



**Installation, Operation and Maintenance Manual  
of DRV300 Protected Data Capsule**

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This manual is a instruction for installation and maintenance for DRV300. Before installation, please seriously read this manual. We appreciate all advices proposed by users.

1 Overview

DRV300 Protected Data Capsule (commonly known as marine black box, and named DRV300 Capsule afterward in this text), the main function is to protect the data information obtained from VDR host, which can be used for future accident investigation.

DRV300 Capsule can record data, storage, playback of data. DRV100 Capsule can record more than 12h of the ship data including radar and voice data which is always up-to-date. Users can select storage size by their needs. After shock, penetration, fire and deep sea immersion. All the data can be protected. At the same time, an underwater acoustic beacons easing sonar signal is also used to help search after ship accident. DRV300 Capsule compliant with the IMO A. 861 (20) and the IEC 61996-1 1.0 standard, it can be installed on all kinds of ship.

2 Technical parameters

The technical parameters and working environment of DRV300 Capsule please check table 1.

Table 1

Name	technical parameters and working environment
Storage size	2 GB, maximum 16 GB
Communicate interface	Communicate with VDR by network
Compass safe distance	420mm
Underwater acoustic beacons	Operating frequency: 37.5kHz±1kHz Work underwater depth: 6096m
Protection	Compliant with IEC 60945 and IEC 61996-1 Penetration: 250kg/100mm fall from 3m height puncture Shock: 50g, 11ms half-sine shock pulse Fire-protectire high-temperature: 1100 °C /1h, 260 °C /10h Deep-sea pressure: 60MPa (equivalent to depth of 6000m)
Working environment	Working temperature: -25°C~+55°C

Power	24±3VDC, less than 10W
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### 3 Working principle

DRV300 Capsule should connect with VDR host (which is used to collect data of ships sailing) by network. And powered 24V DC from the UPS of VDR host. Data such as radar, sensor and voice can be recorded to DRV300 Capsule immediately by network. DRV300 Capsule can delete some outdated data automatically and keep the data recorded newest. The newest data time will be 12h at least. The data recorded in DRV300 Capsule can only be read by passing authority verify. Block diagram can be seen in figure 1.

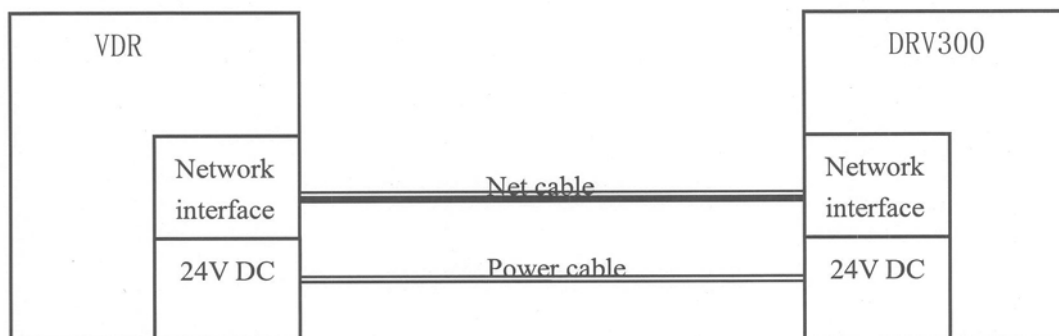


Figure1 Device connection

### 4 Structural characteristics

DRV300 Capsule also paint a high visible, orange fluorescent, and white reflective text logo. Reflective text logo is as follows: **VOYAGE DATA RECORDER, DO NOT OPEN, REPORT TO AUTHORITIES.**

DRV300 Capsule is constituted by the upper shell and the base. The upper shell is used to storage data, while the base is used to receive data by network. And the upper shell is to be recovered after accident. These two parts are connected by a release body. The profile can be seen in figure 2.

