

RFID Specifications

Bulletin Number 56RF

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Our Bulletin 56RF High-frequency Radio Frequency Identification (RFID) system is ideal to track and document products as they move through the manufacturing process in light-duty industrial applications. The RFID system tags and transceivers are designed to the ISO 15693 open standard for high frequency.



Summary of Changes

Bulletin 57RF handheld interfaces have been removed from this publication due to product obsolescence.

High-frequency EtherNet/IP Interface Block

The EtherNet/IP interface block is designed to solve industrial high frequency 13.56 MHz RFID applications that require networking or multiple read/write points. Local status indicators allow for quick visual diagnosis of module status, network status, I/O status, and power status.

Each interface block can have up to two transceivers and two general I/O devices, which allows the RFID system to be easily integrated into an existing architecture. This configuration also allows the RFID system to respond to sensor input and vice versa. For example, a sensor can detect the presence of an object and send a signal to the transceiver to read the RFID tag.

The high frequency 13.56 MHz RFID system is also highly configurable and expandable. The transceivers can be mounted up to 91.4 m (300 ft) away from the interface blocks. The EtherNet/IP ports are configured as an embedded switch with Device Level Ring (DLR), which allows multiple interface blocks to be connected in star, tree, linear, and ring topologies. The RFID system is ISO 15693 compliant and compatible with tags of many different styles and sizes.

Product Selection

Table 1 - Transceiver

Interface Port ⁽¹⁾	Inputs	Outputs	Cat. No.
1 transceiver	1	1	56RF-IN-IPS12
2 transceivers	1	1	56RF-IN-IPD22
2 transceivers	2	—	56RF-IN-IPD22A

(1) Configured as embedded switch. Supports star, tree, linear, and ring topologies.

Table 2 - Interface Block Cables

Interface	Connector Style	Connector Type	No. of Pins	Shielding	Wire Size (AWG)	Cat. No.
Transceiver	DC Micro (M12) patchcord	Straight female to straight male	4	Shielded	22	889D-F5FCDM-Jx ⁽¹⁾
		Straight female				889D-F5FC-Jx ⁽²⁾
	Straight male					889D-M5FC-Jx ⁽²⁾
	M12 terminal chamber	Straight female		—	18...22	871A-TS5-D1
		Straight male				871A-TS5-DM1
	Auxiliary power	DC Micro (M12) patchcord		Straight female to straight male	4	Unshielded
Straight female			889D-F4AC-x ⁽²⁾			
		Straight male	889D-M4AC-x ⁽²⁾			
M12 terminal chamber		Straight female	—	—		871A-TS4-D
		Straight male				871A-TS4-DM
EtherNet/IP		M12 D-code patchcord	Straight male to straight male	4		Shielded
	Straight male to right angle male		1585D-M4UBDE-x ⁽³⁾			
	Right angle male to right angle male		1585D-E4UBDE-x ⁽³⁾			
	Straight male to straight male		Unshielded		24	1585D-M4TBDM-x ⁽³⁾
	Straight male to right angle male					1585D-M4TBDE-x ⁽³⁾
	Right angle male to right angle male					1585D-E4TBDE-x ⁽³⁾

(1) Replace x with OM3 [0.3 m (11.8 in.)], 1 [1 m (3.3 ft)], 2 [2 m (6.6 ft)], 5 [5 m (16.4 ft)], or 10 [10 m (33 ft)] for standard cable lengths.

(2) Replace x with 2 [2 m (6.6 ft)], 5 [5 m (16.4 ft)], or 10 [10 m (33 ft)] for standard cable lengths.

(3) Replace x with OM3 [0.3 m (11.8 in.)], OM6 [0.6 m (23.6 in.)], 1 [1 m (3.3 ft)], 2 [2 m (6.6 ft)], 5 [5 m (16.4 ft)], 10 [10 m (33 ft)], 15 [15 m (49 ft)], and increments of 5 m (16.4 ft) up to 75 m (246 ft).

Specifications

Table 3 - Input

Attribute	56RF-IN-IPS12, 56RF-IN-IPD22, and 56RF-IN-IPD22A
Number of transceiver inputs	2 – 56RF-IN-IPD22 and 56RF-IN-IPD22A 1 – 56RF-IN-IPS12
Number of standard inputs	2 – 56RF-IN-IPD22A 1 – 56RF-IN-IPD22 and 56RF-IN-IPS12
Standard input type	Sink, 24V DC
Voltage, off-state input, max	5V DC
Voltage, on-state input, max	30V DC
Voltage, on-state input, nom	24V DC
Voltage, on-state input, min	11V DC
Current, off-state input, max	1.5 mA @ 5V DC
Current, on-state input, max	5 mA @ 30V DC
Voltage, sensor source, max	30V DC
Voltage, sensor source, min	10V DC
Input delay time ON to OFF OFF to ON	0...16000 μ s
Isolation voltage	50V (continuous), basic insulation type, inputs and sensor power to network No isolation between individual inputs or between network channels Type tested at 707V DC for 60 s

Table 4 - Output

Attribute	56RF-IN-IPS12 and 56RF-IN-IPD22
Number of standard outputs	1
Standard output type	Source, 24V DC
Voltage drop, on-state output, max	0.5V DC
Voltage off-peak blocking, min	30V DC
Voltage, on-state output, max	30V DC
Voltage, on-state output, min	11V DC
Voltage, on-state output, nom	24V DC
Current on-state output, max	0.5 A
Leakage current, off-state output, max	50 μ A
Surge current per output, max	1.2 A for 10 ms, repeatable every 2 s
Isolation voltage	50V (continuous), basic insulation type, outputs, and output power to network No isolation between individual outputs or between outputs and output power or between network channels Type tested at 707V DC for 60 s

Table 5 - RFID Specifications

Attribute	56RF-IN-IPS12 and 56RF-IN-IPD22
Voltage	24V DC (-20...+10%)
Output current per RFID port, max	100 mA @ 24V DC

Table 6 - General Specifications

Attribute	56RF-IN-IPS12, 56RF-IN-IPD22, and 56RF-IN-IPD22A
Voltage, auxiliary power ⁽¹⁾	24V DC (-20...+10%)
Auxiliary current per module, max ⁽²⁾	4 A
Output current per RFID transceiver port, max	100 mA @ 24V DC
Current for output device power per I/O port, max	0.5 A @ 30V
Current for input device power per I/O port, max	5 mA @ 30V
Communication rate	EtherNet/IP 10/100 Mbps Full or half-duplex 100 meter per segment
Status indicators	Module Status - red/green Network Status - red/green Link Status - green/yellow Auxiliary Power - green I/O Status Indicator - yellow
Dimensions (H x W x D), approx	179 x 37 x 43.25 mm (7.05 x 1.46 x 1.7 in.)
Weight, approx	0.2 kg (0.45 lb)
Enclosure type rating	IP67 and IP69K
Wiring category ⁽³⁾	1 - on signal ports 1 - on power ports 1 - on communication ports

(1) Intended for limited voltage power, limited current supply.

(2) A listed or recognized 4 A fuse must be installed on the line side of the device.

(3) Use this conductor category information for planning conductor routing. See publication [1770-4.1](#), Industrial Automation Wiring and Grounding Guidelines.

Table 7 - Environmental Specifications



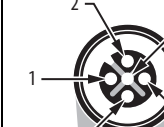

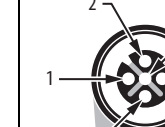
Attribute	56RF-IN-IPS12, 56RF-IN-IPD22, and 56RF-IN-IPD22A
Temperature, operating	IEC60068-2-1/2, Test Ad/Bd Cold: -20 °C (-4 °F) Dry Heat: 60 °C (140 °F) Gradient: 1 °C (33.8 °F)/min Duration: 33.6 hr with insulation tests
Temperature, storage	IEC60068-2-1/2, Test Ad/Bd Cold: -40 °C (-40 °F) Dry Heat: 85 °C (185 °F) Gradient: 1 °C (33.8 °F)/min Duration: 33.6 hr with insulation tests
Relative humidity	IEC60068-2-30, Test Db Temperature Cycle Range: 20-60-20 °C (68-140-68 °F) Humidity Cycle Range: 80...95% noncondensing
Vibration	IEC60068-2-6 Frequency Range: 10...500 Hz Acceleration: 5 g Displacement: 0.030 in. (p-p) Duration: One octave per minute sweep rate No. of sweeps: 10 Vertical mounting
Shock, operating	IEC60068-2-27 Acceleration: 30 g, 11 ms Vertical mounting
Shock, nonoperating	IEC60068-2-32, Test Ea Acceleration: 50g, 11 ms Vertical mounting
Emissions	IEC61000-6-4 (CISPR11) Class A
ESD susceptibility (Performance Criteria B)	IEC61000-4-2 Indirect (Coupling Plate): +/-6 kV contact discharge Direct (to "Points of Initial Contact"): +/-6 kV contact discharge; +/-8 kV air discharge
Radiated RF immunity (Performance Criteria A)	IEC61000-4-3, ENV50204 80...1000 MHz: 10V/m, with 1 kHz sine-wave 80% AM 1...2 GHz: 10V/m, with 1 kHz sine-wave 80% AM 900 MHz Pulse: 10V/m, with 200 Hz 50% pulse 100% AM 1.89 GHz Pulse: 10V/m with 200 Hz 50% pulse 100% AM 2...2.7 GHz: 1V/m, with 1 kHz sine-wave 80% AM
EFT/B immunity (Performance Criteria B)	IEC61000-4-4 DLR Ports: +/-3 kV clamp inject at 5 kHz for 5 min Module and Output Power: +/-3 kV clamp inject at 5 kHz for 5 min Digital I/O: +/-3 kV clamp inject at 5 kHz for 5 min Analog I/O: +/-3 kV clamp inject at 5 kHz for 5 min Earth Ground: +/-3 kV clamp inject at 5 kHz for 5 min
Surge immunity (Performance Criteria B)	IEC61000-4-5 DLR Ports: +/-2 kV common mode @ 2 ohms Module and Output Power: +/-2 kV common mode @ 12 ohms; +/-2 kV differential mode @ 2 ohms Shielded Digital I/O: +/-2 kV common mode @ 2 ohms Shielded Analog I/O: +/-2 kV common mode @ 2 ohms
Conducted Radiated Immunity (Performance Criteria A)	DLR Ports, Module Power, Output Power, Digital I/O, and Analog I/O 150 kHz...80 MHz, CDN inject 10V, with 1 kHz sine-wave 80% AM

Table 8 - Compliance

Compliance (When Product is Marked) ⁽¹⁾	Value
CE	European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications.

