

A Higher Level of Performance



Data Sheet

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## Gladiator

### Gen 3 Microwave Switch Series

Beam Blockage Detection

**Circular Polarisation**



For more information, please visit >  
[www.hawkmeasurement.com](http://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         | • Packaging           |
| • Brewing         | • Paint               |
| • Cement          | • Paper               |
| • Chemical        | • Pharmaceutical      |
| • Dairy           | • Plastics            |
| • Edible oil      | • Power Generation    |
| • Fertilizer      | • Refining            |
| • Food & Beverage | • Semiconductor       |
| • Glass           | • Sugar               |
| • Mining & Metals | • Textile             |
| • Oil & Gas       | • Water & Wastewater. |

### Features

- State of the art Circular transmission
  - Backwards compatible with all Gladiator Microwave generations
  - Ex ta tb IIIC T\* Da Db Tamb -30°C to +80°C / Tamb = -30°C to +55°C (model dependent)
  - 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**

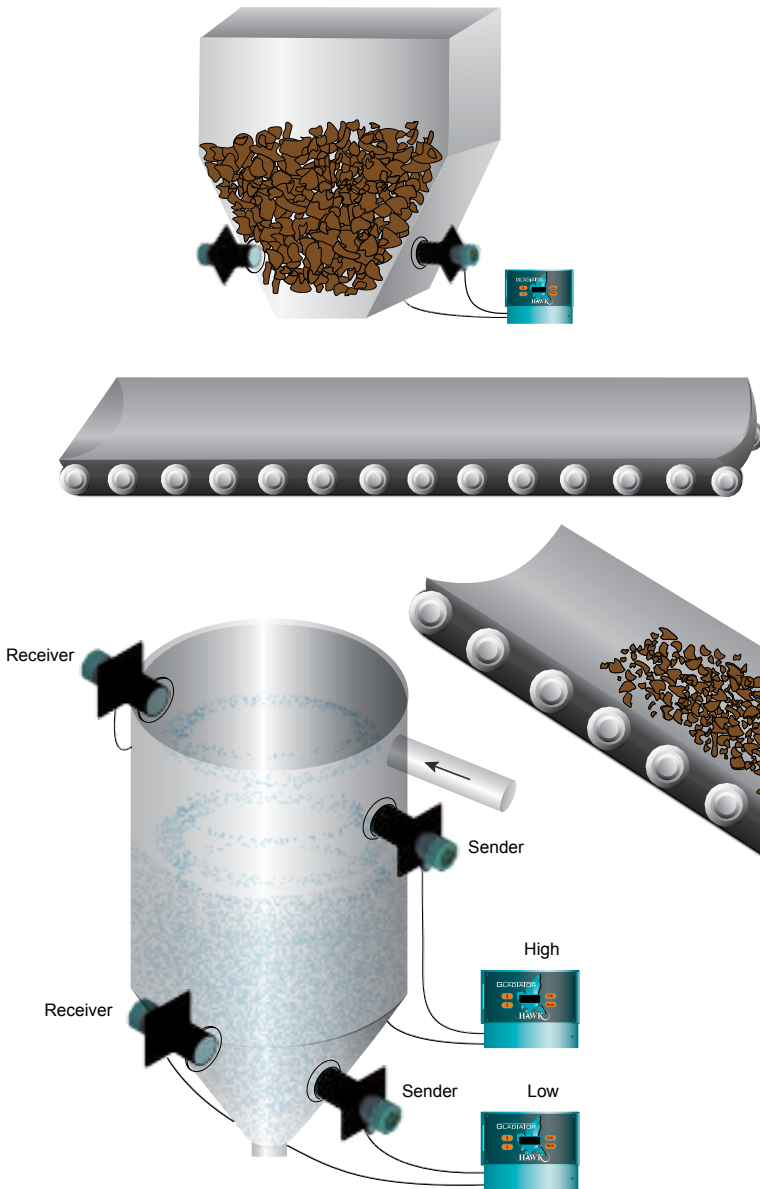
# Typical Applications

Gladiator Gen 3 Microwave Switch Series



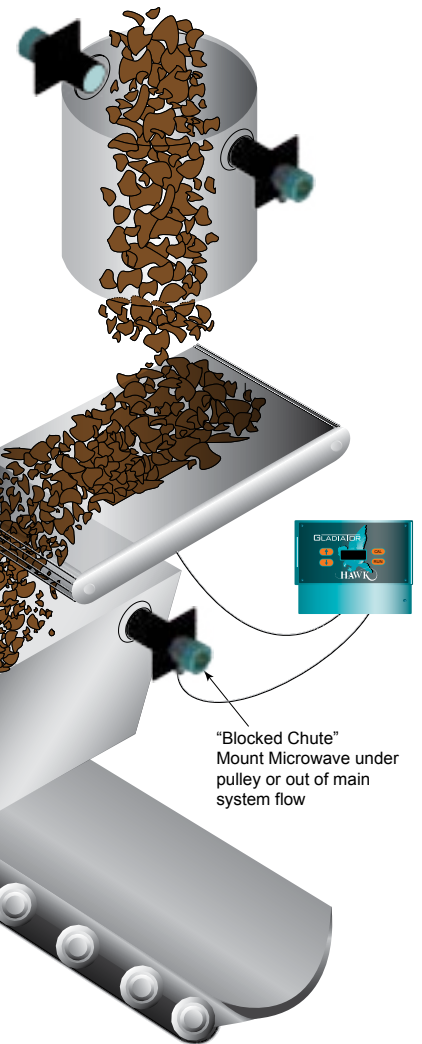
## Conveyor Protection

Presence / Absence of material



