

DataMan[®] 150 Series Reference Manual



2023 September 22
Revision: 23.3.0.3

Legal Notices

The software described in this document is furnished under license, and may be used or copied only in accordance with the terms of such license and with the inclusion of the copyright notice shown on this page. Neither the software, this document, nor any copies thereof may be provided to, or otherwise made available to, anyone other than the licensee. Title to, and ownership of, this software remains with Cognex Corporation or its licensor. Cognex Corporation assumes no responsibility for the use or reliability of its software on equipment that is not supplied by Cognex Corporation. Cognex Corporation makes no warranties, either express or implied, regarding the described software, its merchantability, non-infringement or its fitness for any particular purpose.

The information in this document is subject to change without notice and should not be construed as a commitment by Cognex Corporation. Cognex Corporation is not responsible for any errors that may be present in either this document or the associated software.

Companies, names, and data used in examples herein are fictitious unless otherwise noted. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, nor transferred to any other media or language without the written permission of Cognex Corporation.

Copyright © 2021. Cognex Corporation. All Rights Reserved.

Portions of the hardware and software provided by Cognex may be covered by one or more U.S. and foreign patents, as well as pending U.S. and foreign patents listed on the Cognex web site at: cognex.com/patents.

The following are registered trademarks of Cognex Corporation:

Cognex, 2DMAX, Advantage, AlignPlus, Assemblyplus, Check it with Checker, Checker, Cognex Vision for Industry, Cognex VSOC, CVL, DataMan, DisplayInspect, DVT, EasyBuilder, Hotbars, IDMax, In-Sight, Laser Killer, MVS-8000, OmniView, PatFind, PatFlex, PatInspect, PatMax, PatQuick, SensorView, SmartView, SmartAdvisor, SmartLearn, UltraLight, Vision Solutions, VisionPro, VisionView

The following are trademarks of Cognex Corporation:

The Cognex logo, 1DMax, 3D-Locate, 3DMax, BGAll, CheckPoint, Cognex VSoC, CVC-1000, FFD, iLearn, In-Sight (design insignia with cross-hairs), In-Sight 2000, InspectEdge, Inspection Designer, MVS, NotchMax, OCRMax, PatMax RedLine, ProofRead, SmartSync, ProfilePlus, SmartDisplay, SmartSystem, SMD4, VisiFlex, Xpand

Portions copyright © Microsoft Corporation. All rights reserved.

Portions copyright © MadCap Software, Inc. All rights reserved.

Other product and company trademarks identified herein are the trademarks of their respective owners.

Table of Contents

Legal Notices	2
Table of Contents	3
Symbols	5
Getting Started	6
About DataMan 150	6
Configuration	6
DataMan 150 Accessories	7
Lens Options	7
Filters	8
Lens Covers	9
Light Options	9
Cables	10
Power Supplies	10
Mounting Brackets	10
IO Modules	11
DataMan 150 Systems	11
Model Variants	11
Communication Modules	12
DataMan 150 Cable Pinouts	12
Reader Layout	14
Indicator LEDs	14
Changing Orientation	15
Dimensions	17
Dimensional Drawings	17
DataMan 150 Specifications	19
DataMan 150 Series Imager Specifications	19
LED Wavelengths	21
Illumination Options	21
Setting Up Your DataMan 150	22
Installing an Optical Filter	22
Installing a Liquid Lens	24
Changing a 6.2 mm Lens to a 16 mm Lens	26
Changing to an Illumination with a Different Color	28
Mounting	30
Right-Angle Configuration	30
Field of View and Reading Distances	31
DataMan 150 Readers with a 6.2 mm Lens	31
Short Range (Focused to 105 mm)	31
Long Range (Focused to 190 mm)	32
DataMan 150 Readers with a 16 mm Lens	33
Connections, Optics and Lighting	34
Acquisition Triggering	35
I/O Cable	35

RS-232 Cable	36
Flying Leads Cable	36
USB Connections	37
RS-232 Connections	38
Wiring the Basic I/O Module	38
Output Wiring Example	39
Input Wiring Example	39
Digital Input Wiring Diagrams	40
Current Sink Configuration	40
Current Source Configuration	40
PNP Configuration	40
NPN Configuration	41
Digital Output Wiring Diagrams	41
Sinking Outputs, Sourcing Inputs	41
Sinking Outputs, Sinking Inputs	42
Multi-port Connections	43
Using Your DataMan 150	46
Installing the DataMan Software	46
Setting the Focus Position	46
Tuning	47
External Triggering and Trigger Modes	49
Training and Trigger Modes	49
Training	50
Incremental Training for Multiple Symbologies	51
Cleaning and Maintenance	52
Cleaning the Reader Housing	52
Cleaning the Reader Lens Cover	52
Precautions	53
Regulations/Conformity	54
For European Community Users	55

Symbols

The following symbols indicate safety precautions and supplemental information:

 **WARNING:** This symbol indicates a hazard that could cause death, serious personal injury or electrical shock.

 **CAUTION:** This symbol indicates a hazard that could result in property damage.

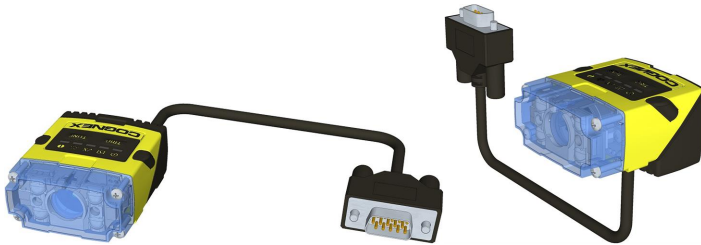
 **Note:** This symbol indicates additional information about a subject.

 **Tip:** This symbol indicates suggestions and shortcuts that might not otherwise be apparent.

Getting Started

This section provides general information about the DataMan 150 series readers as well as about the DataMan 150 accessories and systems.

About DataMan 150



The DataMan 150 readers are best in class ID readers, offering superior performance with the latest ID tools, flexibility to configure the reader in terms of lighting and optics to optimize the application, and an ease-of-use giving the user the ability to setup and deploy an application quickly and efficiently all without the need for PC:

- Superior performance, 1-D and 2-D code reading, including HotBars2™ and patent-pending PowerGrid™
- Flexible optics/lighting, including field upgrades, allowing for the protection of your investment
- Ease-of-use, including an auto-tune and trigger button on the reader, the ability to configure the reader in a straight or right-angle orientation and auto-focus capability utilizing a liquid lens

The DataMan 150 readers provide support for USB and RS-232 communications.

Key highlights:

- 1DMax with HotBars2™, best in class 1-D reading, 2DMax with PowerGrid™, best in class 2-D reading. Reading codes no other ID reader on the market can.
- Multiple options for LED lighting, along with optical filters and polarizing filters. Options for different powered lens, with autofocus capabilities for each.
- Intelligent tuning and dynamic configuration of the reader combined to make the installation and setup of the application a snap.

Configuration

This document provides basic information about how to configure and use DataMan 150 readers. Additional information is available through the Windows **Start** menu or the DataMan Setup Tool **Help** menu after you install the DataMan software on your PC:

- The **DataMan Communications and Programming Guide** shows you how to integrate your DataMan reader into your particular automation and factory environment.

Cognex->DataMan Software v x.x.x->Documentation->Communications->DataMan Communications and Programming Guide

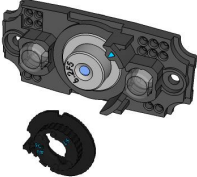
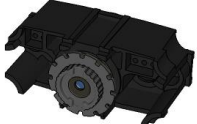
- The **DataMan Industrial Protocols Manual** provides information on how to integrate DataMan readers into your particular environment using industrial protocols.

Cognex->DataMan Software v x.x.x->Documentation->Communications->DataMan Industrial Protocols Manual

- The **DataMan Reader Configuration Codes** document provides printable 2-D codes that you can use to configure the DataMan reader.
Cognex->DataMan Software v x.x.x->Documentation->English->Reader Configuration Codes
- The **DM150 Quick Reference Guide** provides essential information about the DM150 readers.
Cognex->DataMan Software v x.x.x->Documentation->English->DM150 Series->DM150 Quick Reference Guide
- The **DataMan Fixed-Mount Readers Reference** is a complete online hardware reference for the DataMan fixed-mount ID readers.
Cognex->DataMan Software v x.x.x->Documentation->English->DM150 ->Fixed-Mount Reference Manual
- The **DataMan Questions and Answers** document provides context-sensitive information. You can view this help inside the DataMan Setup Tool or as a stand-alone help file.
Cognex->DataMan Software v x.x.x->Documentation->DM150->Questions and Answers
- The **DataMan Control Commands** lists DataMan Control Commands with all relevant information. You can view this help inside the Setup Tool or as a stand-alone help file.
Cognex->DataMan Software v x.x.x->Documentation->English->DataMan Control Commands
- The **Setup Tool Reference Manual** describes the user interface of the DataMan Setup Tool software.
Cognex->DataMan Software v x.x.x->Documentation->English->Setup Tool Reference Manual
- The **Release Notes** list detailed system requirements and additional information about this DataMan software release.
Cognex->DataMan Software v x.x.x->Documentation->DataMan v x.x.x Release Notes

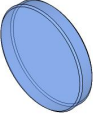
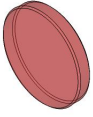
DataMan 150 Accessories

Lens Options

Accessory Name and Number	Accessory Image
6.2 mm lens kit (DM150-LENS-62) <ul style="list-style-type: none"> • 6.2 mm optics mount • 6.2 mm lens • manual lens cap (assembled) • screws 	
16 mm lens with extended optics mount (requires the use of an extended front cover and high-powered red LED) (DM260-LENS-16) <ul style="list-style-type: none"> • 16 mm optics mount • 16 mm lens • manual lens cap (assembled) • screws 	

<p>IR 6.2 mm lens kit, 3-position with IR LED (DMA-KIT-IR-62)</p> <ul style="list-style-type: none"> • 6.2 mm optics mount • 6.2 mm lens (IR) • Standard Infrared Light for 6.2mm (Risk Group Exempt acc. IEC62471) • manual lens cap (not assembled) • screws 	
<p>UV Light Kit for 6.2 mm lens (DMA-KIT-UV365-62)</p> <ul style="list-style-type: none"> • UV light board (365nm wavelength) • UV resistant front cover • screws 	
<p>IR 16 mm lens kit (DMA-KIT-IR-16)</p> <ul style="list-style-type: none"> • 16 mm optics mount • 16 mm lens (IR) • Standard Infrared Light for 16mm (Risk Group Exempt acc. IEC62471) • manual lens cap (assembled) • screws 	
<p>Liquid Lens Module (LLM) to be used with 6.2 mm lens or 16 mm lens (DMA-LLM-150-260)</p>	
<p>16 mm lens with ImageMax kit (DM260-KIT-16LL)</p> <ul style="list-style-type: none"> • 16 mm optics mount • 16 mm lens • Liquid Lens Module (DMA-LLM-150-260) • High Powered red LED illumination (DM260-LED-RED-HP) (Risk Group Exempt acc. IEC62471) • 2-LED half-polarized extended cover (DM260-LENS-16CVR-P) (Risk Group Exempt acc. IEC62471) 	

Filters

Accessory Name and Number	Accessory Image
<p>Blue bandpass filter (DM150-BP470)</p>	
<p>Red bandpass filter (DM150-BP635)</p>	

Lens Covers

Accessory Name and Number	Accessory Image
Clear lens cover (DM150-CVR-CLR)*	
Clear lens cover, ESD safe (DM150-CVR-ESD)*	
Polarized front cover (DM260-LENS-62CVR-F)*	
Extended lens cover, un-polarized (DM260-LENS-16CVR)**	
Extended lens cover, half-polarized (DM260-LENS-16CVR-P)**	
Extended lens cover, fully polarized (DM260-LENS-16CVR-F)**	
C-mount adaptor, IP40 (DM260-CMNT-00)	
C-mount adaptor, IP65 (DM260-CMNT-CVR)	




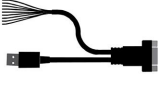
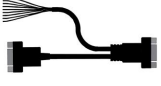


Note: *Use with a 6.2 mm lens only!
 **Use with a 16 mm lens only! For maximum light power 24VDC supply is recommended.

Light Options

Accessory Name and Number	Accessory Image
Red LED illumination (DM150-LED-RED)* Risk Group Exempt acc. IEC62471	
White LED illumination (DM150-LED-WHT) * Risk Group Exempt acc. IEC62471	
Blue LED illumination (DM150-LED-BLU)* Risk Group Exempt acc. IEC62471	
High Powered red LED illumination (DM260-LED-RED-HP)** Risk Group Exempt acc. IEC62471	

Note: *Use with a 6.2 mm lens only!
 **Use with a 16 mm lens only!


