

3- User-Location Protocol

3.2 SERIAL EPIRB

Message balise

Message recu (1-144): FFFED0D0168036B200000A638BAFE0FF0146
 Format flag (25): 1 SELF TEST
 Protocole flag (26): 1
 Code pays (27-36): 0257
 Pays : NORWAY
 Code protocole (37-39): 011
 Protocole utilise : User - Serialized user
 Identification code (26-85): A02D006D6400001
 Identification (Baudot) (40-81): 35P2:::
 Numero : 01
 BCH 1 lu/calcule (86-106/25-85): 098E2E/098E2E
 BCH 2 lu/calcule (133-144/107-132): 146/146
 Homing (84-85): Internal
 Pos. Data source (107): Internal
 Position GPS de reference : N 43°33'34" E 1°28'48"
 Position GPS : Yes
 Position GPS par defaut : Yes

Message balise

Message recu (1-144): FFFE2FD0168036B200000A638BAFE0FF0146
 Format flag (25): 1 DEFAULT POS.
 Protocole flag (26): 1
 Code pays (27-36): 0257
 Pays : NORWAY
 Code protocole (37-39): 011
 Protocole utilise : User - Serialized user
 Identification code (26-85): A02D006D6400001
 Identification (Baudot) (40-81): 35P2:::
 Numero : 01
 BCH 1 lu/calcule (86-106/25-85): 098E2E/098E2E
 BCH 2 lu/calcule (133-144/107-132): 146/146
 Homing (84-85): Internal
 Pos. Data source (107): Internal
 Position GPS de reference : N 43°33'34" E 1°28'48"
 Position GPS : Yes
 Position GPS par defaut : Yes

Message balise

Message recu (1-144): FFFE2FD016A036B2001FEFC6AE6570017151
 Format flag (25): 1 LAB POSITION
 Protocole flag (26): 1
 Code pays (27-36): 0257
 Pays : NORWAY
 Code protocole (37-39): 011
 Protocole utilise : User - Serialized user
 Identification code (26-85): A02D406D64003FD
 Identification (Baudot) (40-81): 5P2:::
 Numero : 01
 BCH 1 lu/calcule (86-106/25-85): 1F1AB9/1F1AB9
 BCH 2 lu/calcule (133-144/107-132): 151/151
 Homing (84-85): Internal
 Pos. Data source (107): Internal
 Position GPS de reference : N 43°33'34" E 1°28'48"
 Position GPS : Yes
 Position GPS par defaut : No
 Latitude position : 43°32'0" Nord
 Longitude position : 1°28'0" Est
 Delta position : 2.9 km

ANNEX A
MANUFACTURER DOCUMENTATION ON
TRON 40GPS JOTRON



INTESPACE

Gérard Peyrou

Deres ref.

Your ref.

e-mail 19.10.2000/G.Peyrou

Vår ref.

Our ref.

Fred I Tallaksen

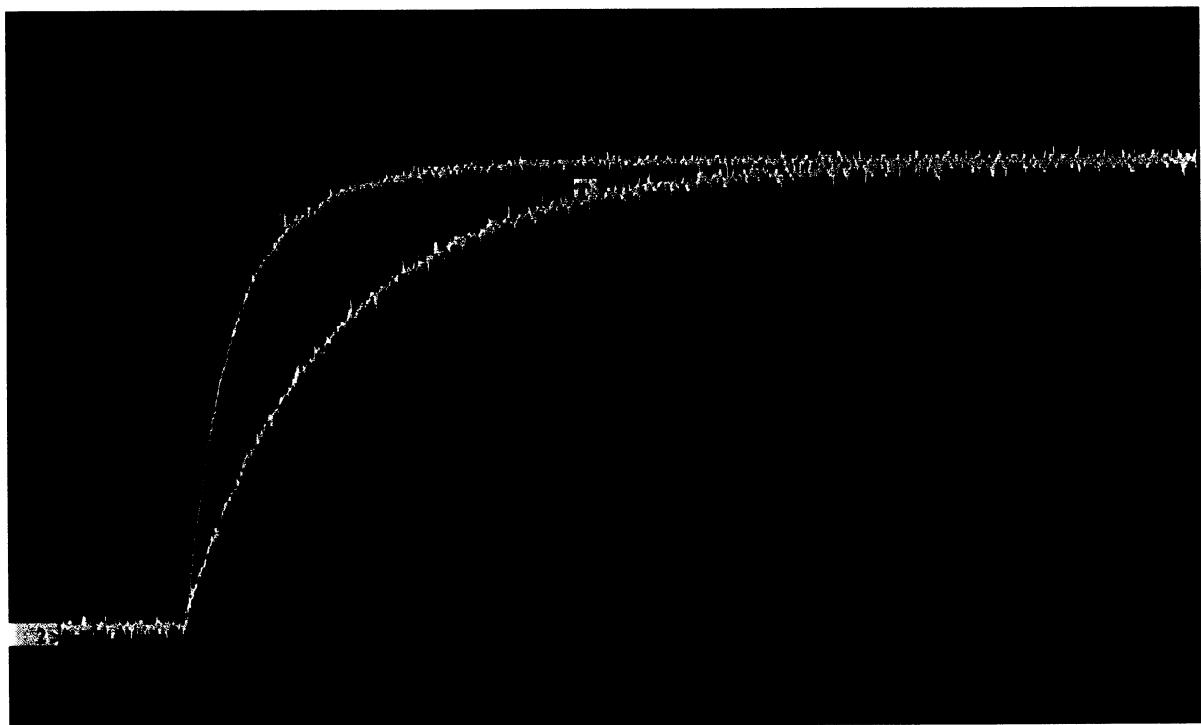
Dato

Date

20.10.2000

Change of rise/fall time of the 406 MHz modulation

We have done a modification that we will introduce on all new beacon of type Tron40GPS regarding the rise/fall time of the modulation to suppress spurious effects. This is done by changing the capacitor C209 from 15nF to 47nF. This will be a stronger low pass filter consisting of R212 (10 k) and C209 (47 nF). Below is a printout from our oscilloscope of type TDS210 (registration number: JOT259, calibrated:16.8.2000). REFA is with 15nF capacitor, REFb is with 47 nF:



As seen on the curves, the rise time is increased from approx. 50 to 150 uS.

