Industrial Radio Frequency Identification (RFID)
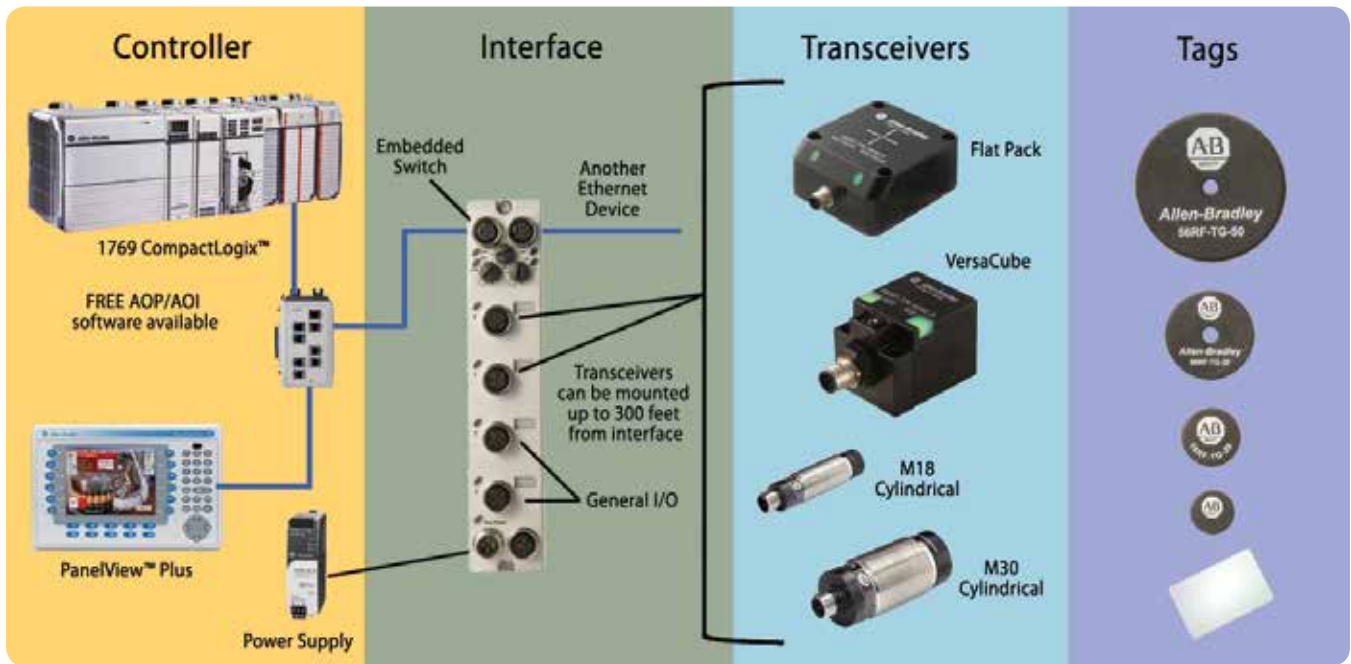
High-Frequency 13.56 MHz ICODE RFID
with EtherNet/IP Interface

Allen-Bradley • Rockwell Software

Rockwell
Automation

RFID SYSTEM COMPONENTS

Interface Block

Receives data from the transceiver and transmits the data to the PLC.

- E/IP embedded switch with DLR
- ISO 15693 / ISO 18000-3 M1
- Read/write ICODE tags SLI, SL2
- Compatible with all 56RF transceivers
- Local I/O

Tags

Memory storage devices that can be read and written to.

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

Transceivers

Gather tag data and send it to E/IP interface.

- Up to 300 ft. between transceiver and interface
- Read/write ICODE tags SLI, SL2, SLI-L, SLI-S
- Read/write up to 4 tags within the transceiver field

Handheld Interface

Accessory to manually read/write tags.

- Microsoft® Windows® CE 5.0
- Transfer data with wireless, Bluetooth®, CompactFlash, USB, or RS-232
- IP65 rated – protects against dust and rain
- Color display with touch screen
- Compatible with all Allen-Bradley® ICODE RFID tags

Industrial Radio Frequency Identification (RFID) systems are a rugged and reliable way to track and document products as they move through the manufacturing process. Unlike the bar code systems used for similar, less demanding applications, industrial RFID systems are designed to withstand harsh environments. Plus, reusable read/write tags allow for flexibility in information and application. ISO 15693 ICODE is an open standard for high-frequency 13.56 MHz RFID. ICODE Tags are lower cost and available from multiple manufacturers in many different styles, physical sizes and memory sizes to fit most applications.

