

COGNEX

In-Sight 1740 Wafer Reader Series



Automatic Identification for Wafer Traceability

The intensely competitive global semiconductor industry demands ever more rigorous control of increasingly complex processes in order to maximize tool utilization and production yield; there is zero margin for error. The need to track wafers throughout back-end processing has never been more vital to profitability.

In-Sight® 1740 series wafer readers help meet this challenge by automatically identifying wafers with extreme reliability to minimize the need for human intervention and prevent tool idle time. Whether installed on new equipment or retrofitted onto existing tools, In-Sight 1740 series readers can make 100% wafer traceability a reality.

Superior Reading Performance

For more than two decades, Cognex wafer ID systems have set the standard for high read rates and reliability, and the In-Sight 1740 series is no exception. In-Sight 1740 series wafer readers may be small, but they're packed full of performance. Everything needed to achieve high read rates without compromising reliability is provided in a single compact, self-contained system.

Advanced lighting system

With 12 modes of built-in, software-controlled, bright and dark field illumination, In-Sight 1740 series readers can image virtually any ID mark. Super-soft marks, ultra-thin coatings, sapphire substrates – the In-Sight 1740 series lighting system is up to these challenges, and many more. Plus, as new wafer processes and coatings are developed, In-Sight 1740 series readers can be extended to meet new imaging challenges with specialized lighting powered by the auxiliary light port.

Proven reading algorithms

Even the most effective illumination needs advanced ID algorithms to successfully read OCR, T7 Data Matrix, and barcodes on hard to image wafers. At the heart of the In-Sight 1740 series are Cognex reading algorithms developed based on the experience that only comes from having installed over 31,000 wafer ID systems. These algorithms are proven to be the most robust, most reliable in the world on ID marks that have been degraded by edge bead, CMP, scribe-on-die patterns, and other conditions.

Image enhancement filters

The effects of wafer processing can impact ID mark quality to such an extent that they resist reading by even the most advanced lighting system and software algorithms. In-Sight 1740 series readers can overcome these visual degradations using automatic image enhancement filters. Even in the most severe cases, filters are able to turn a read failure into a read success while increasing reliability and eliminating the need for a human intervention.

Faster Reading Performance

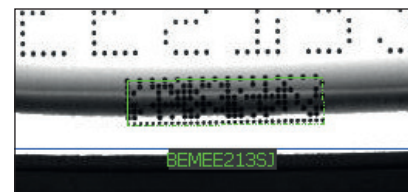
The In-Sight 1740 Series reads 40% faster than its predecessor, the best-selling In-Sight 1720 Series. The extra power can also be used to perform more processor intensive image analysis that delivers exceptionally reliable results without increasing overall read times.



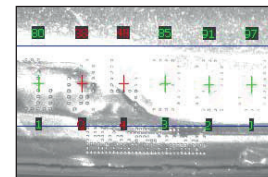
Bright field illumination



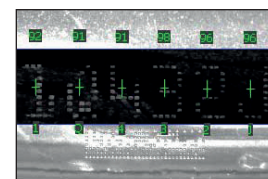
Dark field illumination



SEMI T7



Without OCR Filter



With OCR Filter

Ultimate Simplicity and Unattended Operation

An intuitive user interface makes it easy to configure, operate and maintain an entire network of In-Sight 1740 series readers from PCs inside or outside the fab floor. Powerful features are available to ensure the highest possible read rates and reliability while ensuring unattended operation.

Automatic recipe optimization

In-Sight 1740 series software takes the guesswork out of recipe setup with its "tuning" feature that automatically optimizes settings to read even the most challenging wafer marks - no advanced operator training is required. And with up to 50 reading recipes that can be contained within a single job file, it's even possible to read mixed lots of wafers with completely different ID mark characteristics.

Self-learning recipes

It is not always possible to anticipate every possible variation in ID mark appearance that can occur from wafer-to-wafer and between lots. In the event that any of the recipes in the job fail to read, In-Sight 1740 series readers can dynamically optimize of lighting and image enhancement filters. Successful optimizations are saved to a recipe for future reads, which allows the reader to adapt and eliminates the need for manual adjustments by an operator.

Log complete read history

Optionally, results from every In-Sight 1740 series reader can be saved to a log file on the network, including the read string, read score, and read time. Images can be saved for offline analysis.

Unmatched Flexibility and Ease of Integration

In-Sight 1740 series wafer readers easily integrate with any type of automated wafer processing and handling equipment. Available models include:

- In-Sight 1740 (752 x 480) reader for basic OCR and barcode reading applications.
- In-Sight 1741 (1024 x 768) reader for most OCR, T7 Data Matrix, and barcode reading applications.
- In-Sight 1742 (1024 x 768) reader with infrared lighting for ultra-thin oxide, nitride, and polyimide wafer coatings.

Horizontal or vertical mounting
An optional mirror attachment can be used for horizontal mounting.



