TECHNICAL BULLETIN T04-2019

Usage of Tron 40VDR as main EPIRB onboard

Tron 40VDR has many additional model names issued by manufacturers of different brands of VDR systems. All these variants will have two sets of approval documents in accordance with each of IMO performance standards:

- Res. A.810(19) Ammended by MSC.56(66)and MSC.120(74) *Performance standards for float-free satellite emergency position indicating radio beacons (EPIRBs) operating on 406 MHz*
- Res. MSC.333(90) *Revised performance standards for shipborne Voyage Data Recorder (VDRs)*

In Europe, according to wheelmark (MED- Maritime Equipment Directive) of the product, 40VDR is wheelmarked under two different Annex A1 item numbers:

- As EPIRB: **A1/5.6:** *406 MHz EPIRB (COSPAS-SARSAT)*
- As part of VDR: **A1/4.29**: *Voyage Data recorder(VDR)*

Be aware that "A1" are replaced by "MED" if reapproved after Sept.18th 2016 when new Maritime Directive 2014/90/EU was implemented.

Approval certificate as EPIRB is downloadable from www.jotron.com. Approval document as part of VDR system is downloadable from VDR manufacturers web page. Example below shows two approval documents covering the same product as EPIRB and part of VDR system:

Both of these documents are necessary to show compliance to IMO SOLAS requirements, IMO performance standards and IEC approval standards. And since Tron 40VDR is approved as an EPIRB, it can be used as the main EPIRB onboard if mounted according to COMSAR/Circ.32, chapter 4.10. This is explained in Jotron "40VDR Installation manual" and our eLearning course that mounting shall be done according to this circular.

4. Mounting location of GMDSS EPIRB

The Jotron Tron 40VDR is a combined GMDSS EPIRB and float free VDR storage module compliant with both EPIRB and VDR performance standards IMO A.810(19), and MSC. 333(90). To be compliant as a GMDSS EPIRB, it is important to follow COMSAR regulation on mounting, COMSAR/Circ.32

There have been multiple questions on how to handle if Tron 40VDR needs to be reprogrammed with different "Beacon no" since most are coded as "Beacon no 15". First of all, there is no requirements for specific "Beacon no" in IMO SOLAS regulation, nor in IMO performance standards or IEC/EN standards. The only place where "Beacon no" is mentioned as a requirement, is in Cospas-Sarsat C/S T.001:

> **A2.2 Maritime User Protocol**
> *The maritime user protocol has the following structure:*
> *Bits Usage*
> *25 format flag (=0)*
> *26 protocol flag (=1)*
> *27-36 country code*
> *37-39 user protocol code (=010)*
> *40-75 radio call sign or trailing 6 digits of MMSI*
> *76-81 specific beacon number*
> *82-83 spare (=00)*
> *84-85 auxiliary radio-locating device type(s)*
> *Bits 40-75 designate the radio call sign or the last 6 digits of the 9 digit maritime mobile service identity (MMSI) using the modified-Baudot code shown in Table A3. A - 8 C/S T.001 – Issue 3 – Rev. 16 December 2015 This code enables 6 characters to be encoded using 36 bits (6x6 = 36). This data will be right justified with a modified-Baudot space (100100) being used where no character exists. If all characters are digits, the entry is interpreted as the trailing 6 digits of the MMSI.*
> *Bits 76 to 81 are used to identify specific beacons on the same vessel (the first or only float free beacon shall be coded with a modified-Baudot zero (001101); additional beacons shall be numbered consecutively using modified-Baudot characters 1 to 9 and A to Z).*

So for EPIRBs using "Maritime User Protocol" (Or "Radio Call Sign User protocol") it is correct that the first (or main) EPIRB onboard is programmed as "Beacon no =0". But are these protocols with the requirement of "Beacon=0" used in Tron 40VDR? The answer is NO. The reason is that combined EPIRB/VDR storage module must have an internal navigation device with a position resolution of 4 seconds of Arc which is not possible with "Maritime User Protocol" or "Maritime User location Protocol". Only the last one do have navigation device, but have 4 minutes of Arc resolution which is not good enough for a combined EPIRB/VDR storage according to IEC61996-1, paragraph 5.2.2.3:

> **5.2.2.3 Locating transmitter**
>
> *The float-free capsule shall be capable of resolving and transmitting its last received position or its current position with a minimum accuracy of 4 s of arc and conform to the relevant requirements of IEC 61097-2.*

