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# THORLABS

## SL25085-Y2 - JAN 21, 2021

Item # SL25085-Y2 was discontinued on JAN 21, 2021. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

### TWO-AXIS GALVO SYSTEM SCAN HEADS

- ▶ Packaged XY Galvo Systems
- ▶ Options for 10 mm, 15 mm, and 20 mm Beam Diameters
- ▶ Integrated Digital Control Electronics



**XG215-CD**  
Galvo Scan Head,  
CO<sub>2</sub> Mirrors



**DCB210-CD**  
Galvo Scan Head with Digital  
Processing, CO<sub>2</sub> Laser Mirrors

## OVERVIEW

**Features**

- Packaged Two-Axis Galvo Scan Heads
- $\pm 22.5^\circ$  Optical Scan Angle
- XG Series for High-Speed Scanning Performance
- DCB Series with Advanced Digital Processor Control
- Protected Silver, Nd:YAG, or CO<sub>2</sub> Mirrors Available
- Operate via XY2-100 Digital Signal Input
- Compact Housing

These Two-Axis Galvo Scan Heads provide two-dimensional scanning in a variety of laser applications. Each scan head consists of a dual-axis galvo motor and mirror assembly, two servo amplifiers, and communication electronics. The moving-magnet galvanometers deliver high speed and accuracy while integrated optical position detectors ensure precise control, high linearity, and low drift. The scan head housings are compact and include industry-standard mechanical interfaces for integration into a system.

The DCB Series Scan Heads are designed for OEM integration or easy plug-and-play operation. The system includes advanced digital signal processing (DSP) to rapidly compute and predict the exact drive impulses required to achieve small mirror movements with the fastest possible acceleration. The unit features self-tuning technology that automatically compensates for mechanical wear, extending its lifetime and eliminating issues associated with traditional analog servo filters. A detailed self-diagnosis and system check determine the operating parameters of the individual galvos, ensuring high accuracy and precise, error-free laser marking positioning.

**System Control**

These scan heads are configured to accept inputs via the XY2-100 communication protocol. This industry-standard digital interface integrates with PC-based hardware and software packages for laser marking and micromachining. We recommend the SAMLight software package from SCAPS; click here for information on this software. Analog input versions are also available. Power supplies and cables are sold separately.

**Scan Lenses and Lens Ring Kits**

A scan lens and lens ring are required in order to use a scan head. The XG series scan heads require both a scan lens and lens ring kit to be purchased separately; DCB series scan heads include a lens ring kit but require a scan lens separately. See the *Scan Lenses and Rings* tab to choose an appropriate scan lens and lens ring for your galvo scan head.

**Applications**

- Laser Marking
- Solar Scribing
- Welding with Metal or Plastic
- Micromachining
- Laser Cutting, Trimming, and Patterning
- Surface Treatment
- Ablation
- Engraving and Scribing
- Rapid Prototyping
- Additive Manufacturing
- Laser Surface Treatment
- Photovoltaic Production

**Large-Volume Orders**

For orders where a large quantity of an item is purchased and the delivery of that item is scheduled with our production (i.e., not taken directly from inventory), Thorlabs passes on to the customer the cost savings associated with planned production of high volumes of that item. Since the volume and planned production are key to realizing the cost savings, we ask that you contact us to obtain volume pricing.

Additional requests can include custom optic sizes and coatings, specialized tuning, and variable cable options.

[Contact Us](#)