JOTRON, Tjodalyng 20.10.2000

Fred Ivar Tallaksen

Side/Page 1

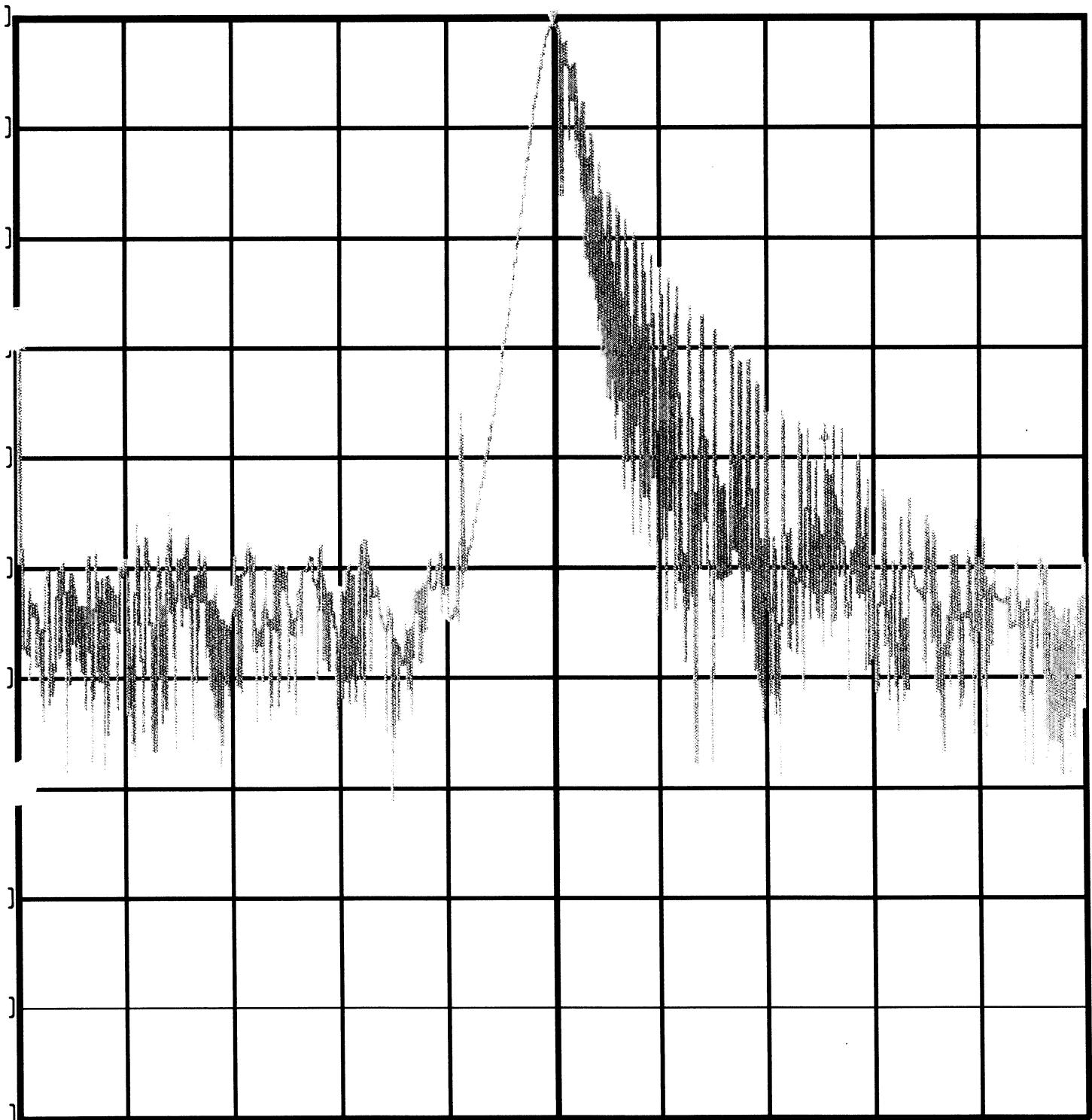
QA Certificate NS-ISO 9001 EN 29001 BS 5750 Part1	Postadresse/Mail P.O.Box 54 N-3280 TJODALYNG NORWAY	Kontor/Office Kirkestien 1	Telefon/Telephone +(47) 33 13 97 00	Telefax/Telefax +(47) 33 12 67 80	Bankgiro 2440.05.08514 Postgiro 0808 2063154	Vat.no 516 28748 Reg.no. NO 917713324
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30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