Cables

Accessory Name and Number	Accessory Image
5-meter extension cable* (DM100-EXTCBL-000)	
RS-232/USB adapter connector (DM100-PATCH-000)	
USB adapter cable with power tap (DM100-USB-000)	
USB adapter cable with power tap (DM100-USB-030)	
USB & Flying Leads I/O Cable, 2.0 m (DM-USBIO-00)	
RS-232 & Flying Leads I/O Cable, 2.5 m (DM-RS232IO-00)	
RS-232 adapter cable with power tap (DM100-RS232-000)	
Flying Leads Connection Cable, 5 m (DM50-PWRIO-05)	


Note: *USB/RS-232 extension connection is possible with the following limitations:


- i**
1. The USB connection is shorter than 5 m.
 2. Serial connection is shorter than 15 m.

Power Supplies


Accessory Name and Number	Accessory Image
Power supply, 6V (DM100-PWR-000)	

Mounting Brackets


Accessory Name	Accessory Number	Accessory Image
Mounting bracket	(DM100-UBRK-000)	

Pivot mounting bracket	(DM100-PIVOTM-00)	
------------------------	-------------------	---

IO Modules

Accessory Name and Number	Accessory Image
DataMan Basic I/O Module (DM100-IOBOX-000)	

DataMan 150 Systems

	1-D and Stacked Codes	Omni-directional 1-D Code Reading	1DMax™ — Best-In-Class 1-D Reading	IDQuick™ — High-Speed 2-D Reading	2DMax™ — for hard to read DPM and damaged 2-D codes	Resolution
DataMan 150 S		√	√	√		752 x 480 Global shutter
DataMan 150 QL		√	√			752 x 480 Global shutter
DataMan 150 Q		√	√	√		752 x 480 Global shutter
DataMan 150X		√	√	√	√	752 x 480 Global shutter
DataMan 152 S		√	√	√		1280 x 960 Global shutter
DataMan 152 QL		√	√			1280 x 960 Global shutter
DataMan 152 Q		√	√	√		1280 x 960 Global shutter
DataMan 152 X		√	√	√	√	1280 x 960 Global shutter

Model Variants

S models do not have Burst and Continuous trigger modes.

	150S	150QL	150Q	150X
2-D Codes	Yes	No	Yes	Yes
Algorithm	1DMax, IDQuick, HotBars	1DMax, HotBars II	1DMax, IDQuick, HotBars II	1DMax, 2DMax (Power Grid available), HotBars II
Acquisition	Max 2 fps	Max 60 fps	Max 60 fps	Max 60 fps
Max Decode Rate	2/sec	45/sec	45/sec	45/sec

	152S	152QL	152Q	152X
2-D Codes	Yes	No	Yes	Yes
Algorithm	1DMax, IDQuick, HotBars	1DMax, HotBars II	1DMax, IDQuick, HotBars II	1DMax, 2DMax (Power Grid available), HotBars II
Acquisition	Max 2 fps	Max 45 fps	Max 45 fps	Max 45 fps
Max Decode Rate	2/sec	45/sec	45/sec	45/sec

Communication Modules

The DataMan 150 is available with the following communication options:

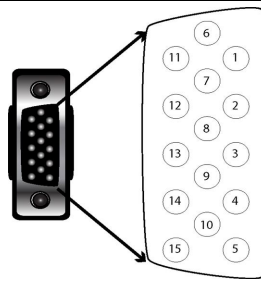
- USB/RS-232

DataMan 150 Cable Pinouts



The I/O module with USB has all signals on a SUB-D 15 connector with the following pinouts:

PIN	Color	Signal
1	Brown	Reserved
2	Green	TxD (RS-232)
3	Green/Black	RxD (RS-232)
4	Red & Red/Black	GND
5	Brown/White	DC+ (system power, 5-24 VDC)
6	Blue	RTS

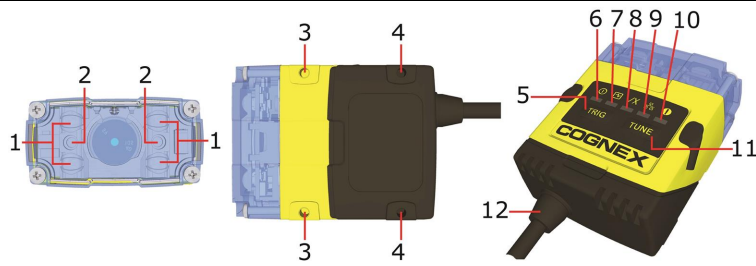


PIN	Color	Signal
7	Blue/White	Output-0
8	White	Input-0
9	White/Black	Input-1
10	Light Blue	CTS
11	Light Blue/Black	Output-1
12	Light Blue/Yellow	Output-Common
13	Light Blue/Green	Input-Common
14	Yellow	Reserved
15	Yellow/Black	Reserved

Note: Pin numbers are shown for cable connector, not I/O module.

Reader Layout

The following images show the built-in lighting system and other features of the DataMan 150.



Item	Description
1	Illumination LEDs
2	LED aimers
3-4*	Mounting holes (M3 x 3.5mm)
5	Trigger button
6	Power indicator
7	Train status indicator
8	Good/bad read indicator
9	Communication
10	Error indicator
11	Tune button
12	Power, I/O and RS-232 connector

Note: *Use only one set of mounting holes (either 3 OR 4) for mounting.

Note: The five status LEDs together also function as a peak meter using an orange light.

Indicator LEDs

Type	Signal	Color	Meaning
Status	Power	GREEN	Power ON
	Train status	GREEN	Trained
		YELLOW	Untrained
	Error	RED	Error - check device log
Action	Good/bad read	GREEN	Good read
		RED	Bad read
	Network	YELLOW	Link up
		<i>blink</i>	Data transfer
	Peak meter	Yellow	Tune
Focus			

Changing Orientation

Perform the following steps to change between in-line and right-angle configuration.

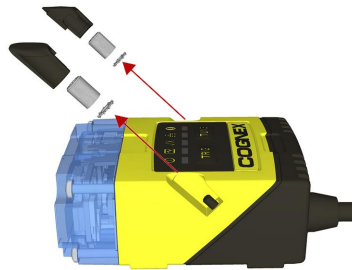
Note:



- Switching between in-line and right-angle configuration is recommended only up to 10 times in the lifetime of the DataMan 150.
- Disconnect the DataMan 150 from power before changing the orientation.

WARNING: Make sure that no electrostatic charges are applied to the PCB. (e.g. wear ESD shoes.) If the main module is separated from the I/O connector module, take care to assemble them correctly. Otherwise, the IP rating can be compromised.

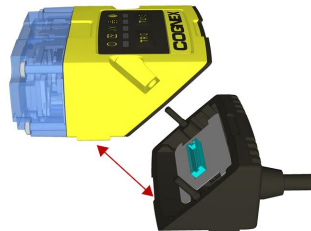
1. Carefully remove the screw covers, threaded nuts and washers.



M2 Torx 10 CAP NUT

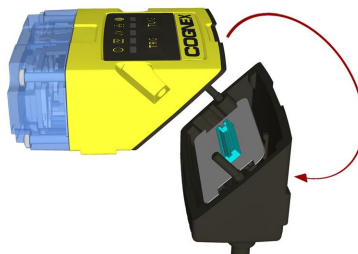
DIN 6798A M2 LOCKWASHER

2. Detach the main module and the I/O connector module by firmly pulling them apart.

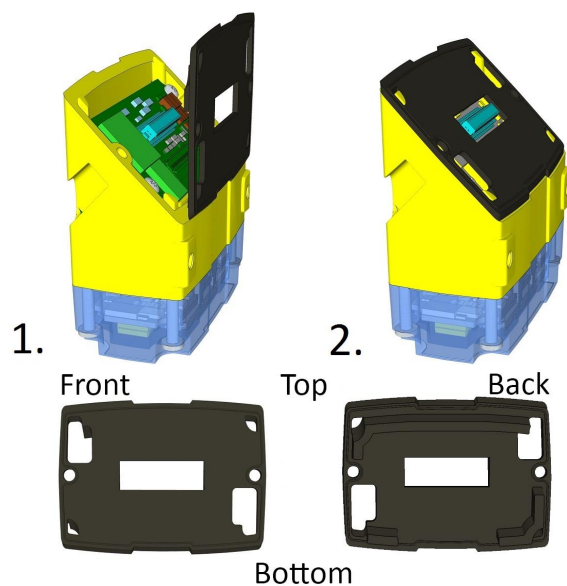


3. Change the orientation.

Note: Make sure that the gasket is properly seated on the main module. Ensure that the flat gasket side is facing away from the module.



Place the bottom edge of the gasket onto the underside of the main module. Press on the top edge to fully seat the gasket:



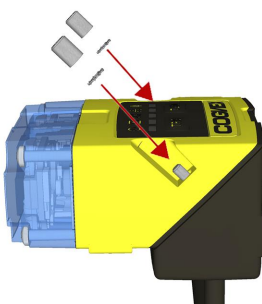
Note: The flat side of the gasket (marked as "Front" in the image above) has to face outside.

WARNING: Do not touch any electrical component.

4. Reattach the I/O connector module to the main module.

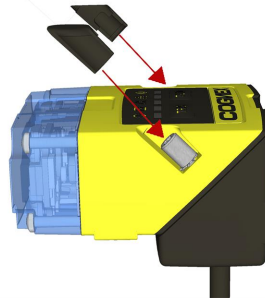


5. Reinstall the washers and loosely fasten the modules together with the two T10 cap nuts, but do not tighten.



6. After each cap nut has been fastened, torque to 0.20 Nm (1.77 in-lb) and reinstall the screw covers.

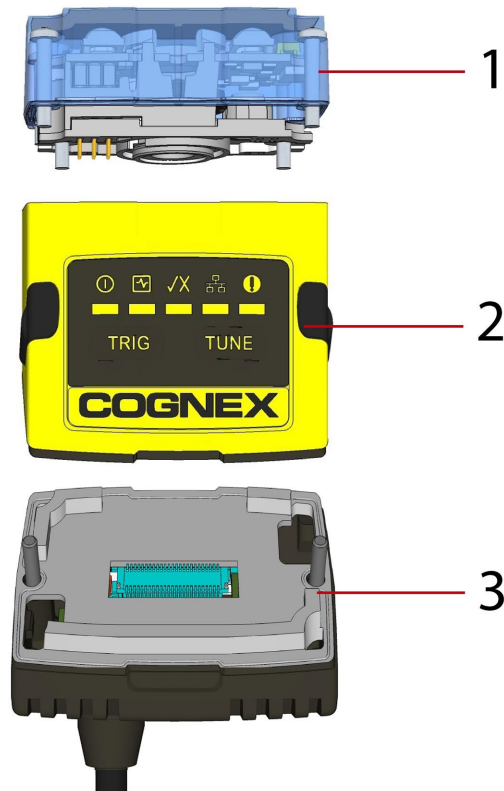
Note: There are unique left and right screw covers. Take care to attach them correctly.



Dimensions

The DataMan 150 consists of three main parts:

1. Optics module (lens including lens mount, illumination and front cover including filter mounting option for a Diameter (\varnothing): 12.3mm< \varnothing <12.7mm, Thickness (t): 1.6mm<t<2mm filter)
2. Main module, including sensor and CPU
3. I/O module



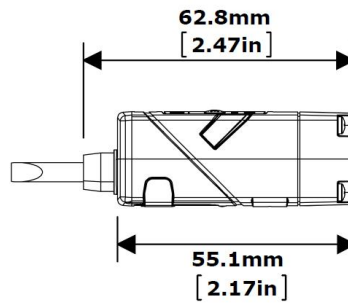
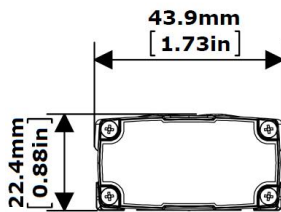
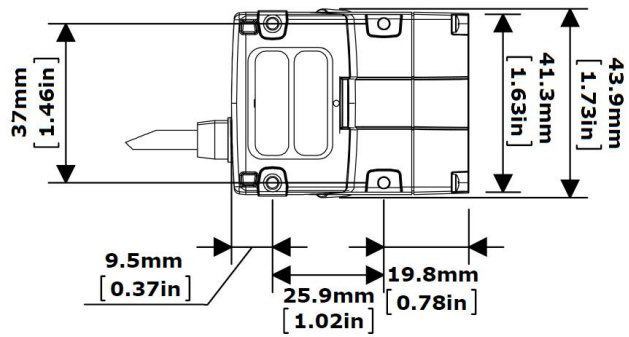
Dimensional Drawings

The size of the DataMan 150 in the straight configuration is shown in the following figure:

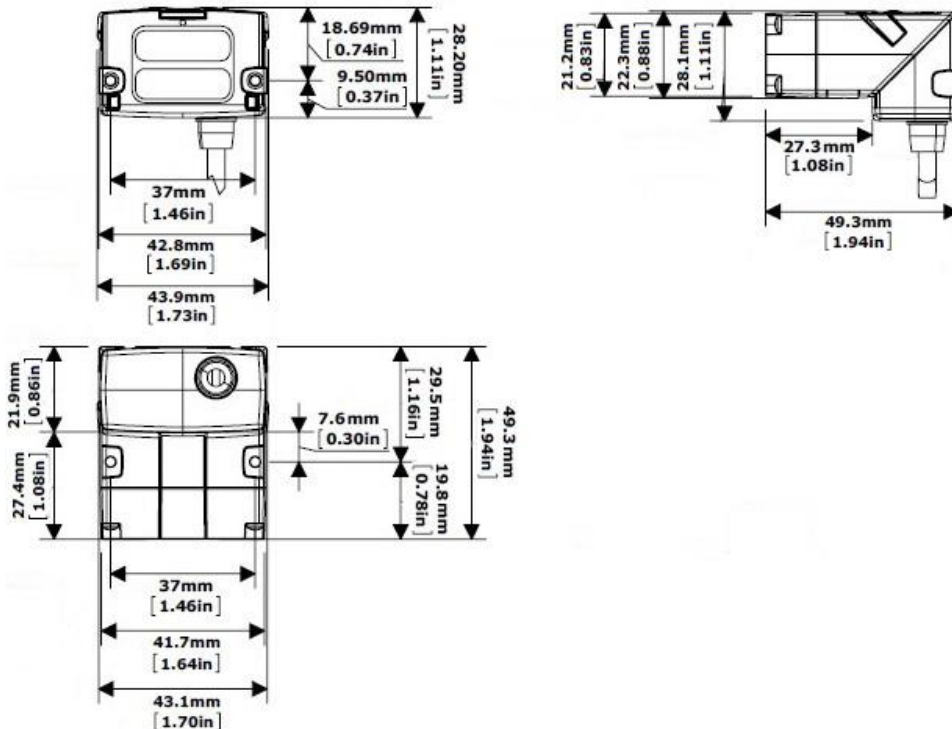
Note:



- Dimensions are in millimeters [inches] and are for reference purposes only.
- All specifications are for reference purposes only and can change without notice.