## XG SERIES SPECS

Item #	XG210-AG	XG210-Y1	XG210-Y1HP	XG215-CD	XG220-Y1
<b>Mirror</b>					
Maximum Beam Diameter	10 mm			15 mm	20 mm
Input/Output Beam Offset <sup>a</sup>	13.6 mm			19.6 mm	
Coating Type	Protected Silver	Nd:YAG	Nd:YAG, High Power	CO <sub>2</sub>	Nd:YAG
Absolute Reflectance	450 - 750 nm: 90 - 95% 750 nm - 10.6 μm: 95 - 98%	99.5% at 1064 nm		99.5% at 10.6 μm	99.5% at 1064 nm
Max Power	CW: 50 W/cm <sup>2</sup>	CW: 500 W/cm <sup>2</sup>	Pulsed: 10 J/cm <sup>2</sup> (20 ns Pulse)	CW: 500 W/cm <sup>2</sup>	
Front Surface Flatness (@ 633 nm)	λ/4			λ	λ/4
Surface Quality	40-20 Scratch-Dig				
<b>Motor and Position Sensor</b>					
Small Angle Step Response <sup>b</sup>	350 μs			600 μs	650 μs
Scale Drift	<100 ppm/°C			<70 ppm/°C	
Zero Drift	15 μrad/°C				
Linearity (50% Full Travel)	99.90%				
Repeatability	20 μrad				
Resolution (Mechanical)	16 μrad				
Peak Current	±3 A				
Maximum Scan Angle (Optical Angle)	±22.5°				
Operating Temperature Range	0 to 40 °C				

a. The input and output beams are offset by 90°.

b. The settling time for the mirror to stop moving once the drive signal is removed.

## GPWR15 Power Supply Unit Specs

Input	100 - 120 VAC or 220 - 240 VAC
Output	±15 V at 5 A (150 W Max Power)
Operating Temperature	0 to 50 °C
Dimensions	14.0" x 4.9" x 3.5" (356 mm x 124 mm x 90 mm)

## DCB SERIES SPECS

Item #	DCB210-AG	DCB210-Y1	DCB210-Y1HP	DCB210-CD
<b>Mirror</b>				
Maximum Beam Diameter	10 mm			
Input/Output Beam Offset <sup>a</sup>	12.5 mm			
Coating Type	Protected Silver	Nd:YAG	Nd:YAG, High Power	CO <sub>2</sub>
Absolute Reflectance	450 - 750 nm: 90 - 95% 750 nm - 10.6 μm: 95 - 98%	99.5% at 1064 nm		99.5% at 10.6 μm
Max Power	CW: 50 W/cm <sup>2</sup>	CW: 500 W/cm <sup>2</sup>	Pulsed: 10 J/cm <sup>2</sup> (20 ns Pulse)	CW: 500 W/cm <sup>2</sup>
Front Surface Flatness (@ 633 nm)	λ/4			λ
Surface Quality	40-20 Scratch-Dig			
<b>Motor and Position Sensor</b>				
Small Angle Step Response <sup>b</sup>	0.28 ms			
Scale Drift	<50 ppm/°C			
Zero Drift	<20 μrad/°C			
Linearity (50% Full Travel)	99.50%			
Resolution (Mechanical)	10 μrad			
Maximum Scan Angle (Optical Angle)	±22.5°			
Power Supply	±24 V, 4 A			
Operating Temperature	0 to 40 °C			

a. The input and output beams are offset by 90°.

b. The settling time for the mirror to stop moving once the drive signal is removed.

## GPWR24 Power Supply Unit Specs

Input	100 - 120 VAC or 220 - 240 VAC
Output	±24 V at 2.4 A (115 W Max Power)
Operating Temperature	0 to 50 °C
Dimensions	9.38" x 4.87" x 3.28" (238.3 mm x 123.7 mm x 83.3 mm)

## SCAN LENSES AND RINGS

## Scan Lens and Lens Ring Selection Guide

Use the table below to select a scan lens and lens ring for your galvo scan head. Scan lens item #s are listed in the green highlighted column, while galvo scan head item # prefixes are listed in the right half of the header row; lens ring item #s are given at the intersection of the compatible scan head and scan lens.

1. Choose a Scan Lens based on desired specs on the left side of the table.
2. Find the compatible Scan Head on the right side of the table.
  - For XG series scan heads, find the compatible Lens Ring on the right side of the table.
  - For DCB series scan heads, the lens ring is included with the scan head.

