# Shutter Capabilities

# Electro- Mechanical Shutters

- Standard and Custom Products
- Specialize in application-specific packages/designs to fit available space in existing and new thermal imagers
- High Speed, Rugged & Inexpensive
- Fully compliant EAR & ITAR programs

# Shutters, Shutter Applications

**Applications**

- Lab/research
  - Imaging/illumination systems
  - Laser safety
- Biotechnology
  - Biomedical instrumentation
  - Microscopy (fluorescence)
- Military/Security/Aerospace
  - Night vision

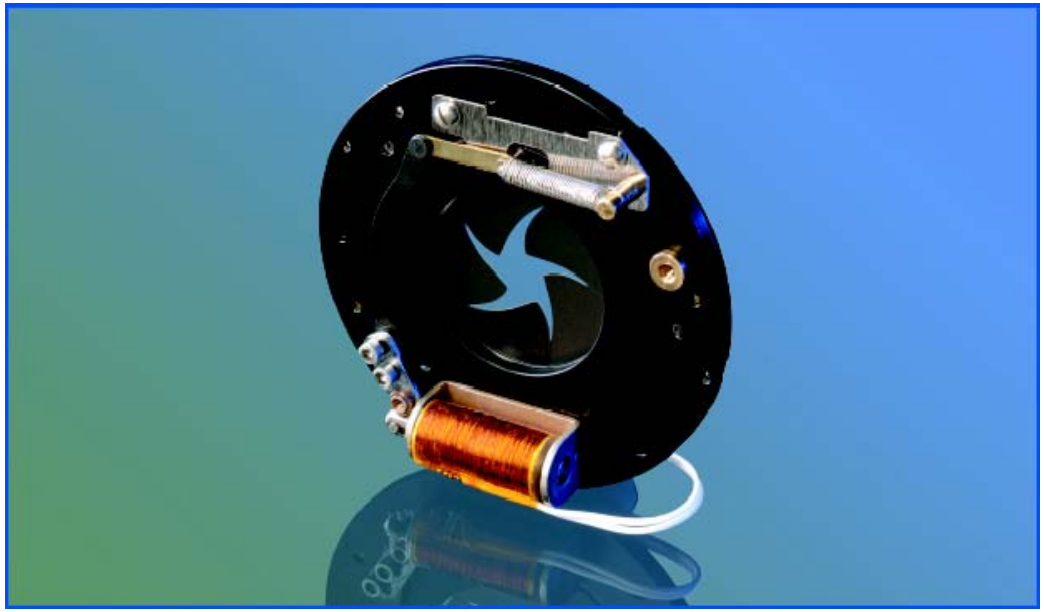
# IES™ Shutters


- High light extinction ratio
- High reliability
- Built-in adjustable diaphragm
- Micro-switch provides “shutter open” trigger
- Manual “press focus” lever opens shutter for setup and alignment

# Ultrathin™ Shutters

- High light extinction ratio
- Compact, light weight
- High reliability
- High speed
- Ultra thin profile

# ExtremeService™ Shutters



- Operate reliably in extreme temperatures (-40°C to +70°C)
- Proprietary low-friction, high-IR emissivity blade coating
- Spring return; normally open or normally closed versions
- Same mounting pattern as 04 UTS 201 UltraThin™ shutter
- Enhanced shock- and vibration-resistant versions available

# Electronic Shutter Controller


- Drives all MG 12V shutters
- Local or remote operation
- 8 preset shutter speeds
- Actuate via manual pushbutton or standard TTL signal input
- Infinitely adjustable shutter speed
- “Desktop” and OEM versions are available

# Standard Commercial Rotor Drive Shutters

- Easily customizable for new and existing applications
- Designed for extreme temperature conditions
- Consume power only while moving the blades (bi-stable)
- Extremely lightweight with few moving parts
- Reliably operate for several million cycles
- Resist high shock an vibration during operation
- Accept onboard battery-powered integrated drive circuitry

# 04RDS850 – Rotor Drive Shutter Controller


- Drives standard Rotor Drive Shutters (9V versions)
- Local or remote operations
- Actuates with manual push button or standard TTL input signal
  - Changing the state requires a new signal
- Supplied with 8 feet connector cable
- Accepts same power supply as 04ISC850

# Shutter Product Evolution

| Specification | IES™ and Ultrathin™ Shutters | ExtremeService™ Shutters | Rotor Drive Shutters |
|---|---|---|---|
| Environment | Lab | Harsh | Harshest |
| Expected Life | 100,000 cycles | 600,000 cycles | 2 Million cycles |
| High IR emissivity blade coating | No | Yes | Yes |
| Temperature | -10°C to +40°C | -40°C to +70°C | -40°C to +70°C |
| Shock/vibration resistant | Fragile | Insensitive | Extremely durable |

# Manufacturing Capabilities

- Shutter assembly area is organized to achieve optimal process flow
- Specialized tooling and fixturing guaranty high quality and productivity
- Assembly technicians are trained to build high-precision products
- Sophisticated test equipment allows early detection and diagnostics of potential problems
- Assembly and test procedures are well documented to meet ISO 9001 requirements

# Shutter Manufacturing System Views