The size of the DataMan 150 in the angled configuration is shown in the following figure:



DataMan 150 Specifications

Specification	DataMan 150 Series Reader			
Weight	128 g			
Operating Temperature	0°C — +40°C (+32°F — +104°F)			
Storage Temperature	-10°C — +60°C (+14°F — +140°F)			
Maximum Humidity	<95% (non-condensing)			
Environmental	IP65			
Shock and Vibration	IEC 60068-2-27: 1000 shocks, semi-sinusoidal, 11g, 10ms IEC 60068-2-6: vibration test in each of the three main axis for 2 hours @ 10 Gs (10 to 500 Hz at 100m/s ² / 15mm)			
LED Safety	IEC 62471: Exempt risk group, no further labeling is required.			
RS-232	RxD, TxD according to TIA/EIA-232-F			
Codes	1-D barcodes: Codabar, Code 39, Code 128, and Code 93, Code 25, Interleaved 2 of 5, Pharma, GS1 DataBar, Postal, Code UPC/EAN/JAN, MSI 2-D barcodes: Data Matrix™ (IDMax and IDQuick: ECC 0, 50, 80, 100, 140, and 200) QR Code and microQR Code, RSS/CS, PDF 417, MicroPDF 417, AztecCode, DotCode, MaxiCode			
Discrete I/O operating Limits	HS Output 0, 1	I_{MAX}	@ 24 VDC	100 mA
		R_{MAX}	@ 12 VDC	200 Ω
			@ 24 VDC	500 Ω
	Input 0 (Trigger)	V_{IH}	± 15 — ± 25 V	
	Input 1	V_{IL}	0 — ± 5 V	
		I_{TYP}	@ 12 VDC	3.6 mA
			@ 24 VDC	7.5 mA
Power Supply Requirements	<ul style="list-style-type: none"> • USB powered: 500 mA (2.5 W maximum), or • External power supply: +5 — +26 VDC Recommended: 24 VDC (1 A maximum at 24 V, 4.5 W average at 24 V) Supplied by LPS or NEC class 2 only			
Power Consumption	<2.5 W (powered over USB) <4.5 W (average, externally powered at +24 V)			
Ethernet Speed	10/100			
Duplex Mode	Full duplex or half duplex			

DataMan 150 Series Imager Specifications

Specification	DataMan 150 Imager	DataMan 152 Imager
Image Sensor	1/3 inch CMOS	1/3 inch CMOS







Specification	DataMan 150 Imager	DataMan 152 Imager
Image Sensor Properties	4.51 mm x 2.88 mm (W x H), 6.0 μ m square pixels	4.8 mm x 3.6 mm (W x H), 3.75 μ m square pixels
Image Resolution (pixels)	752 x 480	1280 x 960
Lens Type	S-mount 6.2 mm F:5 (with optional liquid lens) with IR blocking filter S-mount 16 mm F:7 (with optional liquid lens) with IR blocking filter	

LED Wavelengths

The following table shows LED types and the related wavelengths:

LED	λ [nm]
RED	617
RED HPIL	617
BLUE	470
WHITE	6500K (Color Temperature)
IR	850
IR HPIL	850
UV	365

Illumination Options

Illumination Board	5V USB Powered		PoE Powered		24V Externally Powered	
	Max. exposure time	Max. duty cycle	Max. exposure time	Max. duty cycle	Max. exposure time	Max. duty cycle
Standard Red 	500 μ s	3%	500 μ s	3%	1 ms	6%
High Power Red 	500 μ s	2%	500 μ s	3%	10 ms	10%
Standard White 	450 μ s	3%	450 μ s	3%	1 ms	6%
Standard Blue 	500 μ s	3%	500 μ s	3%	1 ms	6%
IR 	500 μ s	3%	500 μ s	3%	1 ms	6%
High Power IR 	500 μ s	3%	500 μ s	3%	1 ms	6%

Setting Up Your DataMan 150

This section provides information on the physical appearance of the DataMan 150 reader. It also details the steps of mounting the reader, installing the lenses and filters of the reader, describes tuning, and gives information on the imager itself.

Installing an Optical Filter

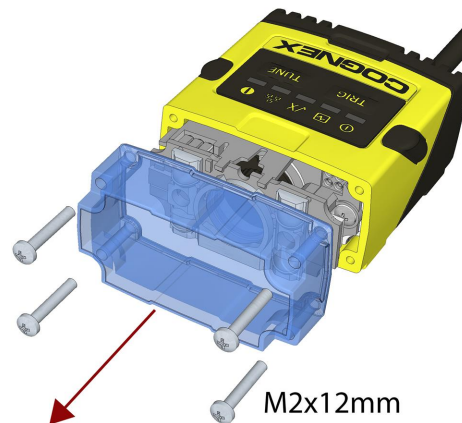
Perform the following steps to install an optical filter in the optics module of the DataMan 150 reader.

Note: Disconnect the DataMan 150 reader from power before installing an optical filter.

Observe the following constraints on the filter:

- Diameter (\varnothing): $12.3\text{mm} < \varnothing < 12.7\text{mm}$
- Thickness (t): $1.6\text{mm} < t < 2\text{mm}$ filter

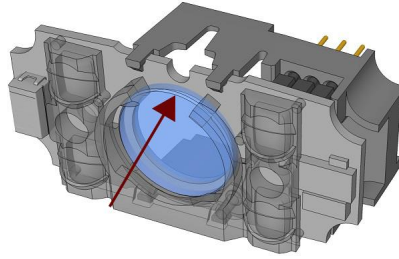
1. First, remove the front cover: unscrew the four M2x12mm Phillips Pan head screws and take off the LED cover.



2. Insert the filter at the bottom side of the round opening in the transparent plastic part.

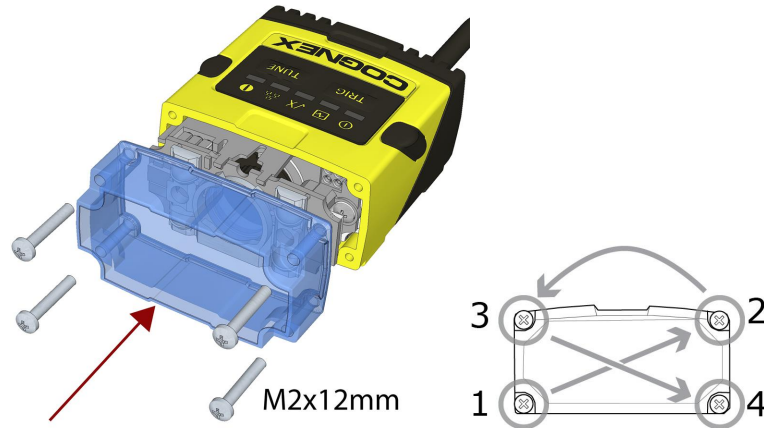


3. Push the top side of the filter firmly until it is sitting flat against the PCB.



Note: Use finger to push the filter in and then a q-tip to clean the filter, or use a q-tip to push the filter into place.

4. Attach the front cover. Observing the tightening sequence below, tighten all four M2x12mm Phillips Pan head screws to 9 Ncm using a torque wrench.



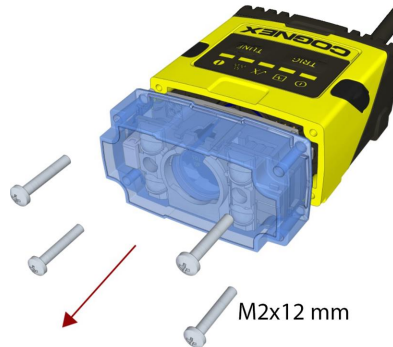
Note: The rib in the front cover must be oriented to the top side.

Installing a Liquid Lens

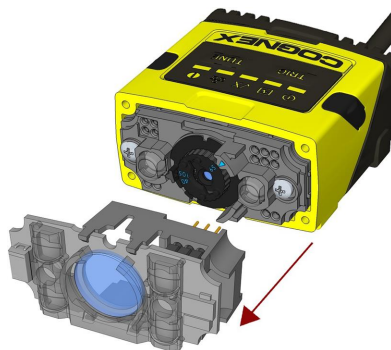
Perform the following steps to install a liquid lens on your DataMan 150 reader.

Note: Disconnect the DataMan 150 reader from power before installing the liquid lens.

1. Remove the front cover: unscrew the four M2x12mm Phillips Pan screws and take off the LED cover.



2. Remove the illumination module.



3. Turn the lens cap to the 105 mm position.



4. Remove the lens cap from the imager lens by pulling it.



Note: Do not rotate the imager lens while the lens cap is removed. Otherwise, focus calibration will be lost.

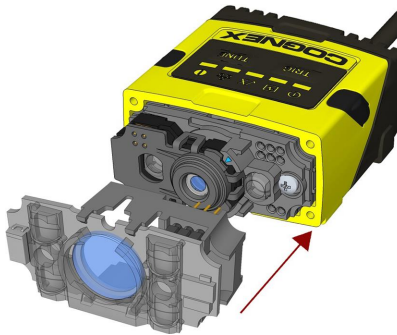
- Attach the liquid lens accessory by aligning the 2x2 connectors of the liquid lens with the 2x2 sockets on the optics mount.



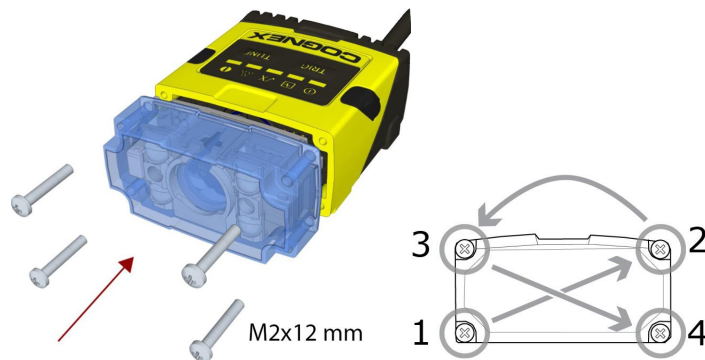
- Press the liquid lens onto the imager lens until you reach the stop.



- Reattach the illumination.



- Attach the front cover. Observing the tightening sequence below, tighten all four M2x12mm Phillips Pan screws to 9 Ncm using a torque wrench.



Note: The rib in the front cover must be oriented to the top side.

Note: The DataMan 150 liquid lens must be calibrated after field exchange. This can be done under **Focus Settings** in the DataMan Setup Tool. For more information, see the *DataMan Questions and Answers* document. **A reboot is required for the lens to operate with the new settings.**

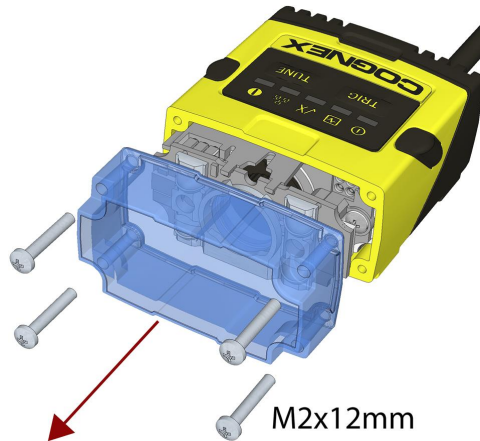
Changing a 6.2 mm Lens to a 16 mm Lens

Perform the following steps to change a 6.2 mm lens to a 16 mm lens on your DataMan 150 reader.

Note: Disconnect the DataMan 150 reader from power before changing lenses.

WARNING: This modification must be made in a dust-free and ESD safe area.

