

**Eaton LifeSense®**  
Hydraulic Hose Condition Monitoring

Play it safe.

Know the moment your  
hose needs attention.



**EATON**

*Powering Business Worldwide*



## We make what's important work.

Unexpected hydraulic hose failure is a significant challenge with serious consequences; consequences that can be costly. Developing a solution that would help our customers deal with hydraulic power more safely, effectively, and efficiently just made sense.

The result is LifeSense, an intelligent hydraulic hose condition monitoring system that detects failure-related events within a hose and provides advance notification the product is approaching the end of its useful life.

How does it work? The LifeSense system is based on the fact certain properties of a hose change as the hose approaches failure. We found by periodically comparing samples of these properties to a baseline gave a highly reliable indicator of imminent hose failure. Each hose fitting is equipped with a sensor that continuously monitors hose conditions via electrical signals which are submitted to a hose diagnostic unit which interprets the data. An alert is generated if the system identifies the hose has been compromised.

### Innovation through Partnership.

Eaton initiated a research project in partnership with Purdue University to effectively address the issue of hydraulic hose failure. The project sought to identify measurable, structural phenomena associated with hose deterioration over time, and develop the required technology to monitor them accurately. Our joint research determined that hydraulic hose failure is the final step in a consistent process that can be measured and therefore monitored to provide a reliable indication of an approaching end-of-life condition. (U.S. Patent 7,555,936)

### Industry Accolades

From the time LifeSense was introduced in the fall of 2011 it has been repeatedly recognized as one of the most technologically significant innovations to hit the hydraulic market.



# Eaton's LifeSense<sup>®</sup>

## Hydraulic Hose Condition Monitoring

### Diagnostic Unit

Continuously monitors real-time data and interprets the ongoing health of each hose assembly. An alert signals an impending hose failure. The unit can monitor up to 11 hose assemblies.



## Two solutions, for the way you work.

Whatever you prefer, the freedom of wireless or the comfort of a wired device, LifeSense has a solution.

### LifeSense Wired

- 12 or 24 volt direct current
- Hose diagnostic unit (HDU) continuously monitors up to 11 hose assemblies
- Alert notification on HDU
- Wire cable lengths available in 10, 15, 25, 50 or 100 feet

### LifeSense Wireless

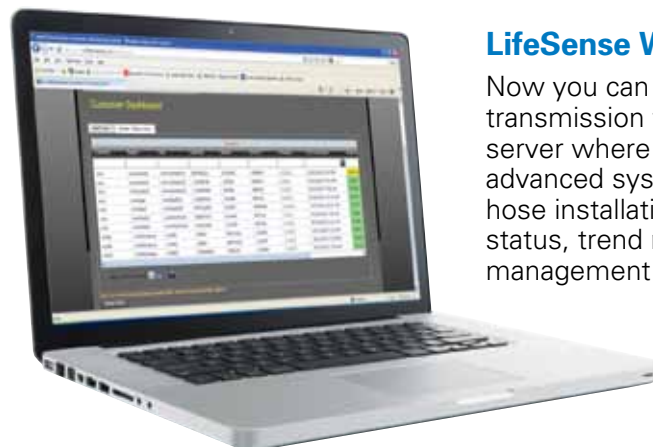
- Gateway monitors up to 100 hoses with a 433Hz frequency communication protocol
- Greater than six-year battery life
- Alert notifications on gateway
- Transmits operating performance data once per shift (every seven hours)
  - If issue arises gateway transmits data immediately
  - Sensors continually monitor hose
- Data access through web portal

### Fittings

Hose fitting sensor monitors and detects potential issues, and to transmits data to HDU or wireless gateway.

### Hoses

System electronically monitors entire length of hose assembly.



### LifeSense Web Portal

Now you can get operational data transmission to a secure Eaton server where you can access advanced system monitoring, hose installation data, connection status, trend reports, diagnostics management and much more.



### Applications:

- Oil and gas
- Alternative energy
- Manufacturing
- Agriculture and forestry
- Construction and mining
- Material handling
- Vocational fleets
- Commercial vehicles

### Features:

- Sizes -08, -12 and -16 2-wire braided 2SN specification
- Diagnostic unit monitors real-time data of each hose assembly
- An alert signals an impending hose failure
- Eaton's highly abrasion resistant synthetic rubber hose cover
- Hose fitting is hard-wired with sensor

### Benefits:

- Provides over 50% more hose life
- Increases reliability – detects and warns of impending failure
- Safeguards workers
- Reduces risk of collateral damage
- Maximizes uptime – mitigates unexpected hose failures
- Improves maintenance operations efficiency – automates inspections, on-going and real-time monitoring
- Protects the environment – mitigates potential spills

### Get the Most from Every Hose



Lab testing shows most hoses that are replaced on a time-based schedule of estimated life had actually reached less than half of their safe useful life. LifeSense can extend the useful service life of hoses by over 50 percent on average and virtually eliminate the current need to guess when to replace a hose.

