CERTIFIKAT

No. SC0955-09

Tele Radio Tiger radio remote control system

Holder / Issued for / Manufacturer

Tele Radio AB i Lysekil AB, VAT no. 556344-0196, Datavägen 21, SE-43632 ASKIM, Sweden

Product name and description

The Tele Radio Tiger is a radio remote control system consisting of a transmitter and a receiver used in machinery application to wireless transfer control commands. The Tele Radio Tiger consists of two main parts, namely:

- Transmitter: TX1-A, TX2-A, JD1-A, JD2-A
- Receiver: RX1-A, RX2-A, RX3-A

The certificate is based on the versions of hardware and software described in SP reports listed below.

Certification

The product described above fulfils the requirements for SIL 3 of the standard IEC 61508:1998 *Functional safety of electrical/electronic/programmable electronic safety-related systems*, part 1,2 and 3 for the following functions:

- *Stop function:* Deactivates all relays on the receiver when the stop button on the transmitter is pressed.
- *Safe function:* Activates the safe function relays on the receiver when both safe buttons on the transmitter are pressed.

The certification is based on a functional safety assessment according to IEC 61508 described in SP reports P803164 and P703967 together with functional tests and fault injections performed by SP on the Tele Radio Tiger radio remote control system and the user documentation in the currently valid revision.

Transmitter Stop function:	
Probability of dangerous failure per hour	PFHd = 8.5 FITs (=λdu)
Fraction of total failure rate with dangerous and detected consequence	λdd = 357 FITs
Diagnostic coverage	DC = 98.3%
Safe failure fraction	SFF = 99.1 %
Common cause failure	0 FIT
Level of hardware fault tolerance	HFT = 1
Proof test interval	10 years
Diagnostic test interval	Continuous

Transmitter Safe function:	
Probability of dangerous failure per hour	PFHd = 5.5 FITs (=λdu)
Fraction of total failure rate with dangerous and detected consequence	λdd = 255 FITs
Diagnostic coverage	DC = 98.1%
Safe failure fraction	SFF = 99.2 %
Common cause failure	0.5 FIT
Level of hardware fault tolerance	HFT = 1
Proof test interval	10 years
Diagnostic test interval	Continuous

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Receiver Stop function:	
Probability of dangerous failure per hour	PFHd = 30.2 FITs(=λdu)
Fraction of total failure rate with dangerous and detected consequence	λdd = 685.0 FITs
Diagnostic coverage	DC = 96.9%
Safe failure fraction	SFF = 98.7 %
Common cause failure	8.0 FIT
Level of hardware fault tolerance	HFT = 1
Proof test interval	10 years
Diagnostic test interval	Continuous

Receiver Safe function:	
Probability of dangerous failure per hour	PFHd = 30.2 FITs (=λdu)
Fraction of total failure rate with dangerous and detected consequence	λdd = 685.0 FITs
Diagnostic coverage	DC = 96.9%
Safe failure fraction	SFF = 98.7 %
Common cause failure	8.0 FIT
Level of hardware fault tolerance	HFT = 1
Proof test interval	10 years
Diagnostic test interval	Continuous

Radio communication between transmitter and receiver:	
Probability of dangerous failure per hour	PFHd = 3.0 FITs

Note: in the case where this product is used together with other products, the SIL (Safety Integrity Level) reached for the complete safety function must be determined by the end user.

Marking

Each sample that conforms in all respects with the original item certified may display the text "Type-examined by SP". In addition, manuals and marking shall also refer to the standard IEC 61508:1998, the reached SIL (Safety Integrity Level) of the item, the number of this certificate and the serial number or equivalent of the item.

Validity

This certificate is valid until not later than 15th December 2019.

Miscellaneous

Other terms and conditions are set out in SP's certification rules for type-examination, SPCR 123. This is the first edition of this certificate.

Borås, 16th December 2009

SP Technical Research Institute of Sweden
Certification

Lennart Månsson
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