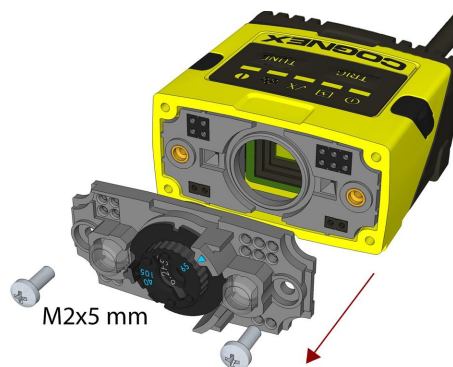
1. Remove the front cover: unscrew the four M2x12mm Phillips Pan head screws and take off the LED cover.



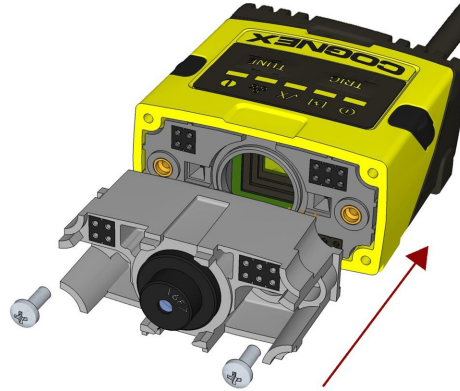
2. Remove the illumination module.



3. Unscrew the two M2x5mm Phillips head screws and remove the 6.2 mm lens mount.



- Attach the 16 mm lens mount.

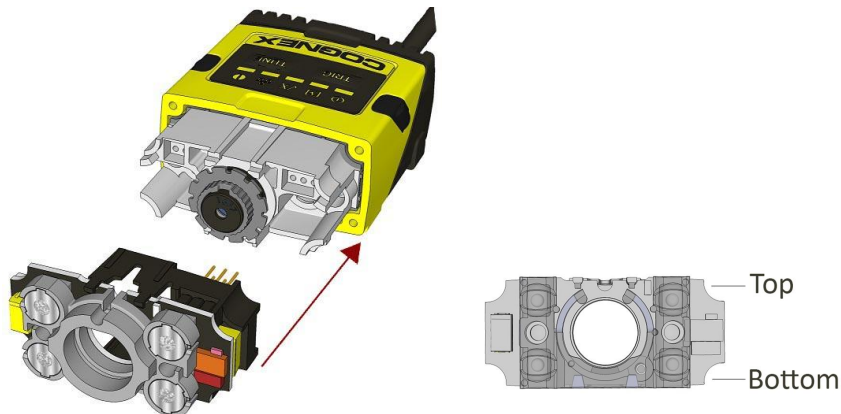


- Fasten the two M2x5mm Phillips head screws to 0.06 Nm using a torque wrench.
- In the case of a manual focus lens, press the 16 mm lens cap onto the lens. The lens has 12 cutouts so it can be locked in steps of 30 degrees.



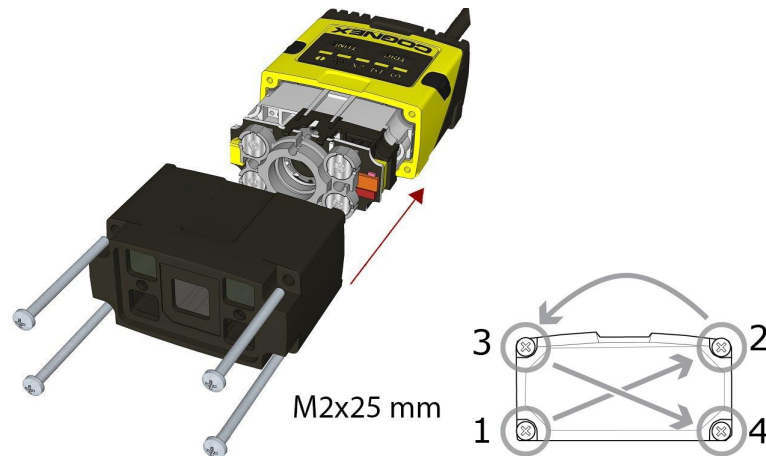
In the case of a liquid lens, mount the liquid lens cap onto the 16 mm lens. (See [Installing a Liquid Lens on page 24.](#))

- Attach the illumination board.



Note: Take care to attach the illumination with the right orientation.

- Attach the front cover. Observing the tightening sequence below, tighten all four M2x25 Phillips Pan head screws to 9 Ncm using a torque wrench.



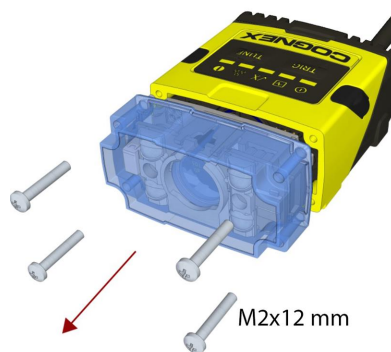
Note: The rib in the front cover must be oriented to the top side.

Changing to an Illumination with a Different Color

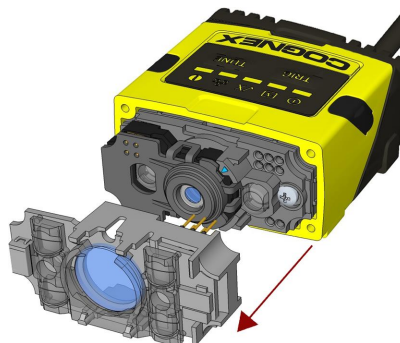
Perform the following steps to change the illumination.

Note: Disconnect the DataMan 150 reader from power before changing to an illumination with a different color.

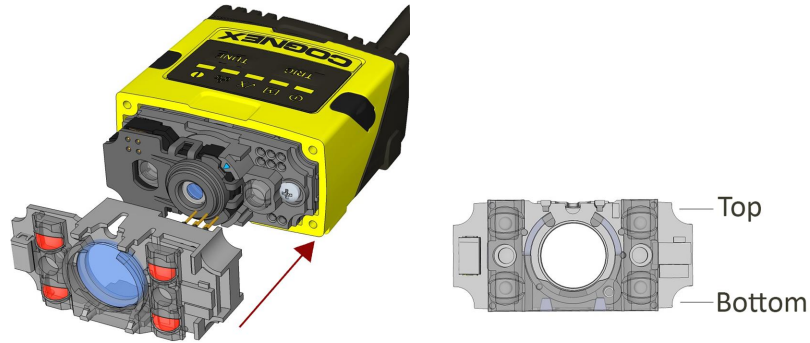
- Remove the front cover: unscrew the four screws and take off the LED cover.



- Remove the illumination module.

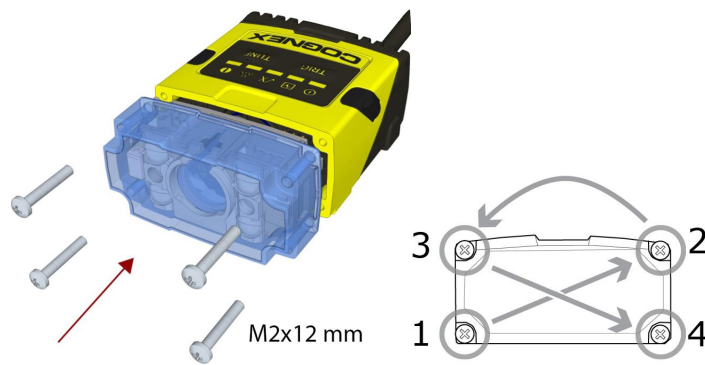


- Attach a new color illumination module.



Note: Take care to attach the illumination with the right orientation.

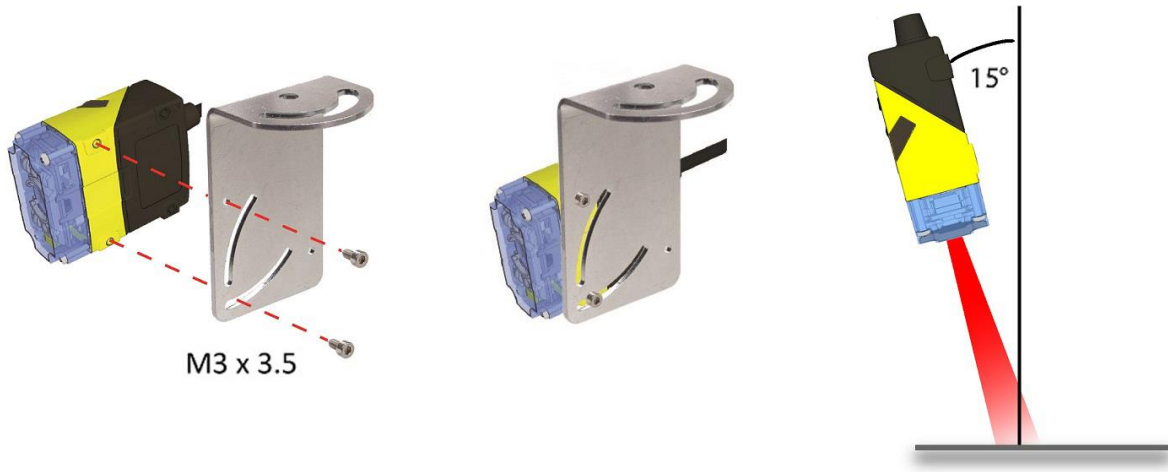
- Attach the front cover. Observing the tightening sequence below, tighten all four screws to 9 Ncm using a torque wrench.



Note: The rib in the front cover must be oriented to the top side.

Mounting

Mounting the DataMan 150 at a slight angle (15°) can reduce reflections and improve reader performance.



Right-Angle Configuration

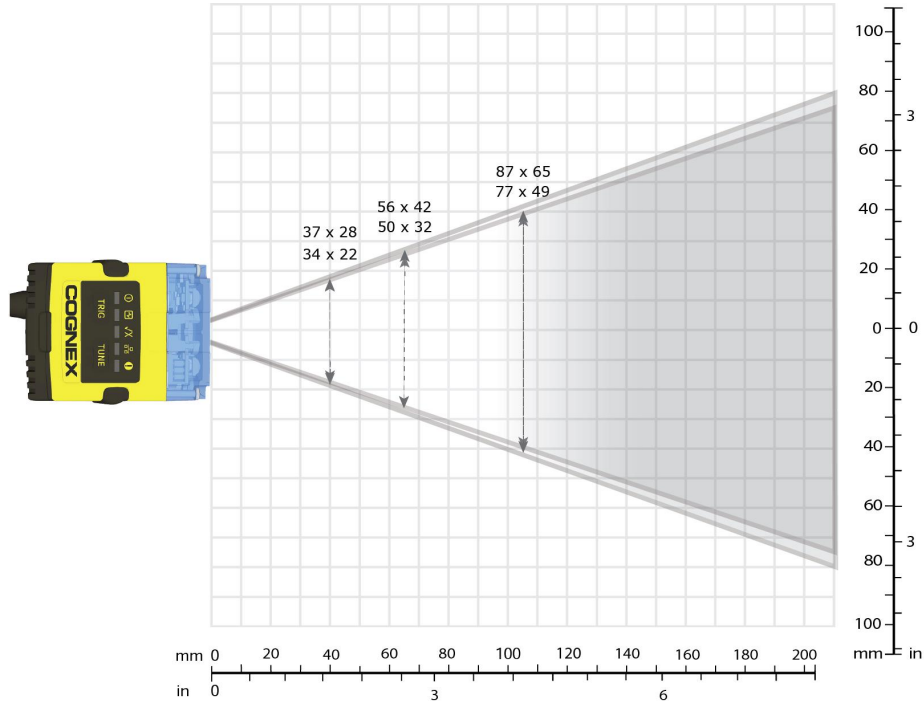


Field of View and Reading Distances

DataMan 150 Readers with a 6.2 mm Lens

Short Range (Focused to 105 mm)

The following map shows the FoV of the DataMan 150 series readers with a 6.2 mm lens. Outer FoV values refer to DM152, inner FoV values refer to DM150.

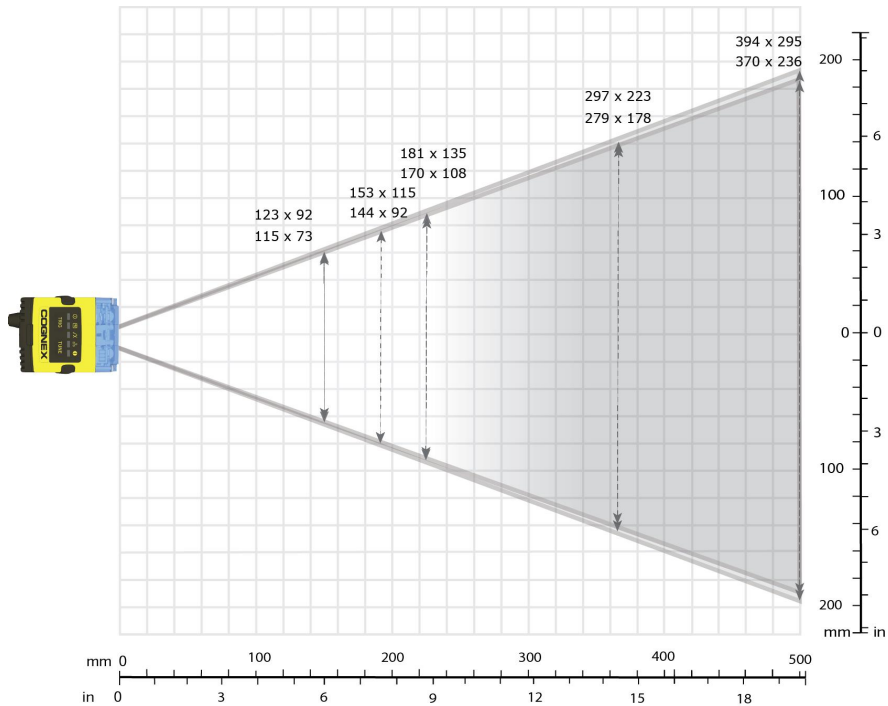


The following tables show the Field of View (FoV) widths of the 6.2 mm lens focused to 105 mm at various distances.

