

A Higher Level of Performance



Data Sheet

Gladiator Gen 3 Microwave Switch Series



Beam Blockage Detection
Circular Polarisation



For more information, please visit >
www.hawkmeasurement.com

Overview

Gladiator Gen 3 Microwave Switch Series



Principle of Operation

A high power circular polarized Microwave pulse is emitted from the Sending unit to the Receiving unit in a transmission chain of approximately 100 pulses per second. If the path between the Sender and Receiver is blocked by any object or material which absorbs or reflects microwave energy the Receiving unit will no longer detect the complete transmission chain and indicate via Relay or 4-20mA output the change for automatic indication and process control requirements.

Typical Uses

- Blocked chute detection
- Collision detection
- Stacker / Reclaimer protection
- Shiploader protection
- Nucleonic switch replacement
- High level alarm / Low level alarm
- Truck / machine detection.

Function

The Gladiator Microwave Switch can be used for blockage detection, barrier detection, machine detection, collision detection for protection, point level measurement, and detection of objects or material between two points.

Primary Areas of Application

- Asphalt
- Brewing
- Cement
- Chemical
- Dairy
- Edible oil
- Fertilizer
- Food & Beverage
- Glass
- Mining & Metals
- Oil & Gas
- Packaging
- Paint
- Paper
- Pharmaceutical
- Plastics
- Power Generation
- Refining
- Semiconductor
- Sugar
- Textile
- Water & Wastewater.

Features

- State of the art Circular transmission
 - Backwards compatible with all Gladiator Microwave generations
 - Hazardous Dust Approved - Ex ta tb IIIC T* Da Db
 - LCD push button setup / diagnostics on remote amplifier
 - Simple sensitivity adjustment and calibration on Integral system
 - Ranges up to 1200 meters (3937 ft)
 - Simple '1-minute' setup application pre-sets
 - Remote sensor or Integral 'all in one' types
 - Relay outputs: Integral (1 + failsafe) Remote (2)
 - Remote test function
 - Adjustable ON and OFF delays (0-20 sec)
 - Remote 3G HAWKlink connection option
 - Remote amplifier to sensor separation up to 500 meters (1640 ft)
 - Bright visual status indication on sensors
 - Independent housing alignment after mounting sensor.
- *Consult Safety Instructions**

Part Numbering

Gladiator Gen 3 Microwave Switch Series



Remote Version

Remote Amplifier

GSA Gladiator Amplifier (compatible with all Gladiator products), Modbus

Housing

S Polycarbonate

Power Supply

B 12-30 VDC

C 36-60VDC

U 12-30VDC and 90-260VAC

Output Options

S 2 x SPDT relays

R 2 x SPDT Relays with Modbus Over Wi-Fi

X 2 x SPDT Relays with 4-20mA output

B 2 x SPDT Relays with Modbus Over Bluetooth

E 2 x SPDT Relays with Modbus Over Ethernet

Approval

A22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

GSA S U S

Remote Sender / Receiver

GMSB Gladiator Microwave Sender

GMSL Gladiator Microwave Sender with Low Power Output

GMRR Gladiator Microwave Remote Receiver

Frequency

1 10.525 GHz

Facing Material Selection

0 UHMW Polyethylene

1 PTFE Teflon

Housing Material

1 Aluminium / Mild Steel

2 316L Stainless Steel

Output Option

X Not Required - Outputs generated from GSA amplifier

Approval Standard

X Not Required

A22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

2D Facing Material: 0 (UHMW) IECEx ta tb IIIC T* Da Db Tamb = -30°C to +55°C

Facing Material: 1 (PTFE) IECEx ta tb IIIC T* Da Db Tamb = -30°C to +80°C

GMSB 1 0 1 X X

**Consult Safety Instructions*

Connection Cable

CA-GMR Pre-cut cable for remote sender or receiver

10 10m cable

20 20m cable

30 30m cable

50 50m cable

100 100m cable

Lengths above 100m available via special order

CA-GMR 10

Part Numbering

Gladiator Gen 3 Microwave Switch Series



Integral Version

- GMS Gladiator Microwave Sender
- GMSR Gladiator Microwave Smart (Integral) Receiver
- GMSL Gladiator Microwave Smart (Integral) with Low Power Output
- GMSRQ Gladiator Microwave Smart (Integral) Receiver with anti-crosstalk Sequenced software. Requires GMSEQ Sequencer

Power Supply

- B 12-30 VDC
- U 12-30VDC and 90-260VAC

Frequency

- 1 10.525 GHz

Transducer Facing Material Selection

- 0 UHMW Polyethylene
- 1 PTFE Teflon

Transducer Housing Material

- 1 Aluminium / Mild Steel
- 2 316L Stainless Steel

Output Option

- X Not Required for Sender units
- S Switch, 1 output relay with Modbus for Receiver Units only.

