

High Temperature ICODE Tag (High Frequency RFID 13.56 MHz)

Catalog Numbers 56RF-TG-50HT

Summary of Changes

This publication contains new and updated information as indicated in the following table.

| Topic | Page |
|---|------|
| Updated operating and storage temperatures in Specifications table. | 1 |
| Added Memory and Performance rows to Specifications table. | 1 |
| Replaced Temperature Test Profile section with temperature specification. | 1 |
| Replaced Time at Elevated Temperature with Cooling Time table. | 2 |
| Added Chemical Resistance section. | 2 |

Description

Industrial RFID systems are designed to withstand harsh environments. Reusable read/write tags allow for flexibility in information and application. ISO 15693 is an open standard for high frequency 13.56 MHz RFID. ICODE tags are available in many different styles and sizes to fit most applications.

Catalog number 56RF-TG-50HT high temperature RFID tags are rate IP68/69K and designed to withstand harsh environments. It is designed for industrial applications where temperatures can reach 220 °C (428 °F). It provides data retention and is suited for automotive assembly lines and paint shop applications.

Features

- 13.56 MHz high frequency RFID solution
- ICODE ISO 15693 Compliant
- 112 byte memory
- Read/write speed up to 500 bytes per second
- Reusable tags
- Improved performance in harsh environment
- IP68/69K
- High temperature up to 220 °C (428 °F)

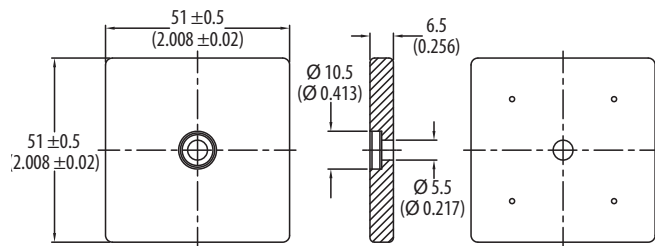
Typical Applications

- High temperature industrial
- Automotive
- Paint shop
- Asset tracking
- Product handling
- Tool management

Specifications

| Description | Parameter |
|---------------------------|--|
| Chip type | ICODE SL2 |
| Resonance frequency (SRF) | 13.8 MHz ± 0.4 MHz |
| Operating temperature | -40...+85 °C (-40...+185 °F) |
| Storage temperature | -40...+220 °C (-40...+428 °F) (cumulative time more than 1500 h) |
| Memory | Read only: 8 bytes Read/write: 112 bytes Map: 28x4 bytes |
| Performance | Read Cycles: Unlimited Programming cycles: Up to 70 C: 100,00 Data retention time/years: ≥ 10 Read time: • 16 bytes: 0.03 s • UID 8 bytes: 0.02 s Programming Time (16 bytes): 0.1 s |
| Housing material | PPS plastics |
| Color | Brown |
| Size [mm (in.)] | 51.0 x 51.0 ± 0.5 (2.01 x 2.01 ± 0.02) |
| Thickness [mm (in.)] | 6.5 ± 0.5 (0.26 ± 0.02) |
| Hole diameter [mm (in.)] | 5.5 ± 0.5 (0.217 ± 0.02) Counterbore 10.5 (0.413) |
| Weight [g (oz)] | 25 (0.88) |
| Protection category | IP68/69K |
| Torque | 2 N·m (17.7 lb-in) max. (use M5 screw with a flat head and mount on a nonmetal plain base) |
| Mechanical resistance | Vibration IEC 68.2.6, shock IEC 68.2.29 |

Dimensions [mm (in.)]



Temperature Specification

Catalog number 56RF-TG-50HT (high temperature RFID tag) is designed to withstand storage temperatures up to 220 °C (428 °F). Higher storage temperatures are not tested and are not covered under warranty.

We tested a continuous temperature of 220 °C (428 °F) for 1000 hr; therefore, there is practically no limitation on the duration of one temperature cycle. See [Cooling Time](#) to determine how long the tag takes to cool before operating.

Typical paint shop applications, such as those used in vehicle construction, can be realized with these products. Typically, the time at the temperatures of 220 °C (428 °F) is not more than one hour.

To read or write to a tag, the tag temperature must be less than 85 °C (185 °F).

