

# IMPLEMENTING RFID WITH TIE-ROD CYLINDERS FOR FAST AND EASY MAINTENANCE



*Imagine a scenario where a maintenance manager is preparing for a preventative maintenance shutdown.*

The shutdown timing is critical, and the maintenance manager wants to make sure everything goes smoothly. Hydraulic cylinders are a critical part of the process, and during the shutdown, the manager has to replace a hydraulic cylinder's rod end wiper and seal to ensure continual future performance.

The manager knows that he has to order the right seal package because having the wrong parts during maintenance would significantly delay the job. He also knows he needs the correct identification information on the cylinder to ensure he gets the correct parts. In the past, the process of getting the identification information was truly a chore. All cylinders have identification markings, however when a cylinder is on a machine, identifying that information is extremely difficult as the markings are often covered with industrial dirt. Further, the tag has to be visually read up close and is often hard to get to on the machine.

## MAKING IT EASY WITH RFID

In this same scenario, if the hydraulic cylinder has a RFID tag, it makes the maintenance shutdown much easier. For example, the RFID tag can be made easily accessible. Milwaukee Cylinder RFID tags feature a proprietary tie rod clamping system. When the cylinder is first installed in the machine, the RFID tag is moved to the specific tie rod offering the best access.



With this in place, the maintenance manager simply takes the RFID reader, positions the reader near the tag, and initiates the read. Even though the tag is caked with industrial dirt, the RFID reader immediately captures all the information about the cylinder. The RFID reader displays all the necessary cylinder information, including the serial number, seal kit product number, and more, as well as information regarding when the last maintenance was done.

The maintenance manager takes this information to purchasing, and the right seal kit is ordered. When the maintenance is completed, the manager enters the maintenance information into the RFID Reader—date and type of maintenance—and then using the RFID reader's write feature, sends the information to the tag. Now the information is stored directly on the tag—with no chance of getting lost.



## WHY USE RFID TAGS?

Tie rod cylinders are typically used in industrial applications, and often in critical roles. In many applications, the operating environment where cylinders are used creates a difficult-to-impossible challenge to read a cylinder's identification markings. Implementing RFID not only allows operators to quickly identify the cylinder, but the RFID tag contains all the required information to track and maintain the cylinder. For example, information stored on the Milwaukee Cylinder RFID tag includes serial number, date of manufacture, model number, bore, stroke, pressure rating, full repair kit number and rod seal repair kit number. The RFID tag even includes a maintenance log, where the date and maintenance comments can be stored right on the tag.

## UNDERSTANDING RFID

High-Frequency (HF) RFID tags use passive RFID technology that contains no battery. Tags are powered by the RF waves emitted from the antenna of an RFID Reader. When the tag is within range, coils in the HF RFID tag capture the RF waves to power the tag. Once powered, the RFID reader can read and write to the tag. No power is required to maintain the memory on the tag. RFID tag memory can only be changed with an RFID reader. RFID tags are designed to hold information for years.

## BALLUFF HF RFID

*Milwaukee Cylinder uses HF RFID tags made by Balluff. Balluff HF RFID is a near field read/write technology to ensure that in environments where multiple tags are present, the correct tag information is being read. Though the range is limited, the penetrating capability of the RF wave is strong, allowing an RFID reader and RFID tag to function in extreme industrial environments. Balluff HF RFID tags are extremely durable with IP 67 environmental ratings and are designed for industrial applications. Note: Metal-based contamination may affect read/write capabilities. In this situation, simply wiping off the RFID tag will typically solve any read/write issues. Also, RFID readers will not read through a liquid stream.*

### Tag Specifications include:

- IP 67 rated
- Memory Capacity:  
read/write 2000 bytes
- Continuous Operating Temperature Exposure:  
-25° to 70° C
- Storage Temperature:  
-25° to 130° C  
(Note: Do not read/write outside the Operating Temperature. Data added prior to leaving the Operating Temperature remains, even at the higher temperature, but should not be read/written until the tag has returned to the Operating Temperature)

## RFID TAG MEMORY MAP

The amount of memory available on an RFID tag is somewhat limited and information on an RFID tag is stored in specific locations. A memory map defines how information is stored. This information is used to create a template for RFID readers to read and read/write to a tag. The memory map below (Table 1) displays the information stored on the Milwaukee Cylinder RFID tag.

In this example, Milwaukee Cylinder has classified information stored on the tag as **“STATIC DATA”** and **“CUSTOMER ENTERED DATA.”**

- “Static Data” is information that will not change, such as a serial number.
- “Customer Entered Data” is information that a customer can enter, such as maintenance log information.