Device	Distances in mm	2D min. code	1D min. code
DM150	40	4 MIL	2 MIL
	65	5 MIL	3 MIL
	105	10 MIL	6 MIL
Device	Distances in mm	2D min. code	1D min. code
DM152	40	3 MIL	2 MIL
	65	4 MIL	2 MIL
	105	7 MIL	5 MIL

Long Range (Focused to 190 mm)

The following map shows the FoV of the DataMan 150 series readers with a 6.2 mm lens. Outer FoV values refer to DM152, inner FoV values refer to DM150.

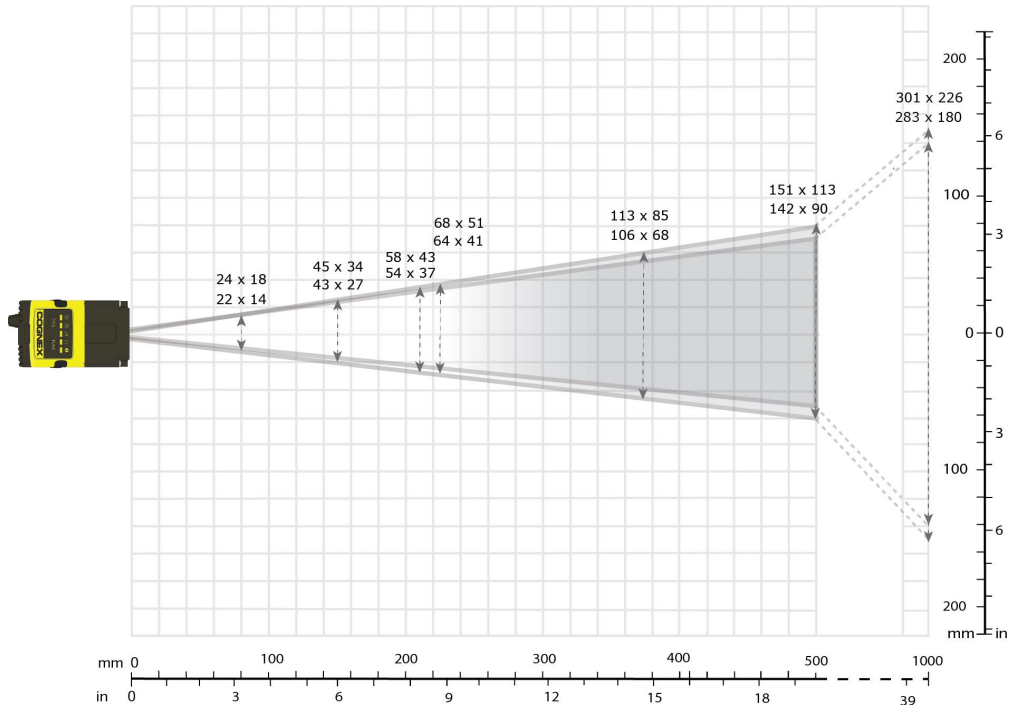


The following tables show the FoV widths of the 6.2 mm lens focused to 190 mm at various distances.

Device	Distances in mm	2D min. code	1D min. code
DM150	150	12 MIL	6 MIL
	190	15 MIL	10 MIL
	225	18 MIL	10 MIL
	375	30 MIL	15 MIL
	500	35 MIL	20 MIL
	1000	-	35 MIL
Device	Distances in mm	2D min. code	1D min. code
DM152	150	10 MIL	5 MIL
	190	12 MIL	6 MIL
	225	15 MIL	6 MIL
	375	20 MIL	10 MIL
	500	25 MIL	15 MIL
	1000	-	30 MIL

DataMan 150 Readers with a 16 mm Lens

The following map shows the FoV of the DataMan 150 readers with a 16 mm lens. Outer FoV values refer to DM152, inner FoV values refer to DM150 .



The following tables show the FoV widths of the 16 mm lens at various distances.

Device	Distances in mm	2D min. code	1D min. code
DM150	80	3 MIL	2 MIL
	150	5 MIL	3 MIL
	190	6 MIL	4 MIL
	225	7 MIL	4 MIL
	375	12 MIL	5 MIL
	500	15 MIL	10 MIL
	1000	25 MIL	15 MIL
Device	Distances in mm	2D min. code	1D min. code
DM152	80	2 MIL	2 MIL
	150	3 MIL	2 MIL
	190	4 MIL	2 MIL
	225	4 MIL	3 MIL
	375	7 MIL	4 MIL
	500	10 MIL	6 MIL
	1000	20 MIL	15 MIL

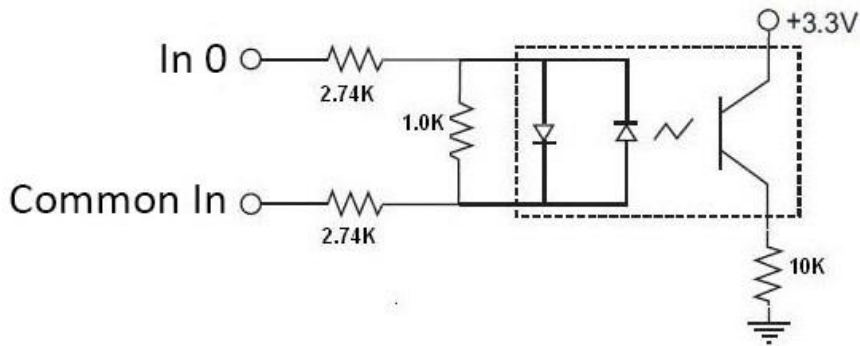
Connections, Optics and Lighting

Descriptions about the I/O Cables, RS-232 cable, flying leads cable, USB connections, digital input and output wiring, and multi- port connections are provided in the following sections.

Acquisition Triggering

To trigger from an NPN (pull-down) type photo-detector or PLC output, connect Common In to +24VDC and connect In 0 to the output of the detector. When the output turns on, it pulls Common In down to 0VDC, turning the opto-coupler on.

To trigger from a PNP (pull-up) type photo-detector or PLC output, connect to the output of the detector and connect to 0VDC. When the output turns on, it pulls up to 24VDC, turning the opto-coupler on.

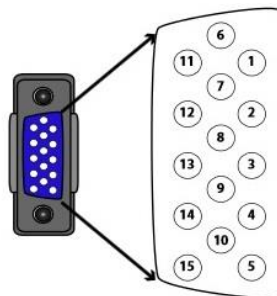


28V Max. Across input pins - Transition approx. 12V (Min).

I/O Cable

You can connect a cable with USB & flying leads (DM-USBIO-00) to the cable that is attached to the device. The following table shows the pinout and color description of the flying leads.

Note: GND (Pin 4) is connected to the reader housing, cable shield, and DB15 shell.

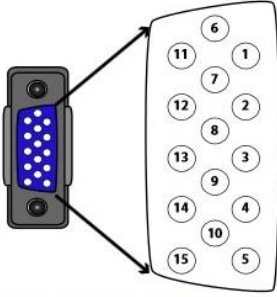


This is a female socket/connector.

PIN	Color	Signal
4	Black	GND
7	Blue/White	Output-0
8	White	Input-0
9	White/Black	Input-1
11	Light Blue/Black	Output-1
12	Light Blue/Yellow	Output-Common
13	Light Blue/Green	Input-Common

RS-232 Cable

You can connect a cable with RS-232 & flying leads (DM-RS232IO-00) to the cable that is attached to the device. The following table shows the pinout and color description of the flying leads.

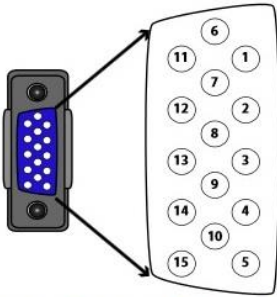


This is a female socket/connector.

PIN	Color	Signal
4	Black	GND
5	Brown/White	VDC
7	Blue/White	Output-0
8	White	Input-0
9	White/Black	Input-1
11	Light Blue/Black	Output-1
12	Light Blue/Yellow	Output-Common
13	Light Blue/Green	Input-Common

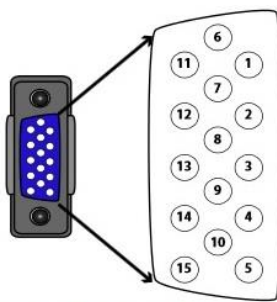
Flying Leads Cable

You can connect a cable with flying leads (DM50-PWRIO-05) to the cable that is attached to the device. The following table shows the pinout and color description of the flying leads.



This is a female socket/connector.

PIN	Color	Signal
2	Green	TxD
3	Green/Black	RxD
4	Red	GND
5	Brown/White	DC+ (system power, 5-24 VDC)
6	Blue	RTS



This is a female socket/connector.

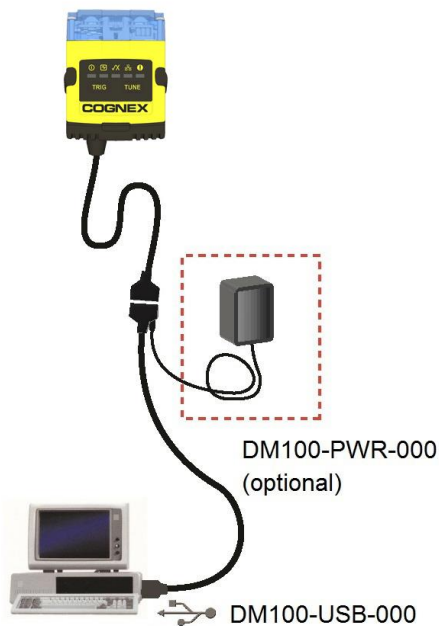
PIN	Color	Signal
7	Blue/White	Output-0
8	White	Input-0
9	White/Black	Input-1
10	Light Blue	CTS
11	Light Blue/Black	Output-1
12	Light Blue/Yellow	Output-Common
13	Light Blue/Green	Input-Common

USB Connections

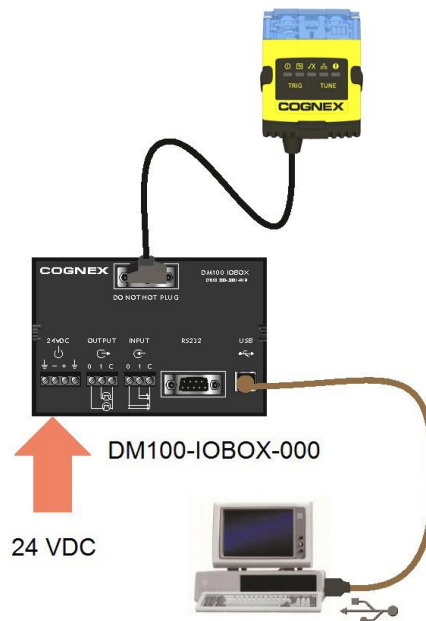
When connected to a PC over USB, the DataMan 150 appears as a COM port.

You can connect your device to the computer in the following ways:

Connect directly to the PC:



Connect to the PC through a basic I/O module:



If the reader is configured as an HID device and you want to return to USB serial, scan the USB serial connection code:



Note: The DataMan PC software must be installed for this connection type!

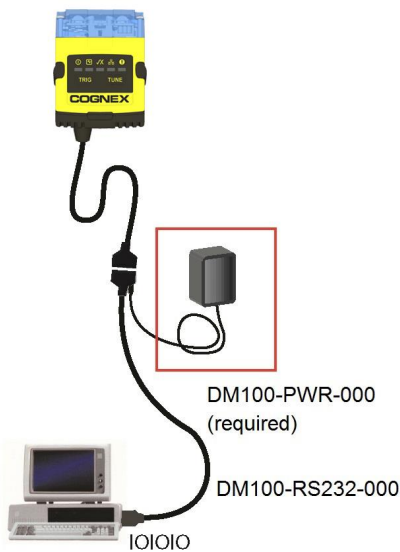
RS-232 Connections

You can connect the DataMan 150 reader to a PC or other device over a standard RS-232 serial connection.

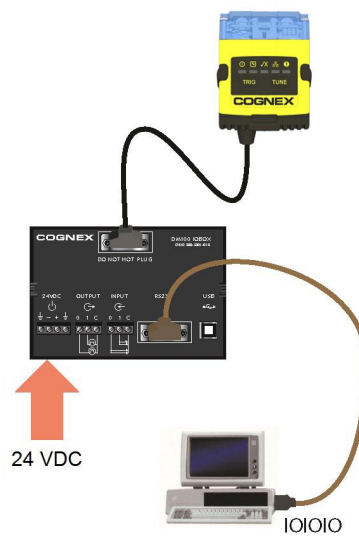
Note: You must supply external power to use this connection type.