(1) See the Product Certification webpage (rok.auto/certifications) for Declarations of Conformity, Certificates, and other certification details.

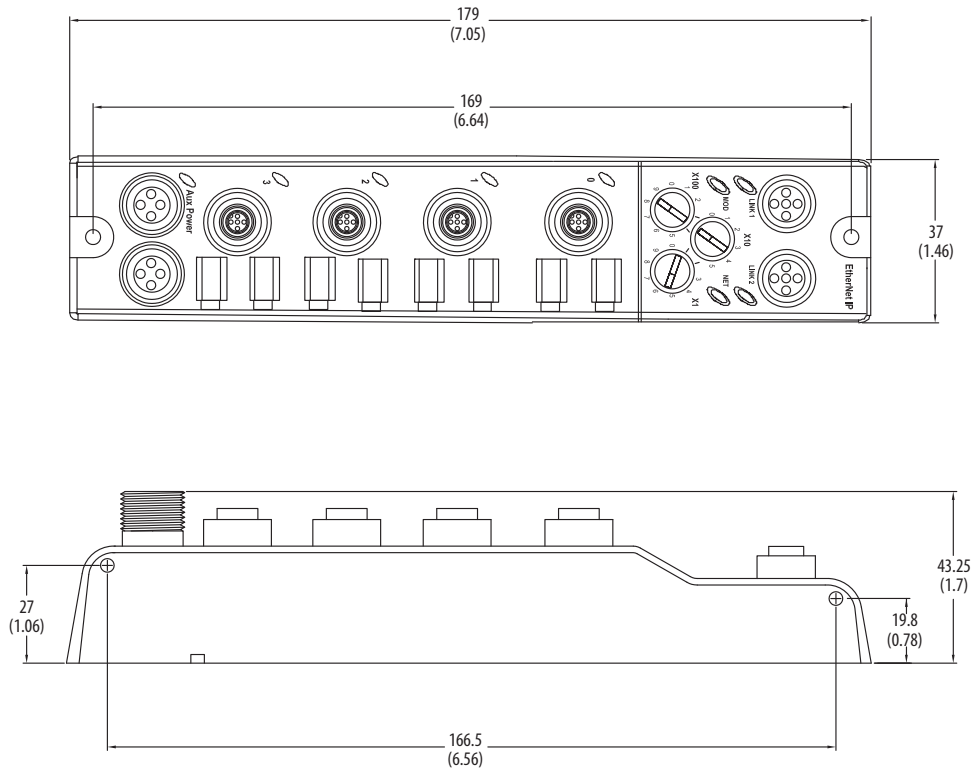
Pinouts

	EtherNet/IP	Power Connector	RFID Transceiver Interface	Input Connector	Output Connector
Connector Diagram					
Pin	Function	Function	Function	Function	Function
1	TX+	Output Power +	Sensors Power +	Sensor Power	Not Used
2	RX+	Module Power +	Data+	Not Used	Not Used
3	TX-	Module Power -	Sensor Power -	Return	Return
4	RX-	Output Power -	Data -	Input	Output
5	Shell	—	Shield/FE	Shield/FE	Shield/FE

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 1 - Interface Block Dimensions



Transceivers

We offer cylindrical, square, and rectangular transceivers to meet the requirements of your application.

18 mm and 30 mm Cylindrical Transceiver

Our cylindrical transceivers are designed for use with the Allen-Bradley® high frequency 13.56 MHz RFID system. These transceivers are ISO 15693 compliant and can read/write ICODE tags SLI and SL2, which allows for infinite tag configuration options from various manufacturers. Local status indicators allow for quick visual diagnosis of module status and read/write status.

These transceivers are recommended for panel mounting and for use with smaller tags with a diameter of 10...30 mm (0.39...1.18 in.). Transceivers can be mounted up to 91.4 m (300 ft) away from the interface module. M18 transceivers can read tags from distances up to 55 mm (2.2 in.), while M30 transceivers can read tags up to 75 mm (3.0 in.). These transceivers have an enclosure rating of IP67 and are designed to withstand harsh industrial environments.

Product Selection

Table 9 - Transceiver

Description	Cat. No.
M18 cylindrical transceiver	56RF-TR-M18
M30 cylindrical transceiver	56RF-TR-M30

Table 10 - Mounting Bracket

Description	Transceiver	Cat. No.
Swivel/tilt style	M18	60-2649
	M30	60-2439
Right angle style	M18	871A-BRN18
	M30	871A-BRN30

Specifications

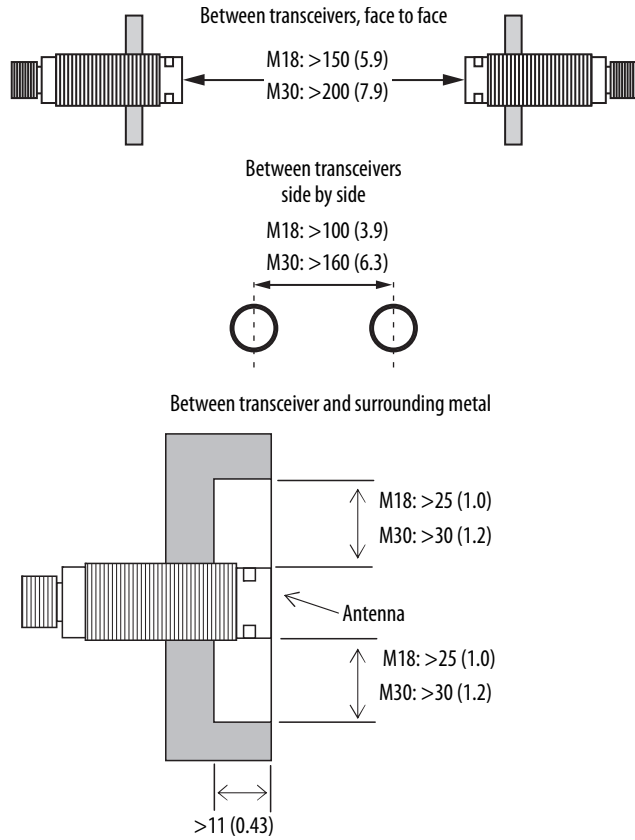
Attribute	56RF-TR-M18	56RF-TR-M30
Supply voltage	24V DC	
Current consumption, max	100 mA	
Tag compatibility	ICODE tags SLI, SL2, SLIX ISO 15693/ISO 18000-3 M1	ICODE tags SLI, SL2 ISO 15693/ISO 18000-3 M1
Connector	M12, 4-pin male	
Communication systems	Half-duplex communication system (RS-485)	
Communication rate (host)	9600/19,200/38,400/115,200 bps	
Frequency	13.56 MHz	
Communication rate (tag)	26.48 Kbps	
Data length	8 bit	
Temperature, operating	-25...+70 °C (-13...+158 °F)	
Temperature, storage	-40...+85 °C (-40...+185 °F)	
Operating humidity (noncondensing)	35...95% RH	
Storage humidity (noncondensing)	25...85% RH	
Vibration	10 g at 10...500 Hz	
Shock resistance	50 g	
Enclosure rating	IP67	
Material	PBT and nickel-plated steel	
Recommended sensing distance ⁽¹⁾	30 mm (1.18 in.)	45 mm (1.77 in.)
Sensing distance, max ⁽¹⁾	55 mm (2.16 in.)	75 mm (3 in.)
Distance from interface module, max	91.4 m (300 ft)	
Compliance	CE	

(1) Range reference for a 50 mm (2.0 in.) diameter tag

Minimum Distances

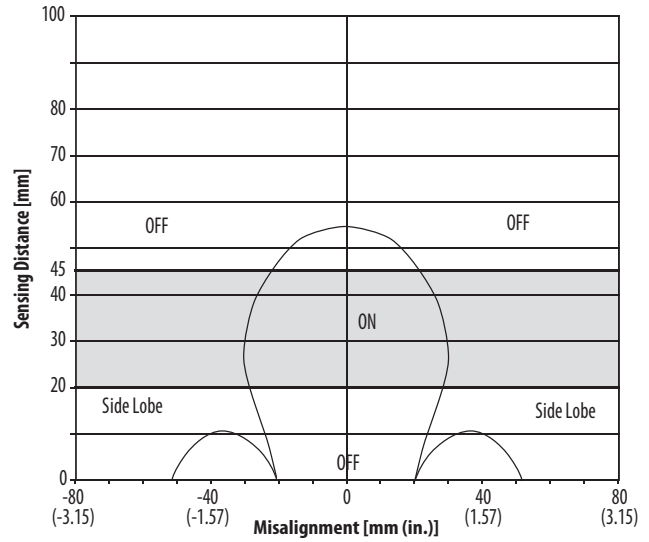
Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 2 - Minimum Distance Dimensions



