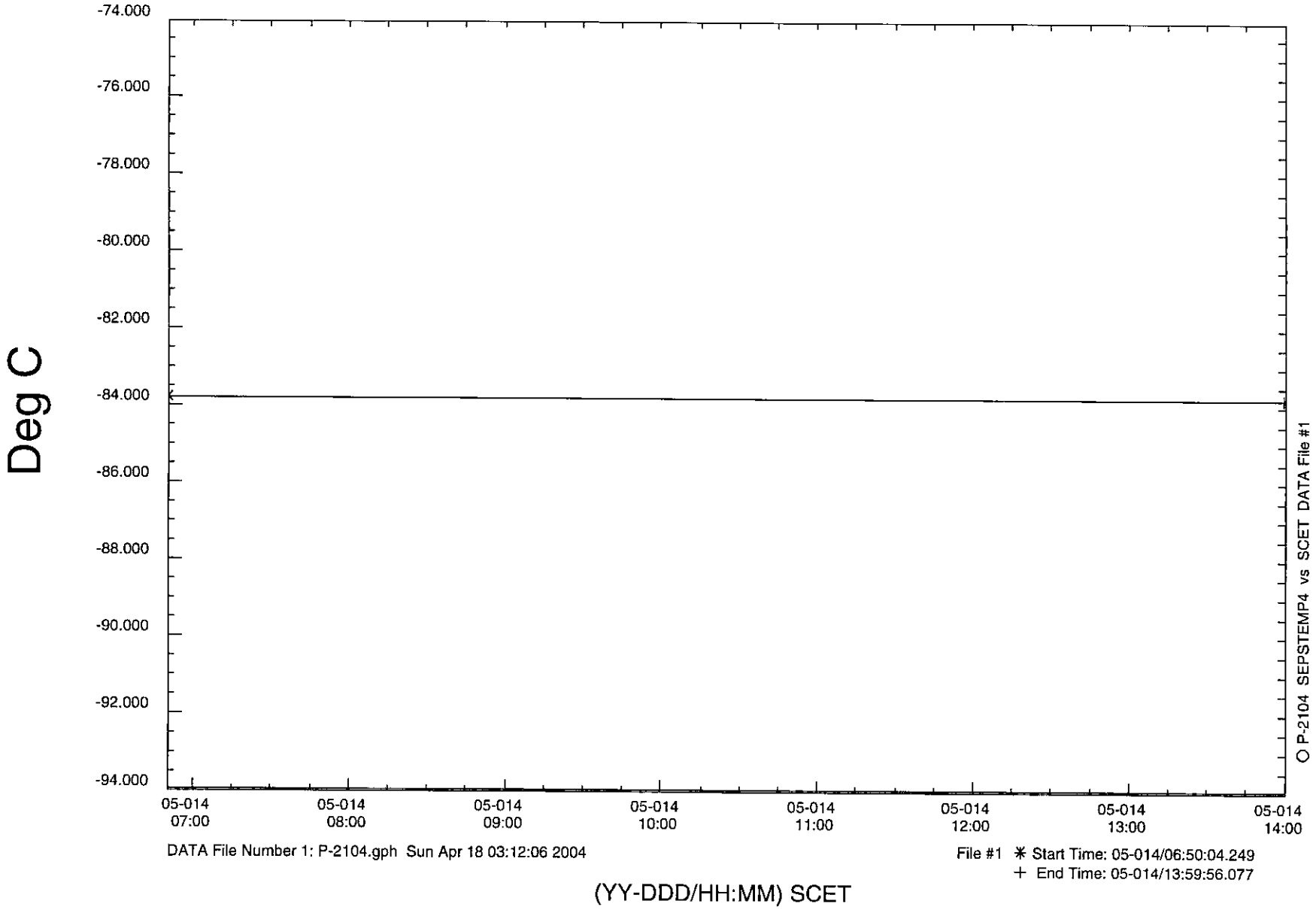
Date: Mon. Jan. 31, 2005 15:30:00

P-2103 (SEPSTEMP3) vs SCET



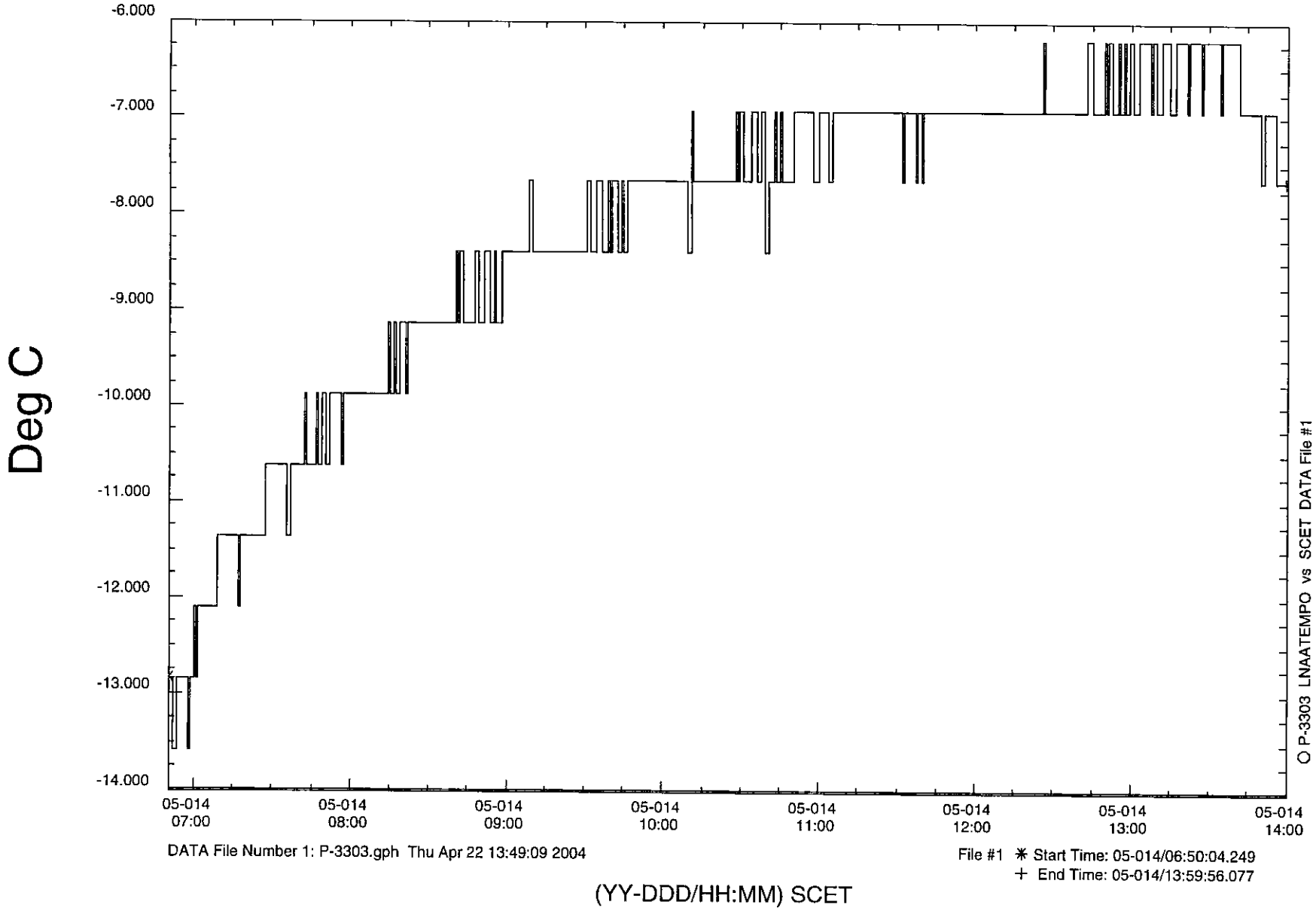
Date: Mon. Jan. 31, 2005 15:30:00

P-2104 (SEPSTEMP4) vs SCET



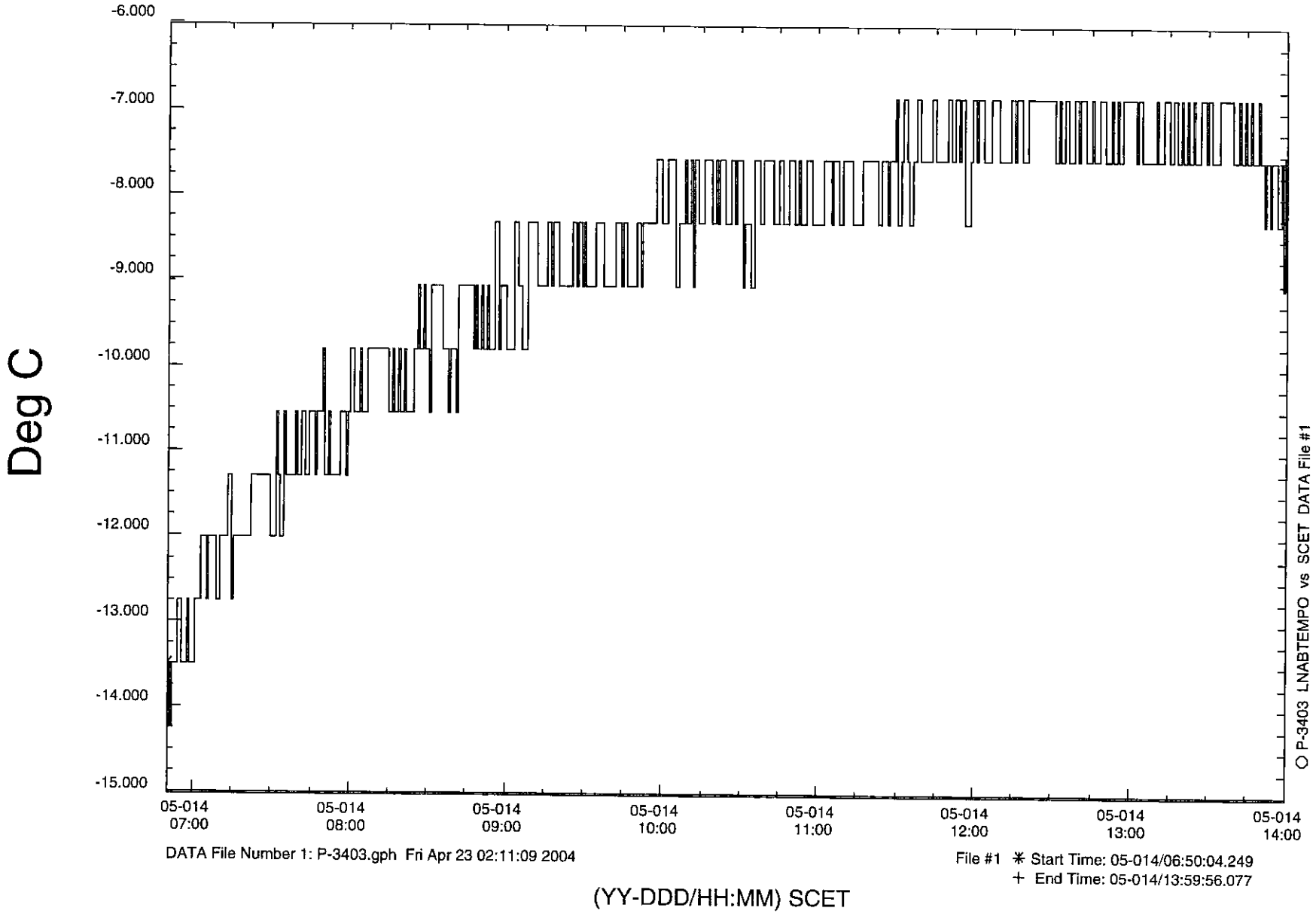
Date: Mon. Jan. 31, 2005 15:30:00

P-3303 (LNAATEMPO) vs SCET



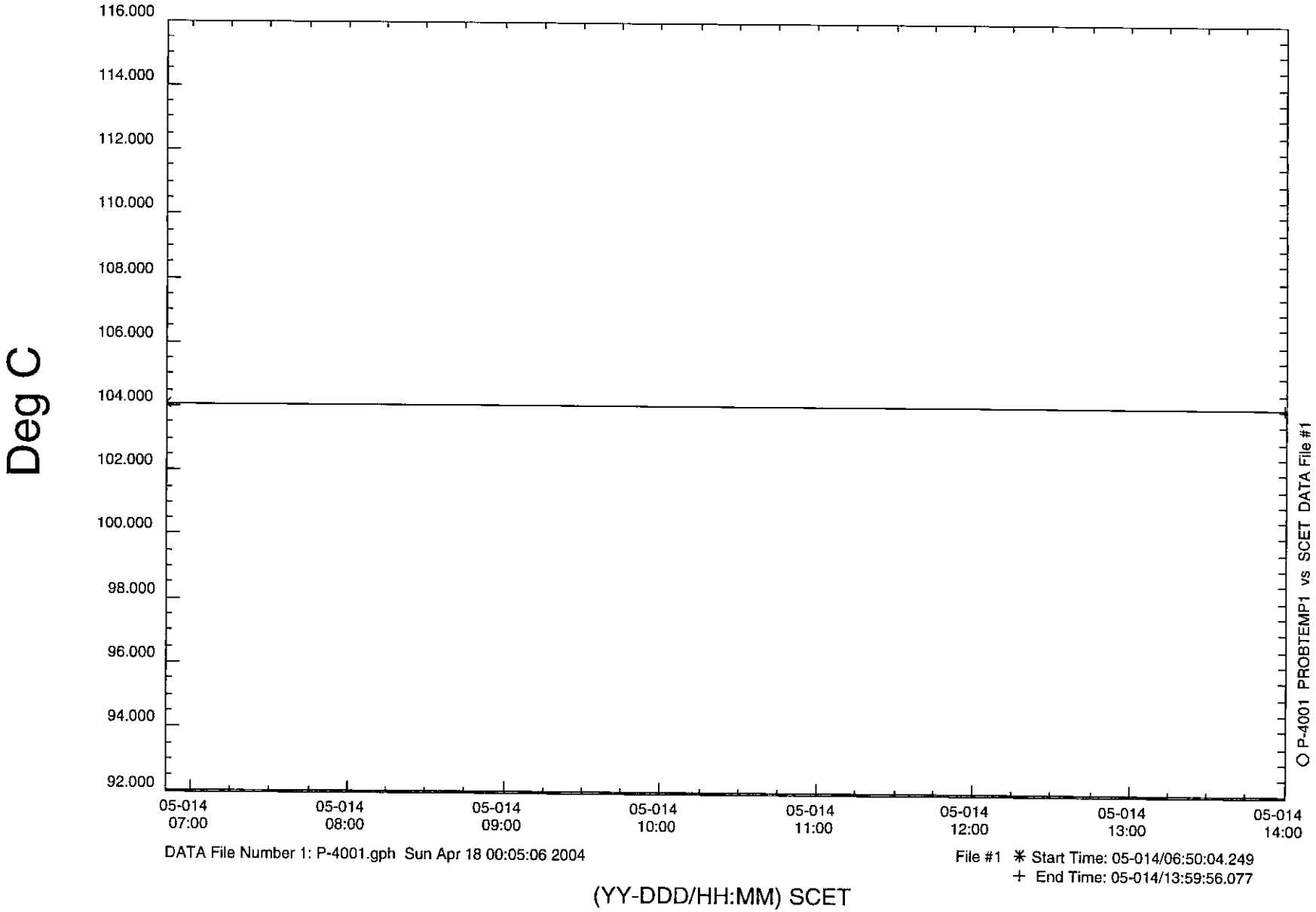
Date: Mon. Jan. 31, 2005 15:30:00

P-3403 (LNABTEMPO) vs SCET



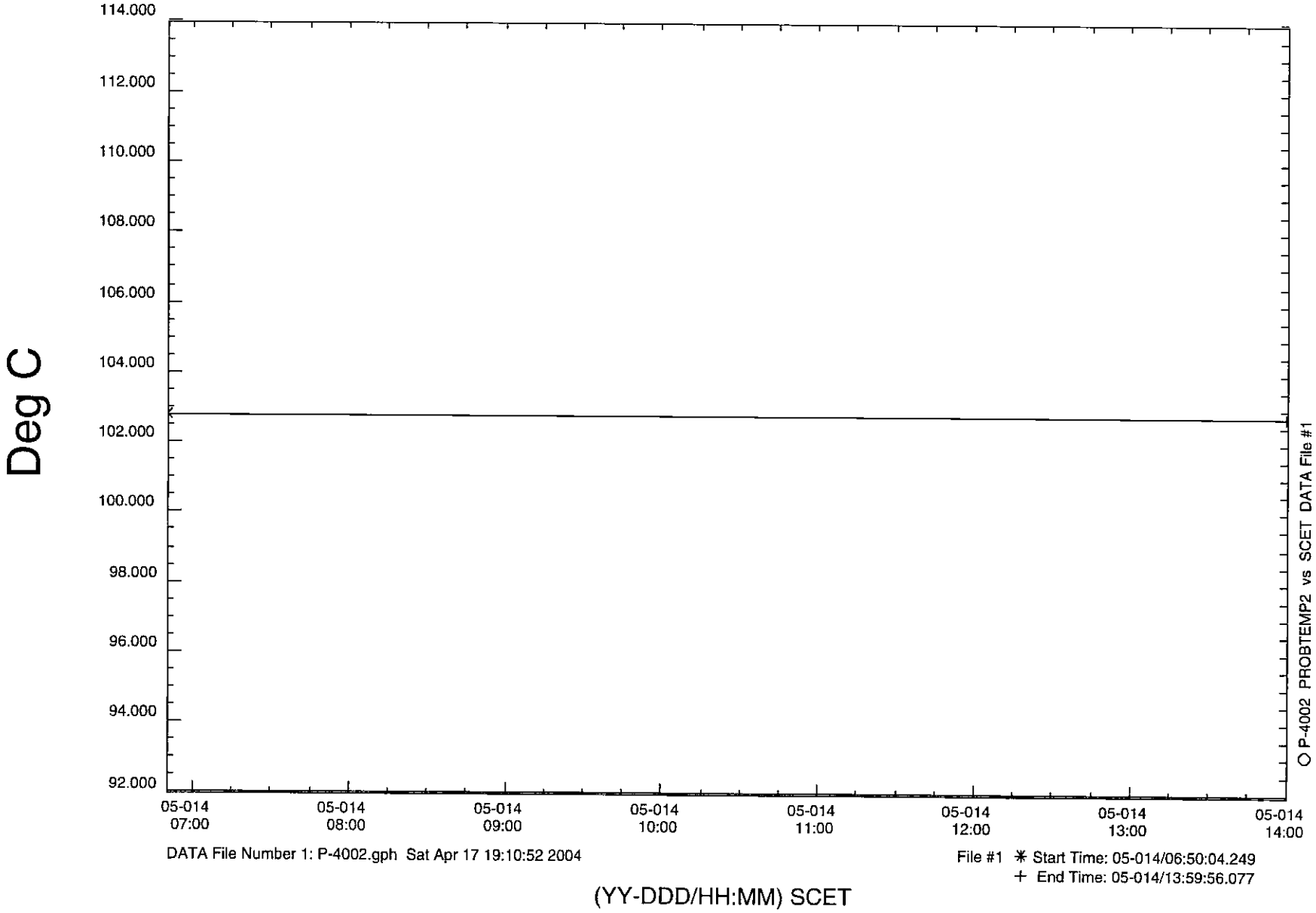
Date: Mon. Jan. 31, 2005 15:30:00