Adjustable focus.
Readers can be mounted at any working distance between 5mm and 80mm.



Remote control over Ethernet
Network devices can remotely control the reader and log results using a comprehensive set of commands. Protocols are compatible with all legacy Cognex wafer readers.

RS-232 serial communications
Enables retrofits on older tools without networking support.

External dark field light
Provides an additional dark field mode to image ID marks that need a low angle of illumination.

Backward-compatible mounting
Compatible with 1700/1701/1720 Series and LKx5 readers.



Auxiliary light port
Supports specialized lighting, if needed to image ID marks on wafers with new and unique wafers.

Specifications

COMPATIBILITY

PC Software	Operating System	In-Sight 1740 series Configuration Interface
	Windows 7 (32/64-bit) with .NET Framework 2.0	In-Sight Explorer, Standalone Executable or web browser (IE8 or later)
	Windows XP (32-bit) with .NET Framework 2.0	In-Sight Explorer, Standalone Executable or web browser (IE7 or later)
Firmware	Windows 2000 with .NET Framework 2.0	Web browser-only (IE6, SP1 or later)
4.5.0 or later (also compatible with In-Sight 1720 Series readers)		

READING CAPABILITY

Mark Type	SEMI M12, M13	SEMI M1.15	SEMI T1-95	Non-SEMI Standard
OCR	Semi font	Semi font	N/A	Triple, OCR-A, IBM, Chartered fonts
2D	N/A	T7 Data Matrix	N/A	Data Matrix, QR Code
Barcodes	N/A	N/A	BC 412	IBM 412

ACQUISITION

Model	1740	1741	1742
Sensor Type	1/3" CMOS	1/3" CCD	1/3" CCD
Resolution	752 x 480	1024 x 768	1024 x 768
Bit Depth	256 grey levels (8-bit)		
Exposure Time	0.10 – 127.00mm		
Image Gain	Controlled by software		
Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration		

LIGHTING AND OPTICS

Model	1740	1741	1742
Illumination Area	29mm x 19mm	31 mm x 19mm	31 mm x 19mm
LEDs	Red, 633nm	Red, 622nm	Infrared, 880nm
Light Modes	11 internal (bright and dark field), plus one external dark field. An auxiliary light port supplies power and control for an external custom dark field.		
Light Intensity	Variable, controlled by software		
Depth of Focus	+/- 3mm		

MEMORY

Job/program storage	128MB non-volatile flash memory. Unlimited storage via networked network device.
Image Processing	128MB SDRAM

COMMUNICATIONS AND I/O

Network	One 10/100Base-T Ethernet port, TCP/IP protocol. Supports DHCP (default) and static IP address.		
Serial	One RS-232C port (1200 to 115,200 baud)		
Protocols	In-Sight, In-Sight Native Mode, Lkx5, Tokyo Electron (TEL), Accretech/TSK, Electroglas (EG)		
Trigger	Software trigger via Ethernet and RS-232.		
	One opto-isolated acquisition trigger input.		
	Delay	6ms latency between leading edge of trigger and start of acquisition. 1ms wide minimum input pulse.	
	Voltage	ON 20 to 28V (24V nominal), OFF 0 to 3V (12V nominal)	
	Current	OFF < 150mA, ON 2.0 to 2.9mA (add external resistor for higher current)	
	Resistance	~ 10,000 Ohms	
Discrete I/O	Up to 8 inputs and 8 outputs available using Cognex CIO-1400 I/O Module (available separately).		
Status Indicators	Power LED, Network connection/data LED, plus two user-definable LEDs.		

POWER

Voltage	24 +/- 10% VDC
Current	140mA (lights OFF) to 200mA (lights ON)

MECHANICAL

Mounting	Vertical and horizontal (requires mirror attachment) orientation. Four M4 threaded holes, each side.
Working Distance	Adjustable, up to 80mm (vertical) or 56mm (horizontal)
Material	Black anodized aluminum case with black painted end caps
Weight	381.0g (13.4 oz)
Dimensions	Height 38mm (1.5in) x Width 72mm (2.8in) x Depth 124mm (4.9in)

ENVIRONMENTAL

Operating	Temperature 0°C to 45°C (32°F to 114°F), Humidity 10 to 90% (non-condensing)
Storage	Temperature -10°C to 65°C (14°F to 149°F), Humidity 10 to 90% (non-condensing)
Vibration	EN61373, including IEC 60068-2-6, IEC 60068-2-64 6.4 and IEC 60068-2-27

CERTIFICATIONS

Regulatory Compliance	CE, UL, CUL, RoHS, FCC, IEC 60825-1/A2:2001, EN 60825-1/A1:2002, CAN/CSA-E60825-1:2003, Class 1 LED Product
SEMI safety	SEMI S2-0709



Companies around the world rely on Cognex vision and ID to optimize quality, drive down costs and control traceability.

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