RBW 1 kHz RF Att 40 dB
VBW 1 kHz
SWT 300 ms Unit dB

Ref Lvl

19 dBm



Center 406.025 MHz

5 kHz/

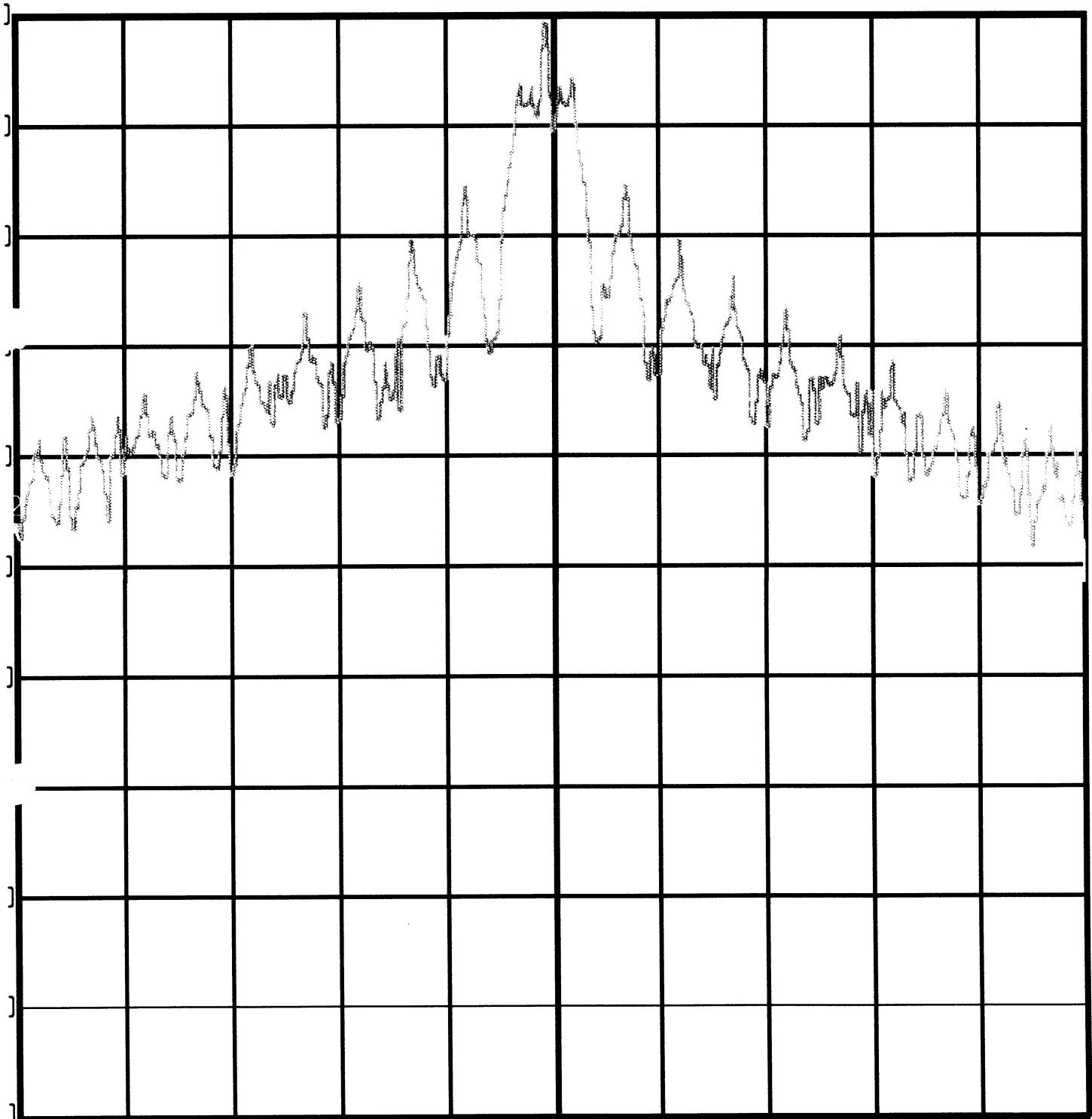
Span 50 kHz

6.DEC.00 11:57:30

RBW 100 Hz RF Att 40 dB
VBW 100 Hz
SWT 9.6 s Unit dB

Ref Lvl

19 dBm



Center 406.025 MHz

1.6 kHz/

Span 16 kHz

6.DEC.00 11:47:09

JOTRON

ISO 9001

Tron 40 GPS GMDSS epirb



- **Tron 40S now with integrated GPS receiver.**
- **Allow service from both Cospas-Sarsat (LEOSAR) and GEOSAR satellite networks.**
- **Your position will immediately be added to your satellite distress transmission via GEOSAR.**
- **Position confirmed through Cospas-Sarsat.**
- **Rescuers can find you sooner.**
- **Prepared for all international protocols.**
- **Manual or automatic operation.**
- **Float free release bracket.**

*The Tron 40GPS meets the demanding needs of all professional mariners.
The JOTRON experience and reliability is well designed into this product.*

Technical specifications:

Dimensions: Height: 38 cm, max. Dim.: 18 cm. Temperature range: -20°C to +55 C. Transmitters: C/S 406 MHz Homing 121.5 MHz	Antenna Built in, vertical polarisation, omnidirectional 406/121.5 MHz and GPS patch antenna Digital message: All location protocols available	Operation: Manual or automatic (in float free bracket) GPS receiver: 8 - 12 Channels, GPS module. Freq. 1575,42 MHz. Time to first fix (TTFT) < 3 min at start-up, positioning every 25 min. gives TTFT between 30 – 60 sec. Complies to: ETSI 300 066 C/S T.001 Dir. 98/85 EEC (Wheel mark)
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<http://www.jotron.com>

TELEFAX

APPLICATION FOR A COSPAS-SARSAT 406 MHz
BEACON TYPE APPROVAL CERTIFICATE

Beacon Manufacturer: JOTRON electronics a.s

Beacon Model: Tron 40 GPS

Name and Location of Beacon Test Facility: INTESPACE /CNES Toulouse

Beacon Type: Aviation Land Maritime

Specified Operating Temperature Range: -20°C to +55°C

Specified Operating Lifetime: 24 48 hr. Other Specify: _____

Beacon Battery Type(s):

Chemistry: : Li-SOCl2

Manufacturer & model no. : SAFT LSH20

Size & number of cells : D x 4

Extra Features in Beacon:

No Yes

Details

a) Auxiliary Radio-Locating Device:

Frequency : 121.5 MHz
Power : 17dBm +/-3 dBm
Tx. Duty Cycle : 100%

b) Transmits Encoded Position Data:

Nav. Device (Internal or External): Internal
Type (GPS, GLONASS, etc.) : GPS
Manufacturer : Connexant
Model : Jupiter LP

c) Transmits Long Message (144 bits):

Intensity : >0.75 cd
Flash rate : 20/mn

d) Automatic Activation:

e) Built-in Strobe Light:

f) Self-test mode

g) Other: Specify: _____

I hereby confirm that the 406 MHz beacon described above has been successfully tested in accordance with the Cospas-Sarsat Type Approval Standard (C/S T.007) and complies with the Cospas-Sarsat Specification (C/S T.001) as demonstrated in the attached report.

Dated:..... Signed:.....
(for test facility)

Send to: Cospas-Sarsat Secretariat, Inmarsat, 99 City Road, London EC1Y 1AX, United Kingdom

Jotron Electronics a.s. P.O.Box 54, N-3280 Tjodalyng, NORWAY

Page 2 of 2

Technical Handbook

**Tron 40GPS
406 MHz EPIRB
w/internal GPS receiver**



**JOTRON electronics a.s
3280 TJODALYNG, NORWAY**

The information in this book has been carefully checked and is believed to be accurate.
However, no responsibility is assumed for inaccuracies.