P-4001 (PROBTEMP1) vs SCET



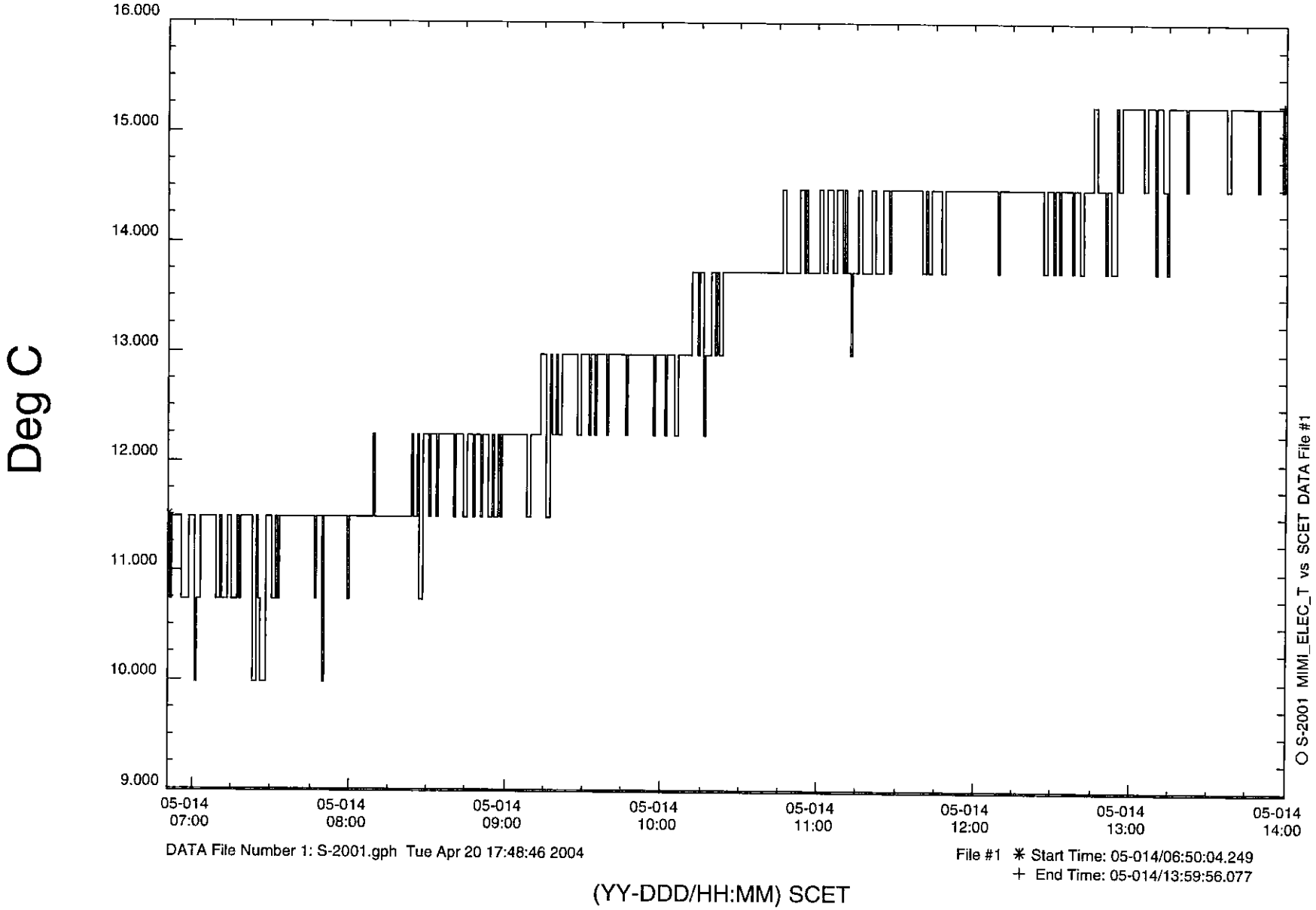
Date: Mon. Jan. 31, 2005 15:30:00

P-4002 (PROBTEMP2) vs SCET



Date: Mon. Jan. 31, 2005 15:30:00

S-2001 (MIMI_ELEC_T) vs SCET



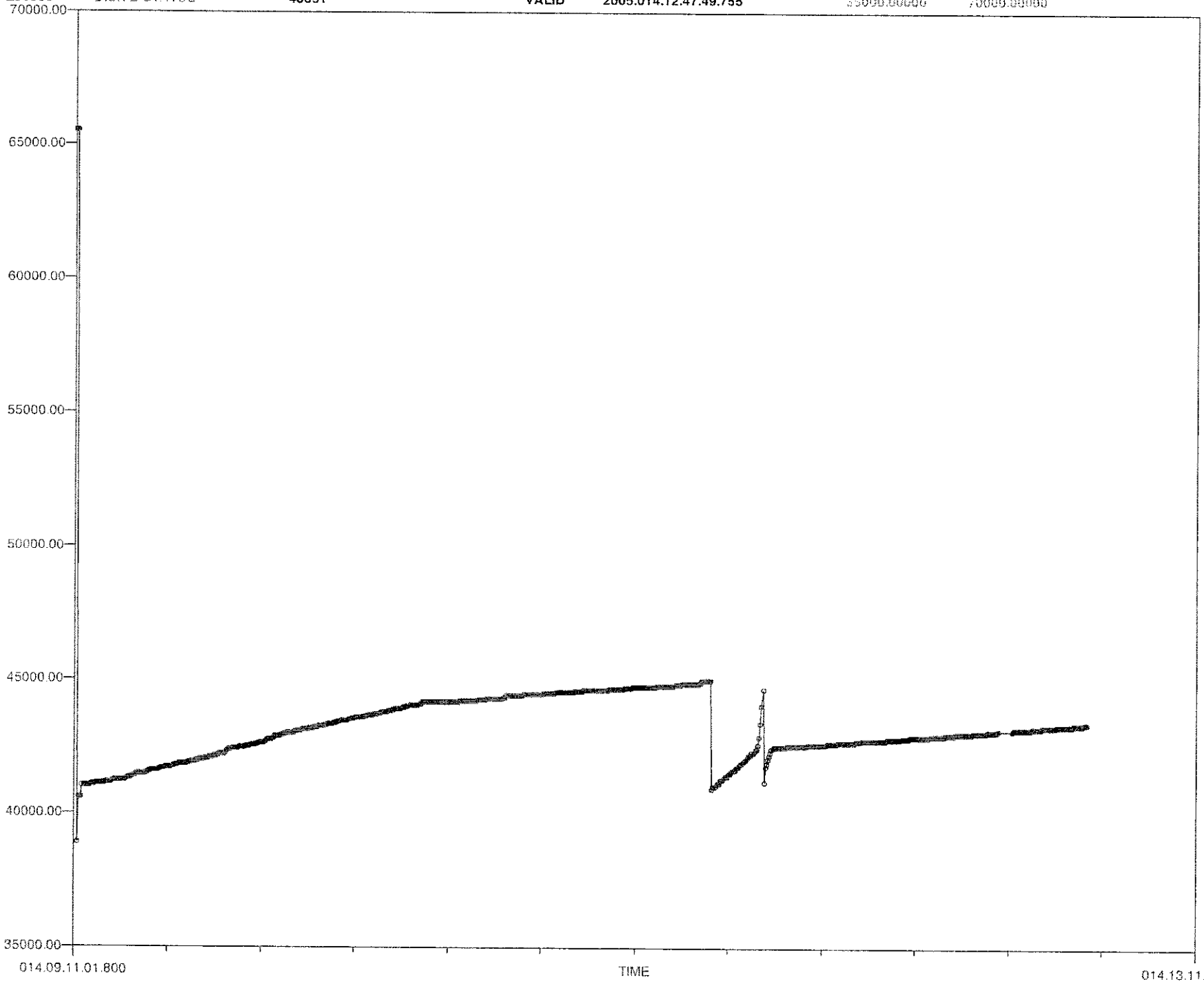
Date: Mon. Jan. 31, 2005 15:30:00

5.7.6 EXPERIMENTS

DS: 524 ID: W146H Title: [EXP] DISR STATUS WORDS Sample Time: 2005.014.12.47.49.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

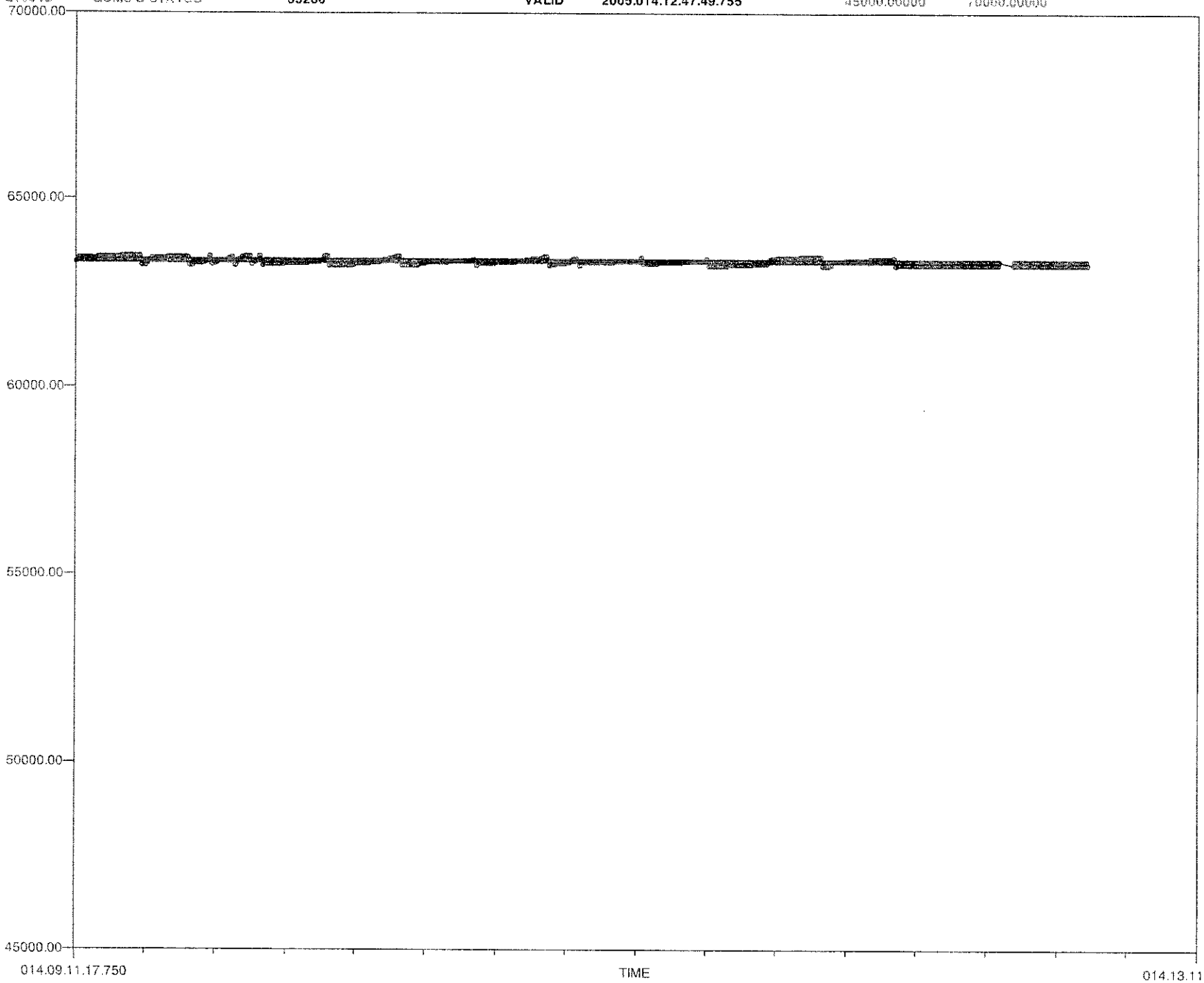
