



GLOBAL COMMUTECH

PHOTONIC COMPONENTS AND SUBSYSTEMS

For Free Space Optical Communication

Precision Beam Control and Advanced Industrial Applications

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COMPANY INTRODUCTION

GLOBAL COMMUTECH specializes in optical communication, precision beam control, photonic components, subsystems and customized integration solutions.

Our product portfolio covers key photonic building blocks and subsystems, including fast steering mirrors, optical amplifiers, optical communication modules, transmit and receive optical assemblies, variable zoom optical assemblies and fine tracking systems.

With system level engineering capabilities and scalable manufacturing resources, we support customers from product selection and interface adaptation to subsystem integration, prototyping, testing and production. We work with satellite manufacturers, system integrators, research institutions and industrial technology companies.

Our products and technologies support a broad range of applications across space optical communication, ground based FSO, airborne optical systems, semiconductor inspection, precision metrology, laser processing, LiDAR, optical sensing, quantum optics, adaptive optics and advanced photonics research.

Our team has experience in the development and deployment of space and ground based optical communication solutions. Selected products and technologies have been validated through on orbit and field applications.

PRODUCT PORTFOLIO

BEAM STEERING AND PRECISION POINTING

- Fast Steering Mirrors
- PE FSM
- EC FSM
- MEMS FSM
- PZT FSM
- Multi FSM Control Solutions

OPTICAL COMMUNICATION MODULES

- Coherent Communication Modules
- High Speed Optical Transceivers

OPTICAL AMPLIFICATION

- Standard Optical Amplifier Modules
- Mini Optical Amplifier Modules
- High Performance Optical Amplifier Modules

OPTICAL ASSEMBLIES

- Transmit Optical Assembly
- Receive Optical Assembly
- Variable Zoom Transmit Optical Assembly

FINE TRACKING SYSTEMS

- Fine Tracking Sensor
- Fine Tracking Assembly

Standard High Power Fiber Amplifier Module

01



Product info

This high-power EDFA module, custom-designed for laser communication systems, delivers high electro-optical efficiency, superior output beam quality and exceptional reliability, making it suitable for harsh operating environments. The module's form factor is customizable, with options for standard bench-top packaging or OEM modular packaging. It enables seamless integration with various communication equipment and supports long-distance, highly reliable transmission for both ground-based and space applications.

Key Facts

Number of Channels	1
Operating Mode	ACC/APC (Default)
Operating Wavelength	C46/C18
System Power Consumption	Power Consumption $\leq$ 18W @ 1W Output
Input and Output Optical Power	Input Optical Power: -10~3 dBm Output Saturation Optical Power: 33 dBm
Noise Figure	<5.5db
Product Size	150×125×20mm (Height Excluding Heat Sink: 10mm)
Operating Temperature	-40~+60°C



Product info

This MINI fiber amplifier module, developed specifically for laser communication systems, achieves high-gain amplification for ultra-low input optical signals, features low noise figure and an ultra-compact design. It provides lossless signal relay solutions for high-density equipment such as laser communication terminals, airborne communication systems and portable instruments. The module's form factor is customizable to meet system integration requirements.

Key Facts

Number of Channels	1
Operating Mode	ACC/APC (Default)
Operating Wavelength	C46/C18
System Power Consumption	Power Consumption ≤ 10W @ Output = 27 dBm
Input and Output Optical Power	Input Optical Power: -10~3 dBm Output Saturation Optical Power: 27 dBm
Noise Figure	<6db
Product Size	90×60×25mm
Operating Temperature	-40~+60°C

High Specification Optical Amplifier Module

03



Product info

High specification EDFA modules are categorized into high power EDFA modules, low noise EDFA modules, and calibration modules. The output power of EDFAs is adjustable in steps to meet the requirements of different communication distances and data rates. Leveraging high gain technology and noise suppression technology, it achieves high power, high efficiency and stable output as well as weak signal amplification, enabling long-term stable on orbit operation.

Key Facts

Product size	218×110×40mm
Power Consumption	< 18W@BA=1W
Weight	< 900g
Working Temperatures	-30~+60℃
Noise figure	≤5.5dB(BA)/≤4.5dB(PA)
In/output isolation	>30dB(Both BA&PA)
Work Mode	ACC/APC(Default)
Power supply voltage	DC12V

Dual Axis Voice Coil Fast Steering Mirror (FSM) — PE Large Aperture

04



Product info

The photoelectric fast steering mirror (FSM) is designed for high precision beam stabilization and pointing applications. Featuring a compact opto electronic architecture, it provides accurate two axis control with stable closed loop feedback, making it suitable for both laboratory and field deployments.