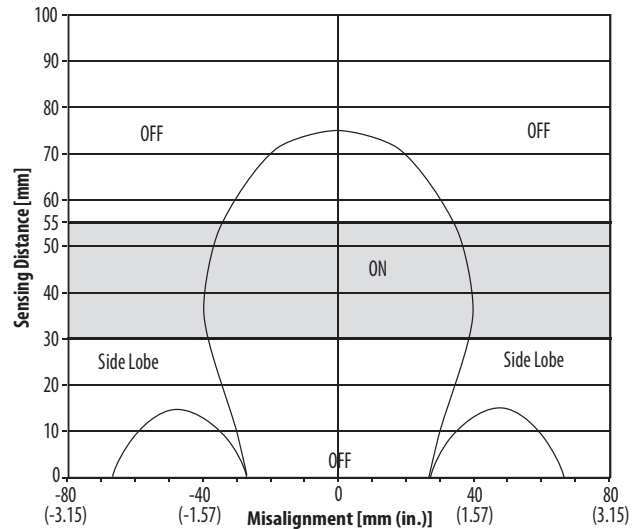
Scanning Area

Figure 3 - M18 Cylindrical Transceiver Scanning Area



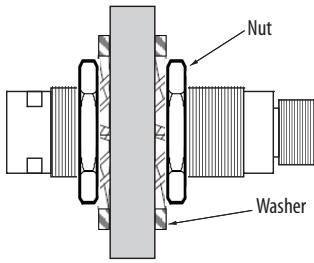
IMPORTANT Ideal tag distance for maximum performance is 20...45 mm (0.79...1.77 in.). Referenced to 50 mm (2.0 in.) disc tag.

Figure 4 - M30 Cylindrical Transceiver Scanning Area



IMPORTANT Ideal tag distance for maximum performance is 30...55 mm (1.2...2.2 in.). Referenced for a 50 mm (2.0 in.) disc tag.

Tightening Torque



IMPORTANT Nuts and washers are included.

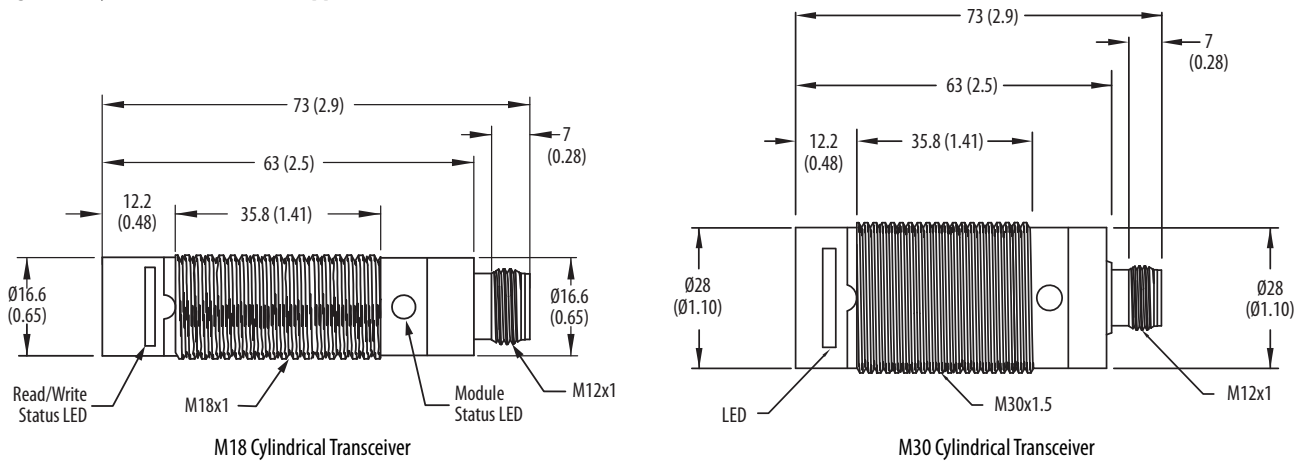
Table 11 - Mounting Nut Torque

Transceiver	Torque [N·m (ft·lb)]
M18	19.8 (14.6)
M30	33.9 (25)

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 5 - Cylindrical Transceiver Approximate Dimensions



Square 40 x 40 mm Transceiver

The square transceiver is designed for use with the Allen-Bradley high frequency 13.56 MHz RFID system. This transceiver is ISO 15693 compliant and can read/write ICODE tags SLI and SL2, which allows for infinite tag configuration options from various manufacturers. Local status indicators allow for quick visual diagnosis of module status and read/write status.

Square transceivers have universal mounting capability and measure 40 x 40 mm (1.57 x 1.57 in.). Transceivers can be mounted up to 91.4 m (300 ft) away from the interface module, and tags are readable from distances up to 85 mm (3.3 in.). This transceiver has an enclosure rating of IP67 and is designed to withstand harsh industrial environments.

Product Selection

Description	Cat. No.
Square 40 x 40 mm transceiver	56RF-TR-4040

Specifications

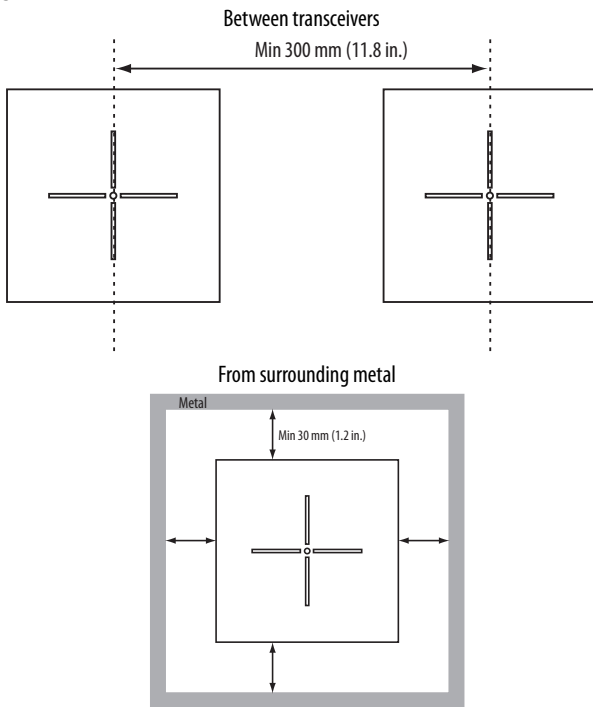
Attribute	56RF-TR-4040
Supply voltage	24V DC (-20...+10%)
Current consumption, max	100 mA
Tag compatibility	ICODE tags SLI, SL2 ISO 15693 / ISO 18000-3 M1
Connector	M12 4-pin male
Communication systems	Half-duplex communication system (RS-485)
Communication rate (host)	9600/19,200/38,400/115,200 bps
Frequency	13.56 MHz
Communication rate (tag)	26.48 kbit/s
Data length	8 bit
Enclosure rating	IP67
Temperature, operating	-25...+60 °C (-13...+140 °F)
Temperature, storage	-40...+85 °C (-40...+185 °F)
Operating humidity (noncondensing)	35...95% RH
Storage humidity (noncondensing)	25...85% RH
Vibration	10 g at 10...500 Hz
Shock resistance	50 g
Recommended sensing distance ⁽¹⁾	50 mm (1.97 in.)
Sensing distance, max ⁽¹⁾	85 mm (3.35 in.)
Distance from interface module, max	91.4 m (300 ft)
Compliance	CE, c-UL-us, C-Tick
Type of equipment	Industrial control

(1) Range reference for a 50 mm (2.0 in.) diameter tag

Minimum Distances

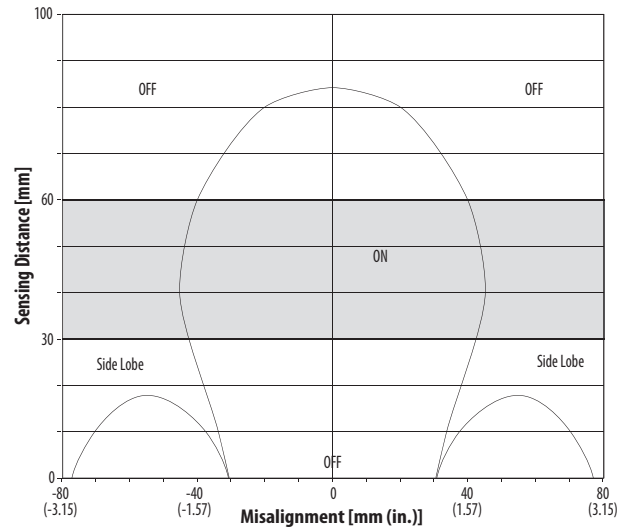
Dimensions that are shown are not intended to be used for installation purposes.