You can make a connection in the following ways:

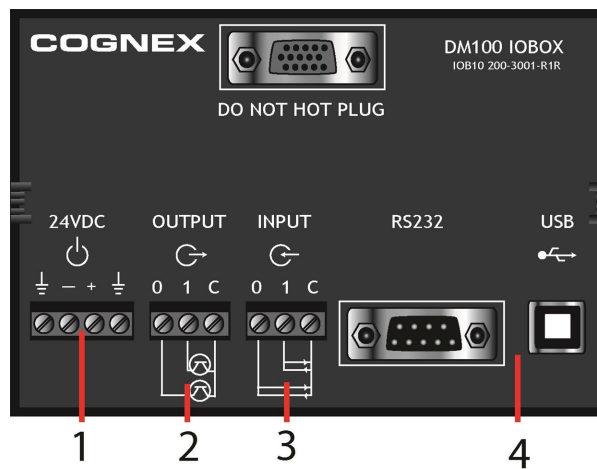
Connect directly to the PC:



Connect to the PC through a basic I/O module:



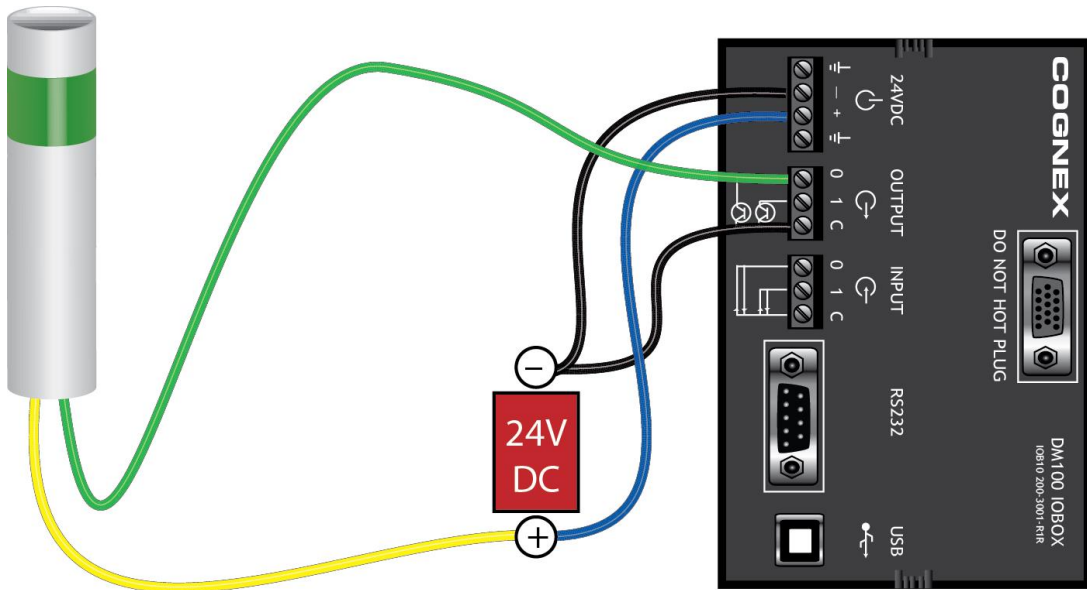
Wiring the Basic I/O Module



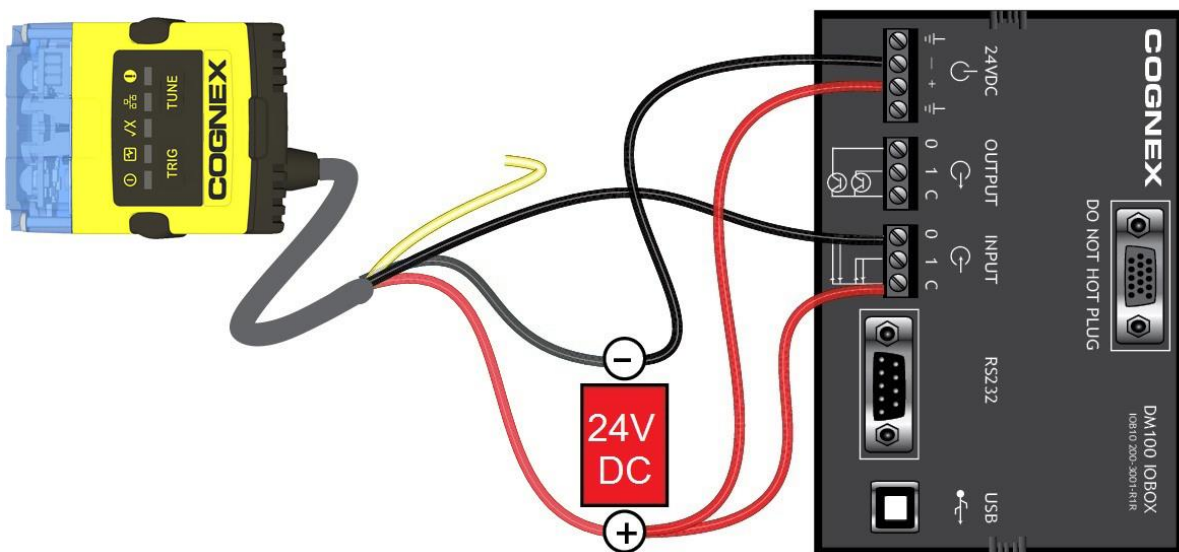
1. **Power:** 5-24 VDC, 2.5W peak. Connect either ground pin to chassis ground.
2. **Discrete output:** Opto-isolated, current source or sink, depending on wiring; must connect logical ground to common. Outputs are opto-isolated and protected against reverse polarity. Max current is 50 mA @ 24 VDC. Output 1 is used for external illumination control by default.
3. **Tigger input:** Opto-isolated, polarity-independent, current source or sink; have reference to a separated common signal. Work with ± 15 -30V. Input 0 is dedicated trigger line.
4. **Communication ports:** RS-232 serial port and USB.

Note: You must use a null modem cable when connecting the Basic I/O Module to a PC's RS-232 serial port.

Output Wiring Example

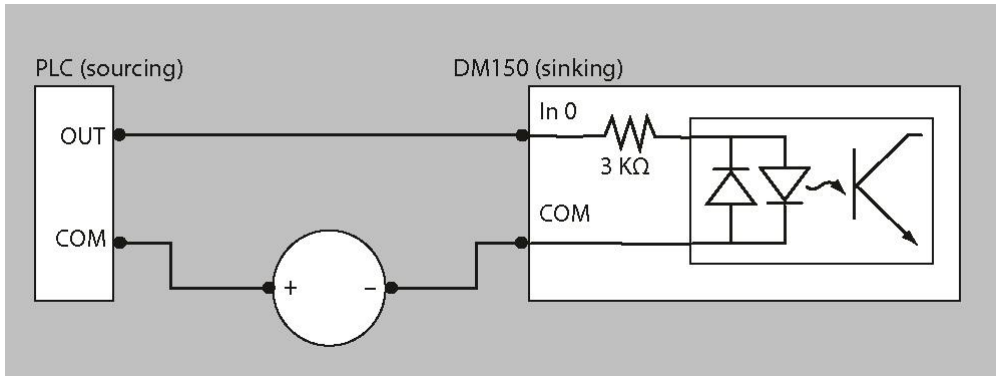


Input Wiring Example

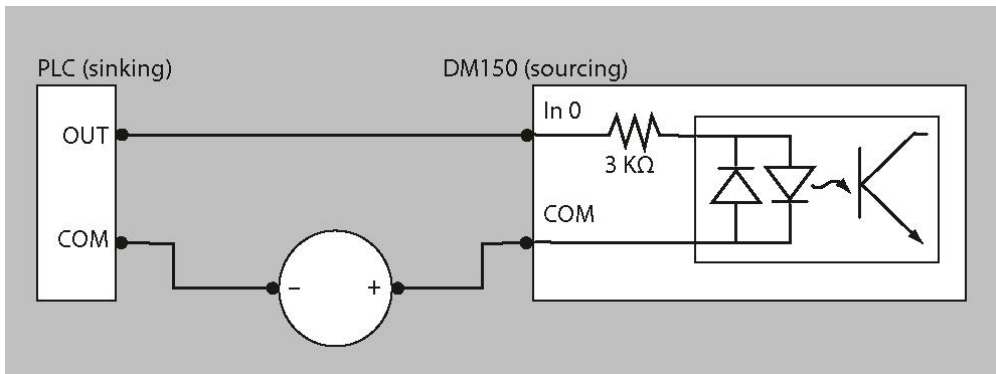


Digital Input Wiring Diagrams

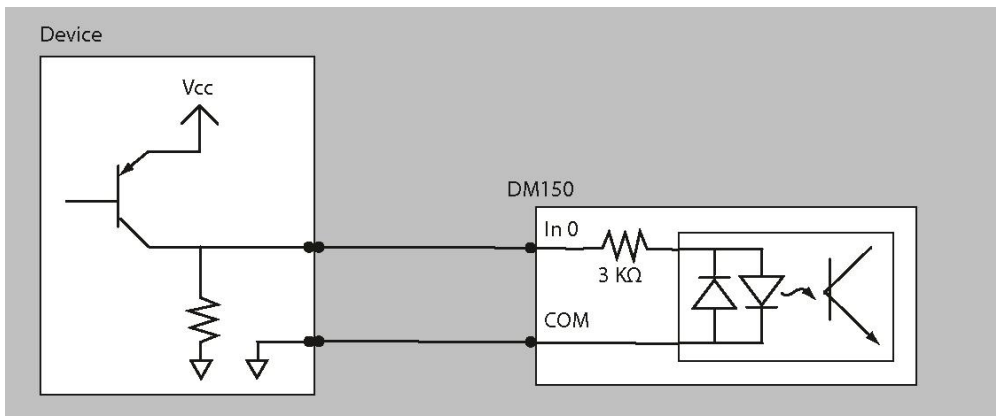
Current Sink Configuration



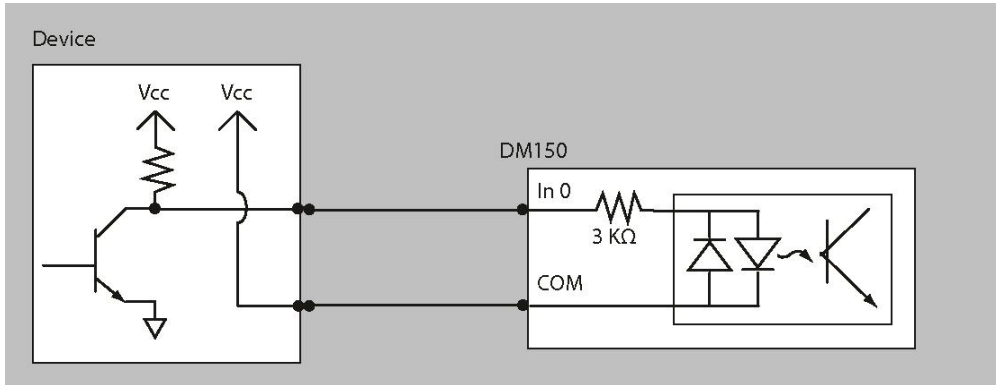
Current Source Configuration



PNP Configuration



NPN Configuration



Digital Output Wiring Diagrams

The digital outputs can be used as either NPN (pull-down) or PNP (pull-up) lines. For NPN lines, the external load should be connected between the output and the positive supply voltage (<26V). The outputs pull down to less than 3V when ON, which causes current to flow through the load. When the outputs are OFF, no current flows through the load.