### Improve Safety and Peace of Mind



By providing advanced warning of impending hose failure, LifeSense gives you peace of mind knowing you're working safer than ever before. Concerns about idled equipment, environmental cleanup, collateral damage, and personal safety are lessened with LifeSense.

### Detect and Prevent Hose Failure



Internal fatigue due to impact cycles and external abrasion are the two most common causes of hydraulic hose failure. In fact, combined, they account for over 80% of field failures. LifeSense physically monitors hose condition so it can detect and provide timely notification of internal fatigue as well as external abrasion.



### Maximize Uptime and Efficiency\*



At Eaton, we recognize our customers operate in industries with high uptime requirements and where unplanned downtime can mean substantial loss in time and money. These factors are a driving force behind LifeSense. LifeSense helps safeguard against unexpected work interruptions; thus, maximizing uptime, enhancing efficiency and providing critical performance value.




Refuse Truck  
**\$3,000**  
per incident



Steel Mill  
**\$70,000**  
per hour



Hydro Power  
**\$78,000**  
per day



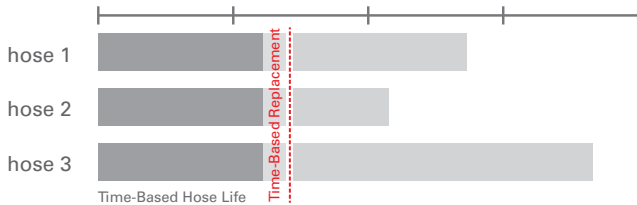
Oil Rig  
**\$500,000**  
per day

\* Cost estimate based on Eaton proprietary study.



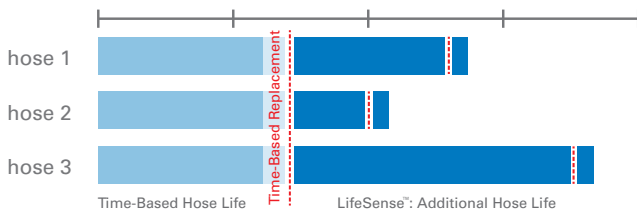
# LifeSense. It just makes sense.

## Traditional Way Time-based Replacement



**Significant** useful life wasted

## LifeSense® True Condition Monitoring



Hose life **maximized**

### Specifications

LifeSense	Hose Size	Fittings	Max Operating Pressure		Min Burst Pressure	
			bar	(psi)	bar	(psi)
Wired	-08	Straight JIC	297	(4250)	1188	(17000)
	-12	Straight JIC	216	(3125)	864	(12500)
	-16	Straight JIC	175	(2500)	700	(10000)
Wireless*	-08	Straight JIC	297	(4250)	1188	(17000)
	-12	Straight JIC	216	(3125)	864	(12500)
	-16	Straight JIC	175	(2500)	700	(10000)

\*Available Q4 2012

Meets 2SN, EN853 requirements

Operating temperature range: -40°C (-40°F) to +100°C (+212°F)

4:1 burst to working pressure safety factor

### LifeSense Unequaled

Some hose manufacturers have developed various predictive formulas that consider time, pressure, temperature, the number of flex cycles, and other factors to produce an approximation of expected hose life. Real time monitoring of the hose through LifeSense can make your workplace a safer, more productive, and more profitable. LifeSense just makes more sense. To find out more contact your Eaton representative or visit [www.eaton.com/hydraulics](http://www.eaton.com/hydraulics).

Eaton  
Hydraulics Business USA  
14615 Lone Oak Road  
Eden Prairie, MN 55344  
USA  
Tel: 952-937-9800  
Fax: 952-294-7722  
[www.eaton.com/hydraulics](http://www.eaton.com/hydraulics)

Eaton  
Hydraulics Business Europe  
Route de la Longeraie 7  
1110 Morges  
Switzerland  
Tel: +41 (0) 21 881 4600  
Fax: +41 (0) 21 881 4601  
[www.eaton.com/hydraulics](http://www.eaton.com/hydraulics)

Eaton  
Hydraulics Business Asia Pacific  
Eaton Building  
No. 7 Lane 280 Linhong Road  
Changning District, Shanghai  
200335 China  
Tel: (+86 21) 5200 0099  
Fax: (+86 21) 2230 7240  
[www.eaton.com/hydraulics](http://www.eaton.com/hydraulics)

© 2012 Eaton Corporation  
All Rights Reserved  
Printed in USA  
Document No. E-H00V-MR011-E1  
September 2012



*Powering Business Worldwide*



**Mixed Sources**  
Product group from well-managed  
forests and recycled wood or fibre