Figure 6 - Minimum Distance Dimensions



Scanning Area

Figure 7 - Square 40 x 40 mm Transceiver Scanning Area

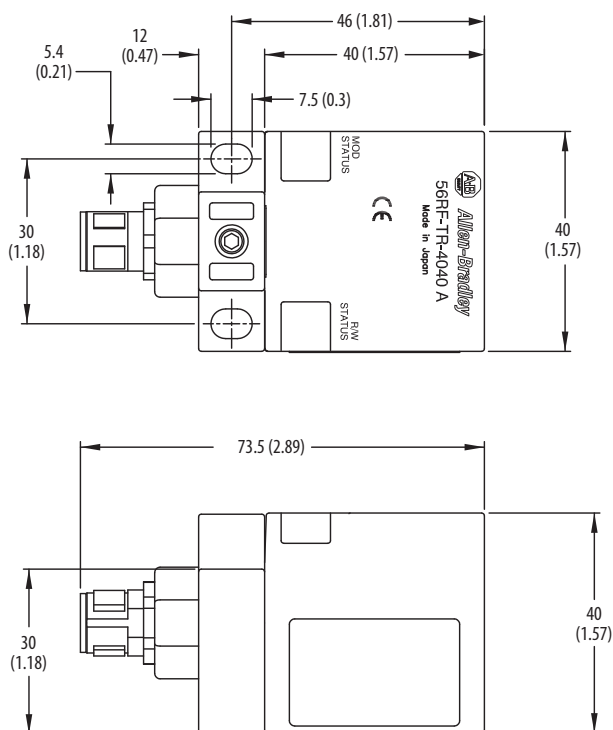


IMPORTANT Ideal tag distance for maximum performance is 30...60 mm (1.2...2.4 in.).
Referenced for a 50 mm (2.0 in.) disc tag.

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 8 - Square 40 x 40 mm Transceiver Dimensions



Rectangular 80 x 90 mm Transceiver

The 80 x 90 mm (3.15 x 3.54 in.) rectangular transceiver is the largest transceiver in the Allen-Bradley high-frequency 13.56 MHz RFID family. This transceiver is ISO 15693 compliant and can read/write ICODE tags SLI and SL2, which allows for infinite tag configuration options from various manufacturers. Local status indicators allow for quick visual diagnosis of module status and read/write status.

Rectangular transceivers are recommended for high-speed/high-performance applications because of their large sensing range. Transceivers can be mounted up to 91.4 m (300 ft) away from the interface module, and tags are readable from distances up to 168 mm (6.6 in.). This transceiver has an enclosure rating of IP67 and is designed to withstand harsh industrial environments.

Product Selection

Description	Cat. No.
Rectangular 80 x 90 mm transceiver	56RF-TR-8090

Specifications

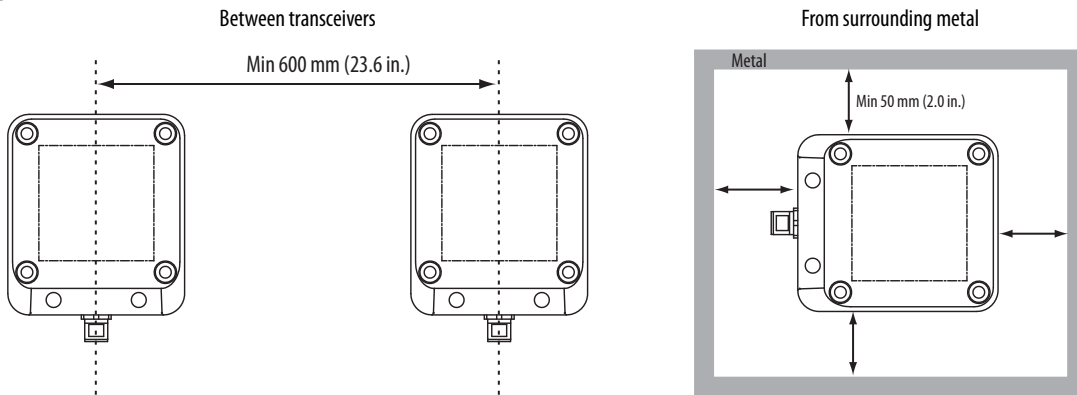
Attribute	56RF-TR-8090
Supply voltage	24V DC (-20...+10%)
Current consumption, max	100 mA
Tag compatibility	ICODE tags SLI, SL2 ISO 15693 / ISO 18000-3 M1
Connector	M12 4-pin male
Communication systems	Half-duplex communication system (RS-485)
Communication rate (host)	9600/19,200/38,400/115,200 bps
Frequency	13.56 MHz
Communication rate (tag)	26.48 kbit/s
Data length	8 bit
Enclosure rating	IP67
Temperature, operating	-25...+70 °C (-13...+158 °F)
Temperature, storage	-40...+85 °C (-40...+185 °F)
Operating humidity (noncondensing)	35...95% RH
Storage humidity (noncondensing)	25...85% RH
Vibration	10 g at 10...500 Hz
Shock resistance	50 g
Recommended sensing distance ⁽¹⁾	102 mm (4 in.)
Sensing distance, max ⁽¹⁾	168 mm (6.6 in.)
Distance from Interface Module, max	91.4 m (300 ft)
Compliance	CE, c-UL-us, C-Tick
Type of equipment	Industrial control

(1) Range reference for a 50 mm (2.0 in.) diameter tag

Minimum Distances

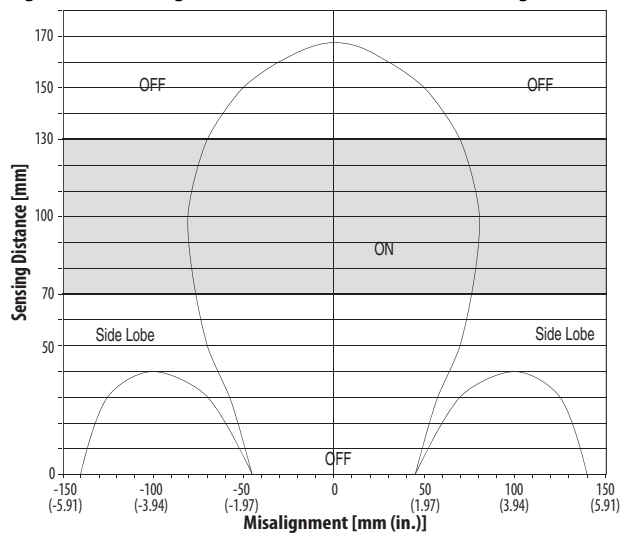
Dimensions that are shown are not intended to be used for installation purposes.

Figure 9 - Minimum Distance Dimensions



Scanning Area

Figure 10 - Rectangular 80 x 90 mm Transceiver Scanning Area

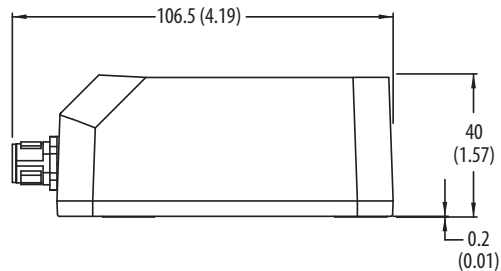
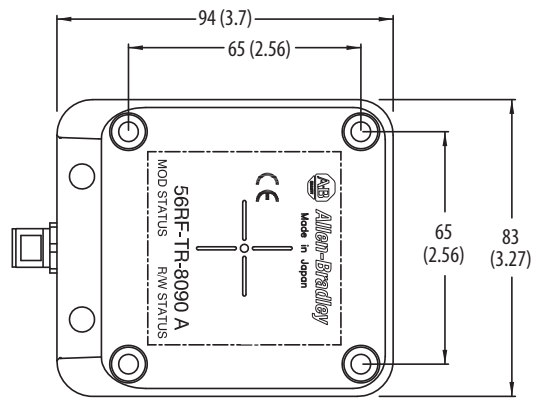


IMPORTANT Ideal tag distance for maximum performance is 70...130 mm (2.8...5.1 in.).
Referenced for a 50 mm (2.0 in.) disc tag.

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

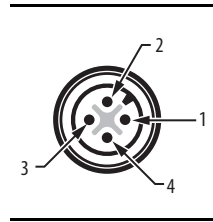
Figure 11 - Rectangular 80 x 90 mm Transceiver Dimensions



Status Indicator Illumination Pattern

Status Indicator Display	State	Status
Module status indicator	Green light	Power on
	No illumination	No power
Read/write indicator	Green light	Normal operation
	Flashing green (short interval)	Communicating
	Flashing amber (short interval)	Sensing tag
	Flashing red (long interval)	Communication error
	Flashing green (long interval)	No tag

Connector Pinout



Pin	Signal
1	24V DC
2	Data +
3	GND
4	Data -

Transceiver Cordsets and Patchcords

Table 12 - Cordsets

No. of Pins	Color Code	Shield	Wire Size [AWG]	Cat. No. ^{(1) (2)}			
				Straight Female	Right Angle Female	Straight Male	Right Angle Male
4-pin	A	Foil Shield	22	889D-F5FC-Jx	889D-R5FC-Jx	889D-M5FC-Jx	889D-E5FC-Jx

- (1) Replace x with 5 [5 m (16.4 ft)] or 10 [10 m (33 ft)] for standard cable lengths.
- (2) Stainless steel connectors can be ordered by adding an S to the catalog number (example: Cat. No. 889DS-F5FC-J5).

Table 13 - Patchcords

No. of Pins	Color Code	Shield	Wire Size [AWG]	Cat. No. ^{(1) (2)}			
				Straight Female Straight Male	Straight Female Right Angle Female	Right Angle Female Straight Male	Right Angle Female Right Angle Male
4-pin	A	Foil Shield	22	889D-F5FCDM-Jx	889D-F5FCDE-Jx	889D-R5FCDM-Jx	889D-R5FCDE-Jx

- (1) Replace x with 0M3 [0.3 m (11.8 in.)], 1 [1 m (3.3 ft)], 5 [5 m (16.4 ft)], or 10 [10 m (33 ft)] for standard cable lengths.
- (2) Stainless steel connectors can be ordered by adding an S to the catalog number (example: Cat. No. 889DS-F5FCDM-J5).

Tags

Our line of RFID 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.