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
ES003S	DISR B STATUS	43391		VALID	2005.014.12.47.49.755	35000.00000	70000.00000	



DS: 524 ID: W147H Title: [EXP] GCMS STATUS WORDS Sample Time: 2005.014.12.47.49.755 Workstation: huygz

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

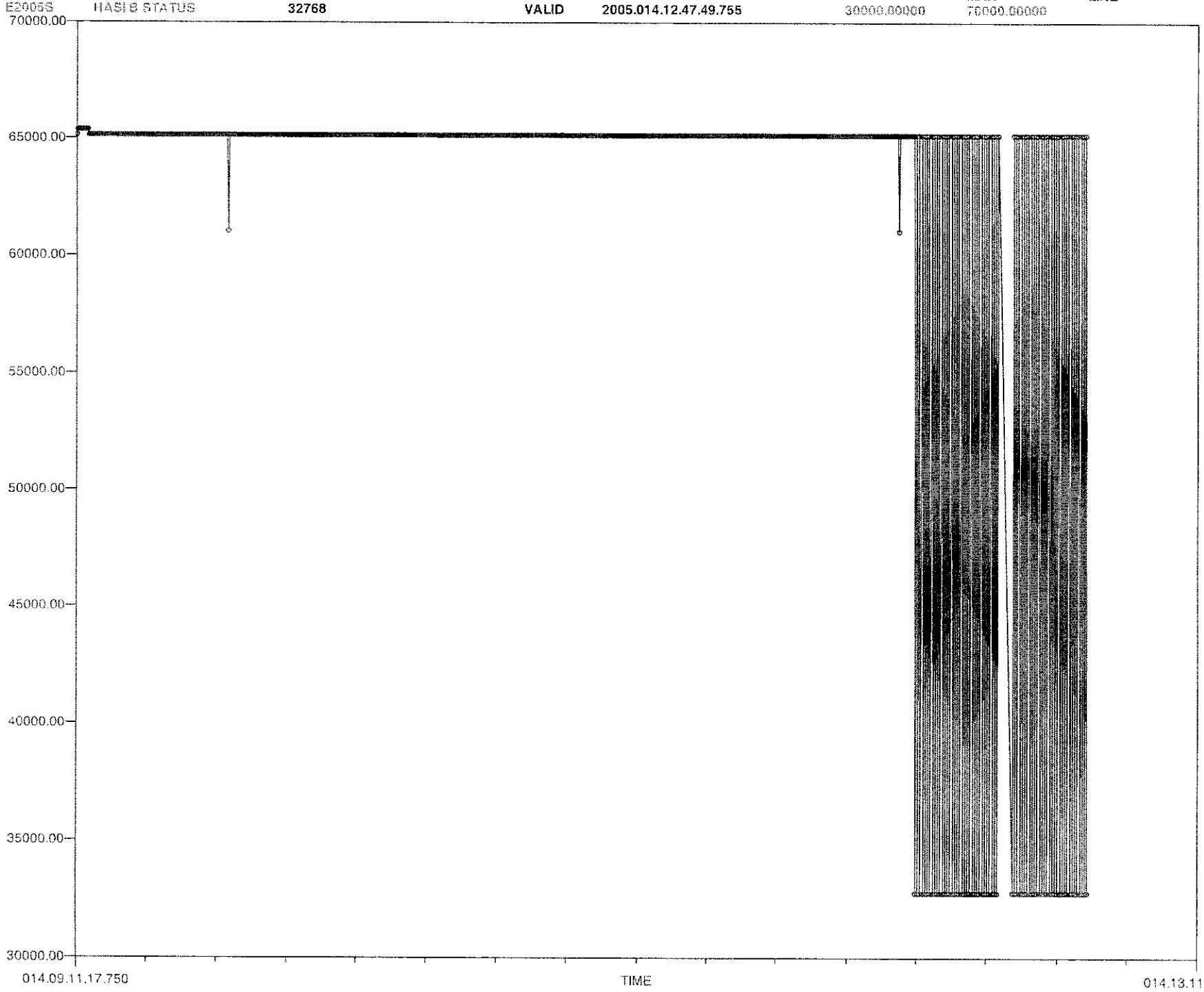
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E1003S	GCMS S STATUS	63280		VALID	2005.014.12.47.49.755	45000.00000	70000.00000	