Benefits of RFID

- **Production efficiency**… detailed tracking available of who, when, where and what was done to build products
- **Preprogrammed batches**… tags identify which recipe to load automatically, reducing errors
- **Data storage**…tags can retain data that can be modified by the control system
- **Great in harsh environments**…unlike bar codes, tags can handle rugged environments
- **Tags are reusable**… write over them and alter information (data retention for 10 years and 100,000 write cycles)
- **Faster processing of products**…read/write up to 4 tags within transceiver field
- **Tag does not need to be seen**… can be read inside cases, boxes, or other containers

APPLICATIONS

Automotive

Tags identify door color, type and storage location.

Packaging

Track product through production process.

AGV

Tags embedded in the floor to guide unmanned vehicle through building.

Pharmaceutical

Track drugs via tray through process for traceability, accuracy and warranty.

Learn more... Watch this and other application videos at: ab.com/sensors-switches/rfid

Manufacturing Application – Each tool, person, and machine has an RFID tag for validation and usage count.

- Inventory control by tagging each tool
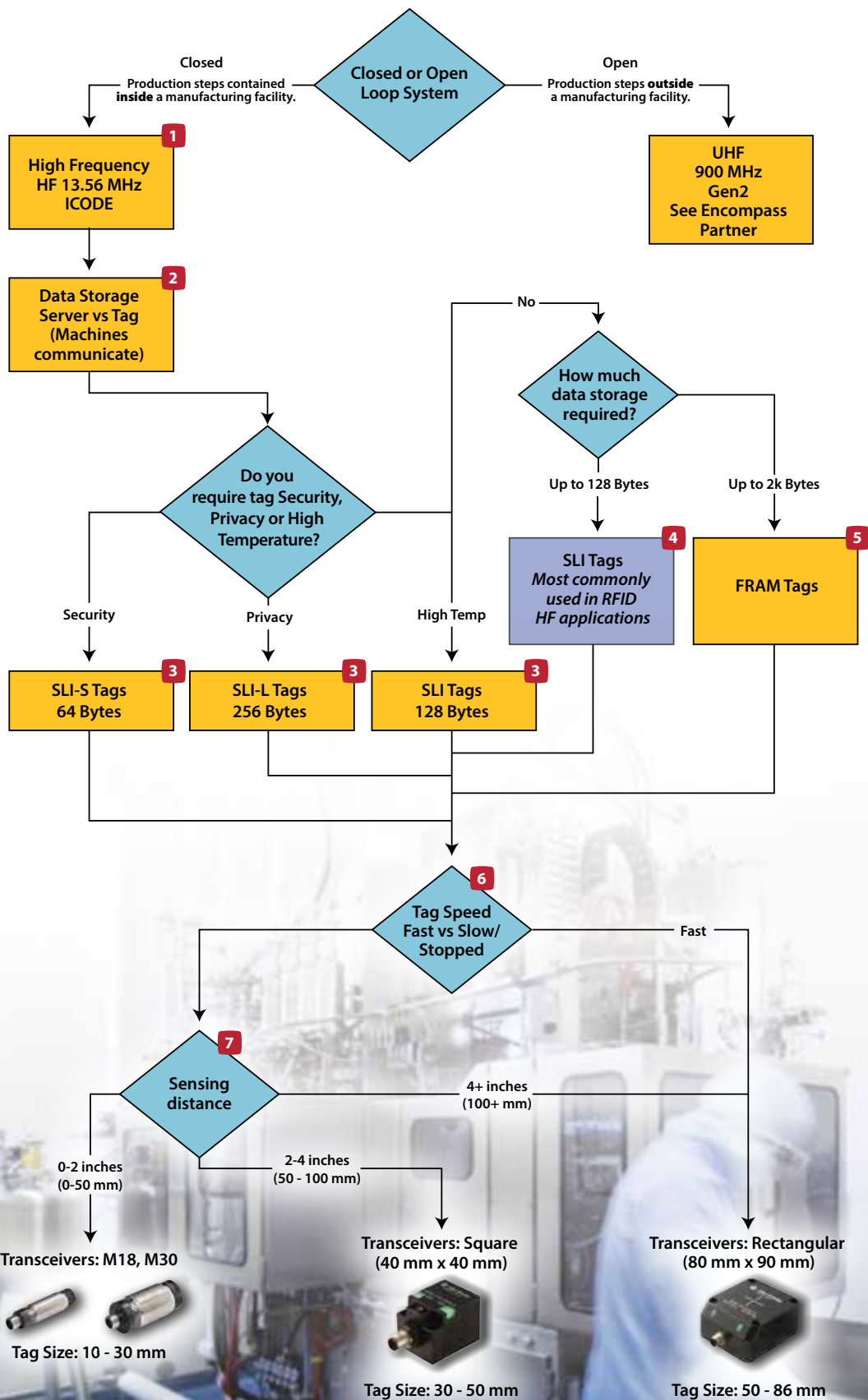- Validate user checking out tool