- ICODE ISO 15693 compliant
- Multiple physical and memory sizes available
- Passive tags (no battery)
- 64 to 2K Bytes tags

Disc Tag — ICODE SLI, SLIx, and SL2 Memory

Available as 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 20 mm mount on metal, 30 mm, 35 mm high-impact resistant, 50 mm, and 51 mm high-temperature tags.

Specifications

Table 14 - 8 mm, 10 mm, 12 mm, and 16 mm Tags

Attribute	8 mm (Cat. No. 56RF-TG-8)	10 mm (Cat. No. 56RF-TG-10)	12 mm (Cat. No. 56RF-TG-12MOM)	16 mm (Cat. No. 56RF-TG-16)
Features	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits
Chip type	SLI	SLI	SLIx	SLI
Typical operating frequency	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz
External diameter	7.5 ± 0.2 mm (0.3 ± 0.01 in.)	9.5 ± 0.3 mm (0.4 ± 0.01 in.)	12.4 ± 0.25 mm (0.5 ± 0.01 in.)	16.0 ± 0.2 mm (0.6 ± 0.01 in.)
Thickness	1.0 ± 0.3 mm (0.04 ± 0.01 in.)	1.0 ± 0.3 mm (0.04 ± 0.01 in.)	2.15 ± 0.50 mm (0.08 ± 0.02 in.)	3.0 ± 0.2 mm (0.1 ± 0.01 in.)
Weight	110 ± 20 mg (0.004 ± 0.0007 oz)	110 ± 20 mg (0.004 ± 0.0007 oz)	0.6 ± 0.12 g (0.021 ± 0.004 oz)	1.0 ± 0.15 g mm (0.035 ± 0.005 oz)
Material	Epoxy	Epoxy	PPS (housing) and epoxy (potting)	FORTRON 6165A6 (PPS)
Color	Yellowish	Yellowish	Black	White (natural)
Package quantity	25 units (plastic bag)	25 units (plastic bag)	25 units (plastic bag)	25 units (plastic bag)
Mechanical	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	—
Chemical/environmental	Water IP67 (1 m/24 hr)	Water IP67 (1 m/24 hr)	<ul style="list-style-type: none"> • Water IP68 (1 m/24 hr) • 100 hrs, 20 °C (68 °F): Salt mist, fuel B, petroleum, and mineral/vegetable oils 	<ul style="list-style-type: none"> • 100 hrs, 20 °C (68 °F): HCl (10%), bleach (5%), caustic soda (PH 11), Perchloroethylene (100%), and neutralizing agent • 100 hrs, 70 °C (158 °F): Industrial laundry detergent (PH 10...11) and hydrogen peroxide (5%)
Compliance	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1
Temperature, storage	-40...+85 °C (-40...+185 °F) 1000 hr	-40...+85 °C (-40...+185 °F) 1000 hr	-40...+90 °C (-40...+194 °F) 1000 h	-25...+85 °C (-13...+185 °F) 1000 hr
Temperature, peak	100 °C (212 °F) 1 hr	100 °C (212 °F) 1 hr	120 °C (248 °F) 100 hr	120 °C (248 °F) 100 hr
Temperature, operating	-25...+85 °C (-13...+185 °F)	-25...+85 °C (-13...+185 °F)	-40...+85 °C (-40...+185 °F)	-25...+85 °C (-13...+185 °F)
Temperature, shock/fatigue	-40...+85 °C (-40...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-40...+85 °C (-40...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-40...+90 °C (-40...+194 °F) 100 cycles (soaking time 5 min, transition time 30 s)	20...160 °C (68...320 °F) 100 cycles (soaking time 5 min, transition time 30 s)

Table 15 - 20 mm, 30 mm, 35 mm High-impact Resistant, and 50 mm Tags

Attribute	20 mm (Cat. No. 56RF-TG-20)	30 mm (Cat. No. 56F-TG-30)	35 mm High Impact Resistant (Cat. No. 56RF-TG-35HIR)	50 mm (Cat. No. 56RF-TG-50)
Features	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits
Chip type	SLI	SLI	SLI	SLI
Typical operating frequency	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz
External diameter	20.0 ± 0.5 mm (0.8 ± 0.02 in.)	30.0 ± 0.5 mm (1.2 ± 0.02 in.)	34.0 ± 0.3 mm (1.3 ± 0.01 in.)	50.0 ± 0.5 mm (2.0 ± 0.02 in.)
Central hole diameter	—	5.2 ± 0.3 mm (0.2 ± 0.01 in.)	5.6 ± 0.3 mm (0.2 ± 0.01 in.)	5.2 ± 0.3 mm (0.2 ± 0.01 in.)
Thickness	3.0 ± 0.5 mm (0.1 ± 0.02 in.)	3.0 ± 0.5 mm (0.1 ± 0.02 in.)	8.0 ± 0.3 mm (0.3 ± 0.01 in.)	3.5 ± 0.5 mm (0.1 ± 0.02 in.)
Weight	1.3 ± 0.3 g (0.05 ± 0.01 oz)	3.0 ± 0.6 g (0.1 ± 0.02 oz)	7.8 ± 0.6 g (0.3 ± 0.02 oz)	9.5 ± 2.0 g (0.3 ± 0.07 oz)
Material	PA6	PA6	PA6 High Impact	PA6
Color	Black 9205	Black 9205	Black 9205	Black 9205
Package quantity	25 units (plastic bag)	25 units (plastic bag)	25 units (plastic bag)	25 units (plastic bag)
Mechanical	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6)
Chemical/environmental	Water IP69K (2m/24 hr)	Water IP69K (2m/24 hr)	Water IP69K (2m/24 hr)	Water IP69K (2m/24 hr)
Compliance	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1
Temperature, storage	-40...+90 °C (-40...+194 °F) 1000 h	-40...+90 °C (-40...+194 °F) 1000 h	-40...+90 °C (-40...+194 °F) 1000 h	-40...+90 °C (-40...+194 °F) 1000 h
Temperature, peak	140 °C (284 °F) 100 h	140 °C (284 °F) 100 hr	100 °C (212 °F) 100 hr	140 °C (284 °F) 100 hr
Temperature, operating	-20...+85 °C (-4...+185 °F)	-20...+85 °C (-4...+185 °F)	-25...+85 °C (-13...+185 °F)	-20...+85 °C (-4...+185 °F)
Temperature, shock/fatigue	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-30...+90 °C (-22...+194 °F) 50 cycles (soaking time 10 min, transition time 30 s)	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)

Table 16 - 20 mm Mount on Metal and 51 mm High-temperature Tags

Attribute	50 mm Mount on Metal (Cat. No. 56RF-TG-50MOM)	51 mm High-temperature (Cat. No. 56RF-TG-50HT)
Features	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits 	<ul style="list-style-type: none"> • 1024 bits memory size (32 blocks of 4 bytes) • 896 user bits
Chip type	SLI	SL2
Typical operating frequency	13.56 MHz	13.56 MHz
External diameter	55 ± 0.25 mm (2.2 ± 0.01 in.)	51.0 x 51.0 ± 0.5 mm (2.0 x 2.0 ± 0.02 in.)
Thickness	5.5 ± 0.1 mm (0.2 ± 0.004 in.)	6.5 ± 0.5 mm (0.3 ± 0.02 in.)
Central Hole diameter	13 mm (0.5 in.)	5.5 ± 0.5 mm (0.2 ± 0.02 in.) Counterbore 10.5 mm (0.413 in.)
Weight	30 ± 6 g (1.1 ± 0.2 oz)	30 g (1.06 oz) typical
Material	Acc. to ISO 1874: PA6T/6I-GF50 Acc. to ASTM: PPA, Polyphthalamide CAS number 25750-23-6	PPS plastics
Color	Black	Black
Package quantity	10 units (plastic bag)	25 units (plastic bag)
Mechanical	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6)
Chemical/environmental	Water IP69K (2m/24 hr)	IP68
Compliance	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693
Temperature, storage	-40...+90 °C (-40...+194 °F) 1000 h	-55...+185 °C (-67...+365 °F) (cumulative time more than 1500 h)
Temperature, peak	140 °C (284 °F) 100 hr	<ul style="list-style-type: none"> • 200 °C (392 °F)/60 min • 220 °C (428 °F)/45 min • 240 °C (464 °F)/30 min
Temperature, operating	-25...+85 °C (-13...+185 °F)	-25...+85 °C (-13...+185 °F)

IMPORTANT For information about the testing of our high-temperature tags, see [High-temperature Tag Testing](#) on page 28.

Memory Organization

The memory contains 1024 bit, organized in 32 blocks of 4 bytes each.