Advantages

- High positioning accuracy with stable closed loop control
- Compact & lightweight design for easy integration
- Low power consumption with efficient actuation
- Good environmental robustness for long term operation
- Cost effective solution for scalable deployment

Applications

- High power laser beam stabilization and laser processing
- Large aperture FSO and optical communication systems
- Precision beam steering in industrial laser systems
- Large beam optical alignment and stabilization

Key Facts

Clear aperture	2 inch
Mechanical deflection angle	$\geq \pm 3.0^\circ$
Number of axes	2
Resolution	$\leq 20 \mu\text{rad}$
Repeatability	$\leq 40 \mu\text{rad}$ (3σ)
Linearity	$\leq 0.15\%$
Bandwidth	$\geq 500 \text{ Hz}$ @ $125 \mu\text{rad}$
Weight	$\leq 350 \text{ g}$ (mirror body)

Dual Axis Voice Coil Fast Steering Mirror (FSM) — PE Small Aperture

05



Product info

The photoelectric fast steering mirror (FSM) is designed for high precision beam stabilization and pointing applications. Featuring a compact opto electronic architecture, it provides accurate two axis control with stable closed loop feedback, making it suitable for both laboratory and field deployments.

Advantages

- High positioning accuracy with stable closed loop control
- Compact & lightweight design for easy integration
- Low power consumption with efficient actuation
- Good environmental robustness for long term operation
- Cost effective solution for scalable deployment

Applications

- Free space optical communication
- Optical ground station subsystems
- Beam alignment and stabilization
- Compact optical tracking and sensing
- Laboratory and research optical systems

Key Facts

Clear aperture	20–30 mm
Mechanical deflection angle	$\pm 1.5^\circ$
Number of axes	2
Resolution	$\leq 1 \text{ urad}$
Repeatability	$\leq 4 \text{ urad}$
Linearity	$\leq 0.08\%$
Bandwidth	700 Hz @125 urad
Weight	110g(Mirror body)

Dual Axis Voice Coil Fast Steering Mirror (FSM) — EC Large Aperture

06



Product info

This product is suitable for positioning, scanning, and other systems, and can also be used independently for experimental research. The eddy current sensing architecture precisely controls the rotation of the mirror surface via voice coil actuators, based on external command input signals and feedback from the mirror angle sensor. It is primarily used to achieve high-precision beam steering control.

Advantages

- Strong anti interference capability for harsh environments
- High reliability with stable long term performance
- Wide angular range suitable for dynamic tracking
- Mature control architecture with proven industrial stability
- Suitable for continuous operation scenarios
- Cost effective solution for scalable deployment

Applications

- High power laser processing
- Long distance FSO and optical ground stations
- Large aperture beam stabilization
- Long range precision pointing and sensing

Key Facts

Clear aperture	2 inch
Mechanical deflection angle	$\geq \pm 5.0^\circ$
Number of axes	2
Resolution	$\leq 20 \mu\text{rad}$
Repeatability	$\leq 40 \mu\text{rad}$ (3σ)
Linearity	$\leq 0.15\%$
Bandwidth	$\geq 350 \text{ Hz}$ @ $125 \mu\text{rad}$
Weight	$\leq 300 \text{ g}$ (mirror body)

Dual Axis Voice Coil Fast Steering Mirror (FSM) — EC Small Aperture

07



Product info

This product is suitable for positioning, scanning, and other systems, and can also be used independently for experimental research. The optical Sensor fast steering mirror precisely controls the rotation of the mirror surface via voice coil actuators, based on external command input signals and feedback from the mirror angle sensor. It is primarily used to achieve high-precision beam steering control.