ATTENTION !

This equipment contains CMOS integrated circuits. Observe handling precautions to avoid static discharges which may damage these devices.



CAUTION !

Some RF semiconductor devices used in this equipment may contain Beryllium Oxide. If inhaled, dust from this oxide can be toxic.

No danger will arise from normal handling but no attempt should be made to tamper with these devices. On no account must these transistors be destroyed or discarded with industrial or domestic waste, but should be returned to the manufacturers for subsequent disposal.

JOTRON electronics a.s reserves the right to make changes without further notice to any products or modules described herein to improve reliability, function or design.
JOTRON electronic a.s does not assume any liability arising out of the application or use of the described product.

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1. Technical specification

1.1 General

Dimensions:	Height : 38cm Max diameter : 18cm
Weight :	app. 2.0 kg
Antenna :	Built in, vertical polarisation, omnidirectional. GPS patch antenna.
Visual indication :	Built in Xenon flash and Test LED.
Operating temperature :	-20°C to +55°C. Class2. -40°C to +55°C. Class1.
Battery:	JOTRON type number X-97780. Lithium, 4 years service life. 4 pcs. SAFT LSH20 Lithium- Thionyl chloride (Li-SOCL2) Connected in series, fuses in each cell.
Operating Life	More than 48 hours at -20°C.
Material housing:	Polycarbonate with 10% glassfibre.

1.2 406 MHz transmitter

Frequency:	406.025 MHz \pm 2ppm
Output power :	5W \pm 2dB
Digital Message	All protocols available.
Modulation :	Phase modulation 1.1 ± 0.1 rad
Data encoding :	Bi Phase L.
Stability :	Short term : $\leq 10^{-9}$ Medium term : $\leq 10^{-9}$ Residual noise : $\leq 3 \times 10^{-9}$
Bitrate :	400 b/s

1.3 Homing transmitter

Frequency :	121.500 MHz \pm 10ppm
Output power:	≥ 75 mW
Modulation:	A9 AM, sweep tone from max 1600 Hz to min 300Hz. Sweep range 700Hz. Sweep rate 2-3 Hz.

1.4 Navigation device

Type:	Connexant ,12 Channel GPS receiver
Frequency:	1575.42 MHz

1.5 FB4

Dimensions:	Height :	42cm
	Width :	21cm
	Depth :	20cm (including beacon)
Weight :	app. 1.6 kg	
Material :	LURAN S	
Hydrostatick release :	Hammar H20	

2. Description

2.1 System description

The COSPAS/SARSAT system was introduced in 1982 as a worldwide search and rescue system with the help of satellites covering the earth's surface. Since the introduction of the system more than 8500 people have been rescued by the COSPAS/SARSAT system.

Currently the system consists of 7 different satellites in a polar orbit constellation, these satellites cover the entire earth's surface and receive the emergency signal from the 406 MHz transmitter within the Tron40GPS, more polar orbit satellites will be available in the future, giving a faster location and rescue time.

In addition there is currently 3 geostationary satellite which is equipped with a 406 MHz transponder, this satellite is not able to locate the Tron40GPS but will give an early warning to the rescue forces, minimizing the time from an emergency occurs until the rescue forces are at the site. With additional navigation device, like a GPS receiver, alerts will be up to 40 minutes faster.

Each emergency beacon in the system is programmed with its own unique code, therefore it is vital that the ships data given to the dealer you obtained your Tron40GPS from, is correct. It is also important that the beacon is registered in the database for each country. This database is normally located in the same country that the ship is registered.

2.2 Signal detection

When the Tron40GPS is activated (manually or automatically) it transmits on the frequencies 121.5 MHz and 406.025 MHz. An analog signal is emitted on 121.5 MHz and a digital signal is transmitted on 406.025 MHz.

After the Tron40GPS is activated, the next passing satellite will detect the transmitted signal and relay it to an antenna at a ground station, called a LUT.

For the 121.5 MHz signal the satellite must be within line of sight of the Tron40GPS and a ground station. The ground station or LUT has a 2500 km satellite reception radius centered at the LUT. In areas without LUT coverage (mostly southern hemisphere), signals from the 121.5 MHz transmitter will not be detected. However, this is not the case with the 406 MHz transmitter as the satellites have a memory unit which stores the signals for relay to the next available LUT giving it a truly global coverage.

Once the signal is received by the LUT, it is processed for location and sent to a Mission Control Center (MCC). The MCC sorts the alert data according to geographic search and rescue regions and distributes the information to the appropriate Rescue Coordination Center (RCC), or if outside the national search and rescue area, to the appropriate MCC that covers the area that the distress signal was detected. The RCC in turn takes the necessary action to initiate search and rescue activities.

Addition: When GPS receiver is equipped, this will be activated when beacon turns on and will give position within 30 minutes to be transmitted in the 406 digital message.

2.3 Distress Location Determination

The location of the distress signal is determined by taking measurements of the Doppler shift in the beacon signal frequency received by the satellite as it approaches and then passes by the Tron40GPS. The actual frequency is heard at the time of closest approach (TCA). Knowing the position of the satellite and using the received Doppler signal information, it is possible to determine the location of the Tron40GPS from the satellite at the TCA. At the LUT, actually two positions are calculated. One is the actual position (A) and the other is the mirror image (B) position. A second satellite pass confirms the correct location (A). With the 406 system the real solution can be determined on the first pass with a reliability of nearly 90% and down to an accuracy of less than 5 km (3.1 miles).

Addition: With GPS receiver, position will be inserted in the digital 406 message, and the resolution will be either 123 m (Standard location protocols & National location protocols) or 7408 m (User location Protocols).

2.4 Tron 40GPS

Tron40GPS is a float free emergency beacon intended for use with the COSPAS-SARSAT satellite system. Tron40GPS transmits on the frequencies 406.025 MHz and 121.5 MHz.

Tron 40GPS can be activated automatically or manually.