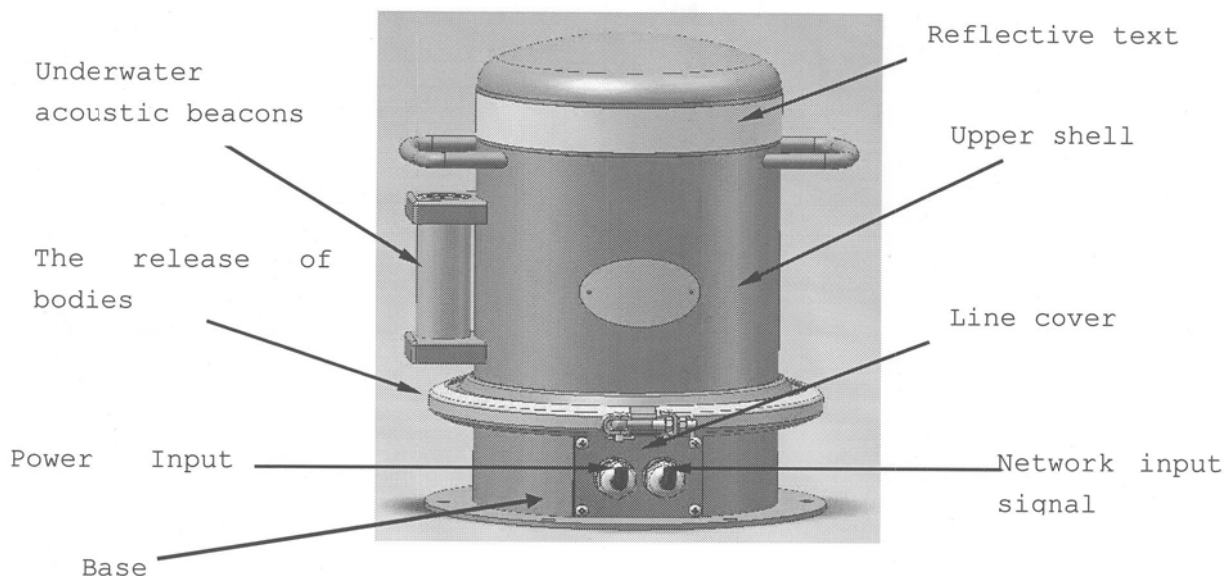


Figure 2 Profile of DRV300 Capsule

#### 4.1 Wiring panel

Wiring panel is in the line cover, open the line cover, the wiring panel can be seen, diagrammatic sketch can be seen in figure 3

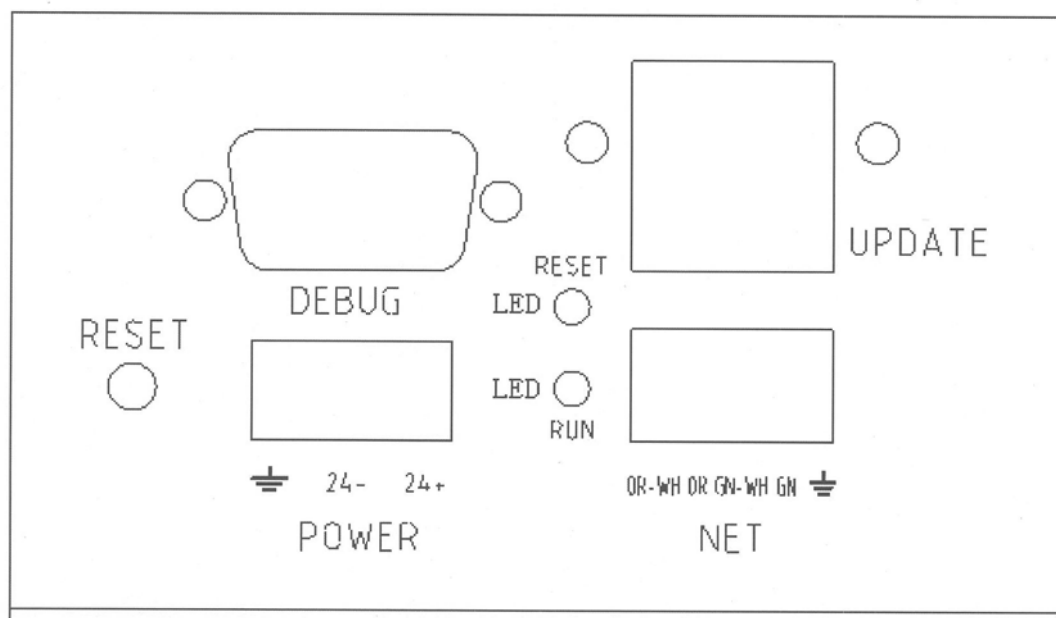


Figure 3 Diagrammatic sketch of wiring panel

- a) working status LED(RUN), working fine, flickers about every 1s
- b) reset LED, push reset button(RESET), the rest LED will light