DS: 524 ID: W148h Title: [EXP] HASI STATUS WORDS Sample Time: 2005.014.12.47.49.755 Workstation: nuyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

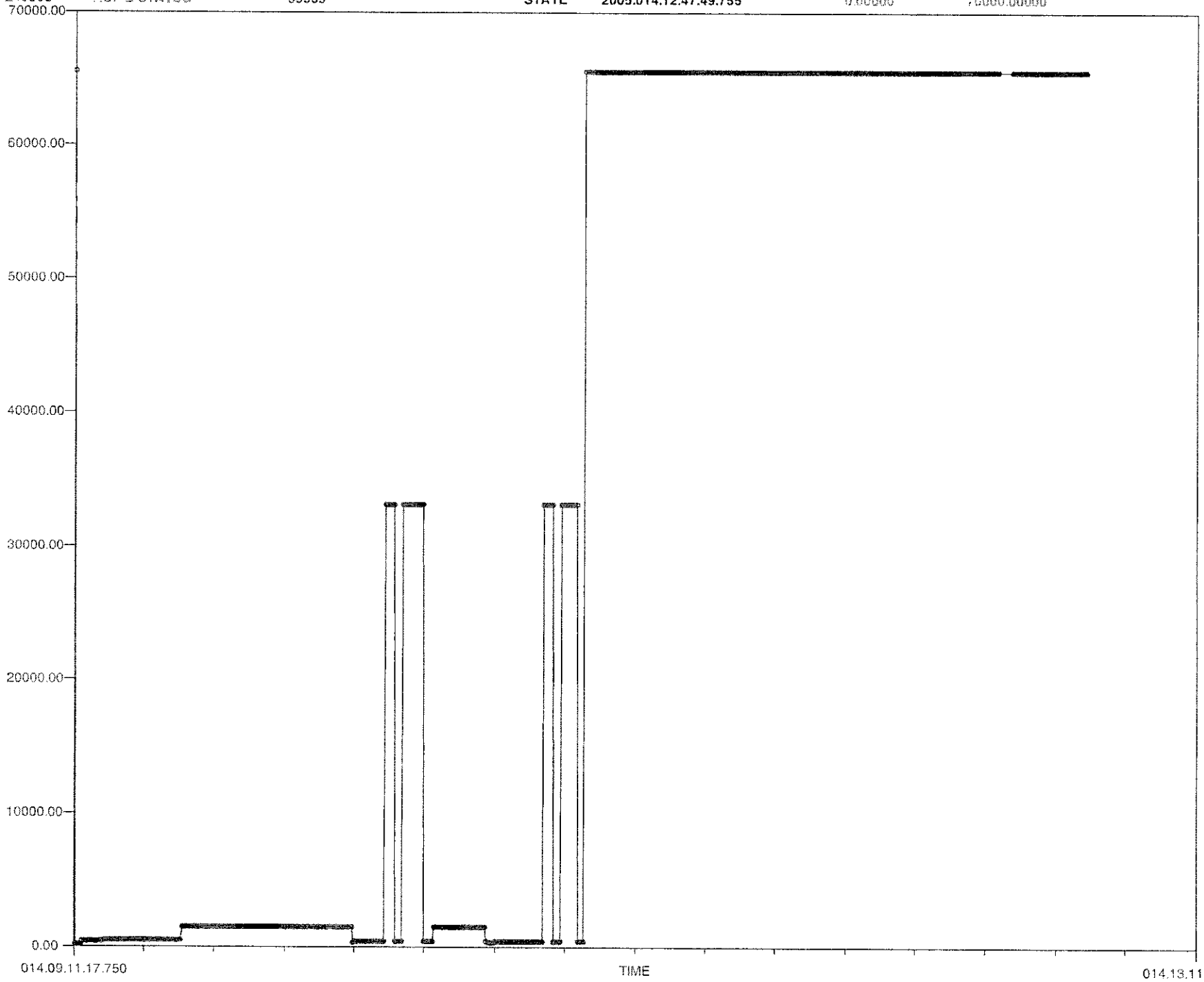
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E2005S	HASI S STATUS	32768		VALID	2005.014.12.47.49.755	30000.00000	70000.00000	



DS: 524 ID: W149h Title: [EXP] ACP STATUS WORDS Sample Time: 2005.014.12.47.49.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

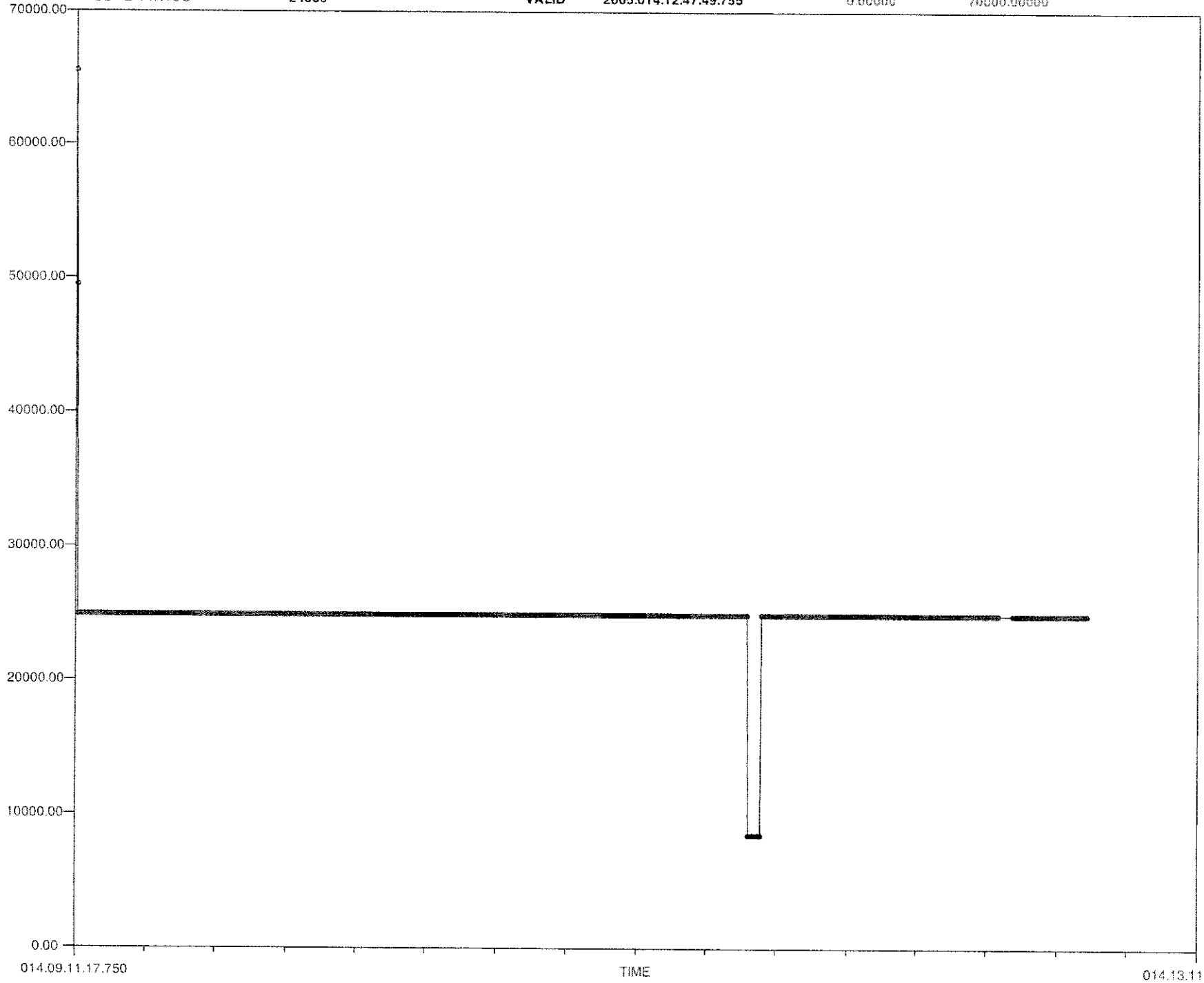
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E4005S	ACP B STATUS	65535		STATE	2005.014.12.47.49.755	0.00000	70000.00000	



DS: 524 ID: W150h Title: [EXP] SSP STATUS WORDS Sample Time: 2005.014.12.47.49.755 Workstation: nuyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
E5003S	SSP B STATUS	24856		VALID	2005.014.12.47.49.755	0.00000	70000.00000	

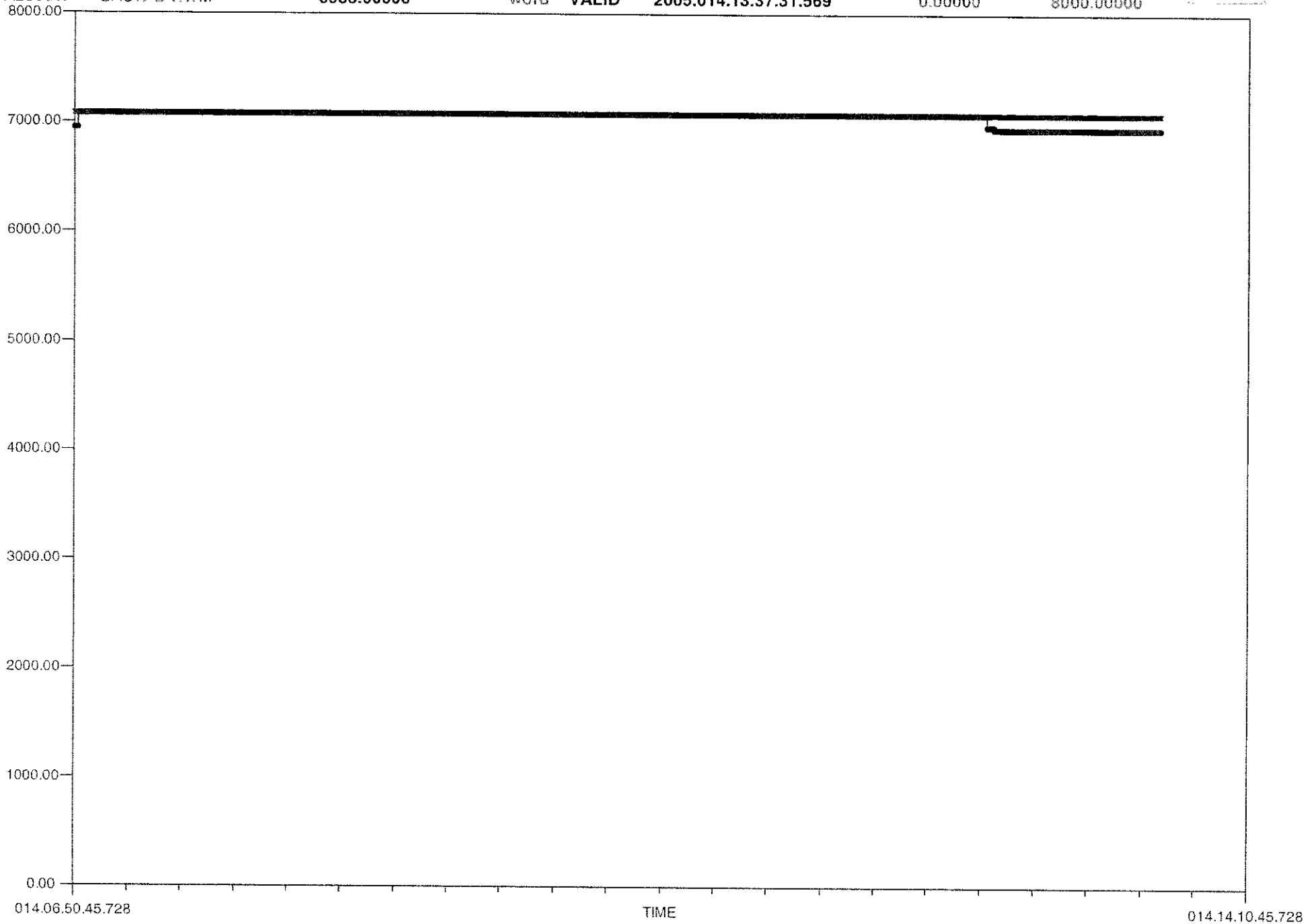


5.7.7 SUPPORT AVIONICS SOFTWARE (SASW)

DS: 524 ID: W113P Title: [SASW] HIGH STACK WATER MARK Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