For automatic activation, put the beacon in the upright position into the water, and the transmission starts when the sea water completes the circuit between the two external electrodes (sea water contacts).

When the beacon is mounted in the automatic release mechanism, there is a safety switch in the battery compartment that will prevent activation.

If submerged in water the hydrostatic release mechanism will release the beacon at a depth of 2-4 meters. The transmission will start when the circuit between the seawater contacts are closed and the beacon is out of the bracket.

Tron 40GPS is manually activated with the main switch, and is then independent of seawater contacts. However the beacon will not operate while placed in the bracket, except when activated by the remote activation unit.

Tron 40GPS may easily be released from the mounting bracket manually.

3. General description

Tron 40GPS may be split into the following main parts:

1. Electronic unit with antenna
2. Battery unit
3. Equator ring with gasket.

3.1 Electronic unit with antenna.

The electronic unit consists of four printed circuit boards which are mounted in the upper housing:

1. The main board w/GPS patch antenna
2. Antenna board. (121.5/406 Mhz)
3. GPS interface board
4. GPS receiver

On top of the antenna board the Xenon flash and an indicator LED is placed.

The main switch is also located on the main board.

The housing is made of polycarbonate.

3.2 Battery unit.

The housing is made of polycarbonate. In the lower part of the housing there is one reed relay which is activated by a magnet in the release mechanism. This is the safety switch which prevent the seawater contacts to activate the beacon while placed in the release mechanism. Optionally there may be an additional reed relay for remote activation. This relay is operated by a solenoid in the release mechanism.

There is a brass weight which gives stability while floating.

The seawater contacts is also mounted in the battery unit, and is connected to the electronic unit via the battery connector.

The batteries is mounted in with a plastic battery holder, and is also moulded with silicon.

3.3 Equator ring with gasket.

The two parts of the housing are held together by the equator ring, and is locked with a U-shaped bolt of stainless steel and a split pin. Between the two halves of the housing there is a gasket made of neoprene.

4. Operating instructions.

4.1 Manual operation

Remove the beacon from the release mechanism.

Break the seal on the main switch and pull the locking pin. Press in the leftmost part of switch mechanism, then the switch will automatically go to the Emergency (ON) position.

The red indicator lamp and the Xenon flash on top of the beacon will start operating, indicating that the beacon is active.

The LED will only operate initially.

NOTE!

The beacon performs a complete selftest before any emergency signals are transmitted. The Transmitters will start after approx. 70 seconds. At the same time GPS receiver is started. This is done so the GPS receiver wouldn't be started in TEST position.

The transmission can be stopped by turning the switch back to the OFF position, and replacing the locking pin. Make sure the battery compartment is dry, to prevent activation of the seawater contacts.

4.2 Automatic operation.

When the beacon is removed from the release mechanism and placed into water it will automatically activate due to the sea water contacts. Transmission will stop when the beacon is lifted out of the water, and if necessary dried off.

When placed in the automatic release mechanism the seawater contacts is disabled.

When the mechanism is reaching a depth of 2-4 meters , the beacon will be released and transmission will start automatically.

Note! There is a time delay of approx. 10 seconds of activation/deactivation with the seawatercontacts.

4.3 Testing Tron 40GPS

To perform the selftest the beacon has to be removed from the release mechanism.

Turn the switch to the «TEST» position. The red indicator will start flashing for approx. 15 sec. This is to allow the internal OCXO (Oven Controlled Reference Oscillator) to warm up.

Then the output power of both transmitters are checked, the battery voltage and the PLL of the 406 transmitter.

A complete message on the 406 frequency is transmitted, with inverted frame sync.

If all tests are passed there will be one flash in the Xenon bulb, and the red indicator light will turn on and stay on until the switch is released.

A successful test will then consist of a series of rapid flashes in the test indicator , followed by one Xenon flash and continuos light in the test indicator.

Any other behaviour indicates a fault in the beacon.

4.4 Error messages

If the selftest detects a fault in the beacon one or more of the following indications are shown :

1. Flashing LED for 15 sec. followed by one (1) flash , no Xenon flash :
Low power on 406 MHz transmitter
2. Flashing LED for 15 sec. followed by two (2) flashes, no Xenon flash :
Low battery voltage.
3. Flashing LED for 15 sec. followed by three (3) flashes , no Xenon flash :
Low power on 121.5 MHz transmitter
4. Flashing LED for 15 sec. followed by four (4) flash , no Xenon flash :
PLL on 406 transmitter out of lock.
5. Five (5) flashes , no Xenon flash:
Beacon not programmed or programming not complete.

5. Change of battery

The lower part of the beacon of the housing is replaced with a new one.

1. Remove split pin and pull the U-shaped bolt from the equator ring.
2. Remove the equator belt by pressing it out from the housing.
3. Separate the two parts of the housing.
4. Unplug the battery connector.
5. Check that the new battery is marked with date of expiration.
6. Place the new gasket on the battery housing.
7. Connect the battery connector.
8. Replace the upper part, taking care that the gasket is correctly fitted and taking note of the orientation marks on the two housings.
9. Replace the equator ring, U-shaped bolt and split pin.
10. Perform a Selftest.

6. Technical description

6.1 Main board

The main board can be divided into the following groups :

1. 406 MHz section
2. 121.5MHz section
3. Microcontroller section
4. Powersupply section
5. Antenna section
6. GPS interface board w/GPS receiver

6.2 406 MHz section.

The 406 transmitter consists of VCO (Q101), buffer amplifier (Q102) and power amplifier (Q103). The output power is 5W. The supply voltage is regulated and switched in the power supply section.

The output frequency is controlled by a PLL circuit (IC203), prescaler (IC204) and reference oscillator (IC205).

Modulation is applied to the reference signal by pulling the reference signals phase.

6.3 121.5 MHz section.

The 121.5MHz transmitter is Xtal controlled. The output power is approx. 200mW PEP. The output power is controlled by IC301 which senses the current in the output stage. The output signal is fed into the antenna via the matching network consisting of L308 and L307. 406 MHz signal is fed directly to the same antenna via pin diode D809. This diode is reverse biased when transmitting on 121.5MHz., by rectifying and inverting the modulation signal(D306).