Table 17 - Memory Organization

	Byte 0	Byte 1	Byte 2	Byte 3	
Block -4	UID0	UID1	UID2	UID3	Unique Identifier (lower bytes)
Block -3	UID4	UID5	UID6	UID7	Unique Identifier (higher bytes)
Block -2	Internally used	EAS	AFI	DSFID	EAS, AFI, DSFID
Block -1	00	00	00	00	Write Access Conditions
Block 0	x	x	x	x	User Data
Block 1	x	x	x	x	
Block 2	x	x	x	x	
Block 3	x	x	x	x	
Block 4	x	x	x	x	
Block 5	x	x	x	x	
Block 6	x	x	x	x	
Block 7	x	x	x	x	
Block 8	x	x	x	x	
Block 9	x	x	x	x	
Block 10	x	x	x	x	
Block 11	x	x	x	x	
Block 12	x	x	x	x	
Block 13	x	x	x	x	
Block 14	x	x	x	x	
Block 15	x	x	x	x	
Block 16	x	x	x	x	
Block 17	x	x	x	x	
Block 18	x	x	x	x	
Block 19	x	x	x	x	
Block 20	x	x	x	x	
Block 21	x	x	x	x	
Block 22	x	x	x	x	
Block 23	x	x	x	x	
Block 24	x	x	x	x	
Block 25	x	x	x	x	
Block 26	x	x	x	x	
Block 27	x	x	x	x	User Data

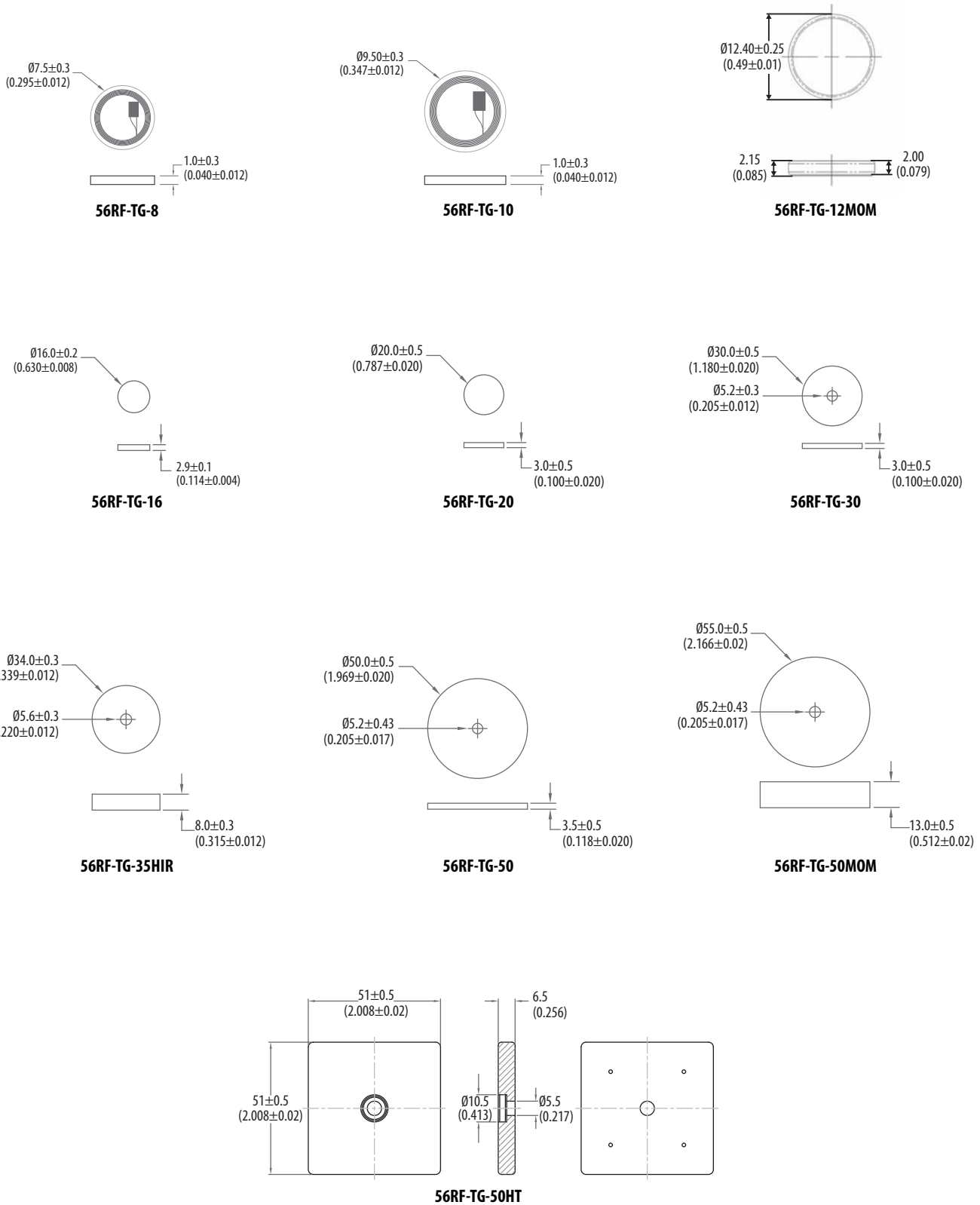
The values (in hexadecimal notation) shown in the previous are stored in the EEPROM after the wafer production process. The contents of blocks that are marked with an x in [Table 17](#) are not defined at delivery.

With read and write commands only blocks 0...27 can be addressed.

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 12 - Tag Dimensions



Disc Tag — ICODE FRAM Memory

Available as 20 mm, 30 mm, 50 mm, and 50 mm mount on metal tags.

Specifications

Table 18 - 20 mm, 30 mm, 50 mm, and 50 mm Mount on Metal

Attribute	20 mm (Cat. No. 56RF-TG-20-2KB)	30 mm (Cat. No. 56RF-TG-30-2KB)	50 mm (Cat. No. 56RF-TG-50-2KB)	50 mm Mount on Metal (Cat. No. 56RF-TG-50-2KBMOM)
Features	<ul style="list-style-type: none"> 16 kbits FRAM® memory that is organized in 256 blocks of 8 bytes High endurance memory: 10¹⁰ writings Data retention >10 years [at ≤55° C (131° F)] 	<ul style="list-style-type: none"> 16 kbits FRAM memory that is organized in 256 blocks of 8 bytes High endurance memory: 10¹⁰ writings Data retention >10 years [at ≤55° C (131° F)] 	<ul style="list-style-type: none"> 16 kbits FRAM memory that is organized in 256 blocks of 8 bytes High endurance memory: 10¹⁰ writings Data retention >10 years [at ≤55° C (131° F)] 	<ul style="list-style-type: none"> 2 kbytes FRAM memory (including 2000 bytes of user area) that is organized in 256 blocks of 8 bytes High endurance memory: 10¹⁰ writings Data retention 10 years [at 70° C (158° F)]
Typical operating frequency	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz
External diameter	20.0 ± 0.5 mm (0.8 ± 0.02 in.)	30.0 ± 0.5 mm (1.2 ± 0.02 in.)	50.0 ± 0.5 mm (2.0 ± 0.02 in.)	55.0 ± 0.5 mm (2.2 ± 0.02 in.)
Central hole diameter	—	5.2 ± 0.3 mm (0.2 ± 0.01 in.)	5.2 ± 0.3 mm (0.2 ± 0.01 in.)	5.2 ± 0.3 mm (0.2 ± 0.01 in.)
Thickness	3.0 ± 0.5 mm (0.1 ± 0.02 in.)	3.0 ± 0.5 mm (0.1 ± 0.02 in.)	3.5 ± 0.5 mm (0.1 ± 0.02 in.)	13.0 ± 0.5 mm (0.5 ± 0.02 in.)
Weight	1.3 ± 0.3 g (0.05 ± 0.01 oz)	3.0 ± 0.6 g (0.1 ± 0.02 oz)	9.5 ± 2.0 g (0.3 ± 0.07 oz)	9.5 ± 2.0 g (0.3 ± 0.07 oz)
Material	PA6	PA6	PA6	PA6 modified - SOK001
Color	Black 9205	Black 9205	Black 9205	Black
Package quantity	25 units (plastic bag)	25 units (plastic bag)	25 units (plastic bag)	10 units (plastic bag)
Mechanical	<ul style="list-style-type: none"> Shock (IEC 68-2-29) Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> Shock (IEC 68-2-29) Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> Shock (IEC 68-2-29) Vibration (IEC 68-2-6) 	<ul style="list-style-type: none"> Shock (IEC 68-2-29) Vibration (IEC 68-2-6)
Chemical/environmental	Water IP69K (2m/24 hr)	Water IP69K (2m/24 hr)	Water IP69K (2m/24 hr)	Water IP69K (2m/24 hr)
Compliance	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	Compliant with ISO/IEC 15693 and 18000-3 Mode 1
Temperature, storage	-40...+90 °C (-40...+194 °F) 1000 h	-40...+90 °C (-40...+194 °F) 1000 h	-40...+90 °C (-40...+194 °F) 1000 h	-40...+90 °C (-40...+194 °F) 1000 h
Temperature, peak	140 °C (284 °F) 100 hr	140 °C (284 °F) 100 hr	140 °C (284 °F) 100 hr	140 °C (284 °F) 100 hr
Temperature, operating	-20...+85 °C (-4...+185 °F)	-20...+85 °C (-4...+185 °F)	-20...+85 °C (-4...+185 °F)	-20...+85 °C (-4...+185 °F)
Temperature, shock/fatigue	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)	-20...+85 °C (-4...+185 °F) 50 cycles (soaking time 5 min, transition time 30 s)

Memory Organization

The memory has 2000 bytes for use as user area and 48 bytes for use as system area. The total area consists of 256 blocks (250 blocks of user area and 6 blocks of system area). Each block can store 64 bits (8 bytes) of data. The block is the unit that is used for data writing and reading.