## Bulk Material Handling

High / Low blocked chute detection

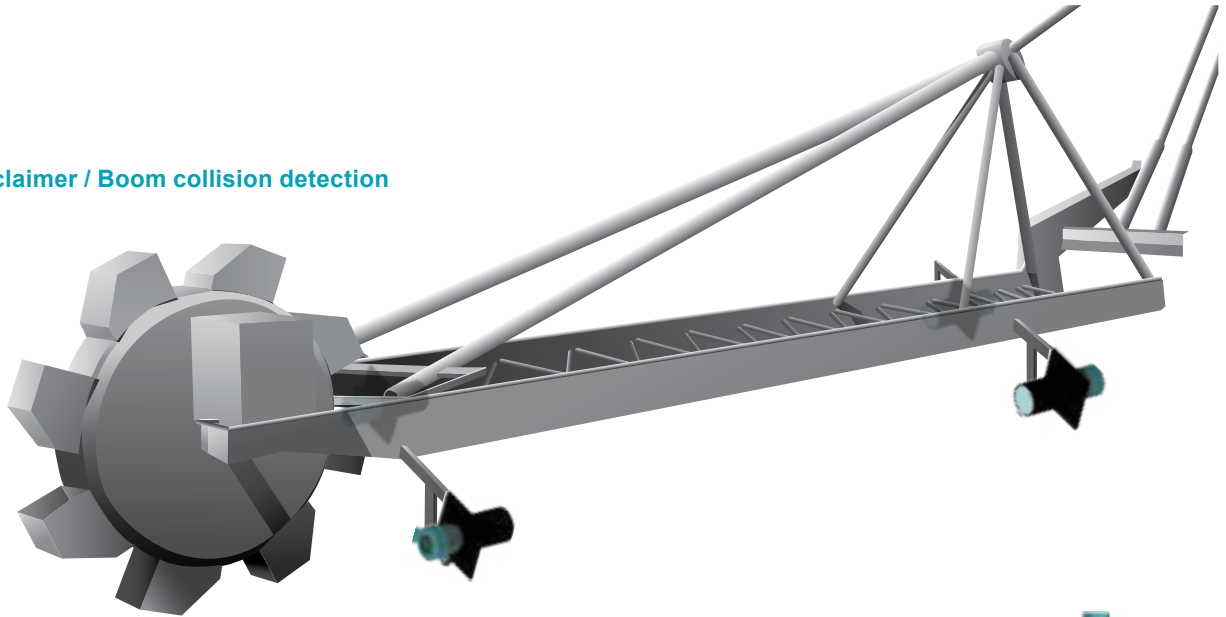


# Typical Applications

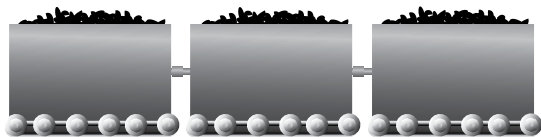
Gladiator Gen 3 Microwave Switch Series



Stacker / Reclaimer / Boom collision detection



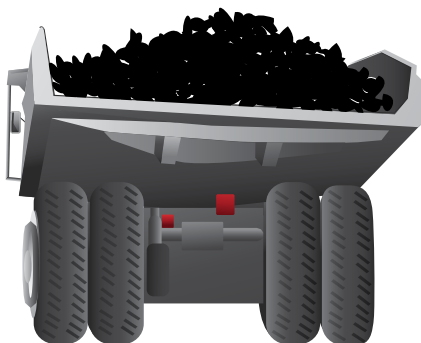
Wagon Detection



Truck Detection



Tip / Overload detection



Tip / Overload detection



# Linear vs Circular Polarisation

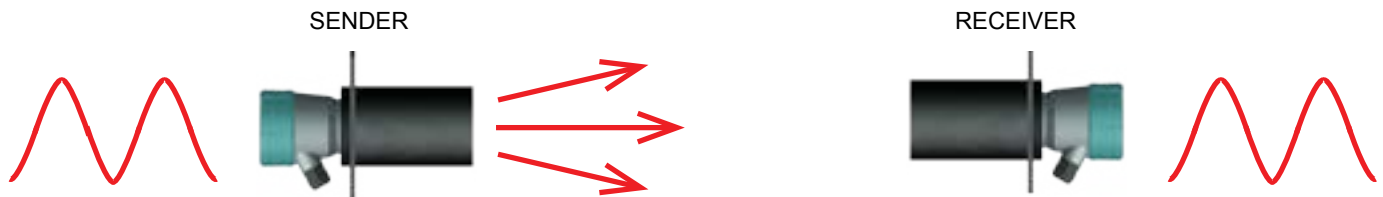
Gladiator Gen 3 Microwave Switch Series



## Generation 1 Microwave - Linear Polarisation

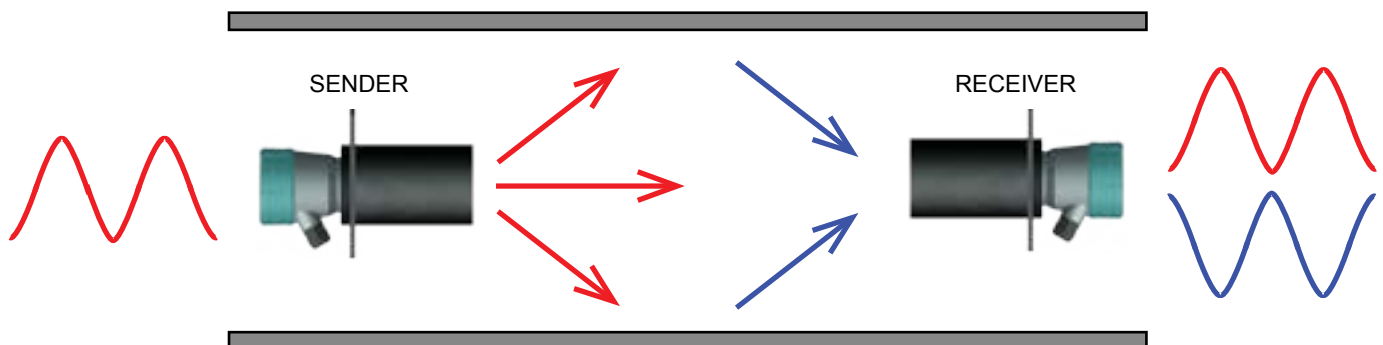
- Maximum Receiver Gain: 5000
- Maximum Distance : 100m
- Beam Angle: 40°

Perfect Condition: Tx Pulse = Rx Pulse

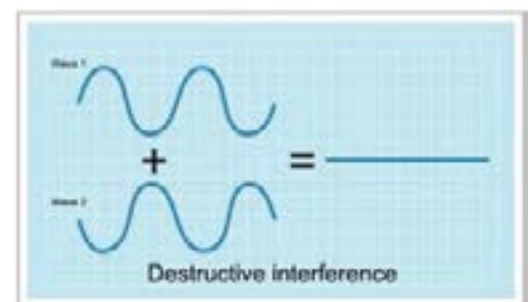
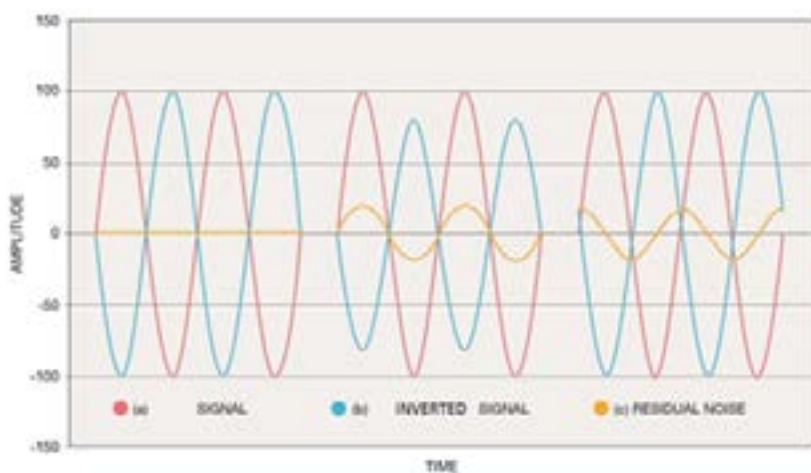


REFLECTIONS FROM CHUTE WALLS OR BOOM

$Rx \text{ Pulse} = Tx \text{ Pulse} - \text{Reflected Pulse}$



When a microwave transmitted signal comes in contact with an object, it will reflect. The amount of reflection and phase change depends on the objects dielectric constant. A linear receiver is not able to differentiate between the direct and the reflected signals; hence it will receive both and sum of the result is likely to be a smaller signal or worst-case no signal at all.