Cooling Time

| Tag Temperature °C (°F) ⁽¹⁾ | Cooling Time (min) ⁽²⁾ | Tag Temperature °C (°F) ⁽¹⁾ | Cooling Time (min) ⁽²⁾ |
|--|-----------------------------------|--|-----------------------------------|
| 220 (428) | 18 | 130 (266) | 13.5 |
| 210 (410) | 18 | 120 (248) | 12 |
| 200 (392) | 18 | 110 (230) | 10.5 |
| 190 (374) | 18 | 100 (212) | 10.5 |
| 180 (356) | 16.5 | 90 (194) | 9 |
| 170 (338) | 16.5 | 80 (176) | 7.5 |
| 160 (320) | 15 | 70 (158) | 6 |
| 150 (302) | 15 | 60 (140) | 4.4 |
| 140 (284) | 13.5 | — | — |

(1) Ambient temperature = 23 °C (73.4 °F).

(2) The recommended temperature to read or write is <50 °C (122 °F).

Chemical Resistance

The housing material of the data carrier consists of Ryton R-4 (PPS Polyphenylene Sulphide) which is known to perform well even at elevated temperature. PPS is resistant to various chemicals.

The following table provides an alphabetical list of chemicals along with our recommendations regarding their compatibility with Ryton PPS compounds.

The Data column indicates the amount of data upon which each recommendation was based. “Extensive” indicates extensive, long-term test data on the compatibility of Ryton PPS with those chemicals. “Limited” indicates limited short-term test data on the compatibility of Ryton PPS with those chemicals. “None” indicates that there is no actual test data on the compatibility of Ryton PPS with those chemicals. The recommendations for “None” are based on the knowledge of the compatibility of Ryton PPS compounds with similar chemicals. The criteria for “Acceptable” compatibility ratings are the expectation that Ryton PPS compounds would retain at least 50% of original mechanical strength. The “Acceptable” compatibility ratings exhibit less than 3% swell after exposure to the chemical for one year at 93 °C (200 °F). We caution against extensive exposure to some chemicals at elevated temperatures; however, brief exposure to those chemicals at elevated temperatures or long-term exposure at near ambient temperatures, can be acceptable. “Avoid Exposure” recommendations that are listed for chemicals with extensive data indicate that we do not recommend using Ryton PPS in service with those chemicals except under the limitations cited.

Chemical Recommendations

| Chemical | Recommendation | Data ⁽¹⁾ |
|------------------------------------|---|---------------------|
| Acetaldehyde | Acceptable | None |
| Acetic Acid, 10% | Acceptable | Limited |
| Acetic Acid, 100% (Glacial) | Acceptable | Limited |
| Acetic Anhydride | Acceptable | Limited |
| Acetone | Acceptable | None |
| Acetonitrile | Acceptable | Limited |
| Acetophenone | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Acetyl Chloride | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Acetylene | Acceptable | None |
| Acid Mine Water | Acceptable | None |
| Acrylic Acid | Acceptable | None |
| Aluminum Chloride | Acceptable | Limited |
| Aluminum Sulfate | Acceptable | Limited |
| 2-Aminoethanol | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ammonia, anhydrous | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Ammonium Chloride | Acceptable | Limited |
| Ammonium Hydroxide | Acceptable | Limited |
| Ammonium Nitrate | Acceptable | Limited |
| Ammonium Sulfate | Acceptable | Limited |
| Amyl Acetate | Acceptable | Limited |
| Amyl Alcohol | Acceptable | Limited |
| Antifreeze | Acceptable | Extensive |
| Aniline | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Aqua Regia | Avoid Exposure | Limited |
| Asphalt Emulsions | Acceptable | None |
| Barium Chloride | Acceptable | Limited |
| Barium Hydroxide | Acceptable | Limited |
| Barium Sulfate | Acceptable | None |
| Benzaldehyde | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Benzene | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Benzene Sulfonic Acid | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Benzoic Acid | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Benzonitrile | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Benzyl Chloride | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Borax | Acceptable | Limited |
| Brake Fluid | Acceptable | Extensive |
| Bromine | Avoid Extensive Exposure above 0.1% | Extensive |
| Butadiene | Acceptable | None |
| Butane | Acceptable | None |
| 2-Butanone (Methyl Ethyl Ketone) | Acceptable | Extensive |
| Butyl Acetate | Acceptable | Limited |
| n-Butyl Alcohol | Acceptable | Extensive |
| Butyl Ether | Acceptable | Extensive |
| Butyl Phthalate | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Butylamine | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Calcium Chloride | Acceptable | Limited |
| Calcium Nitrate | Acceptable | Limited |
| Calcium Sulfate | Acceptable | None |
| Carbon Dioxide | Acceptable | Limited |
| Carbon Disulfide | Acceptable | None |
| Carbon Tetrachloride | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Carbonated Water | Acceptable | None |
| Carboric Acid | Acceptable | None |
| Cellosolve | Acceptable | Limited |
| Chlorine | Avoid Extensive Exposure above 0.1% | Extensive |
| Chlorobenzene | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| 2-Chloroethanol | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Chloroform | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Chlorophenol, 5% Aqueous | Acceptable | Limited |
| Chlorosulfonic Acid | Avoid Extensive Exposure | Limited |
| Chromic Acid | Avoid Extensive Exposure | Limited |
| Clorox (5.25% Sodium Hypochlorite) | Acceptable | Extensive |
| Copper Chloride | Acceptable | Limited |
| Copper Sulfate | Acceptable | Limited |
| Cottonseed Oil | Acceptable | Limited |
| m-Cresol | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Cresyl Diphenyl Phosphate | Acceptable | Extensive |