6.4 Microcontroller section

This section consists of a microcontroller (IC401), EEPROM (IC402) for storing of programming data, a DIL switch, and an I/R interface for programming.

The DIL switch has the following function :

1. VHF modulation on/off
2. UHF repetition rate normal/fast
3. UHF on/off
4. VHF on/off

6.5 Power supply section

The main switch controls Q503 via reed relays Rel501, Rel502 and Rel503. The seawater circuit (IC503) is supplied from a separate reed in the battery compartment, to prevent it from working when placed in the bracket.

IC502 is the 5V main voltage regulator for the microcontroller. It is also reference voltage for the 406 supply switch/regulator.

The circuit to prevent continuous transmission on 406MHz consist of R512, C503, IC501B and Q504. If the transmission length exceeds a few seconds, Q504 is biased and the fuse F501 will be blown.

6.6 Antenna section

The antenna board is the actual antenna. It behaves as a quarter wave on 406 MHz. It is matched to 121.5 MHz as described in 121.5 MHz section.

The high voltage converter to the Xenon flash is also located on the antenna board. The Xenon bulb and test indicator (LED) is placed at the upper end of the antenna board.

6.7 GPS interface w/GPS receiver

The GPS interface is the connection between the GPS receiver and the main board. It consists of a microcontroller of type 16c622 and controls the ON/OFF of the GPS receiver, the update rate of the message (position data) and recalculates BCH1 and BCH2 depending on which protocol is used. Currently "Standard Location Protocol" and "User Location Protocol" is supported.

Test of GPS receiver without transmitters activated:

It is possible to test the GPS receiver without activating the 406/121.5 MHz transmitters:

- Turn DIL switch 1,3,4 in the lower position (OFF) and 2 in high position (ON)
- Activate the TRON40GPS outdoors with free sight in all directions.
- Wait 10 minutes (To be sure)
- Turn off the beacon
- Move DIL switch 3 in upper (ON) position. (To turn on the 406 transmitter)
- Have a decoder ready to receive from the beacon.
- Pull the main switch on Tron40GPS to "TEST".
- After approx. 15 seconds the beacon will transmit the message with inverted frame sync and position in the data fields.
- Turn off the beacon, activate TEST again and "Default position data" will be in the position fields. (According to C/S T.001)

The only interface between the GPS interface board and the Main board is the signals on the I2C bus between the main board's microcontroller and the main boards EEPROM. The microcontroller on the interface board use spare time on this bus to read/write position data directly to the EEPROM (on the main board). When this is done, two blink in the GPS interface's LED will indicate a write to this eeprom. The program in the main board is the same as in standard Tron40s, which was intended to have a GPS receiver when it was made same years ago.

The Interface board is made in such a way that 3 different GPS receivers can be used, either Connexant Jupiter LP, Motorola Oncore M12 or Trimble Lassen LP.

7. Automatic Release Mechanism

7.1 Float Free Bracket FB4

When the Tron40GPS is mounted in the FB4 release mechanism, it operates as a float free automatic unit.

Therefore it is important that the bracket is mounted in a place where there are no obstructions that can endanger the automatic release of the beacon.

The location where the bracket is mounted should be as high as possible on the vessel, protected from environmental conditions such as direct sea spray, chemicals, oil, exhaust and vibrations. The location must also be easily accessible for testing and maintenance.

7.2 Mounting the FB4

Bolt the unit to the vessel using the mounting holes.

7.3 Mounting of Tron40GPS in the FB4

Place the lower part of Tron40GPS on the grip in the bracket. Then push the beacon into the bracket and fold the clamp over the upper part. Place the retaining rod into the corresponding holes in the clamp and the plastic bolt.

Replace the locking pin.

7.4 Replacement and mounting of the Hydrostatic Release Mechanism

- While holding the Tron 40GPS in its place, pull out the locking pin on clamp on the top of the bracket.
- Fold the clamp away.
- Lift the Tron 40GPS out of the bracket.
- Now the H20 unit is accessible. Unscrew the plastic bolt and remove the unit.
- Replace the old unit with a new one . Screw the new plastic bolt on. Make sure the distance piece is in place on the plastic bolt.
- Mount the Tron 40GPS as described earlier.

8. Drawings

Main Board :

Circuit diagrams: E-97738-1
E-97738-2
E-97738-3
E-97738-4
E-97738-5

Component Layout KP-97738-1
KP-97738-2

Antenna Board :

Circuit diagrams: E-92718

Component layout KP-92718-1
KP-92718-2

GPS interface Board :

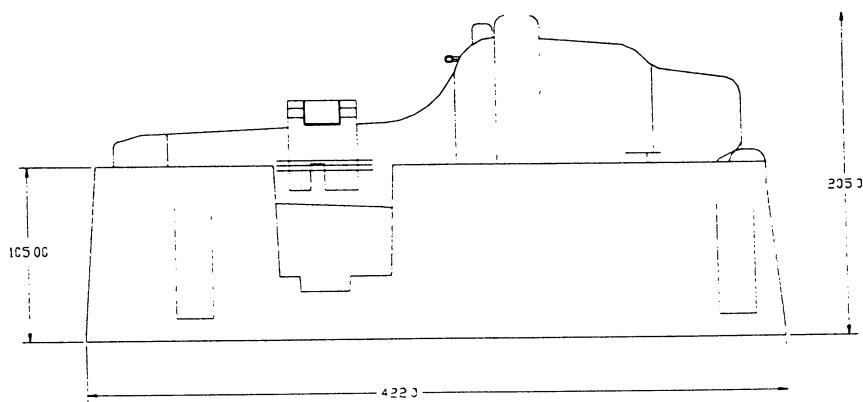
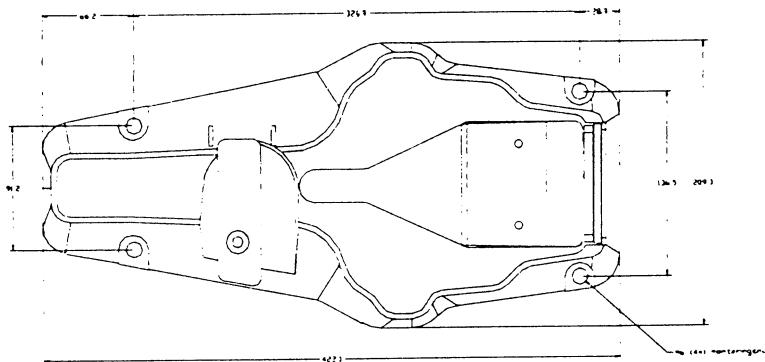
Circuit diagrams: E-99750