Scan Lens					Scan Head (Item # Prefix XG) and Lens Ring (Item # Prefix LR)			
Wavelength	Effective Focal Length	Field Size	Working Distance	Item #	XG210	XG215	XG220	DCB210
532 nm	250 mm	Ø218.4 mm	289 mm	SL25085-Y2	LR102385	-	-	-
1064 nm	100 mm	69 x 69 mm <sup>2</sup>	138 mm	SL10085-Y1	LR102785	-	-	-
	163 mm	Ø162.3 mm	186 mm	SL16376-Y1	LR152476	-	-	-
	163 mm	113 x 113 mm <sup>2</sup>	187.5 mm	SL16385-Y1	-	-	-	Included <sup>a</sup>
	254 mm	Ø222.0 mm	299 mm	SL25485X-Y1	LR102385	-	-	-
	254 mm	175 x 175 mm <sup>2</sup>	281 mm	SL25485D-Y1	-	-	-	Included <sup>a</sup>
	330 mm	Ø306.6 mm	388 mm	SL33085-Y1	LR102385	-	LR201185	-
	420 mm	Ø411.0 mm	494 mm	SL42085X-Y1	LR102385	-	LR201185	-
	420 mm	290 x 290 mm <sup>2</sup>	486 mm	SL42085D-Y1	-	-	-	Included <sup>a</sup>
10.6 µm	100 mm	70 x 70 mm <sup>2</sup>	106.1 mm	SL10048-CD	-	LR150848	-	-
	150 mm	105 x 105 mm <sup>2</sup>	166 mm	SL15085-CD	-	-	-	Included <sup>a</sup>
	175 mm	120 x 120 mm <sup>2</sup>	178.4 mm	SL17548-CD	-	LR150848	-	-
	200 mm	140 x 140 mm <sup>2</sup>	208.8 mm	SL20048-CD	-	LR150848	-	-
	201 mm	140 x 140 mm <sup>2</sup>	223 mm	SL20185-CD	-	-	-	Included <sup>a</sup>
	250 mm	175 x 175 mm <sup>2</sup>	266 mm	SL25085-CD	-	-	-	Included <sup>a</sup>
	300 mm	210 x 210 mm <sup>2</sup>	307.7 mm	SL30048-CD	-	LR150848	-	-

a. DCB series scan heads include a lens ring. Only the scan lens must be purchased separately.

**XG Series Scan Heads**

- ▶ Ø10 mm, Ø15 mm, or Ø20 mm Max Beam Diameter
- ▶ Configured to Accept XY2-100 Digital Input Signals

**Included**

- Two Galvo Mirrors
- Two Servo Motors
- Communication Electronics

**Must Be Purchased Separately**

- Scan Lens
- Lens Ring

These packaged 2-axis scan heads consist of XY galvo mirrors and drive electronics enclosed in an aluminum housing. Scan heads that accept beam diameters up to 10 mm, 15 mm, and 20 mm are available. Each scan head can be operated using an input via the XY2-100 communication protocol.

A scan lens and lens ring must be purchased separately to use these scan heads. See the *Scan Lenses and Rings* tab above for assistance in choosing these components.

The compatible power supply (item # GPWR15), power cable (item # CBLPA16F), and galvo command cable (item # CBLA16D) are sold separately.

Key Specifications <sup>a</sup>					
Item #	XG210-AG	XG210-Y1	XG210-Y1HP	XG215-CD	XG220-Y1
Max Beam Diameter	Ø10 mm			Ø15 mm	Ø20 mm
Coating	Protected Silver	Nd:YAG	Nd:YAG, High Power	CO <sub>2</sub>	Nd:YAG
Wavelength Range	450 nm - 10.6 µm	1064 nm	1064 nm	10.6 µm	1064 nm
Maximum Power	CW: 50 W/cm <sup>2</sup>	CW: 500 W/cm <sup>2</sup>	Pulsed: 10 J/cm <sup>2</sup> (20 ns Pulse)	CW: 500 W/cm <sup>2</sup>	
Repeatability	20 µrad				
Resolution	16 µrad				
Maximum Scan Angle (Optical)	±22.5°				

a. See the *XG Series Specs* tab for complete specifications.