Advantages

- Strong anti interference capability for harsh environments
- High reliability with stable long term performance
- Wide angular range suitable for dynamic tracking
- Mature control architecture with proven industrial stability
- Suitable for continuous operation scenarios
- Cost effective solution for scalable deployment

Applications

- Laser metrology and interferometry
- FSO and optical ground station fine tracking
- Precision laser experiments and research optical paths
- Optical tracking, acquisition and sensing

Key Facts

Mirror aperture	Customizable
Number of axes	2
Optical angle range	$\pm 3^\circ$
Angular resolution	$\leq 1 \mu\text{rad}$
Repeatability	$\leq 3 \mu\text{rad}$
Bandwidth	500 Hz @500 μrad
Operating temperature	-10°C to +55°C
Control method	Analog signal
Supply voltage	+12 V
Mirror coating	Full C-band customizable

MEMS Fast Steering Mirror (MEMS FSM)

08



Product info

The MEMS Fast Steering Mirror (FSM) combines an ultra compact form factor with low power consumption and high scanning frequency, making it ideal for space constrained and high speed optical systems. Its lightweight MEMS architecture enables fast beam steering with minimal system load, while maintaining precise and repeatable angular control. It is well suited for LiDAR, compact optical communication terminals, projection imaging, miniaturized sensing systems, and other applications requiring high speed beam scanning in a small footprint.

Advantages

- Ultra compact form factor
- Low power consumption
- High scanning frequency
- Fast and precise beam steering
- Suitable for continuous operation scenarios
- Cost effective solution for scalable deployment

Applications

- Space optical communication terminal
- LiDAR and high speed beam scanning
- Compact optical communication systems
- Projection imaging
- Miniaturized optical sensing systems

Key Facts

10 mm version

Mirror diameter	10 mm
Dimensions	27.3 × 26 × 11.5 mm
Weight	11 ±3 g
Typical power consumption	260 mW
Mechanical scanning angle	±1.8–2.1 mrad @ ±110 V
Resonant frequency	1050–1250 Hz
Repeatability	1.0 μrad @3σ

15 mm version

Mirror diameter	15 mm
Dimensions	35.6 × 35 × 12 mm
Weight	13 ±3 g
Typical power consumption	350 mW
Mechanical scanning angle	±1.9–2.2 mrad @ ±110 V
Resonant frequency	850–1050 Hz
Repeatability	1.0 μrad @3σ

1 to 2 FSM Configuration

09

One controller

two compatible FSM mirrors



Product info

The 1 to 2 FSM configuration enables a single controller to drive two compatible fast steering mirrors, helping reduce controller count, system volume, cabling and integration complexity. The architecture can be adapted to PE, EC, MEMS and PZT FSM configurations according to specific interface and performance requirements.

Advantages

- One controller for two FSM units
- Reduced controller count, cabling and system footprint
- Simplified integration for dual channel optical systems
- Flexible configuration across PE, EC, MEMS and PZT FSMs

Applications

- Laser metrology and interferometric measurement
- Dual channel and multi aperture optical systems
- Parallel or redundant optical paths
- Multi beam alignment and stabilization
- Compact optical communication terminals
- Research and test platforms with multiple optical paths

Piezoelectric Fast Steering Mirror (PZT FSM)



Product info

The Piezoelectric based fast steering mirror delivers ultra high precision and fast response performance using piezoelectric actuation. It is ideal for applications requiring fine pointing accuracy and high bandwidth control.

Advantages

- Ultra high precision (sub microradian level)
- Very fast response & high bandwidth
- Excellent repeatability and stability
- Ideal for fine tracking & jitter suppression
- Compact design for precision optical systems
- Built in protection for safe and reliable operation

Applications

- Semiconductor inspection and precision optical metrology
- Quantum optics and QKD
- Microscopy and precision imaging
- High precision laser experiments and research optical paths
- Adaptive optics and fine beam correction

Key Facts

Clear aperture	Ø20 mm
Nominal stroke (0–100 V)	≥2.5 mrad
Closed-loop angular resolution	≤1 µrad
Repeat positioning accuracy	≤1.5 µrad
-3 dB bandwidth	>2 kHz
No-load resonant frequency	≥2.8 kHz
Linearity	≤0.1%
Weight	≤130 g

Coherent Communicator

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Product info

The coherent communicator integrates advanced laser communication technology to achieve low-latency data transmission. It features laser ranging and clock synchronization functions, and mainly performs laser signal generation, laser data modulation, laser signal mixing and detection, as well as laser data demodulation. It can interact with electronic control boxes, fiber amplifiers, and satellite platforms, and supports communication formats such as OOK, BPSK, and QPSK.