### STATIC/READ ONLY DATA

NAME	MEMORY LOCATION	BYTES	DESCRIPTION
Serial #	0-15	16	Cylinder’s Unique Serial Number
DOM	20-27	8	Date of Manufacture
Model #	30-57	28	Milwaukee Cylinder Part Number
Cust Part #	60-87	28	Customer Defined Part # (if Available)
Cust Rev #	90-91	2	Customer Defined Rev # (if Available)
Bore	100-104	5	Cylinder Bore
Stroke	110-115	6	Cylinder Stroke
Oper press	120-127	8	Design Pressure
FullRepairKit	130-157	28	Full Service Kit (Rod/Tube/Piston Seals, Rod End Bushing)
Rod Seal Kit	160-187	28	Rod Seal Kit (Rod Seal, Rod End Bearing)
Comments	190-339	150	Tie Rod Torque Spec, Supplier Name, Phone Number and Website

### CUSTOMER ENTERED DATA

Machine #	500-519	20	Optional - Where Used
Location	520-559	40	Optional - Where Used
Comments	560-759	200	For General Comments
1 Date	760-767	8	Date of First Maintenance
1 Notes	770-869	100	Maintenance performed
2 Date	870-877	8	Date of Second Maintenance
2 Notes	880-979	100	Maintenance performed
3 Date	980-987	8	Date of Third Maintenance
3 Notes	990-1089	100	Maintenance performed
4 Date	1090-1097	8	Date of Fourth Maintenance
4 Notes	1100-1199	100	Maintenance performed
5 Date	1200-1207	8	Date of Fifth Maintenance
5 Notes	1210-1309	100	Maintenance performed
6 Date	1310-1317	8	Date of Sixth Maintenance
6 Notes	1320-1419	100	Maintenance performed
7 Date	1420-1427	8	Date of Seventh Maintenance
7 Notes	1430-1529	100	Maintenance performed

## RFID TEMPLATES

Balluff RFID tags can be read by nearly any standard RFID reader,\* however, Balluff offers a handheld reader (Model BIS M-871-1-008-X-001-3002) that two templates have been specifically developed for Milwaukee Cylinder that makes it even easier to use Milwaukee Cylinder RFID tags:

### Template 1-MC Tag Info:

This is a read only template and provides all “static” information about the cylinder such as the cylinder’s serial number, date of manufacture, bore size, etc.

### Template 2-MC Maintenance Info:

This template is a maintenance log for the cylinder. This is a read/write template that allows the user to enter the date the maintenance was performed and information about the maintenance.

These templates are available from Milwaukee Cylinder. Contact Milwaukee Cylinder for information on obtaining these templates.

For more information regarding loading these templates on a Balluff Hand Held or questions about Balluff software, consult the appropriate Balluff technical manual or contact **Balluff**.

\* HF RFID (13.56 MHz) using ISO 15693

## HOW TO ORDER RFID

To order RFID, refer to the RFID PART NUMBER CHART. Choose the RFID Model by bore size or by tie rod diameter. For new cylinders, RFID tags should be ordered when ordering the cylinder. If non-standard tie rod sizes are being used, determine the tie rod diameter and select the correct RFID part number using the tie rod diameter columns. For retrofitting existing cylinders, order the correct RFID part number by consulting the RFID PART NUMBER CHART, and always include the serial number of the cylinder being retrofitted.

### RFID PART NUMBER CHART

H	BORE SIZE		RFID PART #	TIE ROD DIAMETER	METRIC TIE ROD DIAMETER
	AIR/LH/MN	MH			
1-1/8"	1-1/8"	25mm	RTR80190	#10-32	M5
—	1-1/2"	32mm	RTR80250	1/4"	M6
—	2" & 2-1/2"	40mm	RTR80312	5/16"	M8
1-1/2"	3-1/4" & 4"	50 & 63mm	RTR80375	3/8"	M12
2" & 2-1/2"	5" & 6"	—	RTR80500	1/2"	—
3-1/4" & 4"	8"	80 & 100mm	RTR80625	5/8"	M16
—	10" & 12"	—	RTR80750	3/4"	—
5"	14" & 16"	125mm	RTR80875	7/8"	M22
6"	—	160mm	RTR81000	1"	M27
7"	—	200mm	RTR81125	1-1/8"	M30
8"	—	—	RTR81250	1-1/4"	—
10"	—	—	RTR81750	1-3/4"	—
12"	—	—	RTR82000	2"	—



For more information about Milwaukee Cylinder, visit [www.milwaukeeecylinder.com](http://www.milwaukeeecylinder.com)



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