- c) power connection(POWER), power input of DRV300
- d) network connection(NET), connection to equipment which collect sailing data
- e) debugging network connection(UPDATE), use this connection to connect to debugging PC to check the system of DRV300
- f) debugging serial connection(DEBUG), standard RS232
- g) reset button(RESET), push over 5s, recover to factory settings

#### 4.2 Interface characteristics

Signal Interface: VDR host and Capsule are connected by network. Communicate with 10M/100M rapid adoption of standard interfaces adaptive Ethernet interface, in line with the transport protocol TCP/IP protocol stack in the NETBIOS protocol and FTP protocol. Transmission lines use ultra-shielded Category 5 cable, cable length no more than 100m (in accordance with the length of the actual use).

Power Interface: DRV300 Capsule vessel power consumption is less than 10W, while the work voltage is 24V DC. With the VDR host UPS uninterruptible power supply connected to 24V DC output, transmission lines use marine waterproof rubber cable, cable length is no more than 100m (in accordance with the length of the actual use).

### 5 Installation

#### 5.1 Installation location requirements

DRV300 Capsule should be installed in the deck of the ship's external platform at some accessible location, and adjacent to the cab, if ship survived in the accident and recovery is possible. The following should be considered during installation :

- a) away from the fuel or other potential ignition sources.
- b) away from objects may lead to mechanical damage.
- c) have a continuous and reliable working environment.
- d) easy access to take a copy of the record data and do daily maintenance.
- e) sufficient space to help demolition and recycling underwater.

#### 5.2 Methods of line link

Open the line cover, put the power plug(3p) and net plug(5p) through the

watertight, connect to each plug. Shown in figure 4.

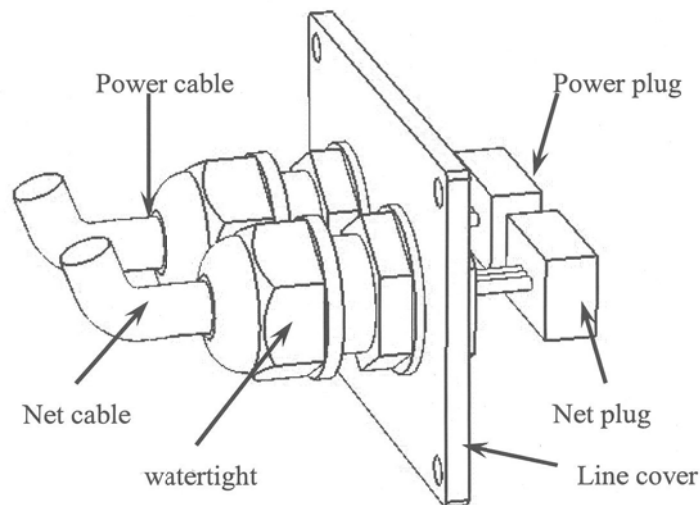


Figure 4 Diagrammatic sketch of line link

Red power cable should connect to +24V, while blue one connect to -24V, shield line connect to GND.

Linking net cable, put down the red button on net plug, then put net cable into the hole, loosen button, stuck the cable, finish the connection of net cable and net plug.

Line sequence of net cable, net input sequence of DRV300 is 1 orange white, 2 orange, 3 green white, 4 green, 5 shielded line. The other end of net cable connect to VDR, and the sequence is :If DRV300 Capsule is directly connected with the VDR host, the cable should be cross-connection mode, which is standard 568A. If DRV300 Capsule is connected with the HUB, the cable use direct-line, which is standard 568B.