Key Facts

Inter-Satellite Link Distance	500km –5200km
Transmission Rate	312.5Mbps – 5Gbps (Independent Adjustment by Gear)
Bit Error Rate (BER)	$\leq 10^{-7}$
Weight	$\leq 3.5\text{kg}$
Power Consumption	$\leq 80\text{W}$

Spaceborne Optical Transceiver

12

100G-4x10G



Product info

The 100G Communicator (i.e., Optical Transceiver Terminal) is mainly used for data forwarding between on-satellite routers and serves as the core device of 100Gbps inter-satellite laser links. Its primary functions include the modulation, transmission, reception, and demodulation of high-speed optical signals, enabling data transmission at the 100Gbps level. With a router-side interface rate of 4x10G, it is a high-performance communicator specifically designed to be compatible with 10G~40G networks. It can well meet the ultra-high bandwidth requirements of future satellite internet, remote sensing data relay, and deep-space communication, while also being compatible with existing low-speed network devices.

Key Facts

Transmission Rate	100Gbps (Single-channel Optical Carrier)
Bit Error Rate (BER)	$\leq 10^{-7}$
Product Size	196*133*30 (mm)
Weight	$\leq 700\text{g}$
Operating Temperature	$0^{\circ}\text{C} \sim +45^{\circ}\text{C}$
Power Consumption	$\leq 36\text{W}$

Spaceborne Optical Transceiver

13

100G-4x25G



Product info

The 100G Communicator (i.e., Optical Transceiver Terminal) is mainly used for data forwarding between on-satellite routers and serves as the core device of 100Gbps inter-satellite laser links. Its primary functions include the modulation, transmission, reception, and demodulation of high-speed optical signals, enabling data transmission at the 100Gbps level. With a router-side interface rate of 4x25G, it can well meet the ultra-high bandwidth requirements of future satellite internet, remote sensing data relay, and deep-space communication.

Key Facts

Transmission Rate	100Gbps (Single-channel Optical Carrier)
Bit Error Rate (BER)	$\leq 10^{-7}$
Product Size	196*133*30 (mm)
Weight	$\leq 700\text{g}$
Operating Temperature	0°C~+45°C
Power Consumption	$\leq 36\text{W}$

Spaceborne Optical Transceiver

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200G-8x25G



Product info

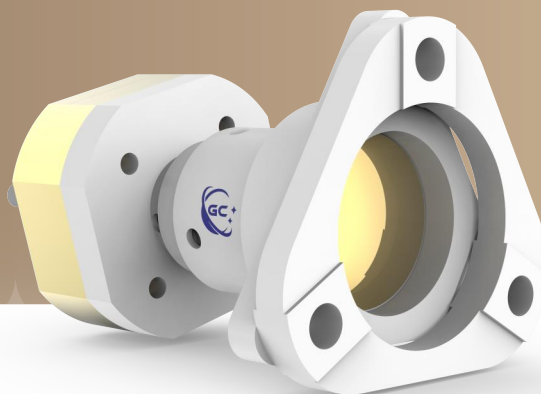
The 200G Communicator (i.e., Optical Transceiver Terminal) is mainly used for data forwarding between on-satellite routers and serves as the core device of 100Gbps inter-satellite laser links. Its primary functions include the modulation, transmission, reception, and demodulation of high-speed optical signals, enabling data transmission at the 200Gbps level. With a router-side interface rate of 8x25G, it can well meet the ultra-high bandwidth requirements of future satellite internet, remote sensing data relay, and deep-space communication.

Key Facts

Transmission Rate	200Gbps (Single-channel Optical Carrier)
Bit Error Rate (BER)	$\leq 10^{-7}$
Product Size	196*133*30 (mm)
Weight	$\leq 700\text{g}$
Operating Temperature	0°C~+45°C
Power Consumption	$\leq 36\text{W}$

Transmit Optical Assembly (TOA)

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Product info

The Transmit Optical Assembly (TOA) forms the outgoing optical path for both communication and beacon lasers in a laser communication terminal. It shapes, expands, and accurately directs the transmitted beam, ensuring low divergence, high beam quality, and precise pointing performance over long distances. The assembly can also integrate functions such as beam splitting, wavefront correction, optical path folding, and tracking support.