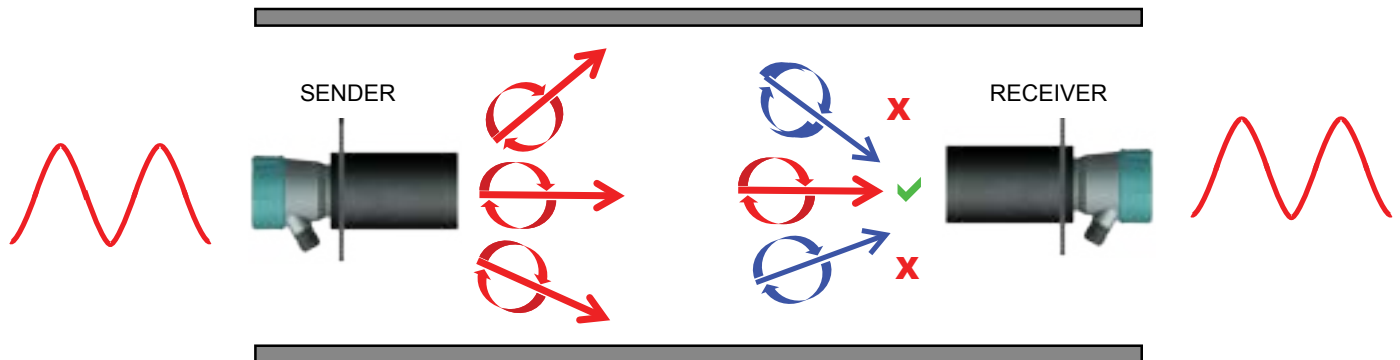
# Linear vs Circular Polarisation

Gladiator Gen 3 Microwave Switch Series



## Generation 3 Gladiator Microwave - Circular Polarisation

- Maximum Receiver Gain: 90,000
- Maximum Distance : 1200m
- Beam Angle: 25° (3 inch horn antenna)



Circular polarization is either right handed or left handed. The HAWK Gen 3 system is right hand circular polarized. When a Circular polarized microwave transmitted signal comes in contact with an object it will reflect a left hand circular polarized transmitted signal, will then change to right hand circular polarized signal on the next reflection and vice versa with every reflection. If it is a single or odd number of reflections it will be a left hand polarized signal and if it is a two or even number of reflection then it will be a right hand polarized signal. The amount of reflection and phase change depends on the objects dielectric constant.

A HAWK Gen 3 receiver is designed to only receive a right hand circular polarized signal which means single or odd number of reflections (left hand circular polarized signals) will be ignored by the microwave receiver.

The only time a circular polarized system can be affected is when two or even numbers of reflection occur where the time delay or phase shift will start to cancel part of the signal. Due to multiple reflections, the amount of energy is smaller compared to the direct signal. Hence a circular polarized system will receive more signal than a linear polarized system, reducing the possibility of false trips.