Therefore, "Standard Location protocol" must be used:

A3.3.5.1 The standard location protocols, identified by the flags F=1, P=0 and the protocol codes no. 1 to 4 of Table A2-B, have the following structure:
a) PDF-1:
>   *bits 37 to 40: 4-bit protocol code as defined in Table A2-B*
>   *bits 41 to 64: 24 bits of identification data*
>   *bits 65 to 85: 21 bits of encoded position data to 15 minute resolution;*
b) PDF-2:
>   *bits 107 to 112: 4 fixed bits and 2 bits of supplementary data*
>   *bits 113 to 132 20-bit position offset (Δ latitude, Δ longitude), to 4 second resolution.*

A3.3.5.2 The 24 bits of identification data (bits 41 to 64) can be used to encode:

a) (PC=0010) the last six digits of MMSI in binary form in bits 41 to 60 (20 bits), plus a ==4-bit specific beacon number (0 to 15) in bits 61 to 64, to distinguish between several EPIRBs on the same ship;==

And as seen above, when it comes to this protocol ,which Tron 40VDR uses, there is no requirement regarding which number to use on the main float free or additional EPIRBs. These protocols were amended to C/S T.001 around year 2000.

In fact, if there is a main EPIRB onboard without GPS, coded as "Beacon no=0" and the Tron 40VDR is also coded as "Beacon no=0", this would not be a problem as these two EPIRBs will have different length of transmitted message (112 vs 144 bit) and also different ways of coding the MMSI (Modified Baudot vs Binary), so the "15 HEX" code from these two will be completely different. Below is a table showing "Beacon no" of different EPIRBs on the same vessel:

Main EPIRB		Secondary EPIRB (if required)		Third EPIRB		Comments
Type	Beacon no	Type	Beacon no	Type	Beacon no	
Float Free EPIRB without GPS	0	Manual or Float free EPIRB without GPS	1	Tron 40VDR (with GPS)	15	OK
Float Free EPIRB without GPS	0	Manual or Float free EPIRB without GPS	0	Tron 40VDR (with GPS)	15	Not OK. Main and secondary EPIRB will transmit same HEX code and not according to C/S T.001
Float Free EPIRB without GPS	1	Manual or Float free EPIRB without GPS	0	Tron 40VDR (with GPS)	15	Not correct coding of first and second EPIRB according to C/S T.001
Float Free EPIRB without GPS	0	Manual or Float free EPIRB with GPS	0	Tron 40VDR (with GPS)	15	OK, since first and secondary EPIRB will have different HEX code, and there is no special requirement with regards to "Beacon no" when "Location protocols are used"
Float Free EPIRB with GPS	0	Manual or Float free EPIRB with GPS	0	Tron 40VDR (with GPS)	15	Not OK. Main and secondary EPIRB will transmit same HEX code
Tron 40VDR (with GPS)	0	Manual or Float free EPIRB with GPS	1	-	-	OK
Float free EPIRB with GPS	0	Tron 40VDR (with GPS)	1 or 15	-	-	OK
Float free EPIRB with GPS	0	Tron 40VDR (with GPS)	0	-	-	Not OK. Main and secondary EPIRB will transmit same HEX code
Tron 40VDR (with GPS)	15	Manual or Float free EPIRB with or without GPS	1	-	-	OK, as there is no requirement that EPIRB containing GPS (GNSS location device) shal be coded with "0" as described above.

Many other different combinations could be listed, but assume these are the most common combinations seen

Even though it is allowed to code the main EPIRB to be "Beacon no 15", we would recommend using same rule as for EPIRBs without GPS: *"0 = First or only float free, additional beacons shall be numbered consecutively..".*

Another important topic with regards to combined EPIRB/VDR storage as Tron 40VDR, is that changes to VDR/S-VDR annual performance test, MSC/Circ. 1222 have changed in the latest revision MSC.1/Circ.1222/Rev.1 to include same mandatory annual EPIRB test, MSC.1/ Circ.1040 rev.1 when doing APT on VDR system.

But please be aware that the final decision whether Jotron Tron 40VDR Float Free Capsule can be used as the main EPIRB on-board vessels with flags **not** from EU/EEA and USA is up to the vessel`s flag administration.

Tjodalyng, September 2019