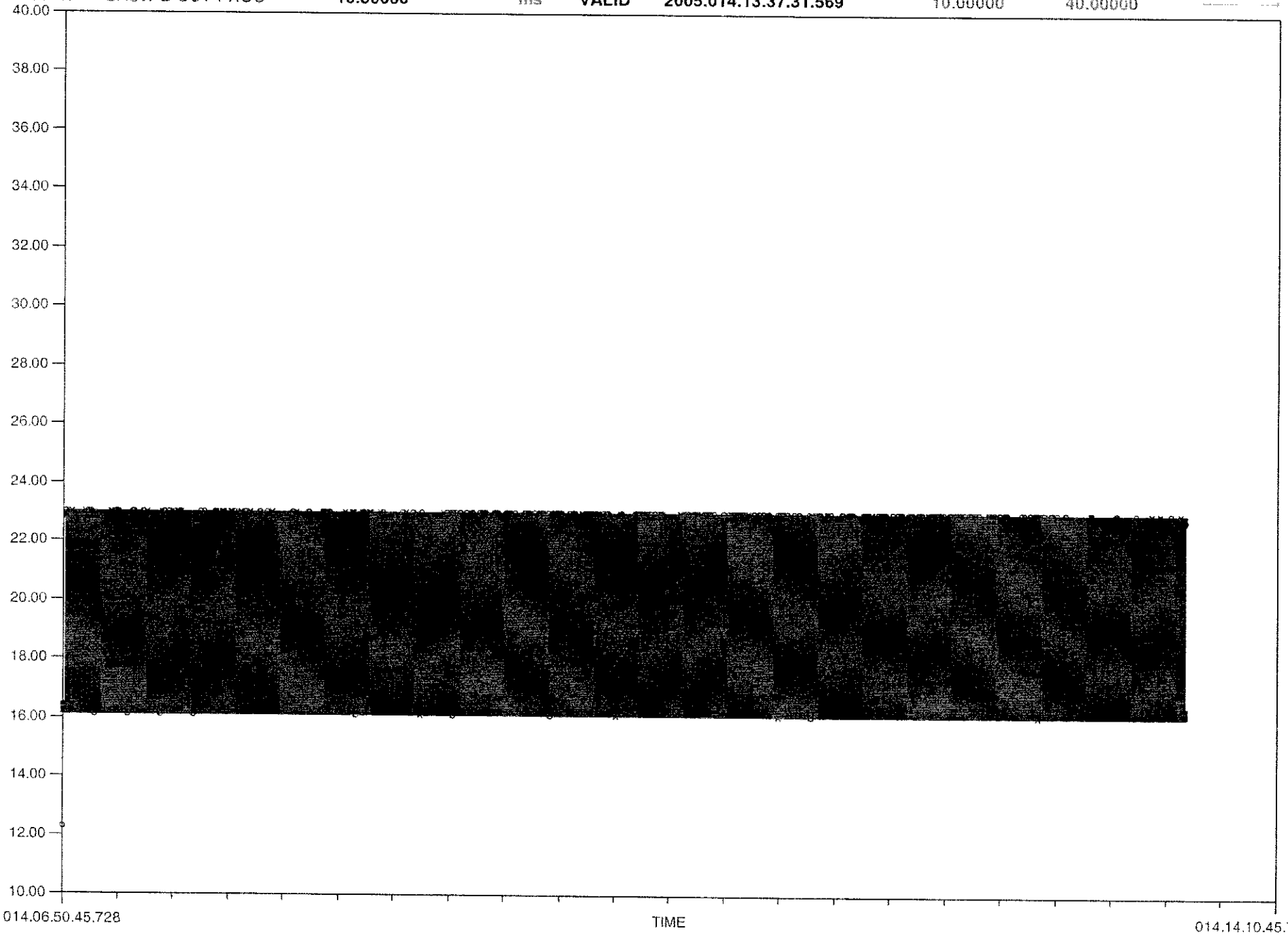
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A1006W	SASW A HWM	7068.00000	word	VALID	2005.014.13.37.31.569	0.00000	8000.00000	
A2006W	SASW B HWM	6938.00000	word	VALID	2005.014.13.37.31.569	0.00000	8000.00000	



DS: 524 ID: W114P Title: [SASW] CUT EXECUTION TIME (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

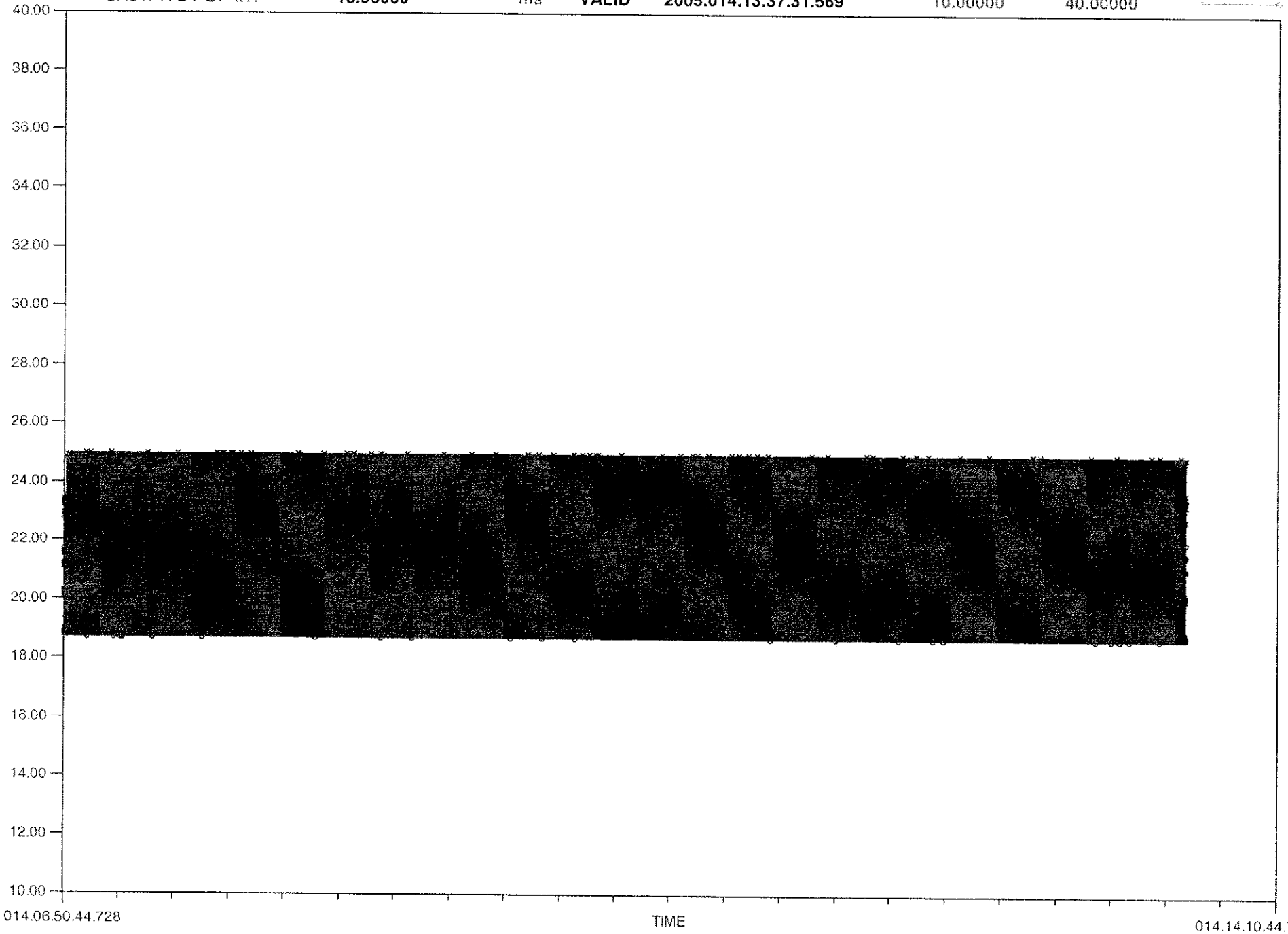
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A1007W	SASW A CUT PROC	16.30000	ms	VALID	2005.014.13.37.31.569	10.00000	40.00000	
A2007W	SASW B CUT PROC	16.30000	ms	VALID	2005.014.13.37.31.569	10.00000	40.00000	



DS: 524 ID: W115P Title: [SASW] DTSTART START/END A (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

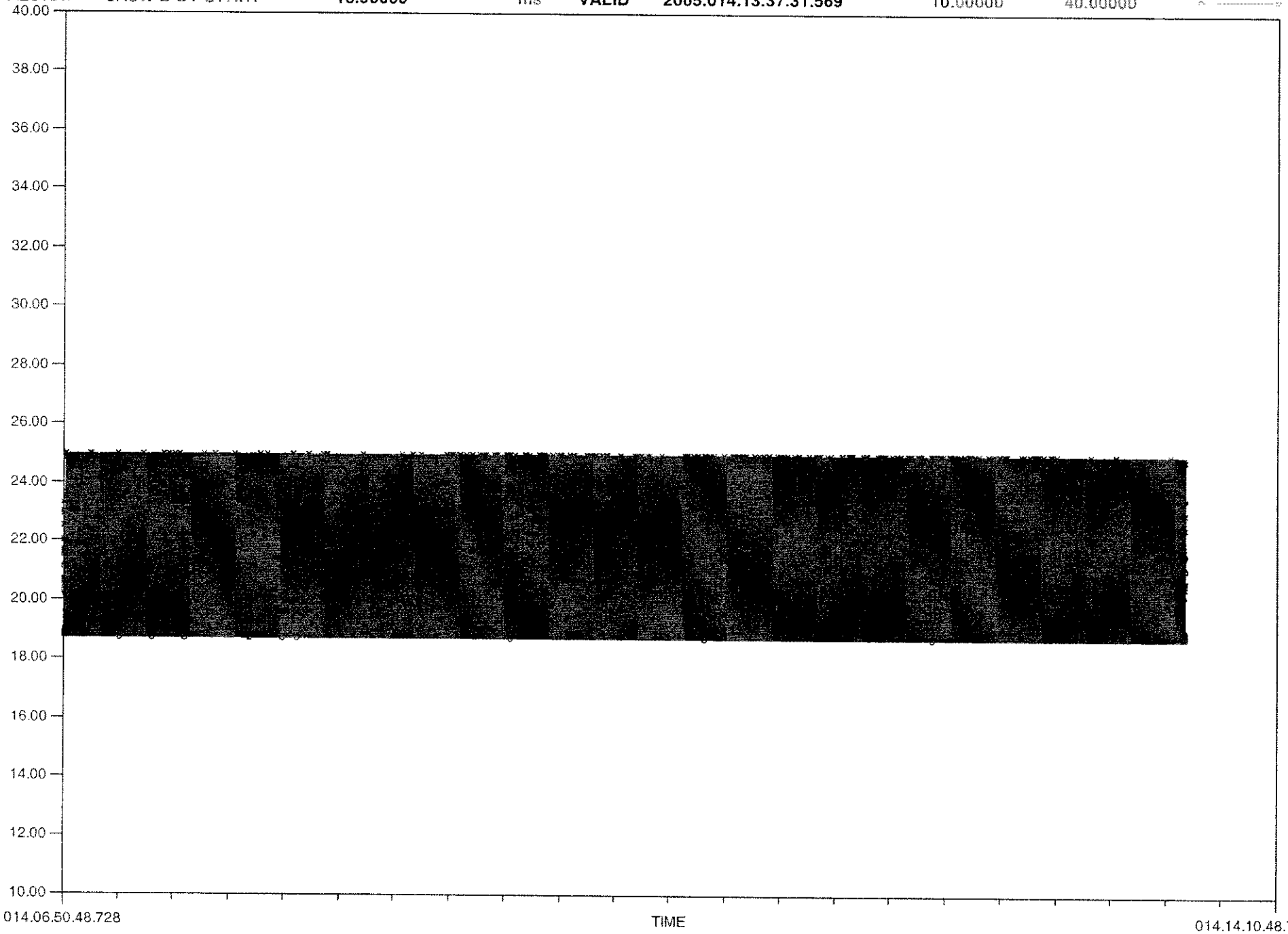
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A1008W	SASW A DT END	20.20000	ms	VALID	2005.014.13.37.31.569	10.00000	40.00000	
A1015W	SASW A DT START	18.90000	ms	VALID	2005.014.13.37.31.569	10.00000	40.00000	