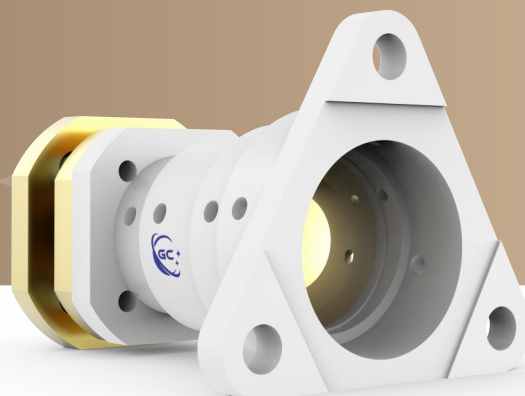
Key Facts

Fiber Type	Single-mode fiber
Fiber Connector	FC/APC
Mode Field Diameter @ 1550 nm	$10.4 \pm 0.5 \mu\text{m}$
Clear Aperture	12 mm
Focal Length	35 mm
System Wavefront Error	$1/20 \lambda @ 632.8 \text{ nm}$
Operating Wavelength	1540-1570 nm
Divergence Angle	$350 \pm 10 \mu\text{rad}$
Optical Efficiency	$\geq 96\%$
Beam Spot Ellipticity	98%
Operating Temperature	$20 \pm 5 \text{ }^\circ\text{C}$
Storage Temperature	0-40 $^\circ\text{C}$
Radiation Tolerance	$\geq 30 \text{ krad (Si)}$
Mechanical Resistance (Random Vibration, RMS)	20 g
Storage Humidity	25%-65%

Note: The mounting interface, divergence angle, and system focal length can be customized according to customer requirements.

Receive Optical Assembly (ROA)

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Product info

The Receive Optical Assembly (ROA) serves as the front-end optical subsystem of a laser communication terminal. It captures and collects weak incoming optical signals, including communication and beacon beams, performs beam conditioning and optical path separation, and delivers qualified optical signals to downstream detectors. The assembly also suppresses stray light and compensates for optical aberrations to support reliable acquisition, tracking, and communication demodulation.

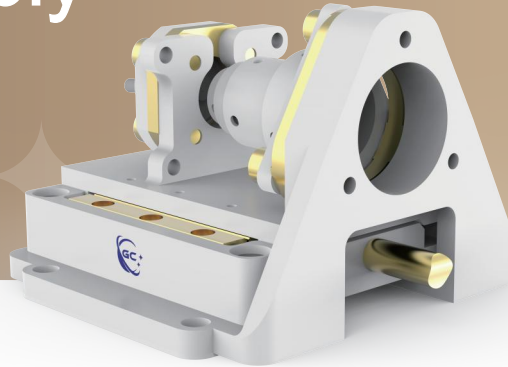
Key Facts

Fiber Type	Single-mode fiber
Fiber Connector	FC/APC
Clear Aperture	12 mm
Focal Length	35 mm
System Wavefront Error	$1/20 \lambda @ 632.8 \text{ nm}$
Operating Wavelength	1540-1570 nm
Entrance Pupil Diameter	7.5 mm
Optical Efficiency (including fiber-coupling efficiency)	$\geq 70\%$
Receiver Field of View	200 μrad
Operating Temperature	$20 \pm 5 \text{ }^{\circ}\text{C}$
Storage Temperature	0-40 $^{\circ}\text{C}$
Radiation Tolerance	$\geq 30 \text{ krad (Si)}$
Mechanical Resistance (Random Vibration, RMS)	20 g
Storage Humidity	25%-65%

Note: The mounting interface, divergence angle, and system focal length can be customized according to customer requirements.

Variable Zoom Transmit Optical Assembly (VZ-TOA)

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Product info

The Variable Zoom Transmit Optical Assembly (VZ-TOA) is an adaptive beam-expanding and collimating subsystem that dynamically adjusts beam divergence to suit different operational phases. By varying the optical magnification through movable lens groups or other adaptive optical elements, the assembly optimizes beam characteristics for acquisition, tracking, and communication, making it a key component of advanced PAT (Pointing, Acquisition, and Tracking) systems.

Key Facts

Fiber Type	Single-mode fiber
Fiber Connector	FC/APC
Mode Field Diameter @ 1550 nm	10.4 ± 0.5 µm
Focal Length	Customized according to customer requirements
System Wavefront Error	1/20 λ @ 632.8 nm
Operating Wavelength	1540-1570 nm
Adjustable Divergence Range	Customized according to customer requirements
Linear Motor Adjustment Range	1 mm
Beam Spot Ellipticity	98%
Operating Temperature	20 ± 5 °C
Storage Temperature	0-40 °C
Radiation Tolerance	≥30 krad (Si)
Mechanical Resistance (Random Vibration, RMS)	20 g
Storage Humidity	25%-65%

Fine Tracking Sensor (High-Precision InGaAs Infrared Camera)

