

A Higher Level of Performance

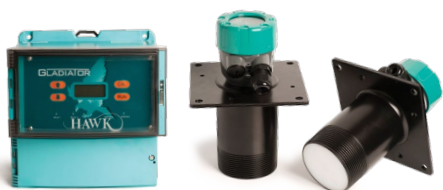


Data Sheet

Gladiator

Microwave Smart Switch Series

Beam Blockage Detection



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

Overview

Gladiator Microwave Smart Switch Series



Principle of Operation

A beam of microwave energy passes from a sender to a separate receiver in bursts approximately 200 times per second. If the path between the sender and receiver is blocked by any object or material which absorbs or reflects microwave energy, the receiver will not be able to detect the signal. The presence or absence of the signal at the receiver is used to switch a relay for indication or control purposes.

Typical Uses

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

Function

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

Note:

For wet, dusty environments where build up issues of wet high dielectric material is prevalent Microwave technology will have performance problems. HAWK recommends the Gladiator Acoustic Switch for these applications.

Features

- LCD setup / diagnostics on remote amplifier
- Ranges up to 200 meters (656 ft)
- Simple '1-minute' setup
- Remote sensor or Smart Integral 'all in one' types
- Relay outputs: Smart Integral (1) Remote (2)
- Remote test function
- Adjustable ON and OFF delays (0-20 sec)
- Remote 3G 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.