DS: 524 ID: W116P Title: [SASW] DTSTART START/END B (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

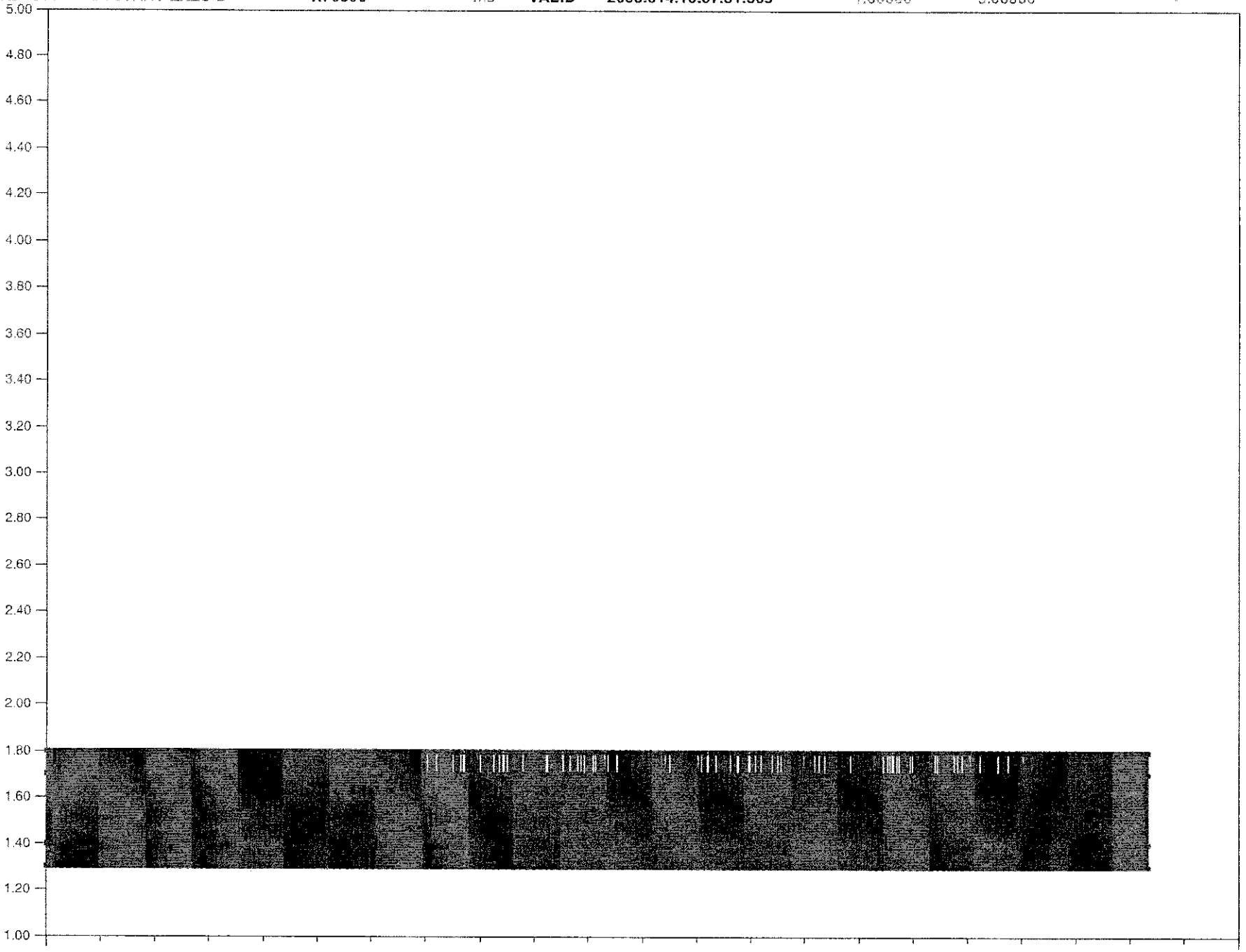
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A2008W	SASW B DT END	20.60000	ms	VALID	2005.014.13.37.31.569	10.00000	40.00000	
A2015W	SASW B DT START	18.90000	ms	VALID	2005.014.13.37.31.569	10.00000	40.00000	



DS: 524 ID: W188P Title: [SASW] DTSTART DELTA TIME (ms) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

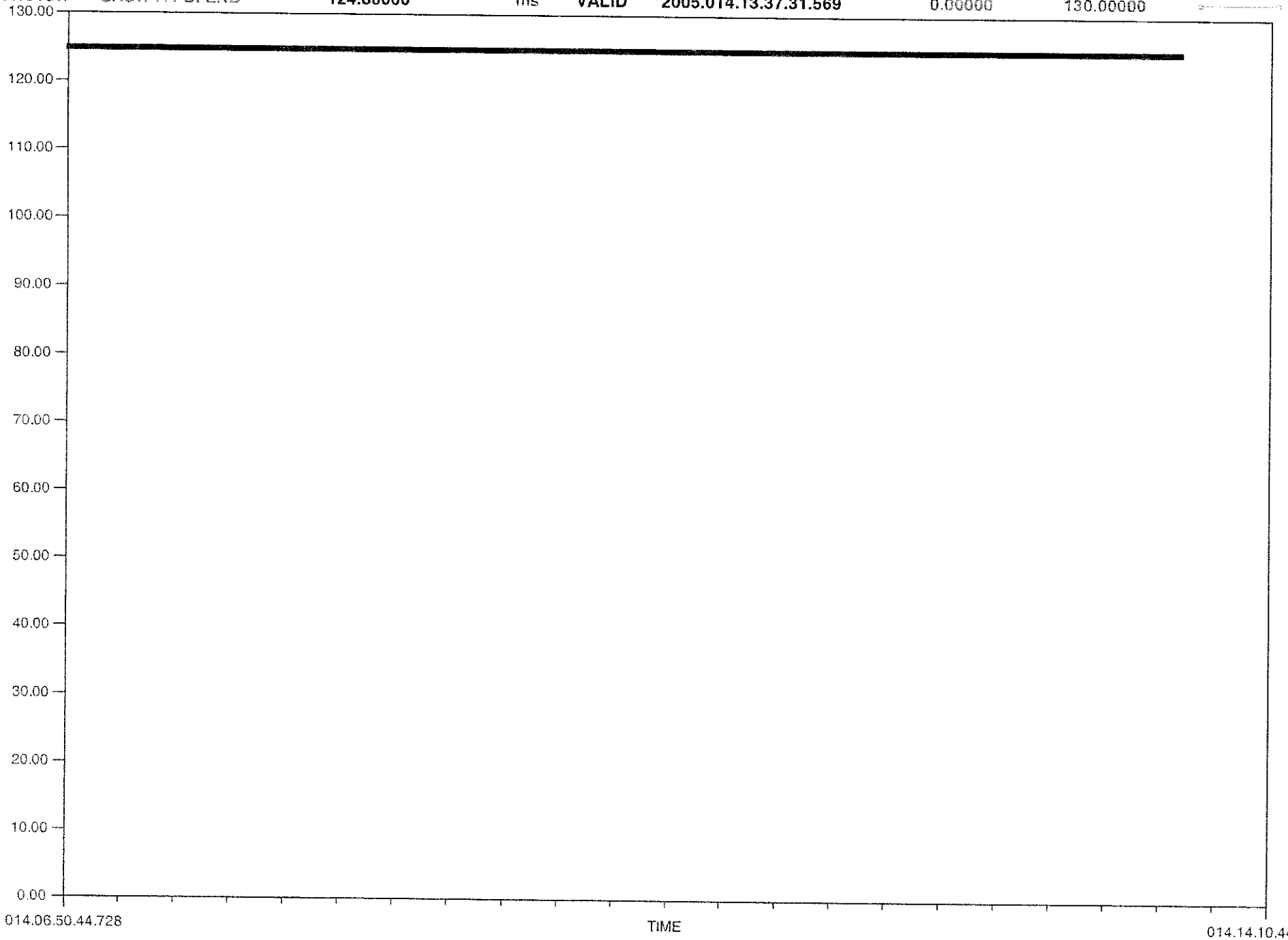
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA6011	DTSTART EXEC A	1.30000	ms	VALID	2005.014.13.37.31.569	1.00000	5.00000	
XB6011	DTSTART EXEC B	1.70000	ms	VALID	2005.014.13.37.31.569	1.00000	5.00000	



DS: 524 ID: W117P Title: [SASW] FDI START/END A (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