Part Number	Description	Price	Availability
XG210-AG	NEW! 2-Axis Galvo Scan Head, 10 mm Max Beam Diameter, Silver Mirrors	\$3,495.00	Today
XG210-Y1	NEW! 2-Axis Galvo Scan Head, 10 mm Max Beam Diameter, Nd:YAG Mirrors	\$3,495.00	Today
XG210-Y1HP	NEW! 2-Axis Galvo Scan Head, 10 mm Max Beam Diameter, High-Power Nd:YAG Mirrors	\$3,795.00	Today
XG215-CD	NEW! 2-Axis Galvo Scan Head, 15 mm Max Beam Diameter, CO <sub>2</sub> Mirrors	\$6,142.00	Lead Time
XG220-Y1	NEW! 2-Axis Galvo Scan Head, 20 mm Max Beam Diameter, Nd:YAG Mirrors	\$5,901.00	Lead Time
CBLA16D	NEW! Command Cable for XG Series Scan Heads	\$138.00	Today
CBLPA16F	NEW! Power Cable for XG Series Scan Heads	\$73.00	Today
GPWR15	NEW! ±15 V Power Supply for BLINK & QS, SS, SP, & XG Series Galvo Scanners	\$427.00	Lead Time

**DCB Series Scan Heads**

- ▶ High Scanning Speed
- ▶ Rapid Drive Impulse Computation
- ▶ Easy OEM Integration or Plug-and-Play Operation
- ▶ Automatic Tuning Checks When Powered On
- ▶ Compatible with Analog Scan Heads Using XY2-100 Protocol
- ▶ Reduced Temperature Drift

**Included**

- Two Galvo Mirrors
- Two Servo Motors
- Communication Electronics
- Lens Ring

**Must Be Purchased Separately**

- Scan Lens

These 2-axis scan heads feature digital signal processing for high-performance scanning. The system rapidly computes drive impulses to achieve small mirror movements with the fastest possible acceleration. The unit automatically performs a self-tuning check when powered on, which analyzes and compensates for mechanical wear in the components, thereby extending the unit's effective lifetime and eliminating issues associated with traditional analog servo filters.

Key Specifications <sup>a</sup>				
Item #	DCB210-AG	DCB210-Y1	DCB210-Y1HP	DCB210-CD
Aperture	Ø10 mm			
Coating	Protected Silver	Nd:YAG	Nd:YAG, High Power	CO <sub>2</sub>
Wavelength Range	450 nm - 10.6 µm	1064 nm	1064 nm	10.6 µm
Maximum Power	CW: 50 W/cm <sup>2</sup>	CW: 500 W/cm <sup>2</sup>	Pulsed: 10 J/cm <sup>2</sup> (20 ns Pulse)	CW: 500 W/cm <sup>2</sup>
Resolution	10 µrad			
Maximum Scan Angle (Optical)	±22.5°			

The housing includes an attached mount for a scan lens. The scan lens must be purchased separately to use these scan heads. See below for scan lens options.

a. See the *DCB Series Specs* tab for complete specifications.

The compatible power supply (item # GPWR24) and cable set (item # CBLA16F) are sold separately.

Part Number	Description	Price	Availability
DCB210-AG	NEW! 2-Axis Galvo Scan Head with Digital Processing, Ø10 mm Aperture, Silver Mirrors	\$2,199.00	Lead Time
DCB210-Y1	NEW! 2-Axis Galvo Scan Head with Digital Processing, Ø10 mm Aperture, Nd:YAG Mirrors	\$1,699.00	Today
DCB210-Y1HP	NEW! 2-Axis Galvo Scan Head with Digital Processing, Ø10 mm Aperture, High-Power Nd:YAG Mirrors	\$2,199.00	Today
DCB210-CD	NEW! 2-Axis Galvo Scan Head with Digital Processing, Ø10 mm Aperture, CO <sub>2</sub> Mirrors	\$2,199.00	Today
CBLA16F	NEW! Command and Power Cables for DCB Series Scan Heads	\$219.00	Lead Time
GPWR24	NEW! Power Supply Unit, ±24 V	\$425.00	Lead Time