Chemical Recommendations

| Chemical | Recommendation | Data ⁽¹⁾ |
|--------------------------------|---|---------------------|
| Crude Oil (aromatic) | Acceptable | Extensive |
| Cyclohexane | Acceptable | Limited |
| Cyclohexanol | Acceptable | Limited |
| Cyclohexanone | Acceptable | Limited |
| Detergents | Acceptable | None |
| 1,2-Dichloroethane | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Dichloromethane | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Diesel Fuel | Acceptable | Extensive |
| Diethanolamine, 25% | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Diethyl Ether | Acceptable | None |
| Diisobutylene | Acceptable | Limited |
| Dimethyl Phthalate | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Dimethyl Sulfoxide | Acceptable | Limited |
| Dimethylaniline | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| N,N-Dimethylformamide | Acceptable | Limited |
| Diocetyl Phthalate | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| p-Dioxane | Acceptable | Extensive |
| Diphenyl Ether | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Dowtherm | Acceptable | Extensive |
| Engine Oil | Acceptable | Extensive |
| Epichlorohydrin | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ethane | Acceptable | None |
| Ethanolamine | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| 2-Ethoxyethanol | Acceptable | Limited |
| Ethyl Acetate | Acceptable | Extensive |
| Ethyl Alcohol (Ethanol) | Acceptable | Extensive |
| Ethyl Chloride | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Ethyl Ether | Acceptable | None |
| Ethyl Mercaptan | Acceptable | None |
| Ethylene | Acceptable | None |
| Ethylene Chloride | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ethylene Chlorohydrin | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ethylene Dichloride | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ethylene Glycol | Acceptable | Extensive |
| Ethylene Glycol Monoethylether | Acceptable | Limited |
| Ethylenediamine | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ferric Chloride | Acceptable | Limited |
| Ferrous Chloride | Acceptable | None |
| Fluorosilicic Acid, 25% | Acceptable | Limited |
| Formaldehyde | Acceptable | Limited |
| Formic Acid | Acceptable | Limited |
| Freon | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Fuel Oil | Acceptable | Limited |
| Furan | Acceptable | Limited |
| Furfural | Acceptable | Limited |
| Gasohol (Gasoline/Alcohol) | Acceptable | Extensive |
| Gasoline | Acceptable | Extensive |
| Glycolic Acid | Acceptable | Limited |
| Heptane | Acceptable | Limited |
| Hexane | Acceptable | None |
| Hexene | Acceptable | None |
| HFC-134a | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Hydraulic Fluid, Aircraft | Acceptable | Extensive |
| Hydrazine | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Hydrobromic Acid | Avoid Extensive Exposure above 0.1% | None |
| Hydrochloric Acid | Avoid Extensive Exposure above 0.1% | Extensive |
| Hydrofluoric Acid | Avoid Extensive Exposure above 0.1% | Limited |
| Hydrogen Gas | Acceptable | None |
| Hydrogen Peroxide | Avoid Extensive Exposure above 5% | Limited |
| Hydrogen Sulfide | Acceptable | None |
| Iodine | Avoid Extensive Exposure above 0.1% | None |
| Isopropyl Alcohol | Acceptable | Limited |
| Isopropyl Mercaptan | Acceptable | None |
| Jet Fuel | Acceptable | Limited |
| Kerosene | Acceptable | Limited |
| Lactic Acid | Acceptable | Limited |
| Liquefied Petroleum Gas (LPG) | Acceptable | None |