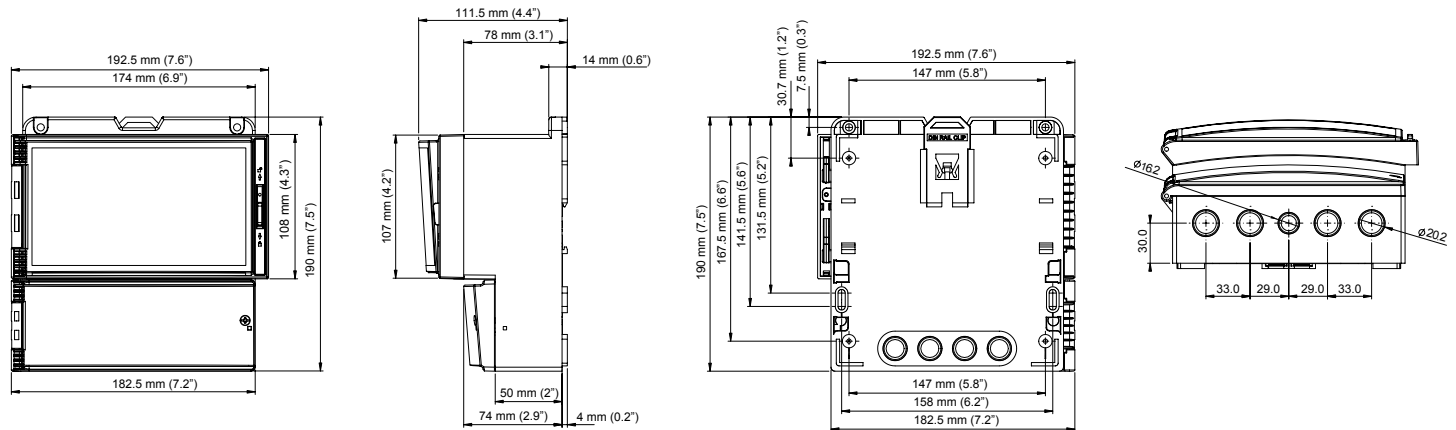
# Dimensions

## Gladiator Gen 3 Microwave Switch Series

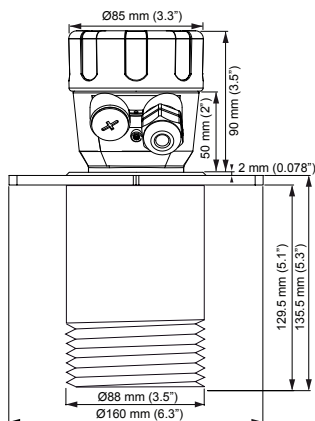


### Remote Microwave System

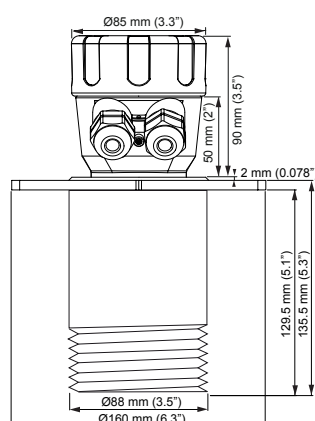
#### Remote Amplifier



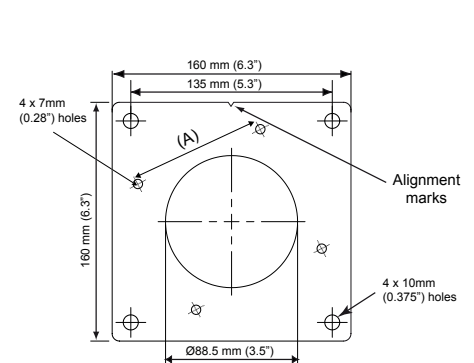
#### Remote Sender / Receiver



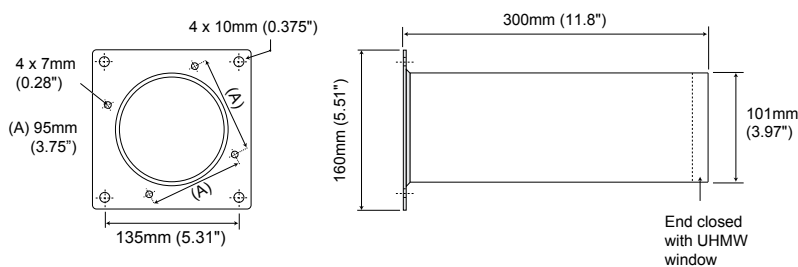
#### Integral Sender / Receiver



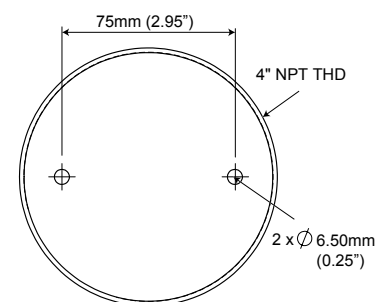
#### Mounting Bracket



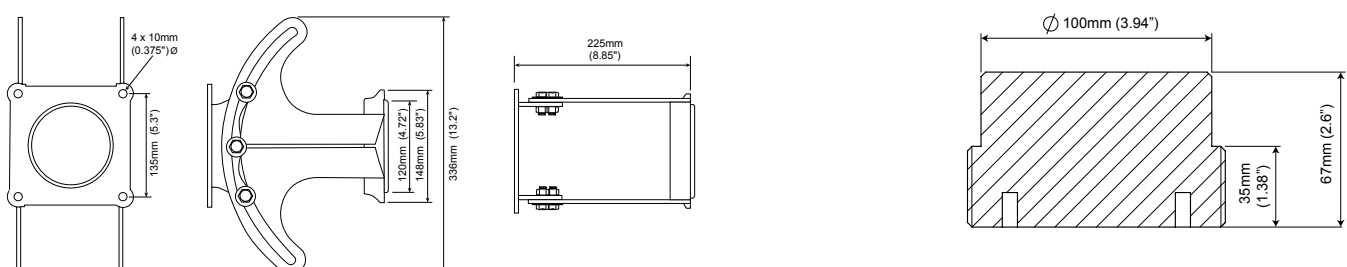
#### MA15 / MA25 Focaliser Tube (extension pipe)



#### MA20-P1



#### MA12 / MA13 Adjustable Mounting Bracket



# Dimensions

## Gladiator Gen 3 Microwave Switch Series



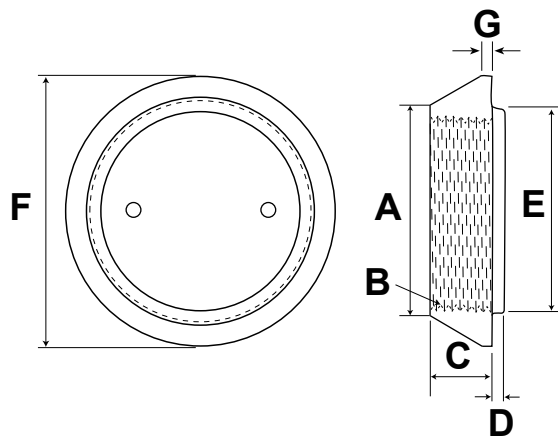
### MA Series Weldments and Windows (UHMW / PTFE)

#### Weldment with UHMW / PTFE Windows

Weldment is welded to the vessel. Window threads into Weldment

Window

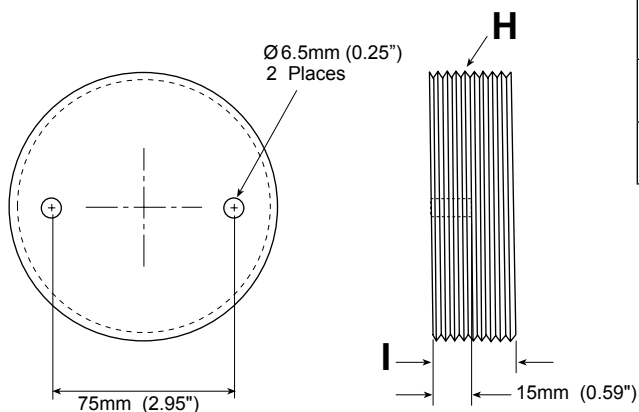
Weldment



Size	A	B	C	D	E	F	G
3"	100 (3.94")	3" NPT	22 (0.87")	5 (0.2")	92.5 (3.64")	118 (4.65")	4 (0.16")
4"	125 (4.92")	4" NPT	24.4 (0.96")	5 (0.2")	120 (4.72")	148 (5.83")	4 (0.16")
6"	190.4 (7.5")	6" NPT	40 (3.94")	5 (0.2")	175 (6.89")	223 (8.78")	11.2 (0.44")

Weldment / Window Parts			
Part Number	Size	Window	Weldment
MA0	3"		✓
MA3	3"	✓	✓
MA4	4"	✓	✓
MA5	6"	✓	✓
MA6	3"	✓	✓
MA7	4"	✓	✓
MA8	6"	✓	✓
MA18	4"		✓
MA19	3"		✓
MA20	4"	✓	
MA21	3"	✓	
MA22	4"		✓

#### UHMW / PTFE Window



Size	H	I
3"	3" NPT	28.7 (1.13")
4"	4" NPT	35 (1.38")
6"	6" NPT	40 (1.57")

# Dimensions

## Gladiator Gen 3 Microwave Switch Series

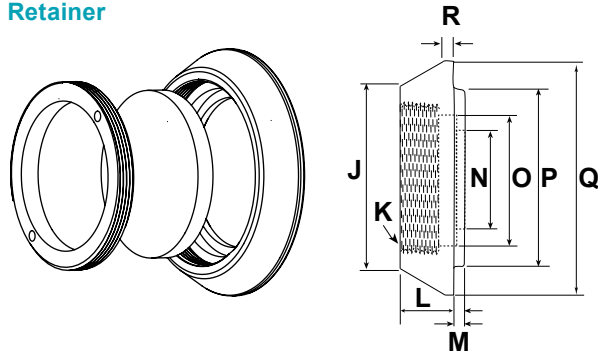


### MA Series Weldments and Windows (Ceramic)

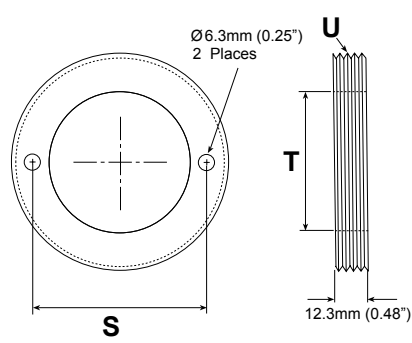
#### Weldment with Ceramic Windows

Weldment is welded to the vessel. Window is locked into Weldment with Locking Retainer

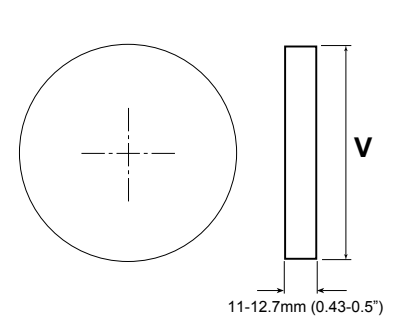
#### Locking Window Weldment Retainer



#### Locking Retainer



#### Ceramic Window



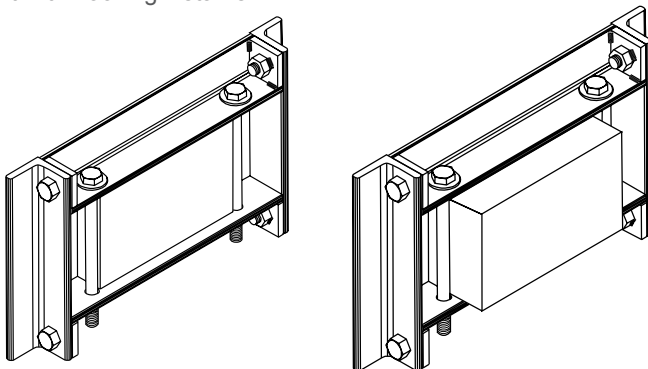
Size	J	K	L	M	N	O	P	Q	R	S	T	U	V
3"	100 (3.94")	3" NPT	22 (0.87")	5 (0.2")	65 (2.56")	75 (2.95")	92.5 (3.64")	118 (4.65")	4 (0.16")	75 (2.95")	65 (2.56")	3" NPT	74.5 (2.93")
4"	125 (4.92")	4" NPT	24.4 (0.96")	5 (0.2")	90 (3.54")	101 (3.98")	120 (4.72")	148 (5.83")	4 (0.16")	100 (3.94")	90 (3.54")	4" NPT	100.5 (3.96")