Standard 568A: green white, green, orange white, blue, blue white, orange, brown white, brown

Standard 568B: orange white, orange, green white, blue, blue white, green, brown white, brown

### 5.3 Wiring requirements

Power cable should be waterproof and with shielding, to make a stable input.

Net cable should use ultra-shielded Category 5 cable, and the two end joints should be well grounded. Capsule network connections, and Internet line with data

protection shield shell should be connected in good condition and at the same time to ensure that the shell be connected to the hull well. Between VDR Capsule host and Capsule the joints must be shielded RJ45 connectors, in order to prevent RF radio frequency interference when transmitting data.

Attention: net cable bending diameter should be more than 12 times of net cable diameter.

After the connection of power cable plug and the connection of net cable plug is finished, plug them in corresponding location in the line cover. Then cover the line cover, tightening the watertight, remember to reserve some space for power cable and net cable when tightening watertight.

#### 5.4 Installation size

Installation size and location of DRV300 is showed is figure 5.

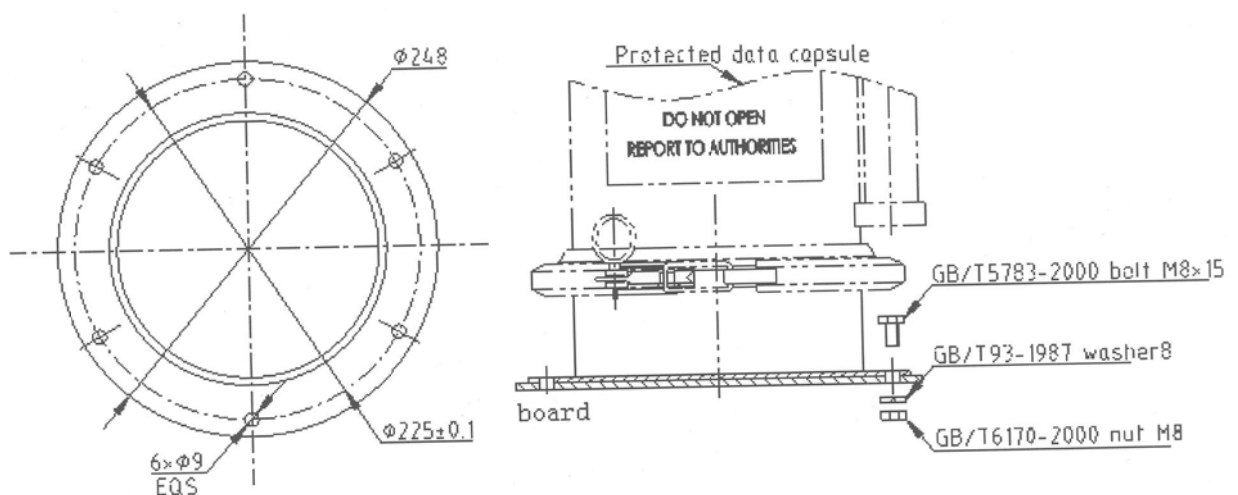


Figure 5

#### 5.5 System test

After power cable and net cable are ready, power on Capsule, ping Capsule's IP address on VDR, it will take about 1m to ping successfully. When ping successfully it means DRV300 is working and net is fine. Showed in figure 6.