## Scan Lenses for XG Series Scan Heads

Scan Lenses for XG210 Scan Heads				
Item #	Wavelength	Effective Focal Length	Field Size	Working Distance
SL25085-Y2	532 nm	250 mm	Ø218.4 mm	289 mm
SL10085-Y1	1064 nm	100 mm	69 x 69 mm <sup>2</sup>	138 mm
SL16376-Y1	1064 nm	163 mm	Ø162.3 mm	186 mm
SL25485X-Y1	1064 nm	254 mm	Ø222.0 mm	299 mm
SL33085-Y1	1064 nm	330 mm	Ø306.6 mm	388 mm
SL42085X-Y1	1064 nm	420 mm	Ø411.0 mm	494 mm

### Follow These Steps:

1. Find the table that corresponds to your XG series galvo scan head.
2. Choose a scan lens with appropriate specifications for your application.
3. See below to find a compatible lens ring to mount the scan lens in the galvo scan head.

All 2-axis galvo scan heads above require a scan lens for proper operation. These scan lenses are suitable for scan head item #s that start with XG. For scan lenses compatible with DCB series scan heads, see below.

Scan lenses produce a flat image plane and a spot size that suffers minimal distortion as the angle of the incident beam with respect to the optical axis of the lens is varied; varying the angle of incidence causes the focal spot to scan over the field of view in the image plane.

Each table includes scan lenses that are compatible with a particular galvo scan head model. After selecting a scan lens, see below to choose an appropriate lens ring for mounting the scan lens to the galvo scan head.

Scan Lenses for XG215-CD				
Item #	Wavelength	Effective Focal Length	Field Size	Working Distance
SL10048-CD	10.6 µm	100 mm	70 x 70 mm <sup>2</sup>	106.1 mm
SL17548-CD	10.6 µm	175 mm	120 x 120 mm <sup>2</sup>	178.4 mm
SL20048-CD	10.6 µm	200 mm	140 x 140 mm <sup>2</sup>	208.8 mm
SL30048-CD	10.6 µm	300 mm	210 x 210 mm <sup>2</sup>	307.7 mm

Scan Lenses for XG220-Y1				
Item #	Wavelength	Effective Focal Length	Field Size	Working Distance
SL33085-Y1	1064 nm	330 mm	Ø306.6 mm	388 mm
SL42085X-Y1	1064 nm	420 mm	Ø411.0 mm	494 mm

Part Number	Description	Price	Availability
SL25085-Y2	NEW! Scan Lens for XG Scan Heads, 532 nm, EFL=250 mm	\$0.00	Lead Time
SL10085-Y1	NEW! Scan Lens for XG Scan Heads, 1064 nm, EFL=100 mm	\$1,159.00	Lead Time
SL16376-Y1	NEW! Scan Lens for XG Scan Heads, 1064 nm, EFL=163 mm	\$1,645.00	Lead Time
SL25485X-Y1	NEW! Scan Lens for XG Scan Heads, 1064 nm, EFL=254 mm	\$2,386.00	Today
SL33085-Y1	NEW! Scan Lens for XG Scan Heads, 1064 nm, EFL=330 mm	\$3,469.00	Today
SL42085X-Y1	NEW! Scan Lens for XG Scan Heads, 1064 nm, EFL=420 mm	\$3,254.00	Today
SL10048-CD	NEW! Scan Lens for XG Scan Heads, 10.6 µm, EFL=100 mm	\$964.00	Lead Time
SL17548-CD	NEW! Scan Lens for XG Scan Heads, 10.6 µm, EFL=175 mm	\$1,159.00	Lead Time
SL20048-CD	NEW! Scan Lens for XG Scan Heads, 10.6 µm, EFL=200 mm	\$1,132.00	Today
SL30048-CD	NEW! Scan Lens for XG Scan Heads, 10.6 µm, EFL=300 mm	\$1,526.00	Lead Time

**Lens Rings for XG Series Scan Heads****Lens Ring Selection Guide**

Scan Lens Item #	Scan Head Item # Prefix		
	XG210	XG215	XG220
SL25085-Y2	LR102385	-	-
SL10085-Y1	LR102785	-	-
SL16376-Y1	LR152476	-	-
SL25485X-Y1	LR102385	-	-
SL33085-Y1	LR102385	-	LR201185
SL42085X-Y1			
SL10048-CD	-	LR150848	-
SL17548-CD			
SL20048-CD			
SL30048-CD			

**Follow These Steps:**

1. Choose a scan lens above if you have not done so already.
2. Look at the table to the right and find your chosen scan lens in the left column.
3. Find your XG series galvo scan head in the header row of the table.
4. The appropriate lens ring item # is listed at the intersection of the scan lens and scan head.