Approval Standard

- X Not Required
- A22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C
- 2D Facing Material: 0 (UHMW) IECEx ta tb IIIC T* Da Db Tamb = -30°C to +55°C
Facing Material: 1 (PTFE) IECEx ta tb IIIC T* Da Db Tamb = -30°C to +80°C

**Consult Safety Instructions*

GMSR B 1 0 1 S X

Accessories

Microwave Sequencer

GMSEQ Gladiator Microwave Sequencer

Power Supply

- B 12-30VDC
- C 36-60VDC
- U 12-30VDC and 90-260VAC

GMSEQ U

HAWKLink Modem

Model

HL HAWKLink

Type

- R Remote stand alone system

Power Supply

- B 12-30VDC
- U 12-30VDC and 90-260VAC

Network Type

- G3 3G

Simcard

- S3 Australian Simcard expires after 3 month
- S12 Australian Simcard expires after 12 month
- X Not Required
(customer supplied data enabled simcard)

Mounting Bracket for Sender / Receiver

MIC-3-BRACKET

(Powder Coated Mild Steel)

HL R U G3 S3

HAWKlink-USB HAWKlink USB PC connector for GosHawkII

Part Numbering

Gladiator Gen 3 Microwave Switch Series



MA Series Mounting Accessories

MA Standard Mounting Accessories

Type

0	3" Weldment, each
3	3" UHMW Window & Weldment each
4	4" UHMW Window & Weldment each
5	6" UHMW Window & Weldment each
6	3" PTFE Window & Weldment each
7	4" PTFE Window & Weldment each
8	6" PTFE Window & Weldment each
9	9' x 4,5" fire brick assembly each
10	6" x 4" ceramic brick assembly each
11	Shock/vibration insulation mounts pack of 4
12	Adjustable mounting bracket (UHMW window) each
13	Adjustable mounting bracket (PTFE window) each
15	Flanged Focaliser tube (extension pipe) (mild steel)
16	3" Ceramic Window & Weldment each
17	4" Ceramic Window & 4" Weldment each
18	4" Microwave Weldment only each
19	3" Stainless steel Weldment only for UHMW each
20	4" UHMW Window only each
21	3" UHMW Window only each
22	4" Stainless steel Weldment only for UHMW each
25	Flanged Focaliser tube (extension pipe) (316L)
20-P1	4" UHMW Window with 40mm insertion depth (fits 4" Weldment)

MA 4

MD Series Mounting Accessories - Kit

For Approval Option 2D Installations. Consult Safety Instructions for critical details.

MD Mounting Accessories Kit

Window Facing Material

3	3" UHMW Window (-30°C to +75°C)
4	4" UHMW Window (-30°C to +75°C)
5	6" UHMW Window (-30°C to +75°C)
6	3" PTFE Window (-30°C to +200°C)
7	4" PTFE Window (-30°C to +200°C)
8	6" PTFE Window (-30°C to +200°C)
-	

Weldment Material

A	SS304
S	SS316
M	Mild Steel

MD 3 - A



Part Numbering

Gladiator Gen 3 Microwave Switch Series



MD Series Mounting Accessories - Parts

For Approval Option 2D Installations. Consult Safety Instructions for critical details.

BASE Weldment Only

-

Weldment Size

- MD3 Matches MD3 & MD6
- MD4 Matches MD4 & MD7
- MD5 Matches MD5 & MD8

-

Material

- A SS304
- S SS316
- M Mild Steel

WIN Window only

-

Window Facing Material

- MD3 UHMW for MD3 (-30°C to +75°C)
- MD4 UHMW for MD4 (-30°C to +75°C)
- MD5 UHMW for MD5 (-30°C to +75°C)
- MD6 PTFE for MD6 (-30°C to +200°C)
- MD7 PTFE for MD7 (-30°C to +200°C)
- MD8 PTFE for MD8 (-30°C to +200°C)