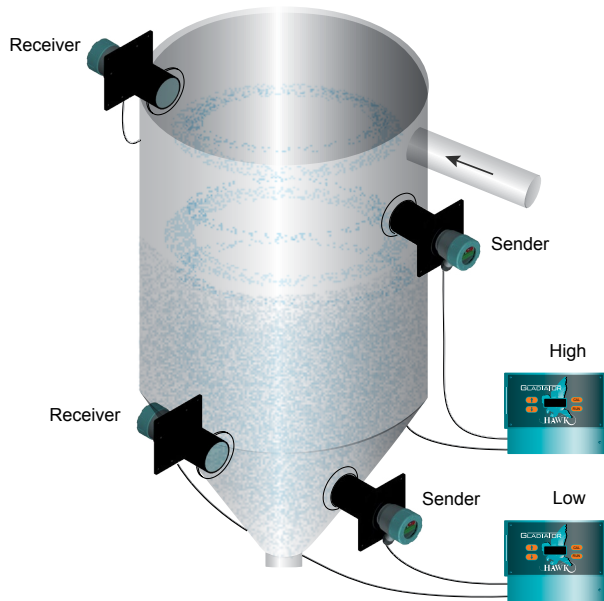
Typical Applications

Gladiator Microwave Smart Switch Series



Cement Plants / Powders

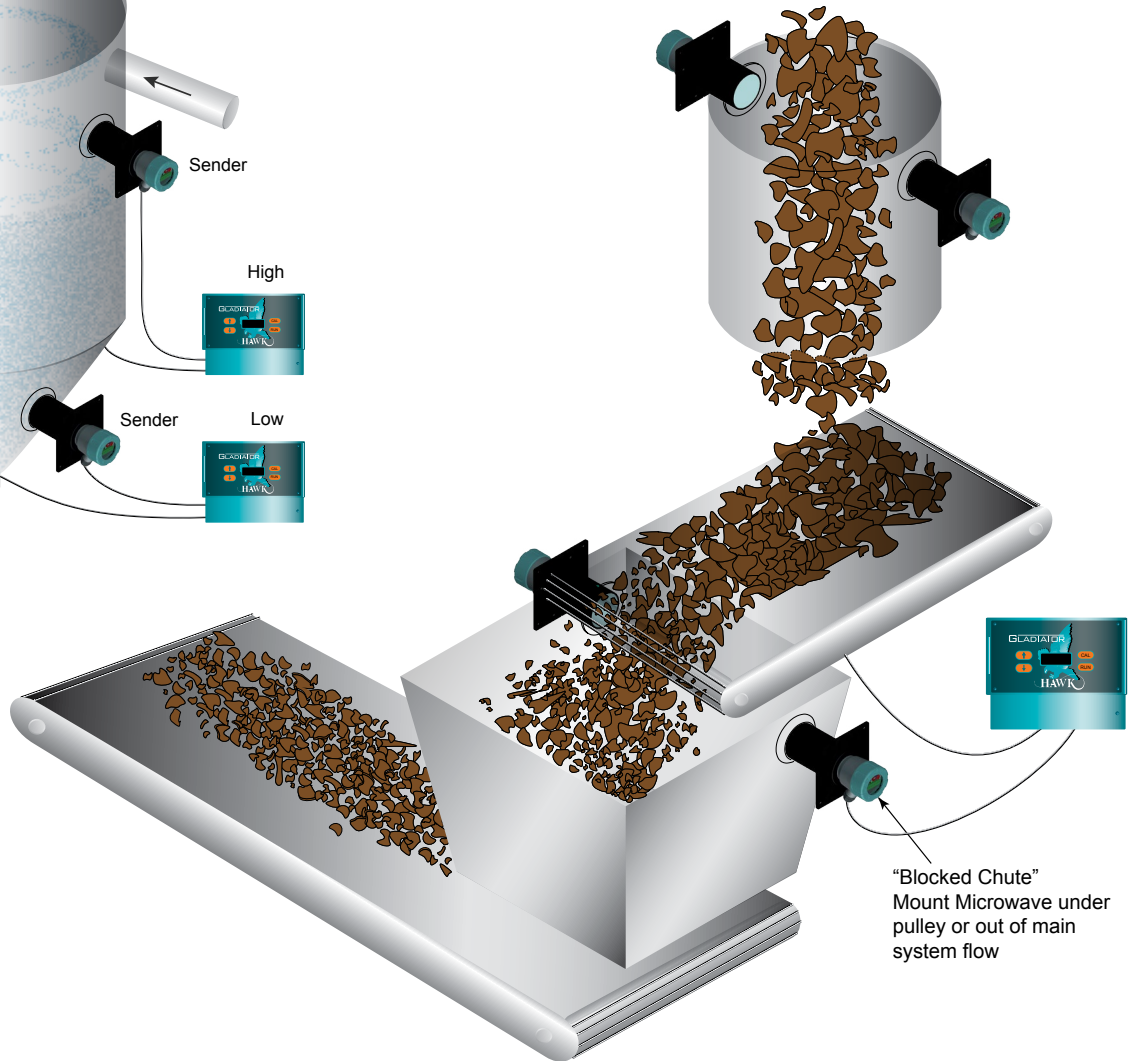
Solid Level - Cyclone Bin High / Low Level



Coal Fired Power Station, Bulk Material Handling

High / Low blocked chute detection

For dual receiver wiring see user manual.