A lens ring is required to mount a scan lens on an XG series 2-axis galvo scan head. Use the table to the right to select the appropriate lens ring by finding the intersection of the compatible scan head and scan lens.

DCB series scan heads include a lens ring and do not require one to be purchased separately.

Part Number	Description	Price	Availability
LR102385	NEW! Lens Ring for XG210 Galvo Scan Heads	\$125.00	Lead Time
LR102785	NEW! Lens Ring for XG210 Galvo Scan Heads	\$205.00	Lead Time
LR152476	NEW! Lens Ring for XG210 Galvo Scan Heads	\$267.00	Lead Time
LR150848	NEW! Lens Ring for XG215 Galvo Scan Heads	\$562.00	Lead Time
LR201185	NEW! Lens Ring for XG220 Galvo Scan Heads	\$417.00	Lead Time

### Scan Lenses for DCB Series Scan Heads

All 2-axis galvo scan heads above require a scan lens for proper operation. These scan lenses are suitable for scan head item #s starting with DCB. For scan lenses compatible with XG series scan heads, see above.

Scan lenses produce a flat image plane and a spot size that suffers minimal distortion as the angle of the incident beam with respect to the optical axis of the lens is varied; varying the angle of incidence causes the focal spot to scan over the field of view in the image plane.

Use the table to the right to select an appropriate scan lens for your application. DCB series scan heads include a lens ring and do not require one to be purchased separately.

Item #	Wavelength	Focal Length	Field Size	Working Distance
<b>SL16385-Y1</b>	1064 nm	163 mm	113 x 113 mm <sup>2</sup>	187.5 mm
<b>SL25485D-Y1</b>	1064 nm	254 mm	175 x 175 mm <sup>2</sup>	281 mm
<b>SL42085D-Y1</b>	1064 nm	420 mm	290 x 290 mm <sup>2</sup>	486 mm
<b>SL15085-CD</b>	10.6 μm	150 mm	105 x 105 mm <sup>2</sup>	166 mm
<b>SL20185-CD</b>	10.6 μm	201 mm	140 x 140 mm <sup>2</sup>	223 mm
<b>SL25085-CD</b>	10.6 μm	250 mm	175 x 175 mm <sup>2</sup>	266 mm

Part Number	Description	Price	Availability
<b>SL16385-Y1</b>	<b>NEW! Scan Lens for DCB Scan Heads, 1064 nm, EFL=163 mm</b>	<b>\$599.00</b>	<b>Today</b>
<b>SL25485D-Y1</b>	<b>NEW! Scan Lens for DCB Scan Heads, 1064 nm, EFL=254 mm</b>	<b>\$599.00</b>	<b>Today</b>
<b>SL42085D-Y1</b>	<b>NEW! Scan Lens for DCB Scan Heads, 1064 nm, EFL=420 mm</b>	<b>\$2,499.00</b>	<b>Lead Time</b>
<b>SL15085-CD</b>	<b>NEW! Scan Lens for DCB Scan Heads, 10.6 μm, EFL=150 mm</b>	<b>\$1,159.00</b>	<b>Lead Time</b>
<b>SL20185-CD</b>	<b>NEW! Scan Lens for DCB Scan Heads, 10.6 μm, EFL=201 mm</b>	<b>\$1,159.00</b>	<b>Today</b>
<b>SL25085-CD</b>	<b>NEW! Scan Lens for DCB Scan Heads, 10.6 μm, EFL=250 mm</b>	<b>\$2,499.00</b>	<b>Today</b>

Visit the *Two-Axis Galvo System Scan Heads* page for pricing and availability information:

[https://www.thorlabs.com/newgrouppage9.cfm?objectgroup\\_id=14124](https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=14124)