Component layout KP-99750-1
KP-99750-2

Battery unit: E-97780

Outline drawing: Tron40GPS

Outline drawing: FB4



Outline drawings FB4

JOTRON ELECTRONICS AS

Bill Of Material

Date 03.03.00

m	99753	COMPLETE TOP TRON40GPS	Design
version			
Item	Name / Description	Makes no. / Additional name	Sub pos.
95478	MONT.SKIVE PCB TRON-40S	MONT.SKIVE PCB, DELRIN (F.nr 95478)	103
93571	PT.SCREW PANHODE POZIDR.	EJOT-PT.KB30x12 WN1412 A2	104
97773	LABEL,ON-OFF-TST,TRON 40S	X-97773	105
97748	LABEL, REFLEX, TRON 40S	X-97748	107
96569	RUBBER SLEEVE	Helavia 201-052, SORT	108
97738	MAIN BOARD, TRON40S w/GPS interface		201
92718	ANTENNA/FLASH BOARD TR40S		202
91947	WEDGE ANTENNA	WEDGE ANTENNA, vare.nr 11570	203
99750-C	TRON40S ,GPS interf, Connexa. Jupiter LP		204
99760	GPS RECEIVER	Connexant Jupiter LP	205
97926	TOPPHUS Tron 40S		301
93766	BRYTERRING TRON-40S	BRYTERRING - DELRIN (F.nr 93766)	302
I28	BRYTERRAMME Tron 40S		303
97927	LINSE Tron40S		304
91511	LENKE / 10CM	CHAIN 3,3 M/M 10CM/STK	307
98214	O-RING 30x2	OR 30x2. NBR 70, Shore, Type 3135596	308
91512	LENKELÅS	CHAIN LOCK NO. 6 - K 210	309
91447	LÅSESPLINT	2.5x16mm DIN 94 A4	310
93786	FJÆR, BRYTERRING	SS 2331-06 (A2)	311
91448	MAGNET(Tol: Ø10 +0/-0,3, 10 +0/-0,2mm)	PHILIPS 4322 020 61024	312

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Version

Item	Name / Description	Makes no. / Additional name	Sub pos.
93201	CHIP CAP 1nF 50V X7R 10% - 0805	MURATA GRM40 X7R 102 K50	C101
93201	CHIP CAP 1nF 50V X7R 10% - 0805	MURATA GRM40 X7R 102 K50	C102
OMIT	Utgår		C104
95904	CHIP TANTAL 150u/10V	SPRAGUE 595D 157X0010R2T	C105
92338	CHIP CAP 15p 50V NP0 5% - 0805	MURATA GRM40 C0G 150 J50PT	C106
92338	CHIP CAP 15p 50V NP0 5% - 0805	MURATA GRM40 C0G 150 J50PT	C107
93225	CHIP CAP 100nF 50V X7R 10% - 0805	MURATA GRM40 X7R 104 K50	C108
93213	CHIP CAP 10nF 50V X7R 10% - 0805	MURATA GRM40 X7R 103 K50	C109
OMIT	Utgår		C110
92348	CHIP CAP 100p 50V NP0 5% - 0805	MURATA GRM40 C0G 101 J50PT	C111
95904	CHIP TANTAL 150u/10V	SPRAGUE 595D 157X0010R2T	C112
95898	CHIP TANTAL 15u/25V	SPRAGUE 595D 156X0025C2T	C113
85	DIODE ,Schottky, smd, 1A	PHILIPS BYG90-40	D101
97907	LED RED SMD	SIEMENS LS T670-HK	D102
OMIT	Utgår		IC101
97691	VOLTAGE REGULATOR	National LP2980IM5-5.0/AIM5-5.0	IC102
92732	PIC16C622	Microchip PIC16C622-04 I SO	IC103
99769	PROGR. MICROC TRON40S GPS Interface	99769 V1.0	IC103'
30321	DC/DC- Step down SMD,LM2675-ADJ	National LM2675M-ADJ	IC104
OMIT	Utgår		J101
91255	TERMINAL STRIP, 2,54mm, 1x15pin, l=7mm	R&N NSH-15SA-S2-T	J102
OMIT	Utgår		J103
99772	6PIN STRAIGHT HEADER	R&N NSH-06SA-S2-TG	J104
99774	20 pin Straight Receptable, 2 Row,2mm	AMP 2-176135-0	J105
OMIT	Utgår		L101
OMIT	Utgår		L102
99124	INDUCTOR POWER 100uH/1.2A SMD	PULSE P0752.104T	L103
11T	Utgår		L104
99763	INDUCTOR, POWER, 68u/1.5A, SMD	PULSE P0751.683T	L105
96984	TRANSISTOR MOSFET BST 82	PHILIPS BST82,215	Q101
96984	TRANSISTOR MOSFET BST 82	PHILIPS BST82,215	Q102
96984	TRANSISTOR MOSFET BST 82	PHILIPS BST82,215	Q103
94443	TRANSISTOR BC 817 SOT-23	PHILIPS BC817,215	Q104
93280	CR 0805 10k 1%	ROHM MCR10 EZH F-1002	R101
93280	CR 0805 10k 1%	ROHM MCR10 EZH F-1002	R102
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R103
93280	CR 0805 10k 1%	ROHM MCR10 EZH F-1002	R104
93304	CR 0805 100k 1%	ROHM MCR10 EZH F-1003	R105
93328	CR 0805 1M 1%	ROHM MCR10 EZH F-1004	R106
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R107
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R108
93280	CR 0805 10k 1%	ROHM MCR10 EZH F-1002	R109
3265	CR 0805 2k4 1%	ROHM MCR10 EZH F-2401	R110
3271	CR 0805 4k3 1%	ROHM MCR10 EZH F-4301	R111
93304	CR 0805 100k 1%	ROHM MCR10 EZH F-1003	R112