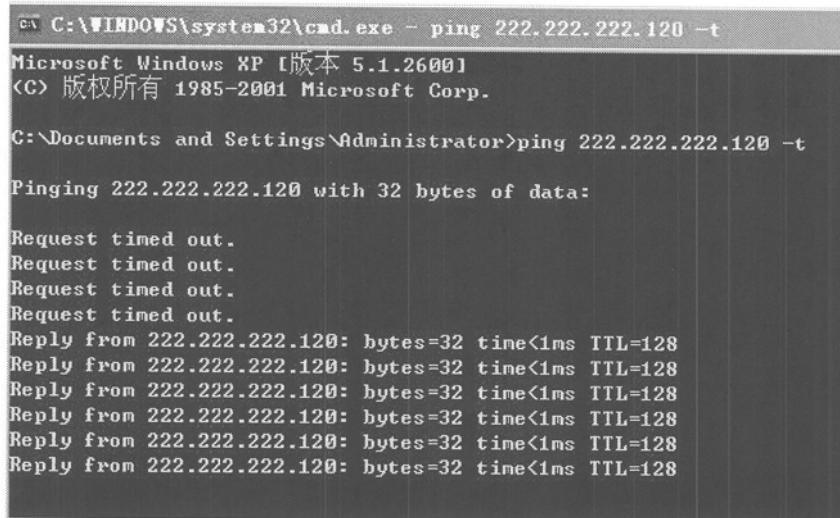


Figure 6

Note: IP of DRV300 please check appendix B, here we use 222.222.222.120.

### 5.5.1 Network share test

Double click “network neighbor”, in address bar input “\\222.222.222.120”, a dialog box like figure 7 will show, input username(c) and password(p), click “ok”, figure 8 will show.

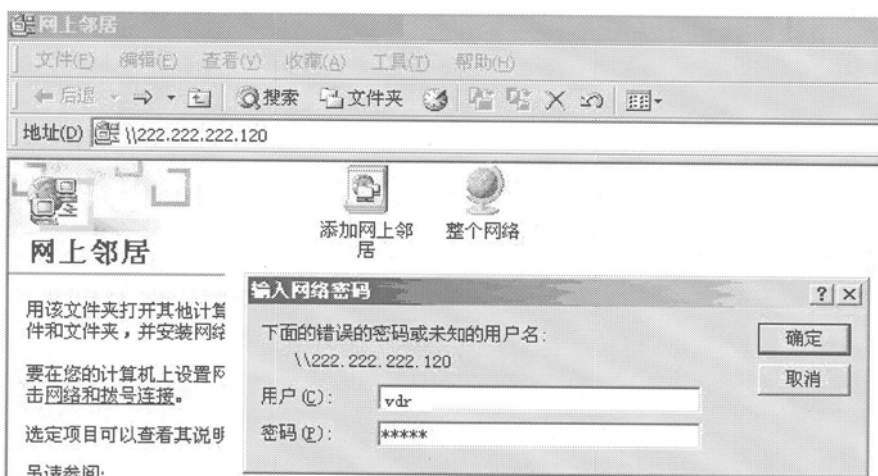


Figure 7

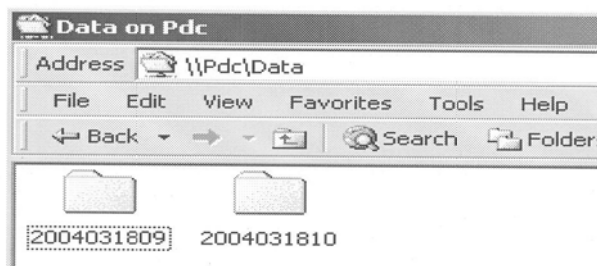


Figure 8

Data VDR collect is transmitted by net to \\222.222.222.120. The data format will be a file or a document. File(or document) name will be constituted by time, yaer, month, date, time. DRV300 can record data for at least 12h up-to-time. Users can manage data by VDR or DRV300.

5.5.2 FTP test

Login FTP must use real name, we don't offer anonymous.

1) Double click "my computer", in address bar input "ftp://222.222.222.120", figure 9 will show. Input username(u) and password(p) to login DRV300, then users can manage files in DRV300.