Weldment / Window Parts			
Part Number	Size	Window	Weldment
MA16	3"	✓	✓
MA17	4"	✓	✓

### Weldments and Windows (Ceramic Tile & Firebrick Assemblies)

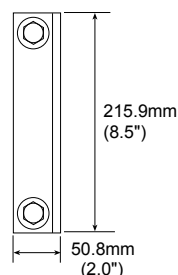
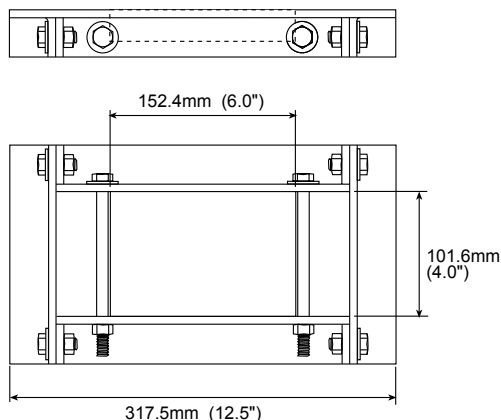
#### Weldment with Ceramic Windows

Weldment is welded to the vessel. Window is locked into Weldment with Locking Retainer

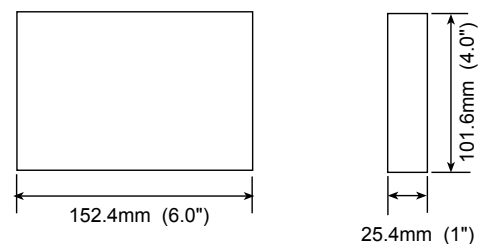


Weldment / Window Parts			
Part Number	Size	Window	Weldment
MA9	Special	✓	✓
MA10	Special	✓	✓
MA16	3"	✓	✓
MA17	4"	✓	✓

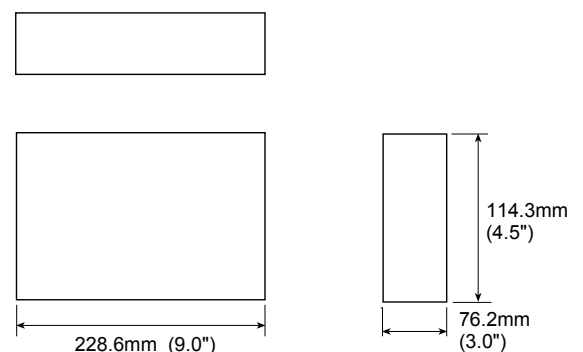
#### Mounting Assemblies



#### Ceramic Tile



#### Firebrick





# Dimensions

## Gladiator Microwave Series



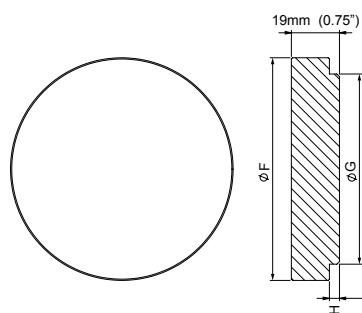
### MD Series Weldments and Windows

#### Weldment with UHMW or PTFE Windows

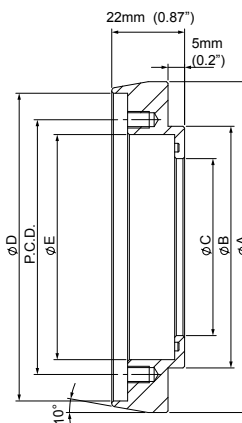
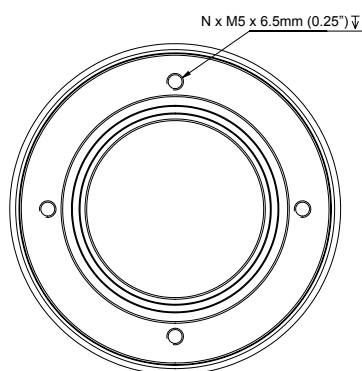
The Weldment is welded to the vessel. The Window locks into the weldment using a locking ring.

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

#### UHMW / PTFE Window



#### Weldment



#### Assembled Piece



Part No <sup>1</sup>	Window Material	A		B		C		D		E		P.C.D		No. Holes
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
MD3-X	UHMW	122	4.8	93	3.7	77	3.0	115	4.5	90	3.5	99	3.9	4
MD4-X	UHMW	148	5.8	120	4.7	102	4.0	141	5.6	116	4.6	125	4.9	6
MD5-X	UHMW	203	8.0	175	6.9	153	6.0	196	7.7	171	6.7	180	7.1	6
MD6-X	PTFE	122	4.8	93	3.7	77	3.0	115	4.5	90	3.5	99	3.9	4
MD7-X	PTFE	148	5.8	120	4.7	102	4.0	141	5.6	116	4.6	125	4.9	6
MD8-X	PTFE	203	8.0	175	6.9	153	6.0	196	7.7	171	6.7	180	7.1	6