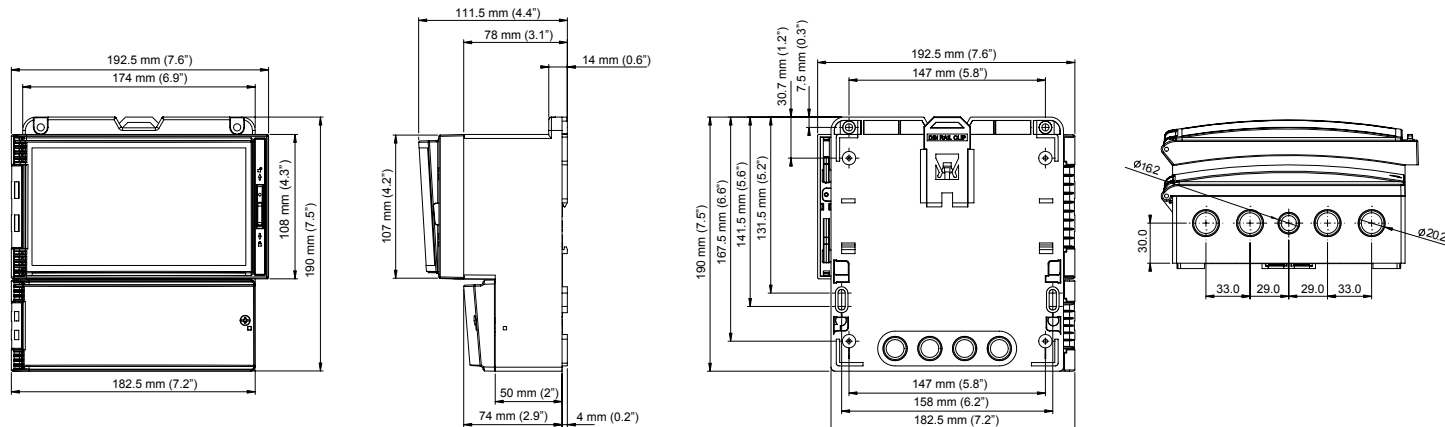
Dimensions

Gladiator Microwave Smart Switch Series

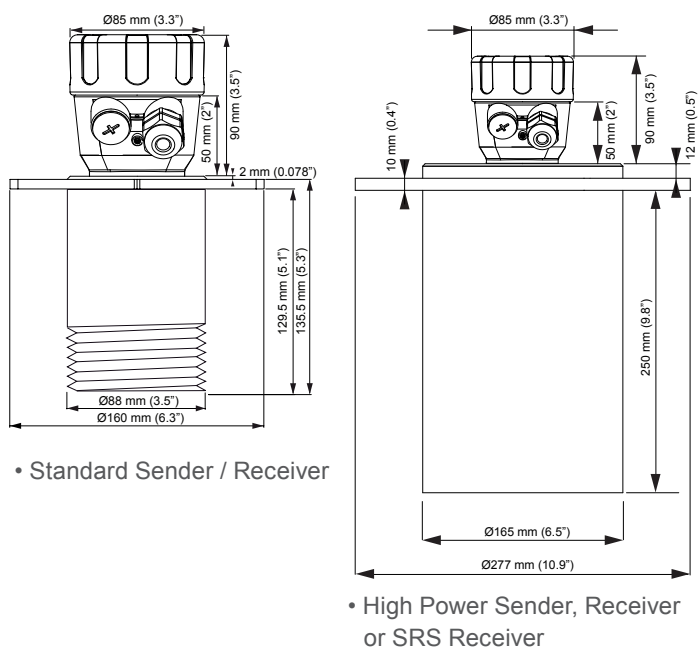


Remote Microwave System

Remote Amplifier



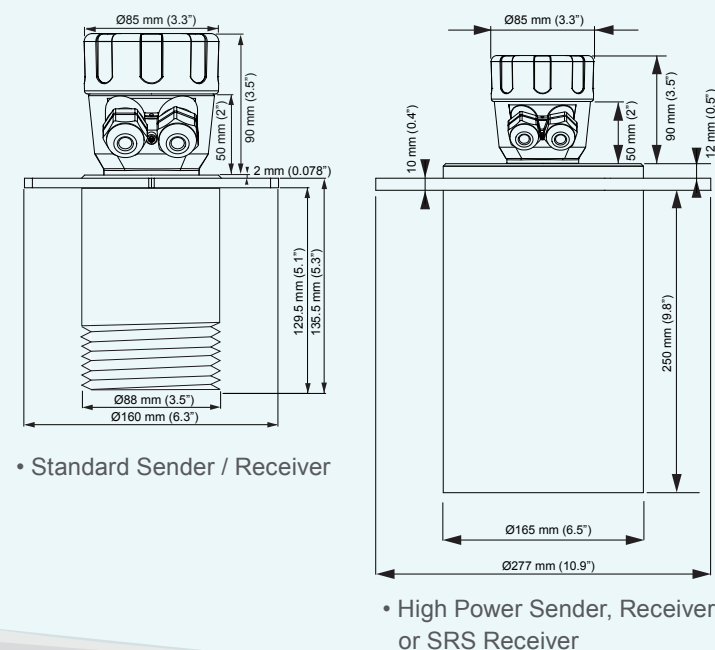
Remote Sender / Receiver



• Standard Sender / Receiver

• High Power Sender, Receiver or SRS Receiver

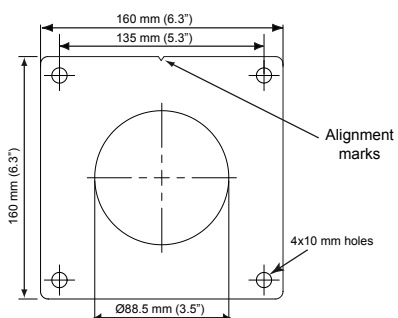
Smart Integral Microwave System



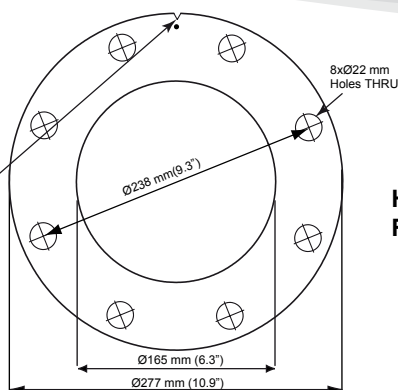
• Standard Sender / Receiver

• High Power Sender, Receiver or SRS Receiver

Standard Sender / Receiver Flange