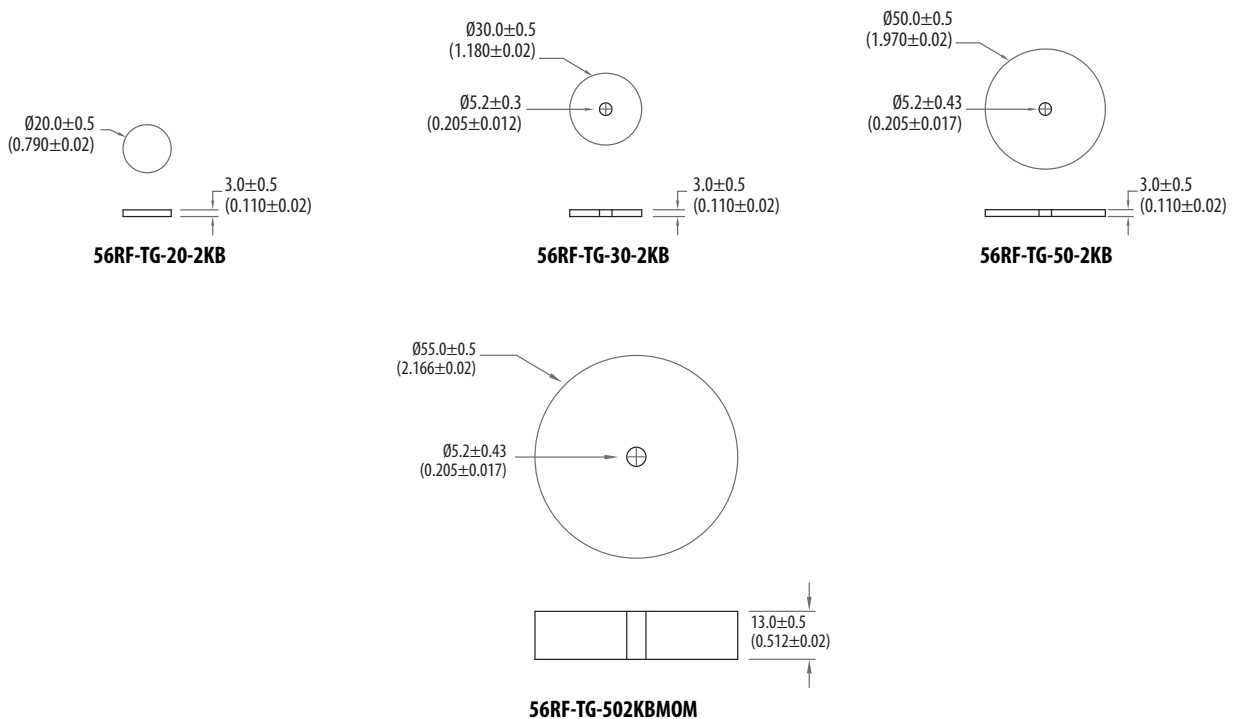
Table 19 - Memory Organization

Area	Block No.	
User	00 _H	
	01 _H	
	02 _H	
	...	
	...	
	F8 _H	
	F9 _H	
System	FA _H	UID
	FB _H	EAS, AFI, DSFID, lock status
	FC _H	Write Access Status
	FD _H	Write Access Status
	FE _H	Write Access Status
	FF _H	Write Access Status

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 13 - Tag Dimensions



Disc Tag — ICODE Large FRAM Memory

Available as a 30 mm 8 Kb tag.

Specifications

Table 20 - General Specifications

Attribute	30 mm 8 Kb (Cat. No. 56RF-TG-30-8KB)
Features	<ul style="list-style-type: none"> • Memory capacity of 9 kBytes FRAM (including 8192 bytes of user area) • 32-byte/block configuration, 256 blocks • Endurance: 10^{12} writes and reads to memory • Data Retention: 10 years (85 °C [185 °F])
Typical operating frequency	13.56 MHz
External diameter	30 ± 0.5 mm (1.2 ± 0.02 in.)
Central hole diameter	5.2 ± 0.3 mm (0.2 ± 0.01 in.)
Thickness	3.0 ± 0.5 mm (0.1 ± 0.02 in.)
Weight	3.0 g (0.1 oz)
Material	According to ISO 1874: PA6T/6I-GF50 According to ASTM: PPA, Polyphthalamide CAS number 25750-23-6
Color	Black
Package quantity	10 units (plastic bag)
Mechanical	<ul style="list-style-type: none"> • Shock (IEC 68-2-29) • Vibration (IEC 68-2-6)
Chemical/environmental	Water IP69K (2m/24 hr)
Compliance	Compliant with ISO/IEC 15693 and 18000-3 Mode 1
Temperature, storage	-40...+90 °C (-40...+194 °F) 1000 h
Temperature, peak	140 °C (284 °F) 100 hr
Temperature, operating	-20...+85 °C (-4...+185 °F)
Temperature, shock/fatigue	-40...+90 °C (-40...+194 °F) 50 cycles (soaking time 5 min, transition time 30 s)

Memory Organization

The FRAM has 8192 bytes for use as a user area and 1024 bytes designated as the system area. The user areas consist of 256 blocks. Each block can store 256 bits (32 bytes) of data. The block is the unit that is used for the writing and reading of FRAM data.

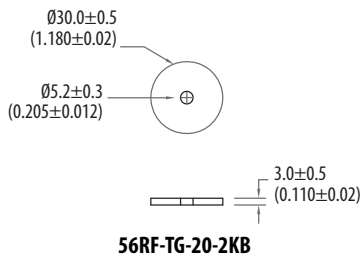
Table 21 - Memory Organization

Area	Block Number (RF)	Logical Address (SPI)	Details	Access	
				RF Communication	SPI Communication
User area (8192 bytes)	000 _H ...0FF _H (1 block = 256 bit)	0000 _H ...0FFF _H (1 address = 16 bit)	User area	Read/write	Read/write
System area (1024 bytes)	100 _H	1000 _H ...100F _H	BSS (Block Security Status)	Read	Read
	101 _H	1010 _H ...101F _H	RLS (Read Lock Status)	Read	Read
	102 _H	1020 _H ...102F _H	SRL (SPI Read Lock)	Read	Read
	103 _H	1030 _H ...103F _H	SWL (SPI Write Lock)	Read	Read
	11E _H	11E0 _H ...11EE _H	AFI, DSFID UID	Read Read	Read Read

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 14 - Tag Dimensions



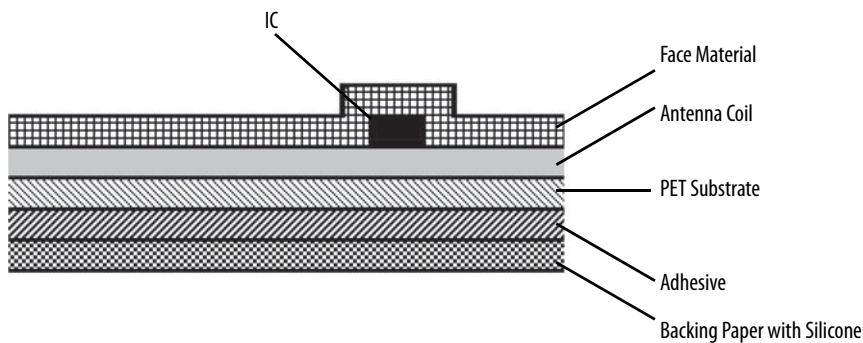
Paper Tag — ICODE SLIx and SLI Memory

Available as 50 x 50 mm and 54 x 86 mm tags.

Specifications

Attribute	50 x 50 mm (Cat. No. 56RF-TG-5050)	54 x 86 mm (Cat. No. 56RF-TG-5486)
Chip type	ICODE SLIx	NXP ICODE SLI
Typical operating frequency	13.56 MHz	
Bend diameter	>50 mm, tension less than 10 N	
Face	Opaque Matt Paper 79	
Backing	Siliconized Paper 56	
Antenna	Aluminum, crimped coil	Aluminum
Adhesive	RA-2RA-2	
Operating temperature, electronic parts	-40...+85 °C (-40...+185 °F)	-25...+85 °C (-13...+185 °F)
Labeling temperature, min	5 °C (41 °F)	
Usage temperature	-10...+120 °C (14...248 °F)	
Peel, min	8 N / 25 mm (FTM 2)	
Printability	Flexography and TTR with selected ribbons. Do not print over IC area.	
Compliance	Compliant with ISO/IEC 15693 and 18000-3 Mode 1	