- Validate tool with machine
- Read/write tool usage count

- Schedule tool maintenance during downtime
- Total tool usage count stored on tool RFID tag

HIGH-FREQUENCY 13.56 MHz ICODE
RFID SELECTION GUIDE

Closed or Open Loop System

Closed — Production steps contained **inside** a manufacturing facility.

Open — Production steps **outside** a manufacturing facility.

1 High Frequency HF 13.56 MHz ICODE

UHF 900 MHz Gen2 See Encompass Partner

2 Data Storage Server vs Tag (Machines communicate)

Do you require tag Security, Privacy or High Temperature?

No

How much data storage required?

Up to 128 Bytes

Up to 2k Bytes

4 SLI Tags *Most commonly used in RFID HF applications*

5 FRAM Tags

Security

Privacy

High Temp

3 SLI-S Tags 64 Bytes

3 SLI-L Tags 256 Bytes

3 SLI Tags 128 Bytes

6 Tag Speed Fast vs Slow/Stopped

Fast

7 Sensing distance

0-2 inches (0-50 mm)

2-4 inches (50 - 100 mm)

4+ inches (100+ mm)

Transceivers: M18, M30

Tag Size: 10 - 30 mm

Transceivers: Square (40 mm x 40 mm)

Tag Size: 30 - 50 mm

Transceivers: Rectangular (80 mm x 90 mm)

Tag Size: 50 - 86 mm

1 High Frequency RFID products are typically used in industrial applications to follow a product through the manufacturing process. The transceiver to tag range is typically less than 8 inches (200 mm). ICODE technology is advantageous because the tags are available from numerous suppliers in an infinite number of physical packages.

2 An application can track the process via the tag either by storing the data directly on the tag or linking the UID (unique identifier) to data in a server. In high-speed applications (> 1.5m/s), it is recommended to read only the UID into the PLC. If the tags are used on multiple machines that do not communicate with each other, then the data is usually stored on the tag. By storing all the data on the tag, the data will be saved through power cycle events on the machine as well.

3 There are several specialty tags available within our portfolio:
- Security
- Privacy protection
- Extreme temperatures

4 Allen Bradley offers label tags, smart cards, disc tags, and square tags, as well as tags for specialty applications such as high impact and mounting on metal. SLI tags are most commonly used in high-frequency industrial RFID applications.

5 These high-memory tags are ideal for applications where the tags move throughout the facility on machines that are not communicating with each other.

6 This section helps determine the recommended transceiver for your application. If you have a high-speed application, it is best to choose the largest transceiver which will provide the largest antenna range. This will provide the longest time the tag is in the field for read/write functions. This will also help when tag misalignment occurs. If your tag will be stopped when all read/write functions occur and tag misalignment is not an issue, smaller transceivers can be used.

7 The larger the transceiver, the larger the antenna field. This typically also correlates to the physical size of the tag. For a larger transceiver, a larger tag is recommended. Conversely, a small transceiver warrants a physically smaller tag.

RFID APPLICATION SIMULATOR

The RFID application simulator will:

- Help design and validate the optimal system for a given application
- Illustrate the size of the transceiver read/write field
- Provide the maximum speed a tag can pass through the field to exchange the data required to and from the tag

This FREE tool can be found in **ProposalWorks** Create Proposals and Submittals
or on the RFID Website:

HIGH-FREQUENCY 13.56 MHz ICODE RFID SOLUTIONS

EtherNet/IP Interface Blocks

	RFID Ports	Inputs	Outputs	Catalog Number
	1	1	1	56RF-IN-IPS12
	2	1	1	56RF-IN-IPD22
	2	2	-	56RF-IN-IPD22A

Handheld Interface

	Description	Catalog Number
	RFID Handheld Interface, 52-Key Directional Pad	57RF-HH-56A
	RFID Handheld Interface, 45-Key Pad	57RF-HH-56B

Transceivers

	Dimensions (mm)	Recommended Sensing Distance (mm)*	Max. Sensing Distance (mm)**	Catalog Number
	Rectangular 80 x 90	100	168	56RF-TR-8090
	Square 40 x 40	50	85	56RF-TR-4040
	Cylindrical M30	35	60	56RF-TR-M30
	Cylindrical M18	18	30	56RF-TR-M18

*Note: Optimum distance for most common applications. Range reference for a 50 mm diameter tag.
** For reference only, during ideal conditions with a 50 mm tag.