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Part No. 99750-C Description TRON40S ,GPS interf, Connexa. Jupiter LP Design

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Item	Name / Description	Makes no. / Additional name	Sub pos.
93280	CR 0805 10k 1%	ROHM MCR10 EZH F-1002	R113
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R114
99766	X-TALL 3.579545MHz, 86SMX-MC	Advabced Crystal Technologyl HM0357HV	X101

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Item	Name / Description	Makes no. / Additional name	Design Sub pos.
95473	COMPLETE TOP TRON-40S	COMPLETE TOP	101
98745	MANUAL FOR Tron 40S	USER MANUAL TRON-40S	102
98746	ESKE TRON-40S	CARTON TRON-40S	103
98747	INNLEGG, ØVRE TRON-40S		104
98748	INNLEGG, NEDRE TRON-40S		105
97780	MAINTENANCE KIT FOR Tron 40S	BATTERY CLASS2 X-97780 Maintenance Kit.	106
97819	LANYARD FOR Tron 30S/40S/SART		107
95181	PLASTIC SEAL 8mm	PLASTIC SEAL	108
91476	RUBBER GASKET	3060007. 4376 RD (F.nr 91476)	109
91477	EQUATOR RING	EQUATOR RING TRON 25/30S	110
91478	U-BOLT	U-BOLT 5mm SF (V.nr 69)	111
91933	LABEL, WARNING TRON 30S	LABEL,WARNING,Yellow/Black	112
936	LABEL PERIOD. MAINTEN.30S	BLACK TEXT ON FASCAL 805	113
98739	Silica Gel	Silica Gel - 1g	114
97645	O-RING 29,87x1,78	OR 29,87X1,78 EPDM GUMMI	115
97886	IMPORTANT	Return this label together w/old Epirb!	116

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Item	Name / Description	Makes no. / Additional name	Sub pos.
95176	RIVET, 1.8 x 6.4	1107-0208 MSF AVLUG	101
91821	FILM CAP 5uF 320VDC 10%	CHUAN HSIN MEF 5uF/320VDC	C601
95113	FILM CAP 22nF 400V	SIEMENS B32521-C6223-K	C602
93225	CHIP CAP 100nF 50V X7R 10% - 0805	MURATA GRM40 X7R 104 K50	C603
93225	CHIP CAP 100nF 50V X7R 10% - 0805	MURATA GRM40 X7R 104 K50	C604
93225	CHIP CAP 100nF 50V X7R 10% - 0805	MURATA GRM40 X7R 104 K50	C605
93201	CHIP CAP 1nF 50V X7R 10% - 0805	MURATA GRM40 X7R 102 K50	C606
93201	CHIP CAP 1nF 50V X7R 10% - 0805	MURATA GRM40 X7R 102 K50	C607
93201	CHIP CAP 1nF 50V X7R 10% - 0805	MURATA GRM40 X7R 102 K50	C608
97357	CHIP TANTAL 3u3 16V LTA-B	ELNA SK-1C 335 M-RB	C609
93213	CHIP CAP 10nF 50V X7R 10% - 0805	MURATA GRM40 X7R 103 K50	C610
96500	EL LYT CAP 33uF 40V	PHILIPS 2222 030 37339	C611
136	DIODE 1,5A SOD-87	PHILIPS BYD17M,115	D601
94436	DIODE 1,5A SOD-87	PHILIPS BYD17M,115	D602
94436	DIODE 1,5A SOD-87	PHILIPS BYD17M,115	D603
94440	ZENER DIODE 150V 2W SOD87	Motorola 1SMB5953 BT3	D604
94440	ZENER DIODE 150V 2W SOD87	Motorola 1SMB5953 BT3	D605
98828	LED	SHARP GL 5UR2k1	D606
94432	DIODE BAW 56 SOT-23	PHILIPS BAW56,215	D607
94432	DIODE BAW 56 SOT-23	PHILIPS BAW56,215	D608
90699	XENON TUBE	ELEVAM MFT 106MS	LA601
97929	STØTTERING Tron 40S		NN
92719	PCB,ANT/FLASH BOARD TR40S	PCB,ANT/FLASH BOARD TR40S/A05477	PCB
94766	TERM.STRIP,90°,2.54mm,1x30pin, l=8mm	Samtec TSW-130-25-G-S-RA	PL601
92736	TRANSISTOR BCP53 SOT-223	PHILIPS BCP53-16,115	Q601
94443	TRANSISTOR BC 817 SOT-23	PHILIPS BC817,215	Q602
94443	TRANSISTOR BC 817 SOT-23	PHILIPS BC817,215	Q603
726	PRC201 - 1218 4R7/1W	PHILIPS 2322 735 60478	R601
3367	CR 0805 10M 5%	ROHM MCR10 EZH J-106	R602
93300	CR 0805 68k 1%	ROHM MCR10 EZH F-6802	R603
93304	CR 0805 100k 1%	ROHM MCR10 EZH F-1003	R604
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R605
93312	CR 0805 220k 1%	ROHM MCR10 EZH F-2203	R606
93328	CR 0805 1M 1%	ROHM MCR10 EZH F-1004	R607
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R608
93280	CR 0805 10k 1%	ROHM MCR10 EZH F-1002	R609
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R610
93256	CR 0805 1k0 1%	ROHM MCR10 EZH F-1001	R611
92738	THYRISTOR BT148W SOT-23	PHILIPS BT148W-600R,115	SCR601
92737	TRANSFORMER 10:300	EUBON EE-13(10V)	T601
90696	TRIGGER TRANSFORMER	EUBON C3B	T602

Revision date	Revision	Requested by	Reference
04.08.99	EM3231	TOW	Pos. NN
26.01.99	EM3165	AA	Pos.PL601

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Part	92718	ANTENNA/FLASH BOARD TR40S		Design
Version	EM3231			
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Revision date	Revision	Requested by	Reference	
14.09.98	EM3114	B.J.	Pos. D606	
16.03.98	EM1658	BJ	Pos. PL601	