High Power Sender / Receiver or SRS Flange

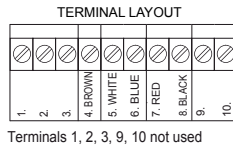




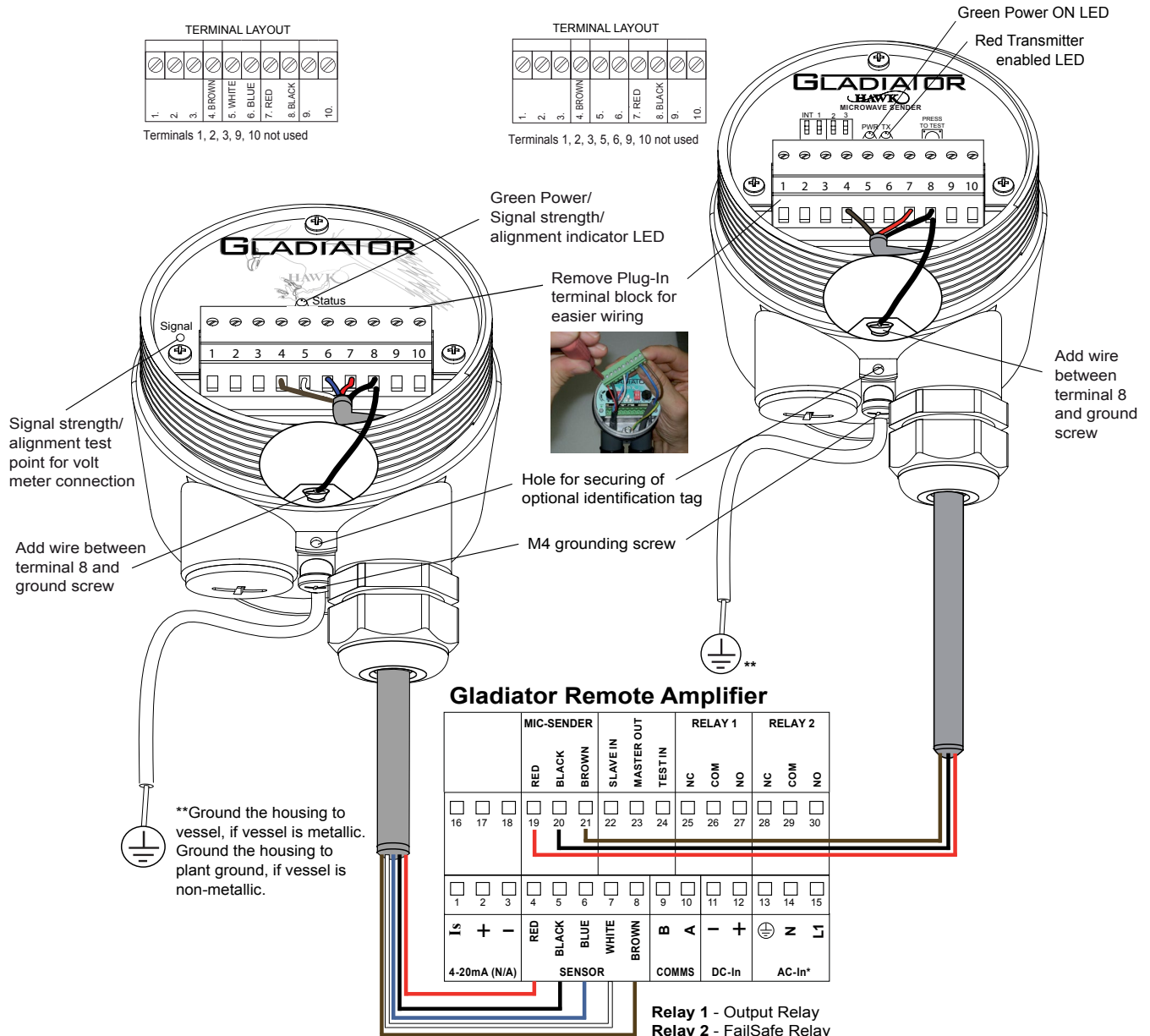
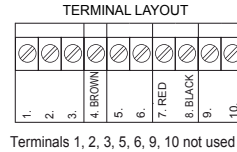
Remote System Connection - HAWK Supplied Cable

- 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 coloured cables.
- The GND / SHLD end must be connected to the amplifier and the GND end to the sender / receiver.

Remote Receiver



Remote Sender

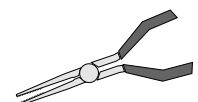


Note:

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.