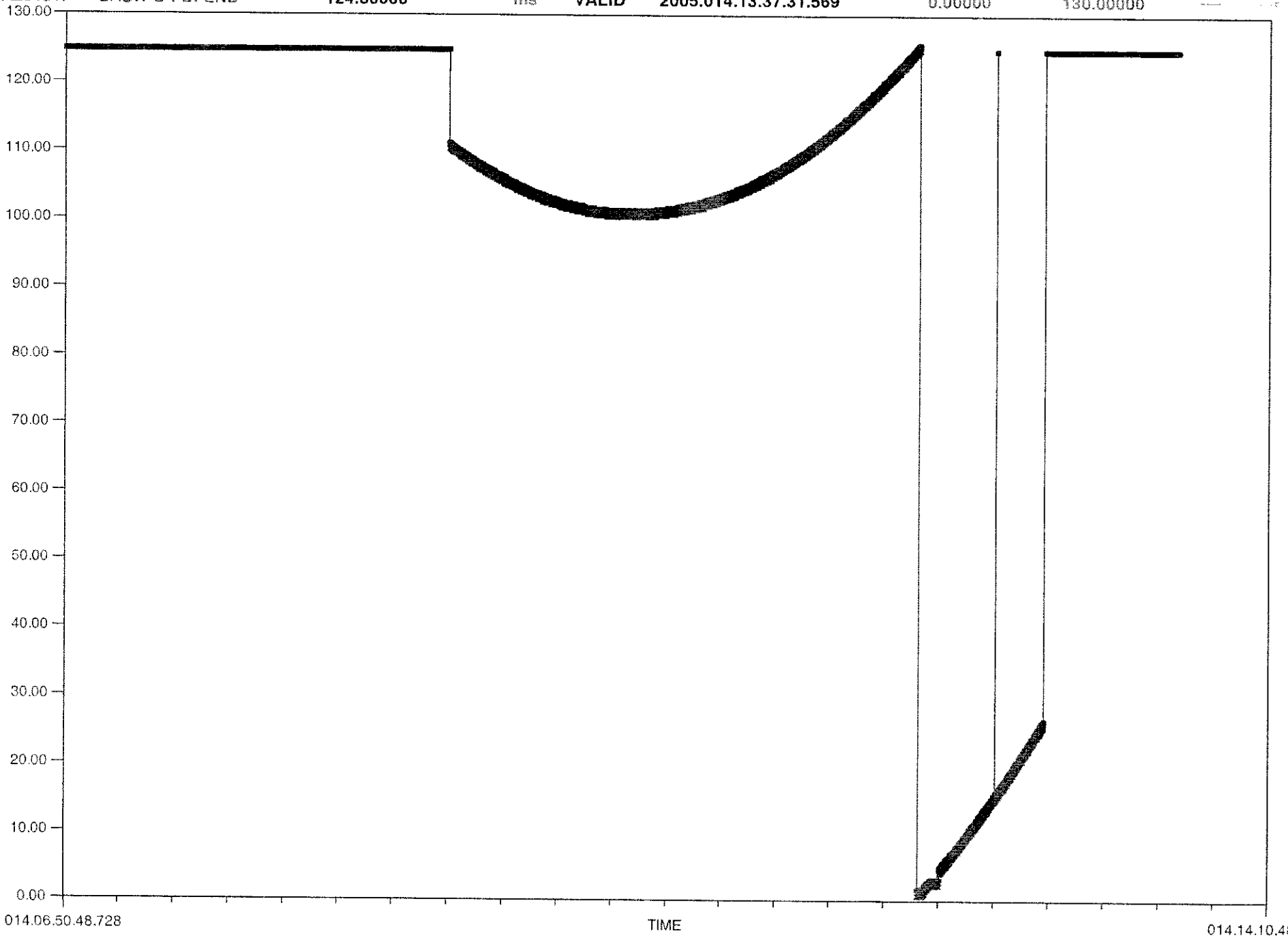
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A1011W	SASW A FDI START	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	
A1013W	SASW A FDI END	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	



DS: 524 ID: W118P Title: [SASW] FDI START/END B (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

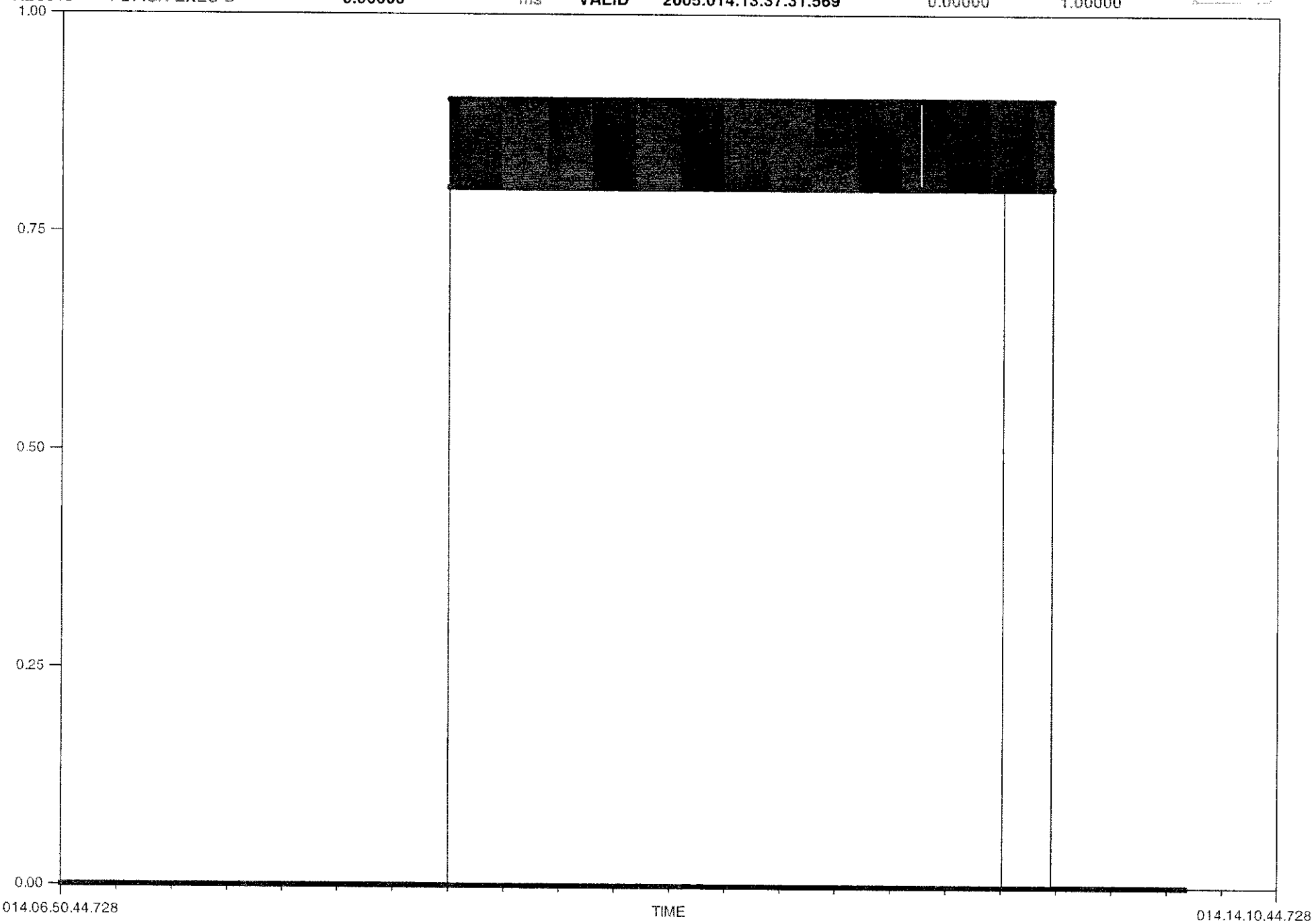
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A2011W	SASW B FDI START	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	
A2013W	SASW B FDI END	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	



DS: 524 ID: W189P Title: [SASW] FDI ISR EXEC TIME (ms) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

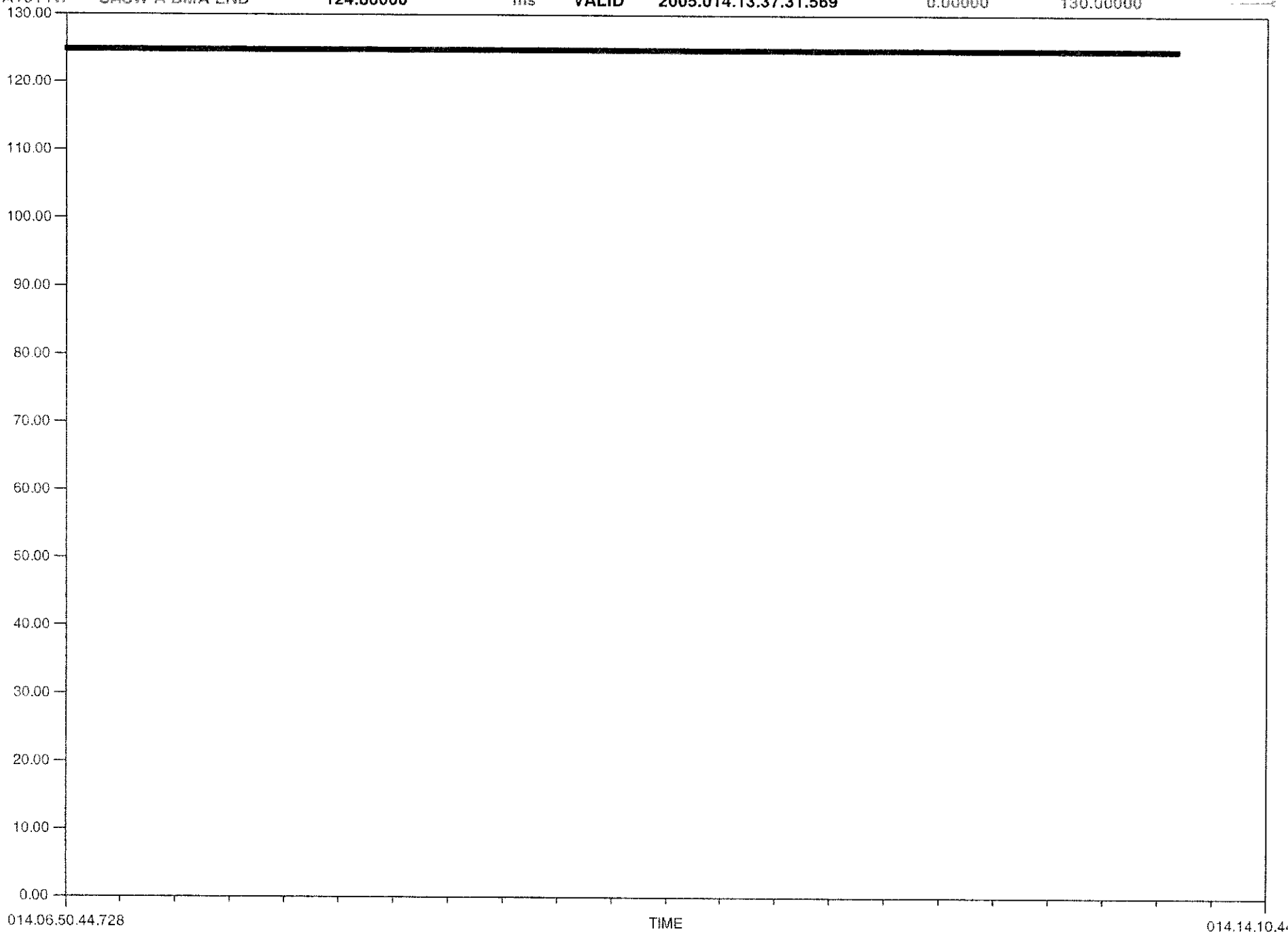
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA8012	FDI ISR EXEC A	0.00000	ms	VALID	2005.014.13.37.31.569	0.00000	1.00000	
XB8012	FDI ISR EXEC B	0.00000	ms	VALID	2005.014.13.37.31.569	0.00000	1.00000	



DS: 524 ID: W119P Title: [SASW] DMA START/END A (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