Handheld Accessories

Description	Catalog Number
Domestic single-position charging cradle with cable, USB cable, stylus	57RF-HH-56US1
Domestic wall mount power supply, serial cable, USB cable, stylus	57RF-HH-56US2
International power supply kit, serial cable, USB cable, stylus	57RF-HH-56IN
Battery pack, Rechargeable	57RF-HH-56BAT
Serial cable, 15 ft, RS-232	57RF-HH-56CA
64 MB CompactFlash card	1784-CF64
128 MB CompactFlash card	1784-CF128

Tags

Outline	Type	Memory Size	Dimensions (mm)	Catalog Number
Disc				
	SLI	128 Bytes	8	56RF-TG-8
			10	56RF-TG-10
			16	56RF-TG-16
			20	56RF-TG-20
			30	56RF-TG-30
			50	56RF-TG-50
	SLI-L	64 Bytes	16	56RF-TG-16-64B
	SLI-S	256 Bytes	10	56RF-TG-10-256B
Disc – High-Impact Resistant (Extreme Durability)				
	SLI	128 Bytes	35	56RF-TG-35HIR
Disc – Mount on Metal				
	SLI	128 Bytes	20	56RF-TG-20MOM
			50	56RF-TG-50MOM
	FRAM	2K Bytes	50	56RF-TG-50-2KBMOM
Disc – FRAM				
	FRAM	2K Bytes	20	56RF-TG-20-2KB
			30	56RF-TG-30-2KB
			50	56RF-TG-50-2KB
Label (Adhesive Backing)				
	SLI	128 Bytes	54 x 86	56RF-TG-5486
			50 x 50	56RF-TG-5050
Smart Card				
	SLI	128 Bytes	54 x 86	56RF-TG-5486SC
Square – High Temperature (240°C Max)				
	SLI	128 Bytes	50 x 50	56RF-TG-50HT

Accessories

	Connector Type	Number of Pins	Shield	Wire Size (AWG)	Catalog Number
Transceiver	**DC Micro (M12) Patchcords**				
	Female Straight to Male Straight	4-Pin	Shielded	22	889D-F5FCDM-J◆
	Female Straight to Male Right Angle				889D-F5FCDE-J◆
	Female Right Angle to Male Straight				889D-R5FCDM-J◆
	Female Right Angle to Male Right Angle				889D-R5FCDE-J◆
	DC Micro (M12) Cordsets				
	Female Straight	4-Pin	Shielded	22	889D-F5FC-J❖
	Female Right Angle				889D-R5FC-J❖
	Male Straight				889D-M5FC-J❖
	Male Right Angle				889D-E5FC-J❖
	M12 Terminal Chambers				
	Female Straight	4-Pin	–	18-22	871A-TS5-D1
	Female Right Angle				871A-TR5-D1
	Male Straight				871A-TS5-DM1
	Male Right Angle				871A-TR5-DM1

	Connector Type	Number of Pins	Shield	Wire Size (AWG)	Catalog Number
Auxiliary Power	**DC Micro (M12) Patchcords**				
	Female Straight to Male Straight	4-Pin	Unshielded	22	889D-F4ACDM-◆
	Female Straight to Male Right Angle				889D-F4ACDE-◆
	Female Right Angle to Male Straight				889D-R4ACDM-◆
	Female Right Angle to Male Right Angle				889D-R4ACDE-◆
	DC Micro (M12) Cordsets				
	Female Straight	4-Pin	Unshielded	22	889D-F4AC-❖
	Female Right Angle				889D-R4AC-❖
	Male Straight				889D-M4AC-❖
	Male Right Angle				889D-E4AC-❖
	M12 Terminal Chambers				
	Female Straight	4-Pin	–	22	871A-TS4-D
	Female Right Angle				871A-TR4-D
	Male Straight				871A-TS4-DM
	Male Right Angle				871A-TR4-DM

