

### Introduction

Variable focus liquid lens technology can simplify installation, setup and maintenance by eliminating the need to manually touch the lens. It is also ideal for applications with reading distances that change from part to part or during part changeover.

Relative to other autofocus mechanisms, the liquid lens has extremely fast response times and provides the ability to focus over a larger range of working distances than standard fixed-focus lenses.

Cognex is the first company to release this new technology integrated into both DataMan® industrial fixed-mount ID readers and DataMan industrial handheld ID readers.

### When Focal Ranges Vary

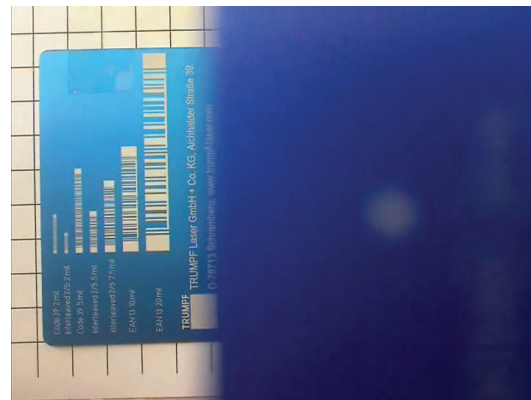
Variable focus is required in applications such as reading barcodes on different sized boxes or parts moving along a conveyor causing varying focal distances from a fixed-mount reader. It does not matter if the code appears near or far, focus is achieved from contact to distances of up to 300 mm (12 inches) in less than 100 milliseconds. There is no need to manually adjust the focus on the line. When focal ranges are unknown, autofocus can be achieved by a software command over Ethernet or serial in one to two seconds.

For the highest speed lines, Cognex VSoC™ (Vision System on a Chip) technology provides the ability to read barcodes on the fastest conveyors, and the high speed focus of the liquid lens allows the reader to change focus from box to box, quickly enough for VSoC to scan the entire box for barcodes.

In handheld barcode reading applications, variable focus technology provides one reader the ability to read small direct part marks (DPM) close up and then read large 1-D codes far away with the same reader. Typically, this type of application requires two readers: one to read the smallest 2-D codes and one to read wide 1-D barcodes. With variable focus technology, one reader's lens can toggle between two or more focal distances providing the ultimate in depth of field flexibility. You can set different step functions so that the reader will focus at, for example, 25 mm away from the reader and then the next focus could be as far as 150 mm or 300 mm.



The liquid lens adjusts for a small close up Data Matrix code, above, and below can focus on barcodes at a distance.

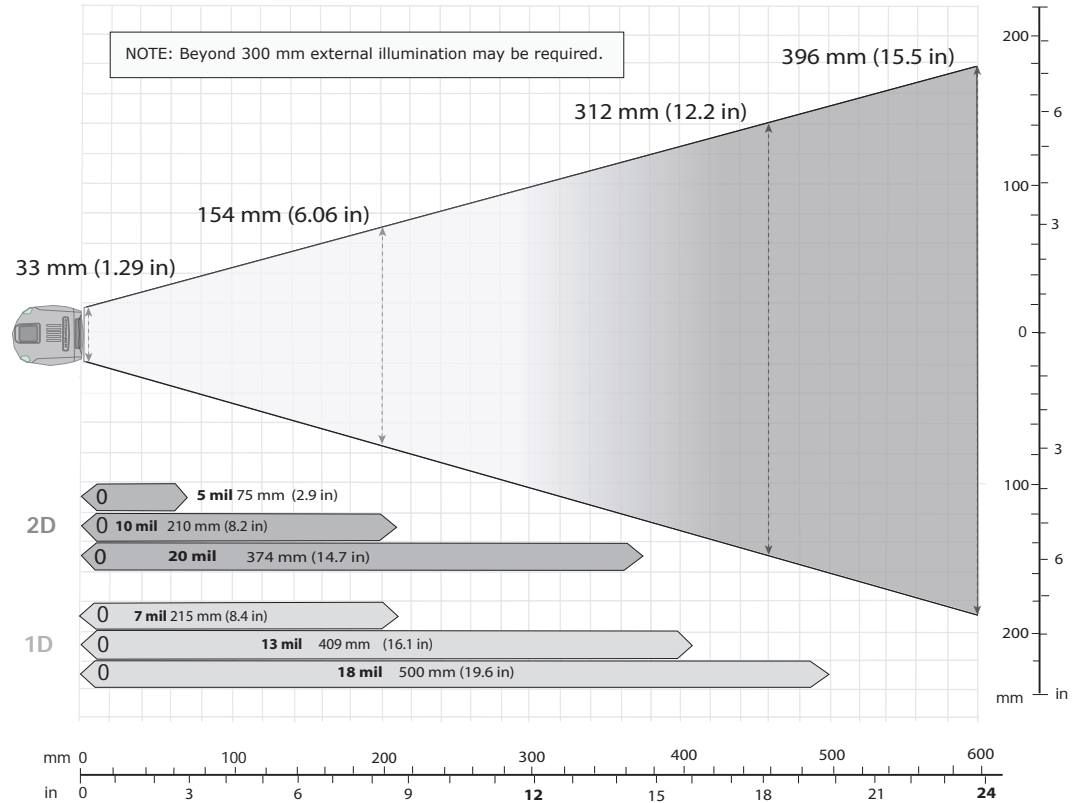


### Benefits of Liquid Lens Variable Focus Technology

- Large focal length range
- Read 2-D symbologies close up and 1-D barcodes further away
- Rugged
- No moving parts
- Fast response
- Very good optical quality
- Wide operating temperature range
- Extremely low electrical consumption

## DataMan 8000 Field of View and Reading Distances

This scan map shows what size codes can be read at what distance from the reader. The scale on the bottom shows the depth of field for 2-D and 1-D codes of different sizes. For example, an 18 mil 1-D code can be read from 500 millimeters.

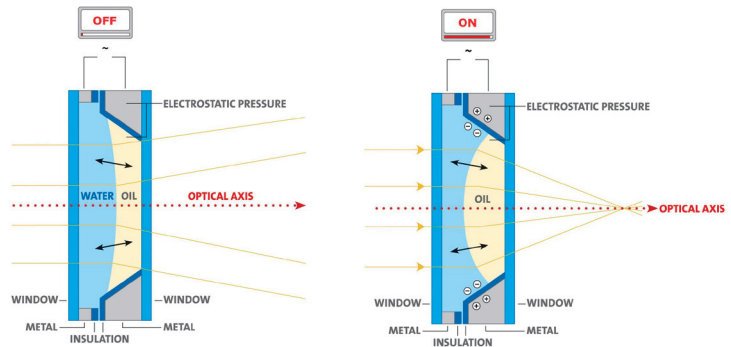


## Liquid Lens Technology

The liquid lens module is an electronically controllable variable focus system.

The liquid lens uses two iso-density liquids—oil is an insulator while water is a conductor. The variation of voltage leads to a change of curvature of the liquid-liquid interface, which in turn leads to a change of the focal length of the lens.

The key advantages of the liquid lens are its ruggedness (no moving parts), fast response times, good optical quality, low power consumption, and small size.



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