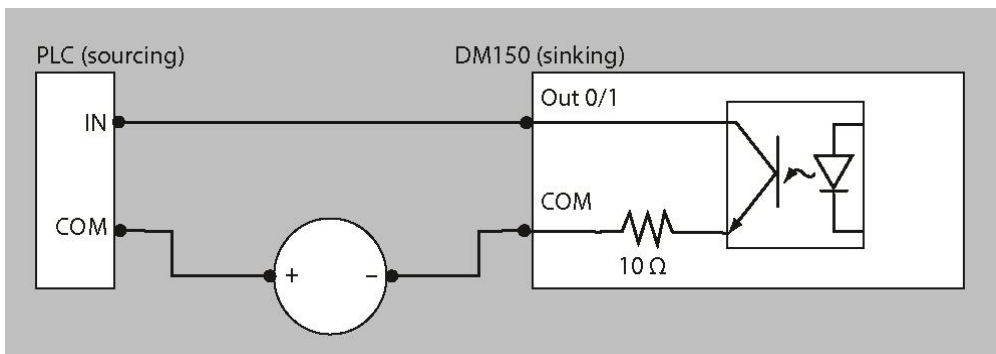
NPN (pull down) output type characteristics are the following:

Applied voltage	26 VDC or less
Residual voltage	0.85 V or less
Maximum sink current	100 mA
Overcurrent protection	multifuse - 160 mA

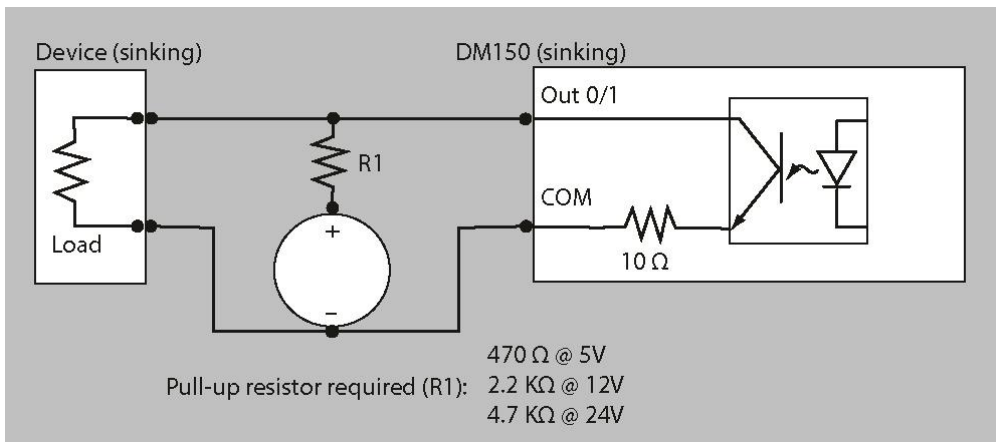
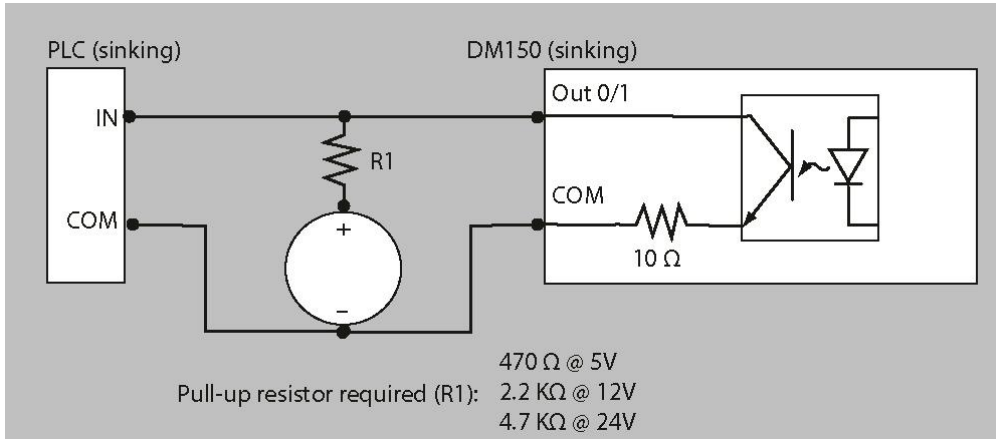
PNP (pull up) output type characteristics are the following:

Output voltage range	26 VDC or less
Residual voltage	0.8 V or less
Maximum source current	100 mA
Overcurrent protection	multifuse - 160 mA

Sinking Outputs, Sourcing Inputs



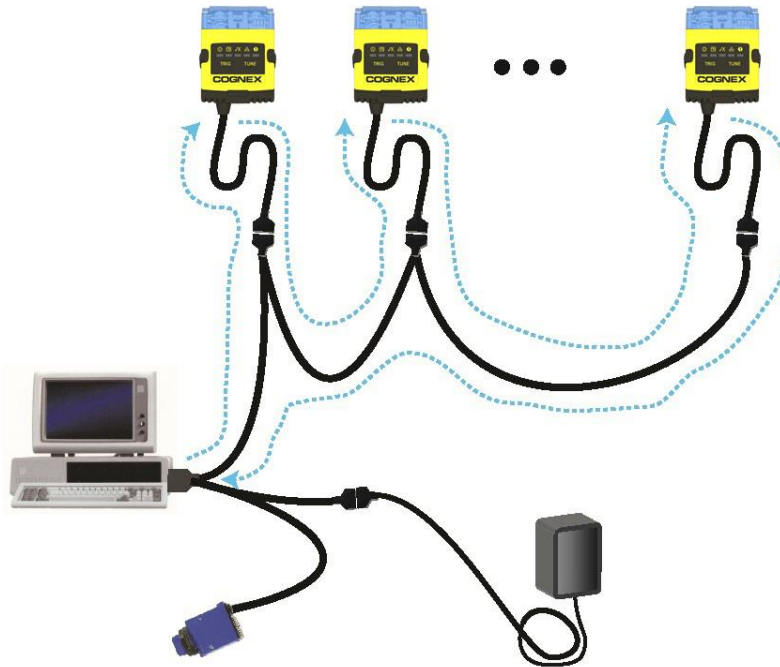
Sinking Outputs, Sinking Inputs



Multi-port Connections

You can connect multiple DataMan 150 readers to a single PC (or other device equipped with a serial port) using a multi-port connection.

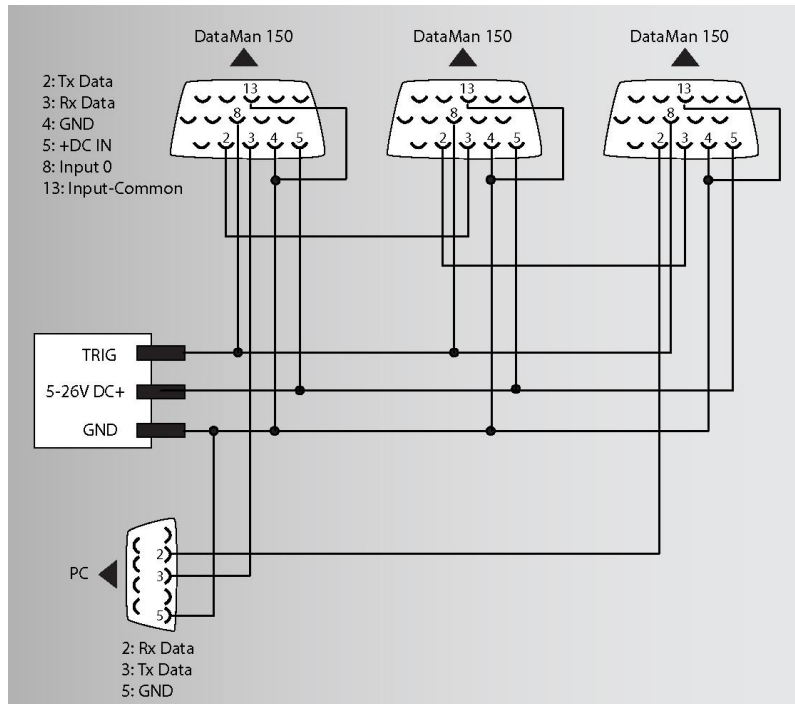
A multi-port connection creates a daisy-chain of readers. Each reader receives serial data from the previous reader and transmits it to the next reader. When a reader transmits data, it is passed through each of the readers in the chain between it and the PC.



You must construct your own cable that meets the requirements of your system configuration.

The cable must provide a DB-15 connector for each DataMan 150 and a DB-9 connector for the PC serial port. Each DB-15 connector must provide Tx Data, Rx Data, Trigger (Input 0), ground, and DC power. The Tx Data and Rx Data pins on adjacent connectors must be connected to provide the multi-port connection.

The following diagram shows how to create a multi-port cable for a 3-reader system. In the example, all the readers share a common trigger. It is also possible to wire individual triggers for each reader.



You must connect each DataMan 150 to DataMan Setup Tool using a USB connection and set the DataMan for multi-port operation. To configure a DataMan 150 for multi-port operation, click on the **Enable Multi-Port (RS-232 Sharing)** check box in **Communication Settings**.

There is no guaranteed delivery order when multiple readers transmit data using a multi-port connection; read results may arrive at the PC in any order. You can configure each DataMan 150 reader in a multi-port connection to add identifying data to each read result. Your PC application can then determine which reader produced a specific read result.

To do this, check the **Standard Formatting Enabled** box (for each symbology that you are using) in **Data Formatting**, and enter text in the **Leading Text** field. (You can also add trailing text by entering text in the **Trailing Text** field.)

You can obtain the best results when using multi-port connections by keeping the following usage guidelines in mind as you design your system:

- The maximum cable length between any two DataMan 150 readers or between the PC and any DataMan reader should be no greater than 15 meters.
- There is no fixed limit to the number of DataMan 150 readers that you can connect to a single PC. Each reader introduces a delay of about 100 ms when it retransmits received serial data. If you have 5 readers, this means that there will be a 400 ms delay between the time the first reader in the chain transmits data and the PC receives it.
- Each DataMan 150 reader must receive a hardware trigger signal on its Input 0 line. You can wire the input ports to a common trigger signal or you can provide individual triggers for each reader.
- Each DataMan 150 reader must be individually configured for multi-port operation, and you must perform this configuration using a USB connection.
- If *any* reader in the multi-port chain loses power or becomes disconnected, then no data from any other reader will be transmitted.
- If a DataMan 150 is transmitting its own read result, it will buffer any data received from another reader until it has finished its own data transmission. If a DataMan 150 is transmitting another reader's data, it will buffer its own data if it receives a trigger signal while it is processing the other reader's data.

-
- If you use a single power supply for multiple readers, make sure that the power supply can provide enough power for all of the readers.

Using Your DataMan 150

This section provides general information about the installation process of the DataMan Setup Tool, triggering, and reader training.

Installing the DataMan Software

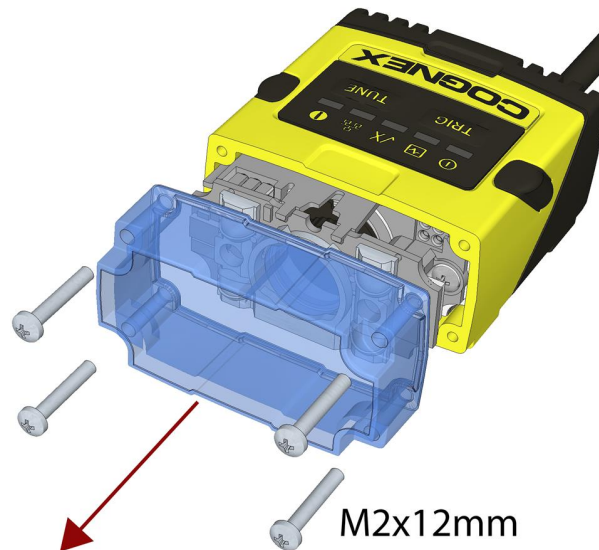
Perform the following steps to install the DataMan Setup Tool:

1. Check the **DataMan Release Notes** for a full list of system requirements.
2. Download the DataMan Setup Tool from <http://www.cognex.com/support/dataman> and follow the on-screen steps.
3. Connect the DataMan 150 to your PC.
4. Choose **Start > Programs > Cognex > DataMan Software vx.x.x > Setup Tool** to launch the DataMan Setup Tool. Detected readers will appear under **COM ports**.
5. Click **Refresh** to update the list of connected devices.
6. Select the device from the Network list (**Discovered Devices**) and click **Connect**.

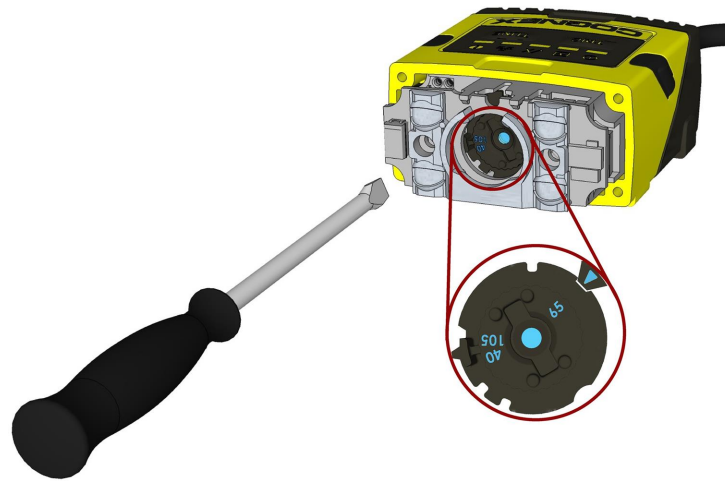
Setting the Focus Position

DataMan 150 can operate in one of three distance ranges. Follow the steps below to set the focus position.