	Connector Type	Number of Pins	Shield	Wire Size (AWG)	Catalog Number
E/IP	**M12 D Code Patchcords**				
	Male Straight to Male Straight	4-Pin	Unshielded	24	1585D-M4TBDM-✳
	Male Straight to Male Right Angle				1585D-M4TBDE-✳
	Male Right Angle to Male Right Angle				1585D-E4TBDE-✳

◆ Available in 0.3, 1, 2, 5, or 10 meter lengths
❖ Available in 2, 5, or 10 meter lengths
✳ Available in 0.3, 0.6, 1, 2, 5, 10, 15, and increments of 5 meters up to 75 meters
Note: See catalog pages for details.

ETHERNET CONNECTIVITY

Rockwell Automation® offers a complete portfolio of network media to help connect your Ethernet enabled components with ease. From switches and controllers to I/O and drives, Allen-Bradley Ethernet connectivity products provide a dependable solution for any application.

Plant-Wide Optimization via Ethernet
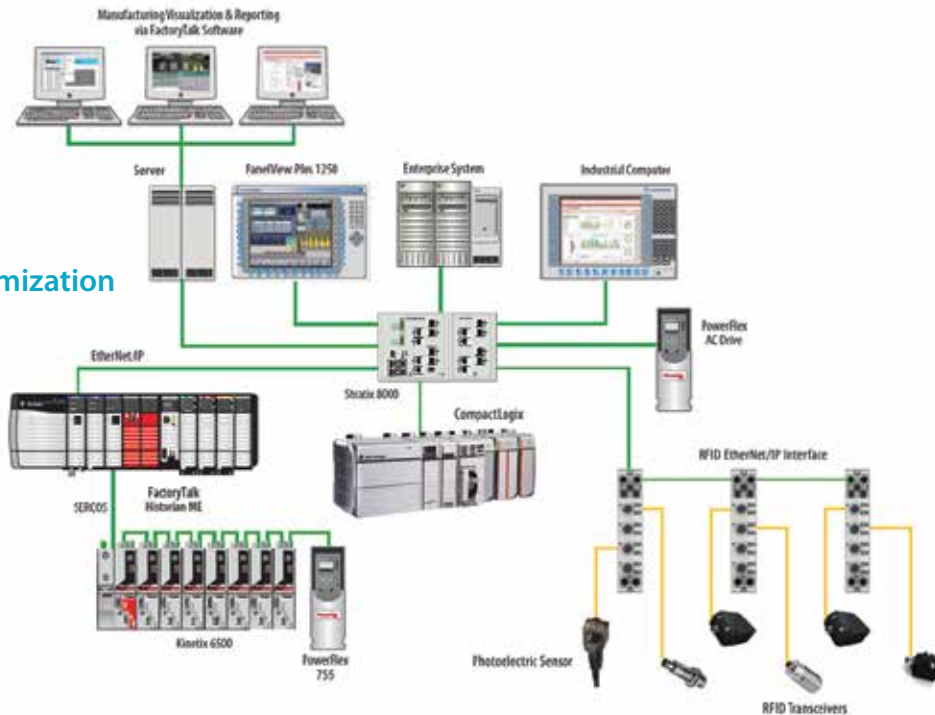
Rockwell Automation offers a breadth of quality Allen-Bradley components to fit your specific needs. In order to assist you with your component selection, we offer a variety of configuration and selection tools.

Local Distributor
- Call 1.800.223.3354 to contact your local Distributor today.
  http://www.rockwellautomation.com/distributor/

RFID Website
- Check out our website at http://ab.rockwellautomation.com/Sensors-Switches/RFID to learn how our Industrial Radio Frequency Identification (RFID) products can help you. There is a Transceiver/Tag Selection Guide to assist you with your order

- With our online catalog, you can perform product searches, download pages in pdf format, receive helpful installation tips and so much more.

Product Selection Toolbox –
Integrated Architecture™ Builder and ProposalWorks™
- Our powerful range of product selection and system configuration tools assist you in choosing and applying our products.
  Go to http://www.rockwellautomation.com/en/e-tools/

- Configure and generate bills of material for NetLinx-based networks with Integrated Architecture Builder

- Easy-to-use ProposalWorks interface makes it a snap to determine the exact Allen-Bradley® products and services you need and current list pricing

- Software automatically selects the appropriate informational documents, photos, etc.

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