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Product info



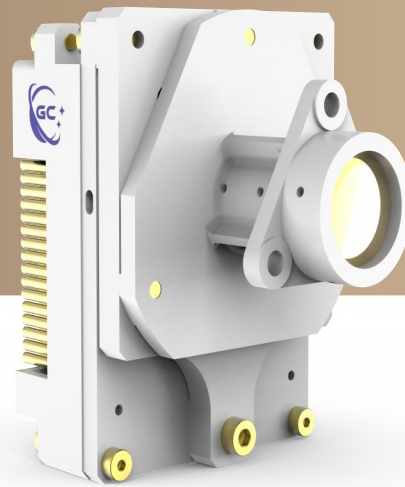
The Fine Tracking Sensor (High-Precision InGaAs Infrared Camera) is the photoelectric sensing element of the fine tracking control loop. Working together with the Fast Steering Mirror (FSM), it continuously measures spot displacement and tracking errors after coarse acquisition is achieved. The sensor provides high-accuracy feedback for sub-microradian beam stabilization and precision pointing control.

Key Facts

Field of View (mrad)	30*30
Effective Aperture (mm)	25
Weight	Less than 250g
Light Spot Detection Sensitivity (dBm)	Better than -80
Sensor Type	InGaAs Focal Plane Detector
Spectral Response Range (μm)	900~1700
Integration Time (μs)	1-5000
Power Supply Voltage (V)	12/1A
Typical Power Consumption (W)	5W (including TEC)
Interface Type	RS422, LVDS, Serial
Interface Functions	Remote Control & Telemetry, Image Transmission Online Loading or Self-Startup

Fine Tracking Assembly (FTA)

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Product info

The Fine Tracking Assembly (FTA) is the core optical subsystem for high-precision closed-loop pointing and tracking. Located within the shared transmit-receive optical path, it works in conjunction with a Fast Steering Mirror (FSM) to perform real-time correction of minute pointing errors. The assembly supports both receive-path tracking and transmit-path point-ahead functions, enabling stable optical link performance under dynamic conditions.

Key Facts

Pixel Size	5 μm
Array Format	640 $\times$ 512
Focal Length	90 mm
Operating Wavelength	1540-1563 nm
Effective Field of View	± 25 mrad
System Wavefront Error	$1/20 \lambda$ @ 632.8 nm
Optical Efficiency	$\geq 90\%$
Operating Temperature	20 ± 5 $^{\circ}\text{C}$
Storage Temperature	0-40 $^{\circ}\text{C}$
Radiation Tolerance	≥ 30 krad (Si)
Mechanical Resistance (Random Vibration, RMS)	20 g
Storage Humidity	25%-65%

Note: The mounting interface, divergence angle, and system focal length can be customized according to customer requirements.

DBXQ50 Pin Puller

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Product info

The DBXQ50 long stroke pin puller uses shape memory alloy (SMA) for triggering and a spring driven mechanism for pin retraction. Before activation, the pin remains in the locked position. When energized, the SMA actuator contracts and releases the mechanism, allowing the pin to retract.

The product features a simple and reliable structure, low unlocking impact, and can serve as an effective alternative to pyrotechnic pin pullers.

Key characteristics include low power consumption, compatibility with pyrotechnic initiation signals, fast response with a response time of 50 ms at room temperature under a 10A current, and excellent environmental adaptability. It is insensitive to temperature, humidity, vacuum, and static electricity.

The product also supports dual-channel SMA actuation, dual-point and dual-line power supply, and redundant mechanical and circuit designs. It is reusable and supports repeated verification, ensuring high reliability. No special positioning, tools, or operations are required, and it can be directly installed with screws.

Key Facts

Weight	45 ± 5 g (grams)
Dimensions	63.7 mm × 41.5 mm × 20 mm (millimeters)
Pin Pulling Force	40 ~ 200 N (Newtons)
Note	The order is adjusted to follow the common "minimum ~ maximum" range expression in technical documents to avoid ambiguity
Stroke	4.3 ~ 4.5 mm (millimeters)
Response Time	Less than 50 ms (milliseconds) at 25°C (under 10 A current)
Reliability	Not less than 0.9999999 (confidence level $\gamma = 0.9$)
Energy Consumption	20 ~ 28 J (Joules) at -70°C; 10 ~ 14 J (Joules) at 25°C
Operating Temperature	-80°C ~ +70°C (no action below 70°C)