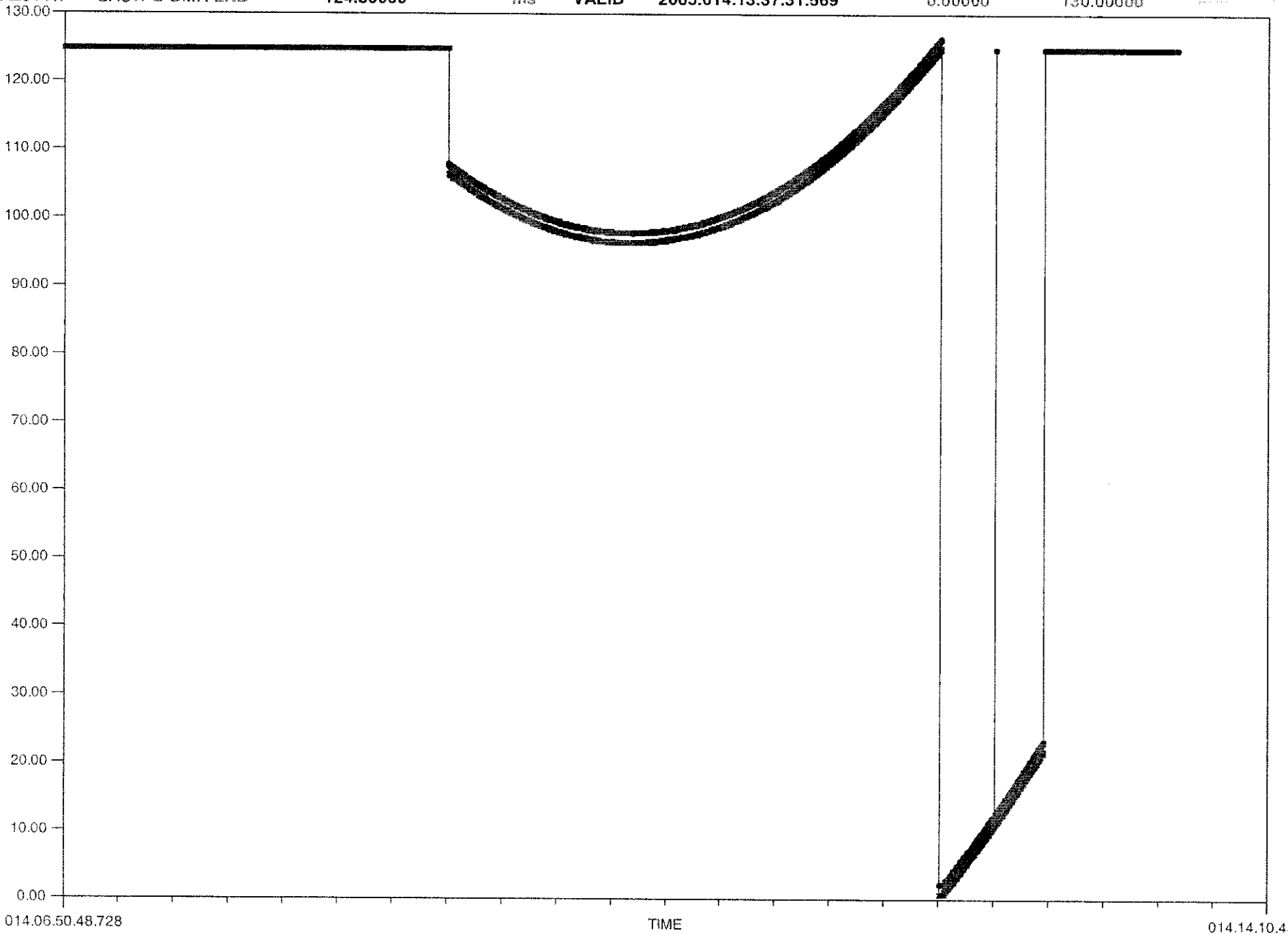
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A1012W	SASW A DMA START	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	
A1014W	SASW A DMA END	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	



DS: 524 ID: W120P Title: [SASW] DMA START/END B (ms) Sample Time: 2005.014.13.37.31.569 Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

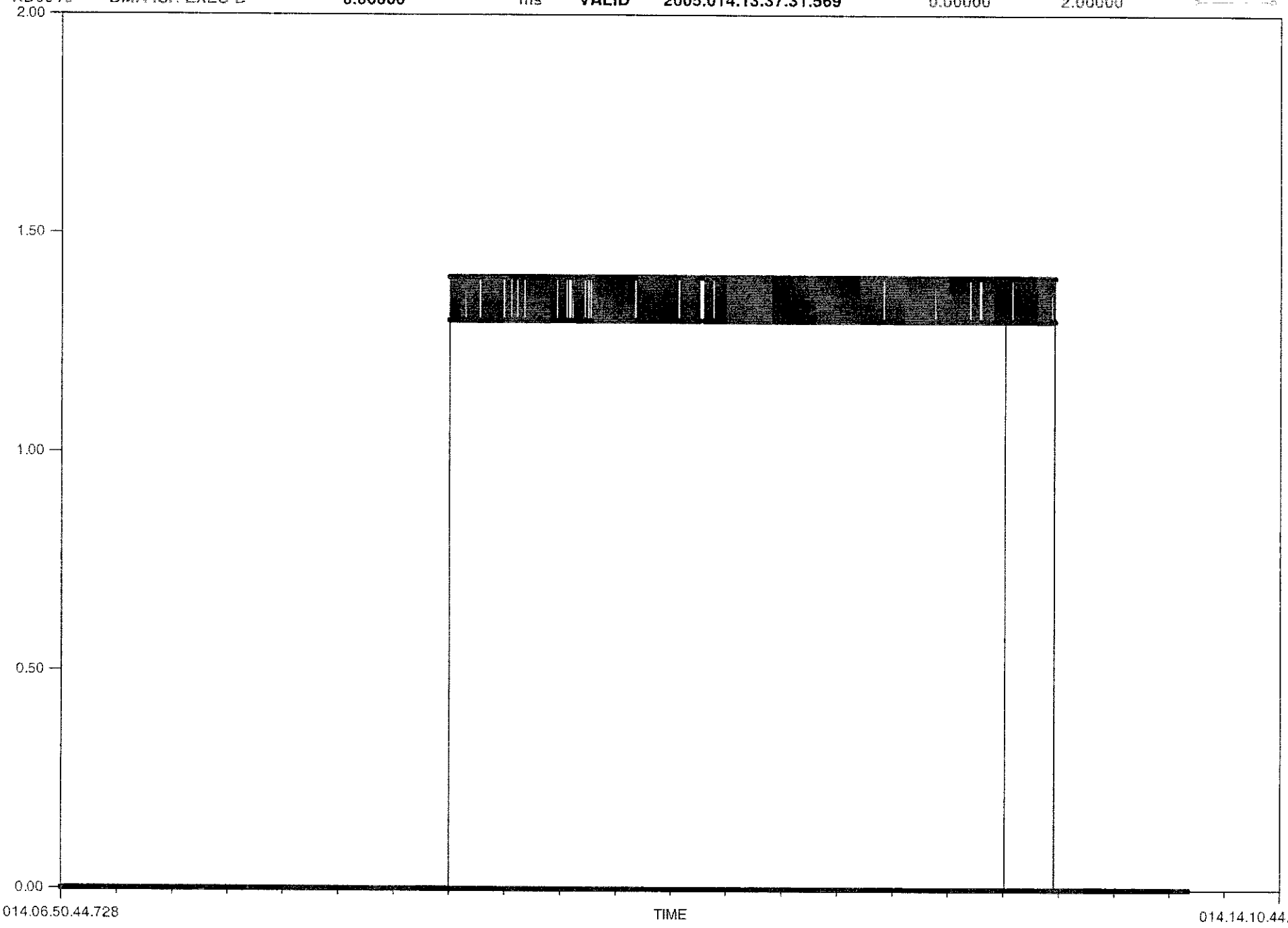
NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
A2012W	SASW B DMA START	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	
A2014W	SASW B DMA END	124.80000	ms	VALID	2005.014.13.37.31.569	0.00000	130.00000	



DS: 524 ID: W190P Title: [SASW] DMA ISR EXEC TIME (ms) Sample Time: Workstation: huyg2

X-GRID INTERVAL 000.07.20.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
XA8013	DMA ISR EXEC A	0.00000	ms	VALID	2005.014.13.37.31.569	0.00000	2.00000	
XB8013	DMA ISR EXEC B	0.00000	ms	VALID	2005.014.13.37.31.569	0.00000	2.00000	

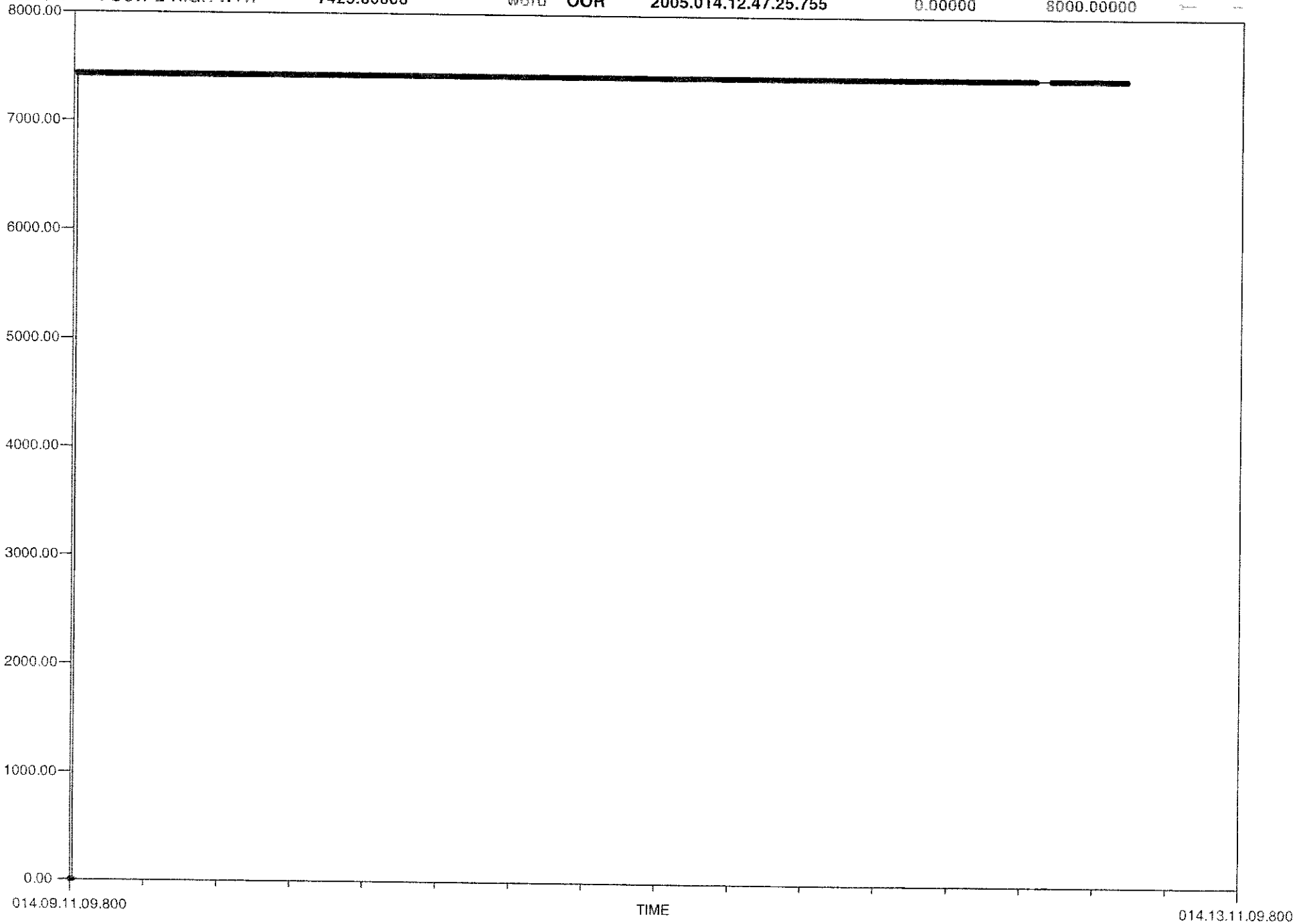


5.7.8 PROBE ON-BOARD SOFTWARE (POSW)

DS: 524 ID: W125h Title: [POSW] HIGH STACK WATER MARK Sample Time: 2005.014.12.47.25.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 **AUTO HARD COPY** OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1019W	POSW A HIGH WTR		word			0.00000	8000.00000	
S2019W	POSW B HIGH WTR	7425.00000	word	OOR	2005.014.12.47.25.755	0.00000	8000.00000	



DS: 524 ID: W126h Title: [POSW] CUT EXECUTION TIME (ms) Sample Time: 2005.014.12.47.25.755 Workstation: huyg2

X-GRID INTERVAL 000.04.00.00 AUTO HARD COPY OFF

NAME	DESCRIPTION	VALUE	UNIT	VLDITY	SAMPLE TIME	MIN	MAX	LINE
S1021W	POSW A CUT PROC		ms			40.00000	80.00000	
S2021W	POSW B CUT PROC	56.40000	ms	VALID	2005.014.12.47.25.755	40.00000	80.00000