<sup>1</sup>X = Weldment Material Selection

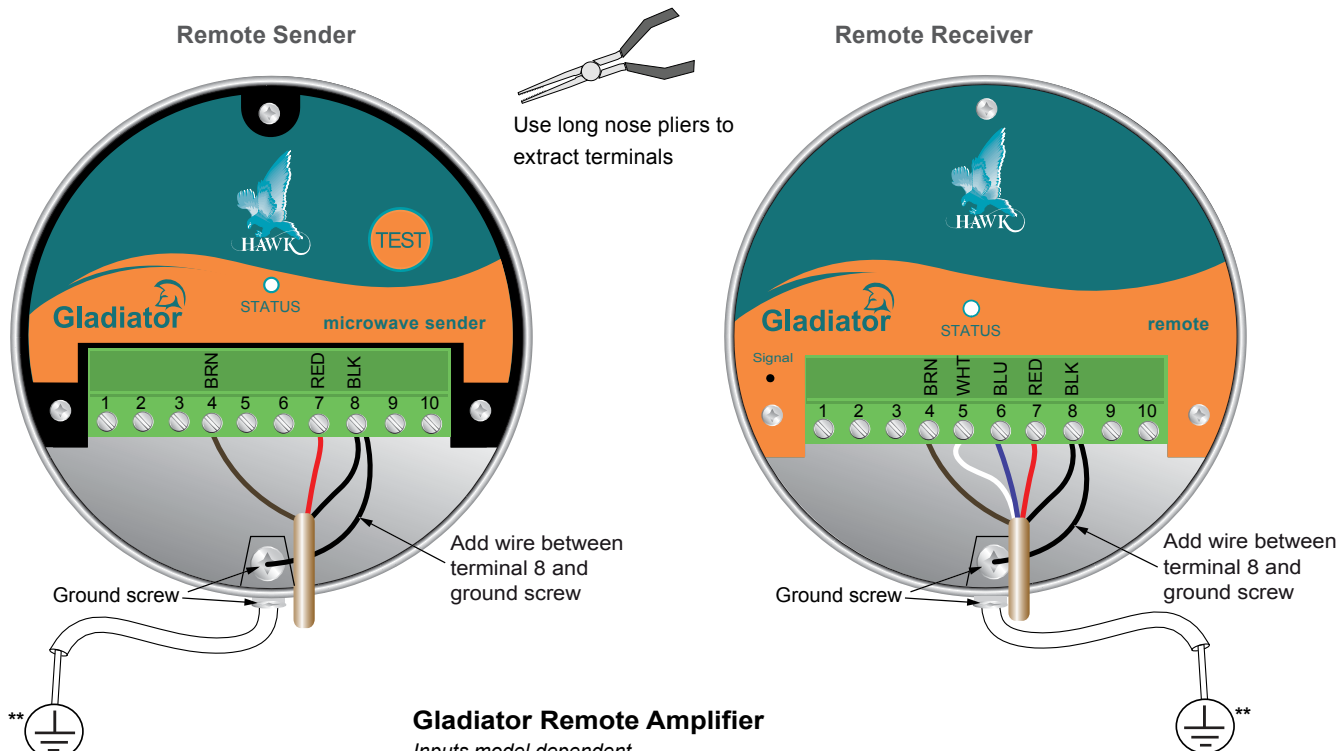
Part No <sup>1</sup>	Window Material	F		G		H		P.C.D		No. Holes
		mm	in	mm	in	mm	in	mm	in	
MD3-X	UHMW	89	3.5	76	3.0	4	1.6	99	3.9	4
MD4-X	UHMW	115	4.5	102	4.0	4	1.6	125	4.9	6
MD5-X	UHMW	170	6.7	153	6.0	4.5	1.8	180	7.1	6
MD6-X	PTFE	89	3.5	76	3.0	4	1.6	99	3.9	4
MD7-X	PTFE	115	4.5	102	4.0	4	1.6	125	4.9	6
MD8-X	PTFE	170	6.7	153	6.0	4.5	1.8	180	7.1	6

<sup>1</sup>X = Weldment Material Selection




### Remote System Connection - HAWK Supplied Cable

- The black wire of HAWK supplied cable comes with one end GND and the other GND / SHLD together.
- The GND / SHLD end is a larger cable which has been heat shrunk. The GND only end is the same size as the other cables.
- The GND / SHLD end must be connected to the amplifier.



### Gladiator Remote Amplifier

Inputs model dependent

			MIC-SENDER						RELAY 1			RELAY 2		
			RED	BLACK	BROWN	SLAVE IN	MASTER OUT	TEST IN	NC	COM	NO	NC	COM	NO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
			Sender											
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I <sub>s</sub>	+	-	RED	BLACK	BLUE	WHITE	BROWN	B	A	-	+		N	L1
4-20mA			SENSOR					COMMS		DC-In		AC-In		

Remote Receiver

#### Remote Sender

##### Status LED

- Green when powered
- Blinks while working correctly
- Solid while not transmitting

##### TEST Button

- Press and hold to test level relay action

#### Remote Receiver

##### Status LED

- Green when powered
- High illumination = strong signal
- Low illumination = weak signal

##### Signal Contact

- Signal can be read with voltmeter across Signal contact point and earth screw (or other ground reference)

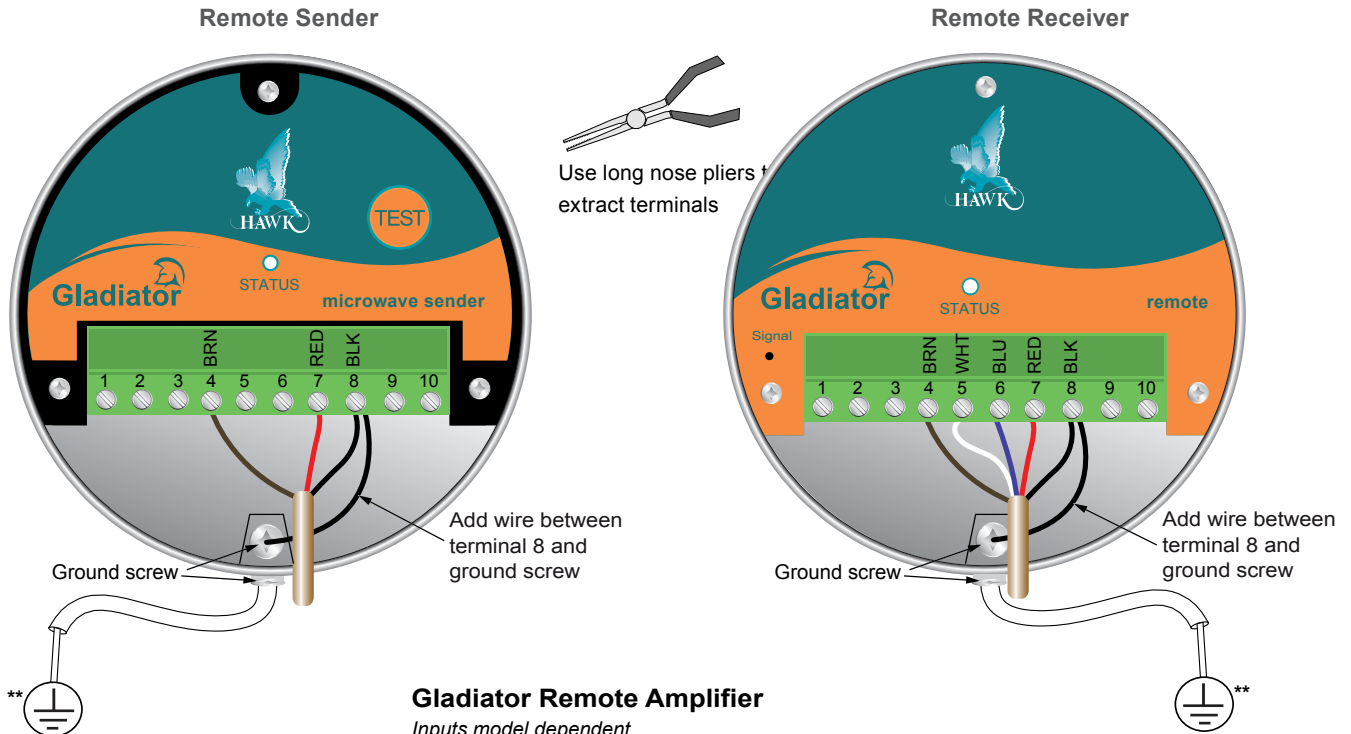
- 2.4-2.5V is full signal. 0V is no signal

\*AC-In is replaced by 36-60VDC with Power Input Option 'C'.

\*\*Ground the housing to vessel if vessel is metallic. Ground the housing to plant ground if vessel is non-metallic.