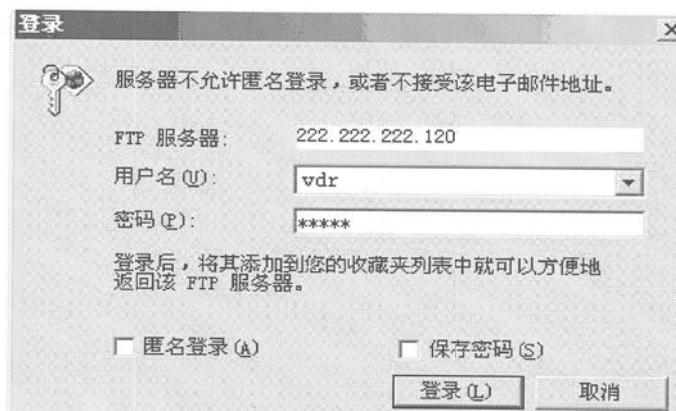


Figure 9

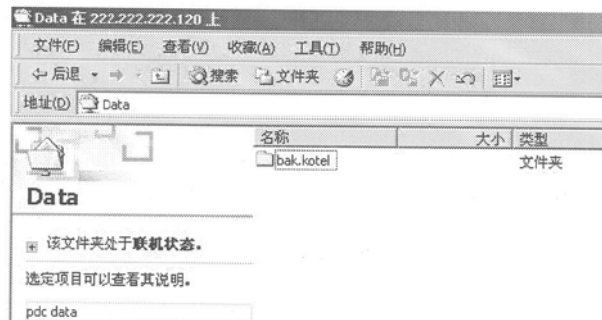


Figure 10

5.6 Use

If all the test are fine, DRV300 can be in use. Note: maximum transmmition speed is 1.5MB/s.

6 Maintenance

6.1 Validity test of manually release of bodies

DRV300 Capsule is with manual release of the container body, the initial installation of the ship or annual inspection, the requirements of testing the

effectiveness of manual release of bodies. Manually through the release of a pulling force testing: In not more than 500N under tension, the release of hand-pulling pulling bodies, so that the release of data protection agencies and the natural separation of the container, then the release of bodies to be effective. If the release of tension in the 500N can not naturally release, the release rod in the joint institutions and the release of the hole a few drops of oil drops, or contact with the manufacturers to release a replacement body. Figure 11 show the release of bodies.

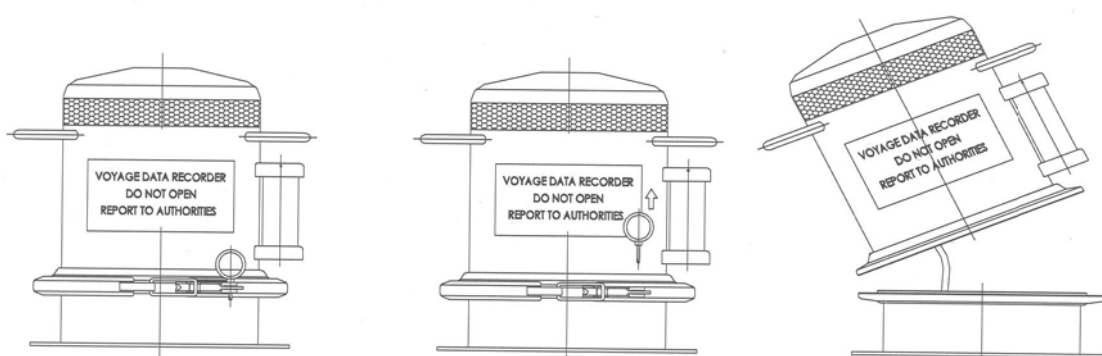


Figure 11

## 6.2 Inspection of the Beacons and replacement of battery

Before the start of the test, make sure that the cylinder at both ends dry and clean; use a short cable to connect the two ends of the beacon, last about 3 seconds, the beacon turn into the test mode. This mode will last for about 60s, 60s later the beacon will turn into sleep mode. All the test should be done in 60s.

Use multimeter to test the voltage of the two ends of beacon, high-impedance voltmeter is suggested, and impedance should be no less than  $10M\Omega$ . Because of the pulse of the beacon, the demical of multimeter may change, it's normal.

Qualified criterion: the minimum value of multimeter should be 3.25V, which means the beacon is working finely, or, the battery should be changed.

## 6.3 O-ring inspection and replacement of aging

Regular checks whether the O-ring is aging is needed. Inspection and replacement of O-ring, should first open the release of bodies. This should better

be carried out by specialized technical staff, to ensure that after the replacement the waterproof of shell is fine. Three years of regular check and inspection is suggested. Inside diameter of O-ring is  $\phi 200\text{mm}$ , route diameter is  $\phi 3.55\text{mm}$ .