Chemical Recommendations

| Chemical | Recommendation | Data ⁽¹⁾ |
|----------------------------------|---|---------------------|
| Lithium Bromide | Acceptable | None |
| Lubricating Oil | Acceptable | None |
| Magnesium Chloride | Acceptable | Limited |
| Magnesium Hydroxide | Acceptable | None |
| Methane | Acceptable | None |
| Methoxy Propanol | Acceptable | Extensive |
| Methyl Acrylate | Acceptable | None |
| Methyl Alcohol (Methanol) | Acceptable | Extensive |
| Methyl Ethyl Ketone | Acceptable | Extensive |
| Methyl Isobutyl Ketone | Acceptable | Limited |
| Methyl Mercaptan | Acceptable | None |
| Methyl Methacrylate | Acceptable | None |
| Methyl tert-Butyl Ether (MTBE) | Acceptable | Limited |
| Methylene Chloride | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| N-Methylpyrrolidinone | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Mineral Oil | Acceptable | Limited |
| Morpholine | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Motor Oil | Acceptable | Extensive |
| Naphtha | Acceptable | Limited |
| Naphthalene | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Nitric Acid | Avoid Extensive Exposure above 0.1% | Extensive |
| Nitrobenzene | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Nitrogen | Acceptable | Limited |
| Nitrogen Tetroxide | Avoid Extensive Exposure above 0.1% | None |
| Nitromethane | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Ozone | Avoid Extensive Exposure above 100 ppm | Limited |
| Perchloroethylene | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Peroxyacetic | Avoid Extensive Exposure above 1% | None |
| Peroxybenzoic | Avoid Extensive Exposure above 1% | None |
| Phenol | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Phosphoric Acid | Avoid Use of Mineral Filled Grades | Extensive |
| Phosphorus Trichloride | Acceptable | Limited |
| Potassium Chloride | Acceptable | None |
| Potassium Dichromate | Avoid Extensive Exposure above 0.1% | Limited |
| Potassium Hydroxide | Acceptable | None |
| Potassium Permanganate | Avoid Extensive Exposure above 0.1% | Limited |
| Propane | Acceptable | None |
| Propyl Mercaptan | Acceptable | None |
| Propylene | Acceptable | None |
| Propylene Chlorohydrin | Avoid Extensive Exposure above 65 °C (150 °F) | None |
| Propylene Glycol Monomethylether | Acceptable | Extensive |
| Pyridine | Avoid Extensive Exposure above 65 °C (150 °F) | Limited |
| Refrigerant R-22 | Avoid Extensive Exposure above 65 °C (150 °F) | Extensive |
| Sodium Acetate | Acceptable | Limited |
| Sodium Bicarbonate | Acceptable | Limited |
| Sodium Bisulfate | Acceptable | Limited |
| Sodium Carbonate | Acceptable | Limited |
| Sodium Chloride | Acceptable | Limited |
| Sodium Cyanide | Acceptable | None |
| Sodium Dichromate | Avoid Extensive Exposure above 0.1% | Limited |
| Sodium Hydro sulfite | Acceptable | None |
| Sodium Hydroxide | Acceptable | Extensive |
| Sodium Hypochlorite | Avoid Extensive Exposure above 5% | Extensive |

Rockwell Automation Support

Use the following resources to access support information.

| | | |
|---|---|---|
| Technical Support Center | Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates. | https://rockwellautomation.custhelp.com/ |
| Local Technical Support Phone Numbers | Locate the phone number for your country. | http://www.rockwellautomation.com/global/support/get-support-now.page |
| Direct Dial Codes | Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer. | http://www.rockwellautomation.com/global/support/direct-dial.page |
| Literature Library | Installation Instructions, Manuals, Brochures, and Technical Data. | http://www.rockwellautomation.com/global/literature-library/overview.page |
| Product Compatibility and Download Center (PCDC) | Get help determining how products interact, check features and capabilities, and find associated firmware. | http://www.rockwellautomation.com/global/support/pcdc.page |

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Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment can be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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