### Remote System Connection - Customer Supplied Cable



#### Remote Sender

##### Status LED

- Green when powered
- Blinks while working correctly
- Solid while not transmitting

##### TEST Button

- Press and hold to test level relay action

#### Gladiator Remote Amplifier

Inputs model dependent

			MIC-SENDER			SLAVE IN			MASTER OUT			RELAY 1			RELAY 2		
	RED	BLACK	BROWN									NC	COM	NO	NC	COM	NO
<div><div></div><div>16</div></div>	<div><div></div><div>19</div></div>	<div><div></div><div>20</div></div>	<div><div></div><div>21</div></div>	<div><div></div><div>22</div></div>	<div><div></div><div>23</div></div>	<div><div></div><div>24</div></div>						<div><div></div><div>25</div></div>	<div><div></div><div>26</div></div>	<div><div></div><div>27</div></div>	<div><div></div><div>28</div></div>	<div><div></div><div>29</div></div>	<div><div></div><div>30</div></div>
			Sender														
<div><div></div><div>1</div></div>	<div><div></div><div>4</div></div>	<div><div></div><div>5</div></div>	<div><div></div><div>6</div></div>	<div><div></div><div>7</div></div>	<div><div></div><div>8</div></div>	<div><div></div><div>9</div></div>	<div><div></div><div>10</div></div>	<div><div></div><div>11</div></div>	<div><div></div><div>12</div></div>	<div><div></div><div>13</div></div>	<div><div></div><div>14</div></div>	<div><div></div><div>15</div></div>					
<div><div>Is</div><div>+</div><div>-</div></div>	RED	BLACK	BLUE	WHITE	BROWN	B	A	-	+	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>	<div><div></div><div></div></div>
4-20mA			SENSOR			COMMS			DC-In			AC-In					

Remote Receiver

\*AC-In is replaced by 36-60VDC with Power Input Option 'C'.

\*\*Ground the housing to vessel if vessel is metallic. Ground the housing to plant ground if vessel is non-metallic.

#### Remote Receiver

##### Status LED

- Green when powered
- High illumination = strong signal
- Low illumination = weak signal

##### Signal Contact

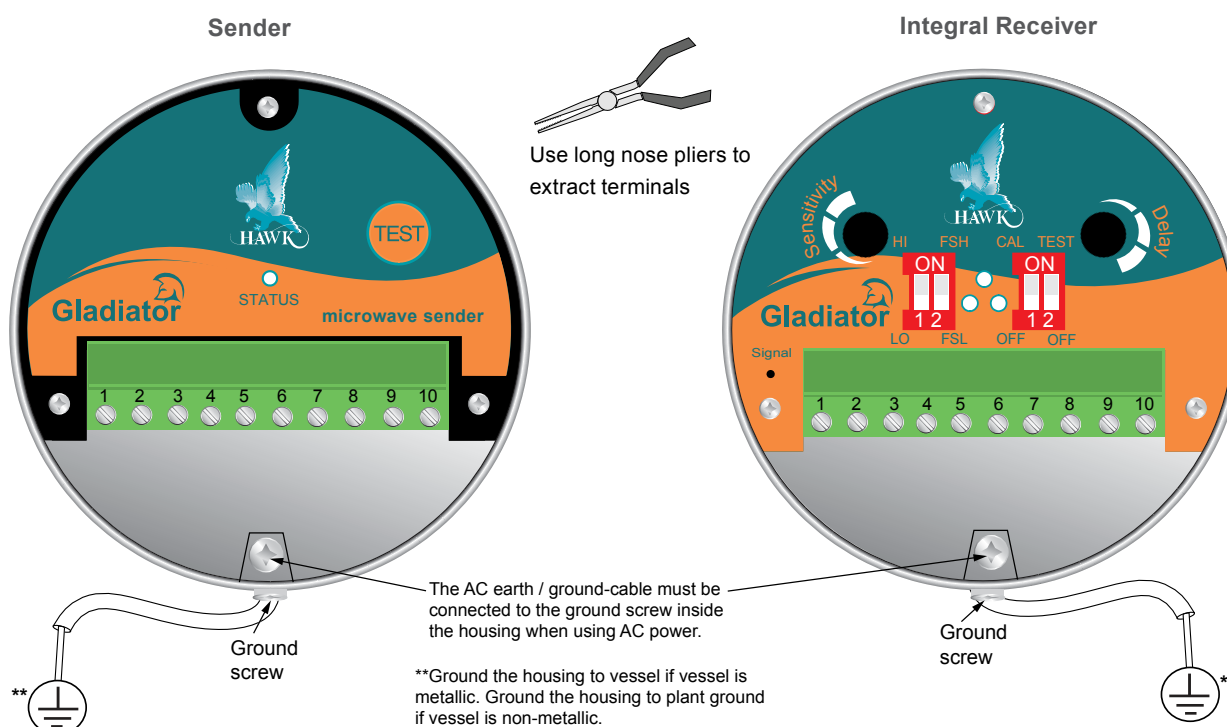
- Signal can be read with voltmeter across Signal contact point and earth screw (or other ground reference)
- 2.4-2.5V is full signal. 0V is no signal

### 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.

Alternate Cable Colour Equivalents			
Pairs	HAWK	Belden 3120A	Dekorons
Pair 1	Red Black	Red Black	White 1 Black 1
Pair 2	White Blue	Yellow Green	White 2 Black 2
Pair 3	Brown ---	Brown White (not used)	White 3 Black 3 (not used)
Pair 4	not used	not used	not used

## Integral System Connection



## Remote Sender

## Status LED

- Green when powered
- Blinks while working correctly
- Solid while not transmitting

**TEST Button**

- Press and hold to test level relay action

## Integral Receiver











## Status LED

- Green LED: Indicates received signal strength
- High illumination = strong signal
- Low illumination = weak signal
- Red LED: Indicates Relay status
- Blue LED: Flashes during calibration.  
Stays illuminated if calibration fails











## Signal Contact

- Signal can be read with voltmeter across Signal contact point and earth screw (or other ground reference)
- 2.4-2.5V is full signal. 0V is no signal

## SENDER TERMINAL LAYOUT

						DC-IN		AC-IN	
									
1.	2.	3.	4.	5.	6.	+	-	N	L1
						12-30VDC		80-260VAC	

## RECEIVER TERMINAL LAYOUT

RELAY				COMMS		DC-IN		AC-IN	
									
1. NC	2. COM	3. NO	4. Test	5. A	6. B	7. +	8. -	9. N	10. L1
				RS 485		12-30VDC		80-260VAC	

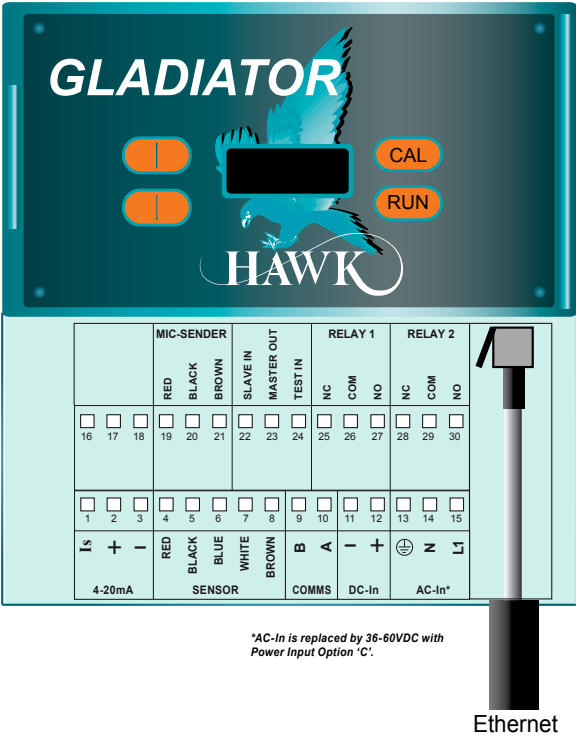
**Note:**

AC power terminals may only be used when universal AC power supply option has been selected - see part numbers -  
AC terminals have no function in products without universal AC power option.