#### 6.4 Installation of base and shell surface maintenance

Regular checks for screws is also needed. And regular maintenance for shell surface whether is' s rusted or corrosion should be done. Users can frequently paint the 3rd of local calcium-based grease (butter) to release of bodies and screws that can easily get rusted. If the Capsule is breakdown, maintenance or replacement should be done at certified place.

#### 6.5 Trouble shooting

##### 6.5.1 Ping failure of DRV300 and VDR

Possible reasons:

- a) Failure of cable connection: net cable broken or unreliable contact;
- b) Failure of hardware: something wrong with power supply or hardware failure of system;
- c) Failure of VDR net connection;
- d) Failure of software: incorrect IP configuration of VDR

Trouble shooting:

Check whether the net connection has been established between PDC and VDR, if the connection is disconnected, it' s due to hardware failure, then, just check whether broken net cable, unreliable contact or improper making of RJ45; measure whether power supply of 24V DC is good or not.

IP error can be handled by reset the system through reset button on wiring panel.

##### 6.5.2 File R/W error: fail to write file

Possible reasons:

- a) Some files in data partition have been damaged and fail to read or write normally.
- b) Failure occurs in data partition and fails to mount
- c) Abnormal interruption occurs in file transmitting, it will cause R/W error,

even damaged system file, as a result, the partition information is missing and the system can not be recovered completely.

Trouble shooting:

If the DATA file can be browsed, the data partition is mounted normally. The damaged file can be solved through partition checking or formatting. For damaged partition, you may only recover it through re-partition and formatting.

#### 7. Contact us

If there is other problems, please contact us, we will reply as fast as possible.

**Appointed maintenance points: Kotel Micro Technique Co., Ltd. Shanxi**

**Warranty: 18 months after delivery**

**Technical support hotline: 0086 8009121118 , 0086 351-5618673**

**E-MAIL: [services@kotelmems.com](mailto:services@kotelmems.com)**

**Website : [www.kotelmems.com](http://www.kotelmems.com)**

## Appendix A

## Accompanied materials

No	Name	Pattern	Quantity
1	PDC	DRV300	1
2	Net cable	Ultra-five pairs of shielded twisted line	1
3	Power cable	CHVVP-SAMarine cable	1
4	Other things	M8 Bolt/Nut	6
5	Material	Certification(copy)	1
		Quality certification	1
		Installation, Operation and Maintenance Manual	1
		Delivery list	1

Factory set up information table:

Customer Name:	COM. AS
Document Management:	YES
Login User Name:	kt
Password:	ktpdc
Product storage capacity:	16G
Products IP address:	222. 222. 222. 120

# 产品质量证明书

## QUALITY CERTIFICATE

产品名称 数据保护容器

Product Name Protected Data Capsule

产品型号/Model DRV300

产品编号/ Serial No. 1209001

公司名称 山西科泰微技术有限公司

Manufacturer Shanxi Kotel Micro Technique Co.,Ltd.

公司地址 山西省太原市高新技术开发区数码路 3 号

Address No.3 Digit Road High-Tech Develop Zone, Taiyuan Shanxi, P.R.China

生产日期/Date 20120915

售后服务电话 +86 351 5618631 4000801780

Service Telephone +86 351 5618631 4000801780

图纸批准号/ Approval No.of Drawings TJ09A00026

认可证书编号/Cert.No.of Approval TJ09T00013

**产品检验项目/ Test item**

外形尺寸与外观、重量、记录数据持续时间测试、记录数据与日期时间相关性测试、记录顺序测试、浸水试验、释放机构实效试验、干热测试、干热高温存储试验、低温试验、信标测试


size and appearance, weight, continuity of operation, relation test in data and time, record sequence test, seal, release mechanism, function at high temperature, storage at high temperature, low temperature test, beacon test

**检验结论/ Result**

本批产品 DRV300 数据保护容器，编号：1209001 已按：DRV300JT《DRV300 数据保护容器技术条件》要求检验合格，可以交付使用。

The product DRV300 protected data capsule, SerialNo. 1209001 has been tested by DRV300JT and qualified

质量安全环保部部长(QC): 

质量总监 (CQO):  20130516