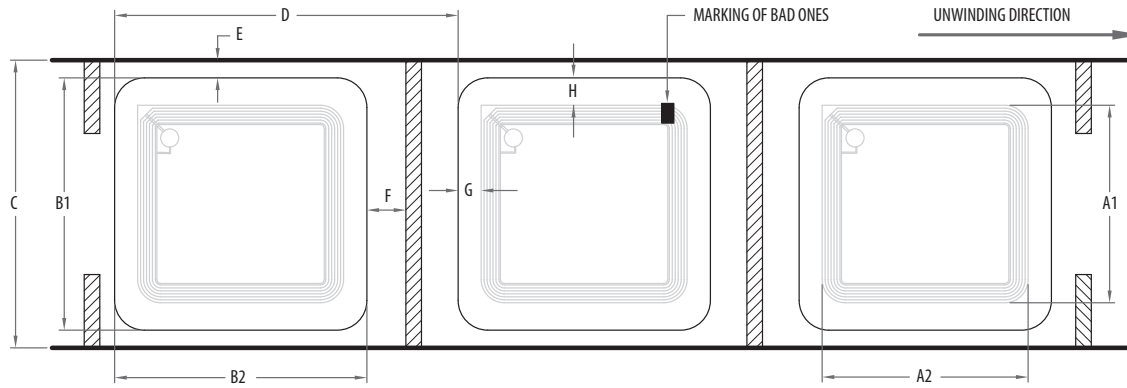
Figure 15 - Structure



Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

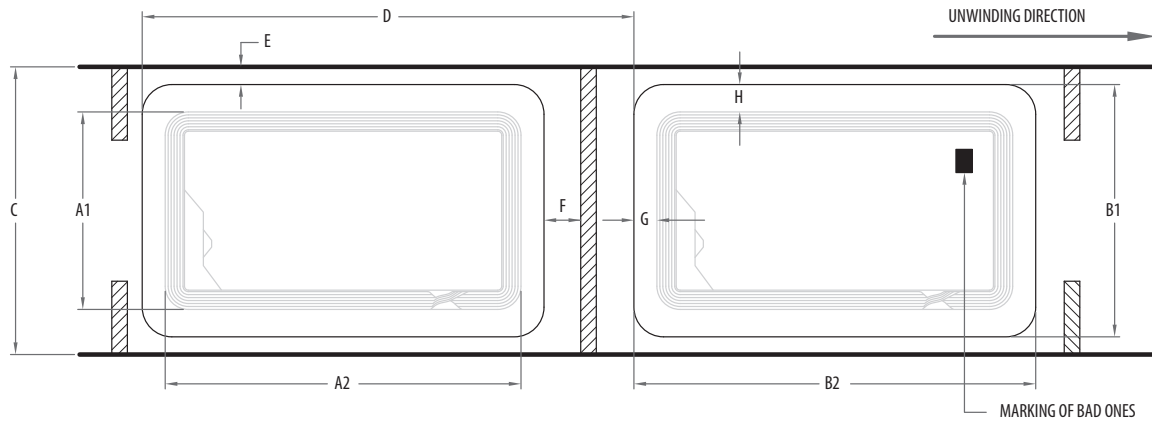
Figure 16 - Paper Tag Dimensions — Catalog Number 56RF-TG-5050



	Description	Dimension
A1 x A2	Coil size	47 x 47 ± 0.5 mm (1.9 x 1.9 ± 0.02 in.)
B1 x B2	Die-cut size	50 x 50 ± 0.2 mm (2.0 x 2.0 ± 0.01 in.)
C	Web width	54 ± 0.5 mm (2.1 ± 0.02 in.)
D	Pitch, length per piece MD	56 ± 1.5 mm (2.2 ± 0.06 in.)
E	Die-cut to web edge	2 ± 1.5 mm (0.08 ± 0.06 in.)
F	Die-cut to register mark	1.5 ± 1.0 mm (0.06 ± 0.04 in.)
G	Coil to die-cut (MD)	1.5 ± 1.5 mm (0.06 ± 0.06 in.)
H	Coil to die-cut (CD)	1.5 ± 1.5 mm (0.06 ± 0.06 in.)
	Thickness of the IC	120 μm ± 15%
	Overall thickness of transponder package (excluding IC and siliconized paper)	208 μm ± 10%
	Thickness of the siliconized paper	56 μm ± 5%

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 17 - Paper Tag Dimensions—Catalog Number 56RF-TG-5486



	Description	Dimension
A1 x A2	Coil size	50 x 82 ± 0.5 mm (2.0 x 3.2 ± 0.02 in.)
B1 x B2	Die-cut size	54 x 86 ± 0.2 mm (2.1 x 3.4 ± 0.01 in.)
C	Web width	57 ± 0.5 mm (2.2 ± 0.02 in.)
D	Pitch, length per piece MD	96 ± 1.5 mm (3.8 ± 0.06 in.)
E	Die-cut to web edge	1.5 ± 1.5 mm (0.06 ± 0.06 in.)
F	Die-cut to register mark	3.5 ± 1.0 mm (0.1 ± 0.04 in.)
G	Coil to die-cut (MD)	2 ± 1.5 mm (0.08 ± 0.06 in.)
H	Coil to die-cut (CD)	2 ± 1.5 mm (0.08 ± 0.06 in.)
	Thickness of the IC	150 μm ± 10%
	Overall thickness of transponder package (excluding IC and siliconized paper)	205 μm ± 10%
	Thickness of the siliconized paper	56 μm ± 5%

Proximity ISO Card — ICODE SLI Memory

Available as a 85.60 x 53.98 mm tag.

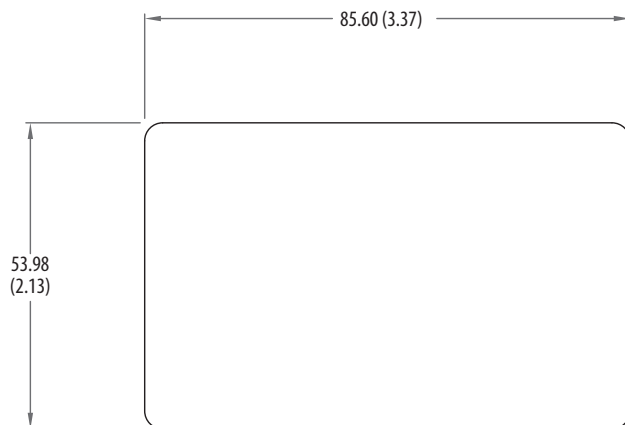
Specifications

Attribute	Cat. No. 56RF-TG-5486SC
Card type	ICODE SLI
Typical operating frequency	13.56 MHz
Length	85.6 ± 0.12 mm (3.4 ± 0.005 in.)
Width	53.98 ± 0.05 mm (2.1 ± 0.002 in.)
Thickness	0.76 ± 0.08 mm (0.03 ± 0.003 in.)
Material	PVC, white/white (glossy)
Color	White/white
Temperature, operating	-35...+50 °C (-31...+122 °F)
Printing	Both sides are fully printable with various technologies

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions that are shown are not intended to be used for installation purposes.

Figure 18 - Proximity ISO Card Dimensions



High-temperature Tag Testing

The following tests are conducted on our high-temperature tags.

Temperature Test Profile — Catalog Number 56RF-TG-50HT

Catalog number 56RF-TG-50HT high temperature tags are tested according to the following profile:

1. Tested at 60 °C (140 °F)
2. Placed in an oven at 185 °C (365 °F) for 30 minutes and then 240 °C (464 °F) for 30 minutes
3. Removed from oven and tested at 60 °C (140 °F)

The cycle was repeated after 20 minutes.

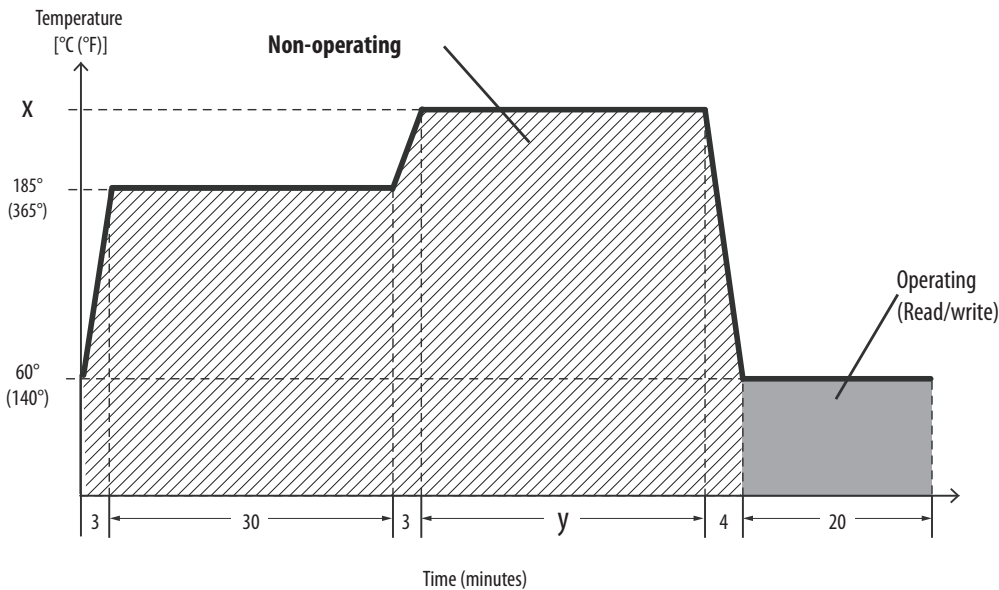
Time at Elevated Temperature

The length of time the tags can withstand elevated temperature depends on the temperature.

Table 22 - Time at Elevated Temperature

Temperature	Time
200 °C (392 °F)	60 min
220 °C (428 °F)	45 min
240 °C (464 °F)	30 min

Figure 19 - Elevated Temperature Graph



Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Bulletin 56RF RFID Industrial Radio Frequency Identification Brochure, publication RFID-BR001	Provides an overview of the entire RFID product line.
Bulletin 56RF RFID Industrial Radio Frequency Identification User Manual, publication 56RF-UM001	Provides information to design, install, program, or troubleshoot control systems that use Bulletin 56RF RFID products.
Bulletin 56RF RFID High Frequency 13.56 MHz RFID EtherNet/IP Interface Block Installation Instructions, publication 56RF-IN008	Provides information to install and configure RFID EtherNet/IP™ interface blocks.
Bulletin 56RF RFID Square 40 mm x 40 mm Transceiver Installation Instructions, publication 56RF-IN009	Provides information to install and configure square (40 x 40 mm) transceivers.
Bulletin 56RF RFID 18 mm Cylindrical Transceiver Installation Instructions, publication 56RF-IN012	Provides information to install and configure 18 mm cylindrical transceivers.
Bulletin 56RF RFID 30 mm Cylindrical Transceiver Installation Instructions, publication 56RF-IN013	Provides information to install and configure 30 mm cylindrical transceivers.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines to install a Rockwell Automation® industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/global/literature-library/overview.page>.

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.	www.rockwellautomation.com/knowledgebase
Local Technical Support Phone Numbers	Locate the phone number for your country.	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.	www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	www.rockwellautomation.com/literature
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	www.rockwellautomation.com/global/support/pcdc.page

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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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