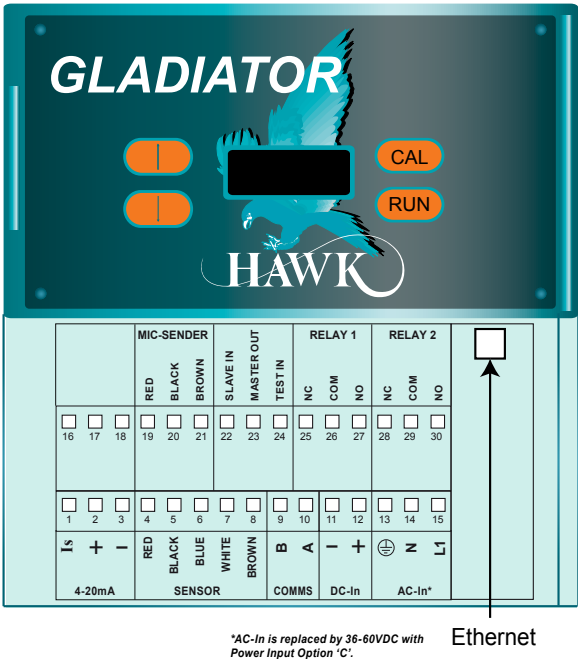


Gladiator Remote Units With Ethernet

Unit with External Ethernet Connector



Unit with Internal Ethernet Connector





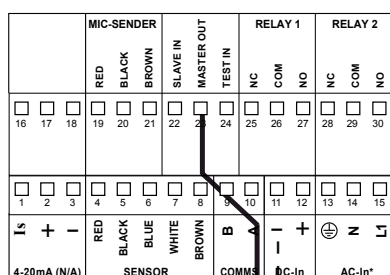


## Cross-Talk Prevention / Sequencer Wiring

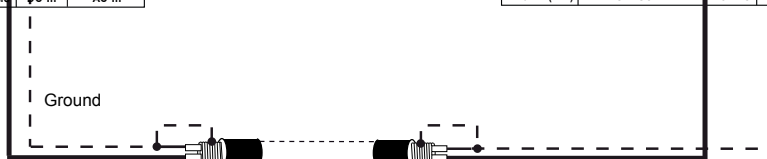
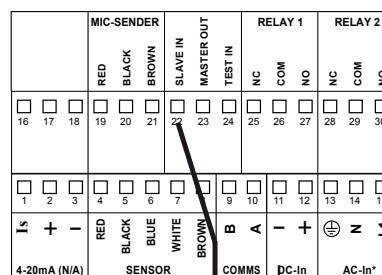
- Up to four remote Microwave systems can be set up for anti-crosstalk.
- For two systems, one can be set to operating mode 'Master' and the other to operating mode 'Slave'
- For up to four systems, a dedicated Sequencing control unit must be used with the four systems set to operating mode 'Slave'

## Master / Slave Wiring

## GLADIATOR MICROWAVE REMOTE AMPLIFIER - MASTER

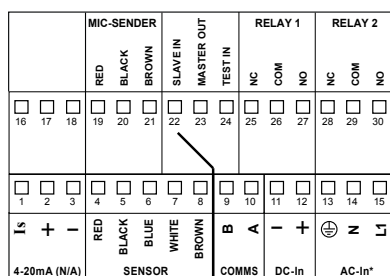


## GLADIATOR MICROWAVE REMOTE AMPLIFIER - SLAVE

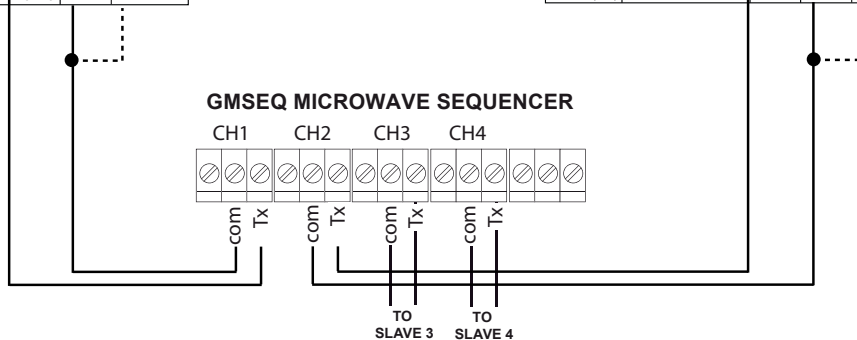
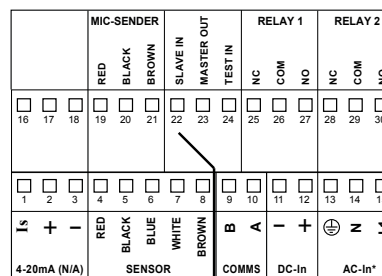


## Sequencer / Slave Wiring

## GLADIATOR MICROWAVE REMOTE AMPLIFIER - SLAVE



## GLADIATOR MICROWAVE REMOTE AMPLIFIER - SLAVE



# 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)

**HL R U G3 S3**

**HAWKlink-USB** HAWKlink USB PC connector for GosHawkII



### 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**



### 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

MD Series Part Combinations				
Full Kit <sup>1</sup>	Size	Window	Weldment <sup>1</sup>	Locking Ring <sup>1</sup>
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

<sup>1</sup>X = Material Selection

**LRING - MD3 - A**



# 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/cm<sup>2</sup>
- 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 IP65 (NEMA 4x)
- 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

*\*Consult Safety Instructions*



## HAWK, Since 1988

Hawk Measurement Systems Pty Ltd (HAWK) was established in 1988. It's founding members saw the universal requirement of various industries requiring improved process control and efficiency in their operations.

## We Can Help

HAWK understands the difficulties customers face when seeking accurate level measurement. Every application is different, involving a multitude of environmental factors. This is where HAWK excels. Our aim is to ensure that customers feel comfortable with our technology, and are provided with long term and reliable solutions. We believe that a combination of application and product expertise, as well as forward thinking and proactive support policies are the foundation of successful customer-supplier relationships.

## Progressive Technical Support

HAWK believes that the future of the Level Measurement Industry revolves around the quality of pre and post sales - support. Our aim is for all sales & support staff to be product experts, and more importantly application experts making our customers applications as efficient and consistent as possible.

## Knowledge Sharing

HAWK believes that knowledge sharing is key to creating long term relationships. Empowering our customers and our worldwide distribution network, whilst being available at all times to lend a helping hand, is the perfect recipe for long term solutions and relationships. HAWK openly extends an invitation to share our 25 years of level measurement experience, and ensure that your day to day processes are efficient, understood, and always working.

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