WIN - MD3

BASE - MD3 - A

LRING Locking Ring Only

-

Ring Size

- MD3 Matches MD3 & MD6
- MD4 Matches MD4 & MD7
- MD5 Matches MD5 & MD8

-

Material

- A SS304
- S SS316
- M Mild Steel

LRING - MD3 - A

MD Series Part Combinations

Full Kit ¹	Size	Window	Weldment ¹	Locking Ring ¹
MD3-X	3"	WIN-MD3	BASE-MD3-X	LRING-MD3-X
MD4-X	4"	WIN-MD4	BASE-MD4-X	LRING-MD4-X
MD5 -X	6"	WIN-MD5	BASE-MD5-X	LRING-MD5-X
MD6-X	3"	WIN-MD6	BASE-MD6-X	LRING-MD6-X
MD7-X	4"	WIN-MD7	BASE-MD7-X	LRING-MD7-X
MD8-X	6"	WIN-MD8	BASE-MD8-X	LRING-MD8-X

¹X = Material Selection

Specifications

Gladiator Gen 3 Microwave Switch Series



Operating Voltage

- Integral 12-30VDC / Remote 12-30VDC (residual ripple no greater than 100mV)
- Integral 80-260VAC / Remote 90-260VAC 50 / 60Hz
- Remote 36-60VDC

Power Consumption

- <0.8W @ 24VDC
- <6W @ 48VDC
- <5VA @ 240VAC
- <3VA @ 115VAC

Communications

- GosHawk, Modbus
- Modbus over Ethernet TCP/IP
- 4-20mA

Relay Output: (1) SMART (2) Remote

- Form 'C' (SPDT) contacts, rated 5A at 240VAC resistive
- Remote fail-safe test facility for one relay.

Operating Temperature

- Remote electronics -40°C (-40°F) to 80°C (176°F)
 - Integral Units -30°C (-20°F) to 65°C (150°F)*
 - Remote Sensors -30°C (-20°F) to 65°C (150°F)*.
- *For higher temperature applications, remote mounting with refractory windows is necessary.*

Power Density

- Rated from emitter to receiver at approximately 20μW/cm²
- Complies with FCC Title Rules Part 15 (Beam Blockage)
- Caution sign posting not required.

Transmitted Signal

- Circular transmission polarity
- Frequency: 10.525GHz
- Power: +20dBm / 100mW
- Sensitivity -95dBm
- Beam width 25°.

Fail-Safe

- Selectable - presence or absence of material
- High level fail-safe: relay is activated when material is present
- Low level fail-safe: relay is activated when no material is present.

Range

- Maximum range under ideal conditions: 1200m (3937 ft)
 - Minimum range under ideal conditions: 10cm (4 inches).
- Note: Minimum ranges are dependent on application conductivity.*

Sender / Receiver to Amplifier Separation

- Up to 500m (1640ft) using specified extension cable.

Alternate Cable Type Between Amplifier and Sensors

- 6 or 8 conductor (5 used) shielded twisted pair instrument cable
- Conductor size dependent on cable length
- BELDEN 3120A, DEKORON or equivalent
- Max: BELDEN 3120A = 500m (1640 ft). 3 pairs, 1 conductor not used
- Max: DEKORON IED183AA004 = 350m (1150 ft). 4 pairs, 3 conductors not used.

Maximum Operating Pressure

- 6 BAR

Display (Remote version only)

- 2 line x 12 character alphanumeric LCD
- Backlight standard.

Memory - Remote

- Non-Volatile (No backup battery required)
- >10 years data retention.

Enclosure Sealing

- Integral Sensors IP66/67
- Remote Electronics: Rated IP65 (NEMA 4x). Designed for and tested to pass IP66 hose and IP67 submergence standards
- Remote Sensors IP66/67

Cable Entries

- Remote Sensors: 1 x M20 Gland / 3/4" NPTF threaded adaptor
- Remote Amplifier: 4 x 20mm (0.8"), 1 x 16mm (0.6") knock outs
- Integral Units: 2 x M20 Glands / 3/4" NPTF threaded adaptors.

Mounting

- 3.5" male NPT thread or four 10mm (0.4") holes in flange
- MA12 / MA13 adjustable mounting bracket

Environment Seal

- 3", 4" and 6" weldments for standard mounting on vessel wall with PTFE and UHMW windows
- Flange for mounting separate from vessel wall - isolation shock mounts are available
- Ceramic window assemblies
- Firebrick window assemblies available on custom basis

Weight

- GSA 1kg
- GMS 5kg
- GMR 5kg

Approval

- IECEx Zone 20/21, Zone 21
- Ex ta tb IIIC T* Da Db Tamb -30°C to +80°C / Tamb = -30°C to +55°C (model dependent)
- IP66