1. Remove the screws and the front cover.

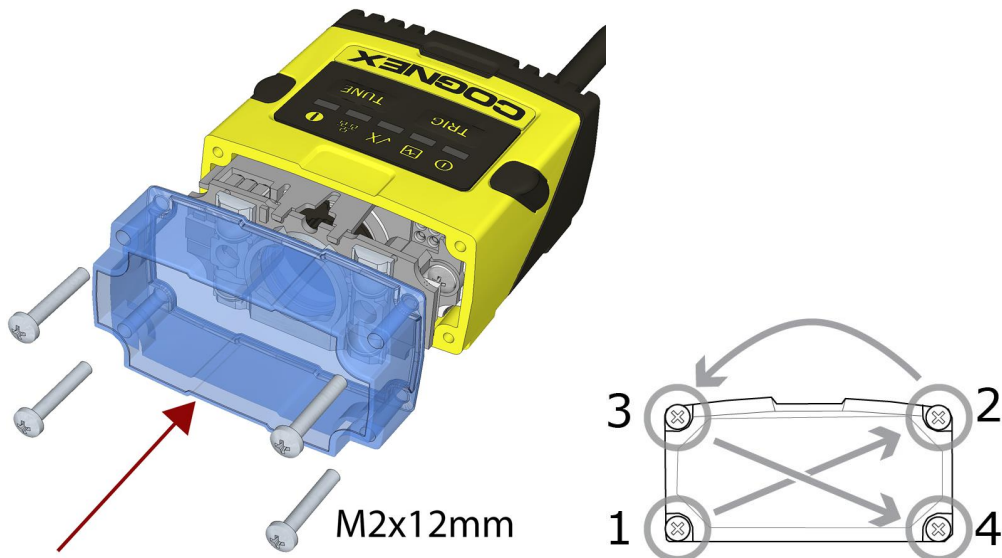


- Using a flathead screwdriver, set the focus position from the front. Always turn clockwise to focus to a larger distance and counterclockwise to focus to a shorter distance.



Note: If an optical filter has been mounted, first disconnect the DataMan 150 reader from power and remove the illumination module with the filter before adjusting the focus.

- Remount the front cover. Observing the tightening sequence below, tighten all four screws to 9 Ncm using a torque wrench.




Note: If you use an optical filter and the illumination was removed, remount the illumination module first and then remount the front cover.

Note: The rib in the front cover must be oriented to the top side.

Tuning

By tuning, your DataMan 150 reader automatically selects the best settings for the given reading situation, based on parameters of illumination, camera and decoder properties, and focal distance. Tuning autodiscriminates all enabled symbologies (both 1-D and 2-D). If multiple symbols are found in the field of view, tuning locks on the first one found. Use this feature to create an optimum setting to read your codes.

You can use any of the following methods to tune your reader:


Press the Tune button () at least for 3 seconds on your reader. The first press starts the tuning and the second press cancels the tuning, if it is still ongoing.



Turn on tuning in DataMan Setup Tool ().



Start tuning by sending a DMCC, for more information, see the **Command Reference**, available through the Windows **Start** menu or the DataManSetup Tool **Help** menu.

Use Input line 1 for tuning. Go to the **System Settings** pane in the DataManSetup Tool and check **Tune**. You can also use the **In1** button on the toolbar.

 **Note:** Tune button can toggle the aimer light ON and OFF.

External Triggering and Trigger Modes

If you are using external triggering, you can use any of the following methods to trigger your DataMan 150 reader:

1. Press the Trigger button () on the reader.
2. Send a pulse on Input-0 line.
3. Send a serial trigger command over the serial line. (You must use RS-232 or USB communications type.)
4. Click the Trigger button () or press <Ctrl>-T in DataMan Setup Tool.

DataMan 150 supports a variety of trigger modes:

- **Single:** Acquires a single image and attempts to decode any symbol it contains or more than one symbol in cases where multicode is enabled. The reader relies on an external trigger source.
- **Presentation:** Repeatedly scans for a symbol and decodes it whenever one is detected. The reader relies on an internal timing mechanism to acquire images.
- **Manual** (default): Begins acquiring images when you press the trigger button on the reader or the discrete trigger input is activated, and continues acquiring images until a symbol is found and decoded or you release the button or the discrete trigger input is deactivated.
- **Burst:** Performs multiple image acquisitions based on an external trigger and decodes one or multiple symbols appearing in the sequence of images.
- **Self:** Similar to *Presentation* mode in that the reader perpetually scans for symbols and decodes them each time one is detected. Unlike *Presentation* mode, however, *Self* mode supports multicode results and a decode attempt occurs with every image. The main difference between *Self* and *Presentation* is the fixed and exact interval for image acquisitions in *Self*.
- **Continuous:** Begins acquiring images based on a single external trigger and continues to acquire images until a symbol is found and decoded, or until multiple images containing as many codes as specified in multicode mode are located, or until the trigger is released.

S models do not have Burst and Continuous trigger types.



Training and Trigger Modes

Training is supported for the following trigger modes:

- Single trigger
- Burst mode
- Self trigger
- Continuous mode

Training

Training your reader with the expected symbology may help increase decode yield. To train your reader, place a code in front of the reader and do one of the following:

- Press and hold the trigger button () for at least 3 seconds and then release it.
- Click and hold the trigger button in the DataMan Setup Tool () for at least 3 seconds and then release it.
- Click **Train Code** in the **Action** ribbon of the DataMan Setup Tool.

If using Single trigger mode, upload the code through **File** -> **Train Image**.

Note: You can use training in *Single*, *Burst*, *Continuous* or *Self* trigger modes. Only a single symbol of each kind of symbology can be trained per read setup.

DataMan 150 reports the status of the training and brightness optimization operations using its signaling LEDs. The second LED from left on the reader flashes green to indicate that the reader is currently trained, or yellow to indicate that it is not trained.

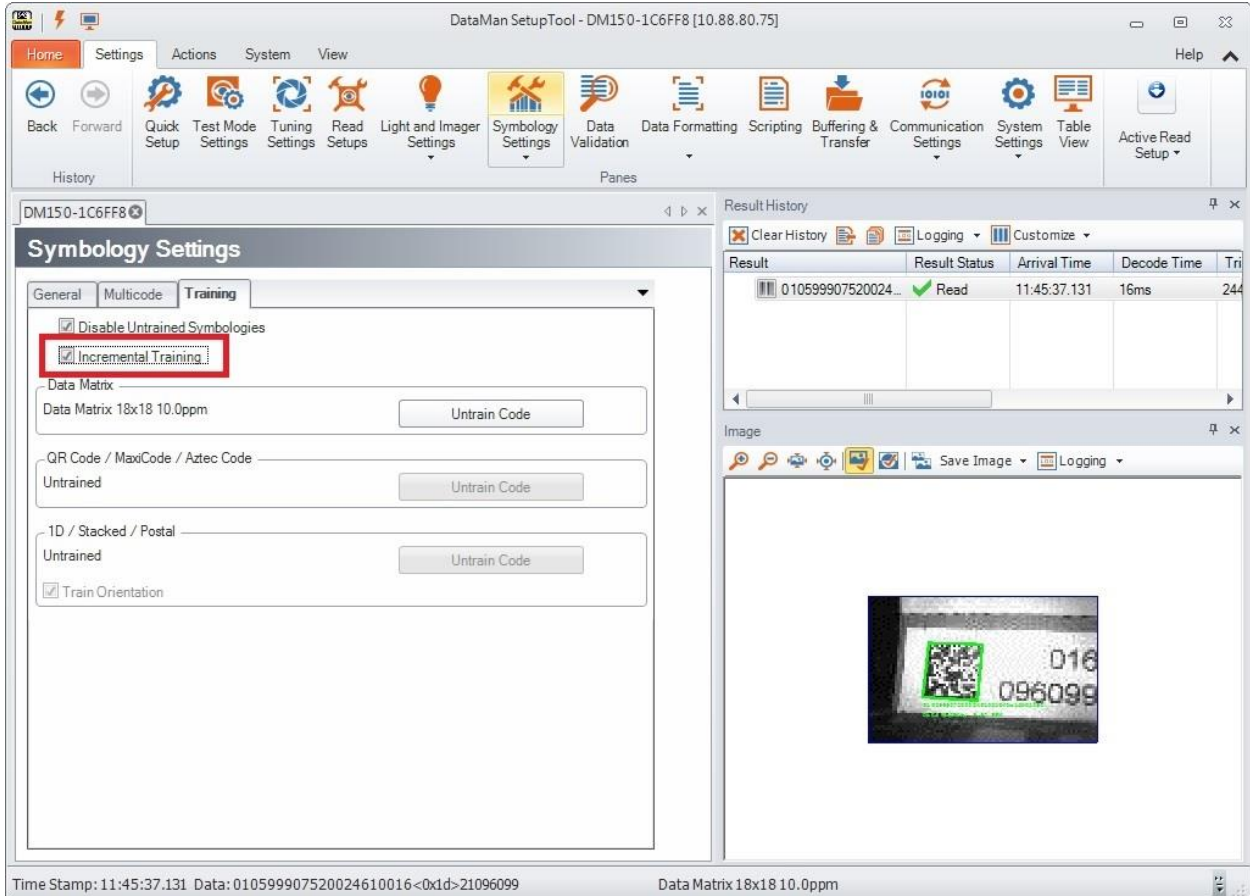


Connect the reader to the DataMan Setup Tool to untrain it and allow it to recognize other enabled symbologies.

Incremental Training for Multiple Symbologies

If you want to train the reader to recognize multiple symbologies, you can present a single image showing all the desired symbologies and perform the training procedure described in the previous section.

If you cannot present a single image showing all the necessary symbologies, you can enable incremental training on the **Training** tab of the **Symbology Settings** page:



With incremental training enabled, you can train the reader using multiple images showing the symbologies you expect to decode. The reader will train each new symbology while retaining the existing trained symbologies.

Cleaning and Maintenance

Cleaning the Reader Housing

To clean the outside of the reader housing, use a small amount of mild detergent cleaner or isopropyl alcohol on a cleaning cloth. Do not pour the cleaner directly onto the reader housing.



CAUTION: Do not attempt to clean any DataMan product with harsh or corrosive solvents, including lye, methyl ethyl ketone (MEK) or gasoline.

Cleaning the Reader Lens Cover

To remove dust from the lens cover, use a pressurized air duster. The air must be free of oil, moisture or other contaminants that could remain on the lens cover. To clean the plastic window of the lens cover, use a small amount of isopropyl alcohol on a cleaning cloth. Do not scratch the plastic window. Do not pour the alcohol directly on the plastic window.

Precautions


To reduce the risk of injury or equipment damage, observe the following precautions when you install the Cognex product:

- This device requires the use of an LPS or NEC class 2 power supply.
- Do not connect or disconnect this device from the I/O module or 15-pin USB adapter cable when the I/O module or adapter cable is connected to a PC.
- Route cables and wires away from high-current wiring or high-voltage power sources to reduce the risk of damage or malfunction from the following causes: over-voltage, line noise, electrostatic discharge (ESD), power surges, or other irregularities in the power supply.
- Changes or modifications not expressly approved by the party responsible for regulatory compliance could void the user's authority to operate the equipment.
- Ensure that the cable bend radius begins at least six inches from the connector. Cable shielding can be degraded or cables can be damaged or wear out faster if a service loop or bend radius is tighter than 10X the cable diameter.
- This device should be used in accordance with the instructions in this manual.
- All specifications are for reference purposes only and can change without notice.
- This product is intended for industrial use in automated manufacturing or similar applications.
- The safety of any system incorporating this product is the responsibility of the assembler of the system.
- This product does not contain user-serviceable parts. Do not make electrical or mechanical modifications to product components. Unauthorized modifications can void your warranty.

Regulations/Conformity

The DataMan 150 Series has Regulatory Models 1AA3 and 1ABE and meets or exceeds the requirements of all applicable standards organizations for safe operation. However, as with any electrical equipment, the best way to ensure safe operation is to operate them according to the agency guidelines that follow. Please read these guidelines carefully before using your device.

Note: For the most current CE declaration and regulatory conformity information, see the Cognex support site: cognex.com/support.

Safety and Regulatory	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
USA	FCC 47 CFR Part 15 Subpart B, Class A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
Canada	ICES-003, Class A This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
Europe	EN55022 (CISPR 22) Class A EN55024 EN60950 This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take immediate measures. This equipment complies with the essential requirements of the EU Directive 2014/30/EU. Declarations are available from your local representative. The CE mark on the product indicates that the system has been tested to and conforms with the provisions noted within the 2014/30/EU Electromagnetic Compatibility Directive. For further information please contact: Cognex Corporation, One Vision Drive Natick, MA 01760 USA. Cognex Corporation shall not be liable for use of our product with equipment (i.e., power supplies, personal computers, etc.) that is not CE marked.
Australia	Radiocommunications (Electromagnetic Compatibility) Standard: 2017 (EN 55032:2012) 
Korea	KN22, KN24 A급 기기(업무용 방송통신기자재): 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. Certificate number: MSIP-REM-CGX-DM150 MSIP-REM-CGX-DM152X

Safety and Regulatory	
Japan	VCCI V-/2013.04 Class A <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。</p> <p>VCCI-A</p> </div>
TÜV	Regulatory Model 1AA3 Regulatory Model 1ABE
	TÜV SÜD SCC/NRTL OSHA Scheme for UL/CAN 61010-1..
	CB report available upon request. .TÜV SÜD, IEC/EN 61010-1.

For European Community Users

Cognex complies with Directive 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE).

This product has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment, if not properly disposed.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems for product disposal. Those systems will reuse or recycle most of the materials of the product you are disposing in a sound way.



The crossed out wheeled bin symbol informs you that the product should not be disposed of along with municipal waste and invites you to use the appropriate separate take-back systems for product disposal.

If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You may also contact your supplier for more information on the environmental performance of this product.



Reset Scanner to
Factory Defaults



Reboot Scanner