Sender / Receiver
(GND only end)

Amplifier
(GND / SHLD end)



Use long nose pliers to extract terminals



Remote System Connection - Customer Supplied Cable

Remote Receiver

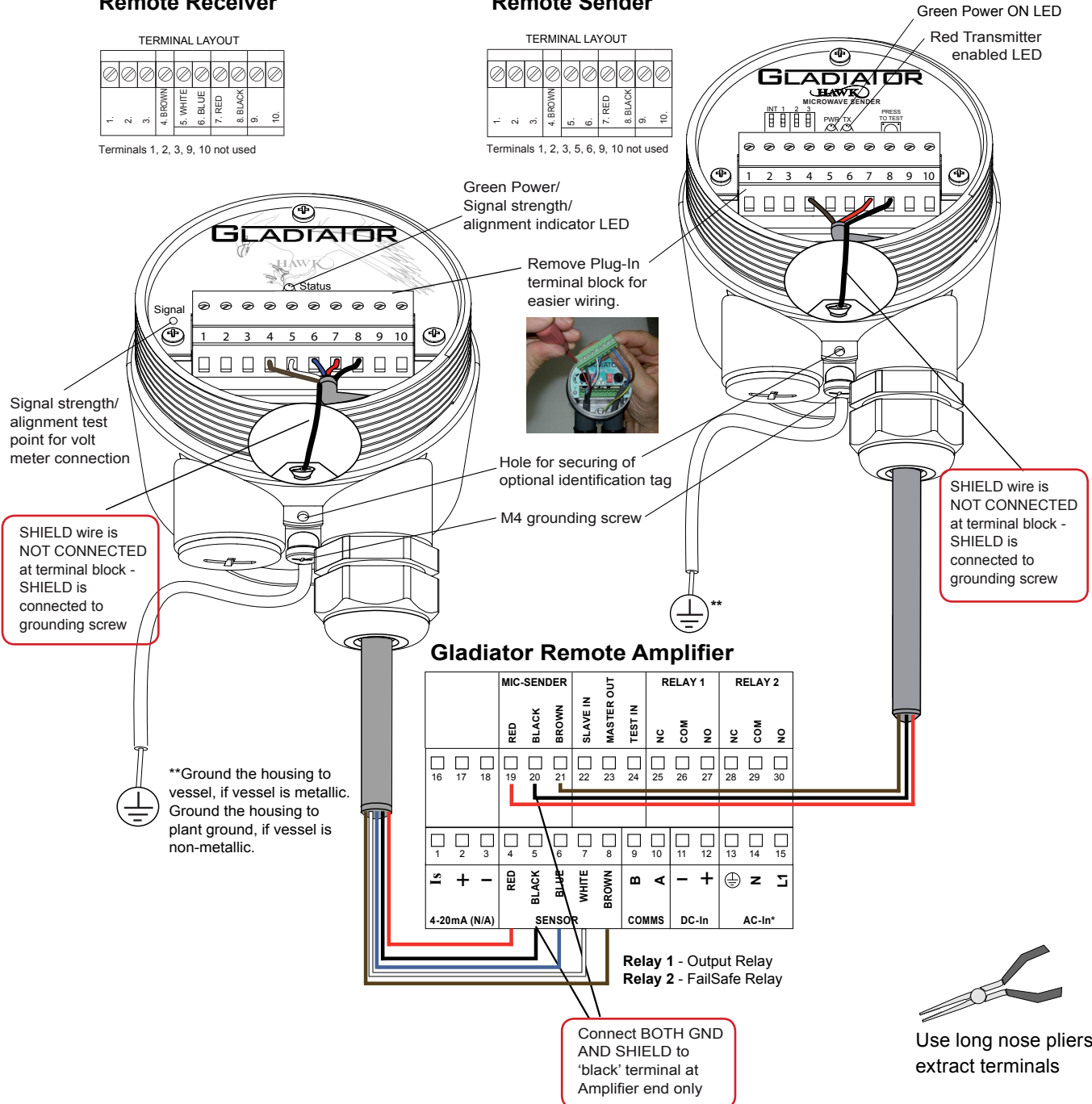
1.	2.	3.	4. BROWN	5. WHITE	6. BLUE	7. RED	8. BLACK	9.	10.

Terminals 1, 2, 3, 9, 10 not used

Remote Sender

1.	2.	3.	4. BROWN	5.	6.	7. RED	8. BLACK	9.	10.

Terminals 1, 2, 3, 5, 6, 9, 10 not used



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.

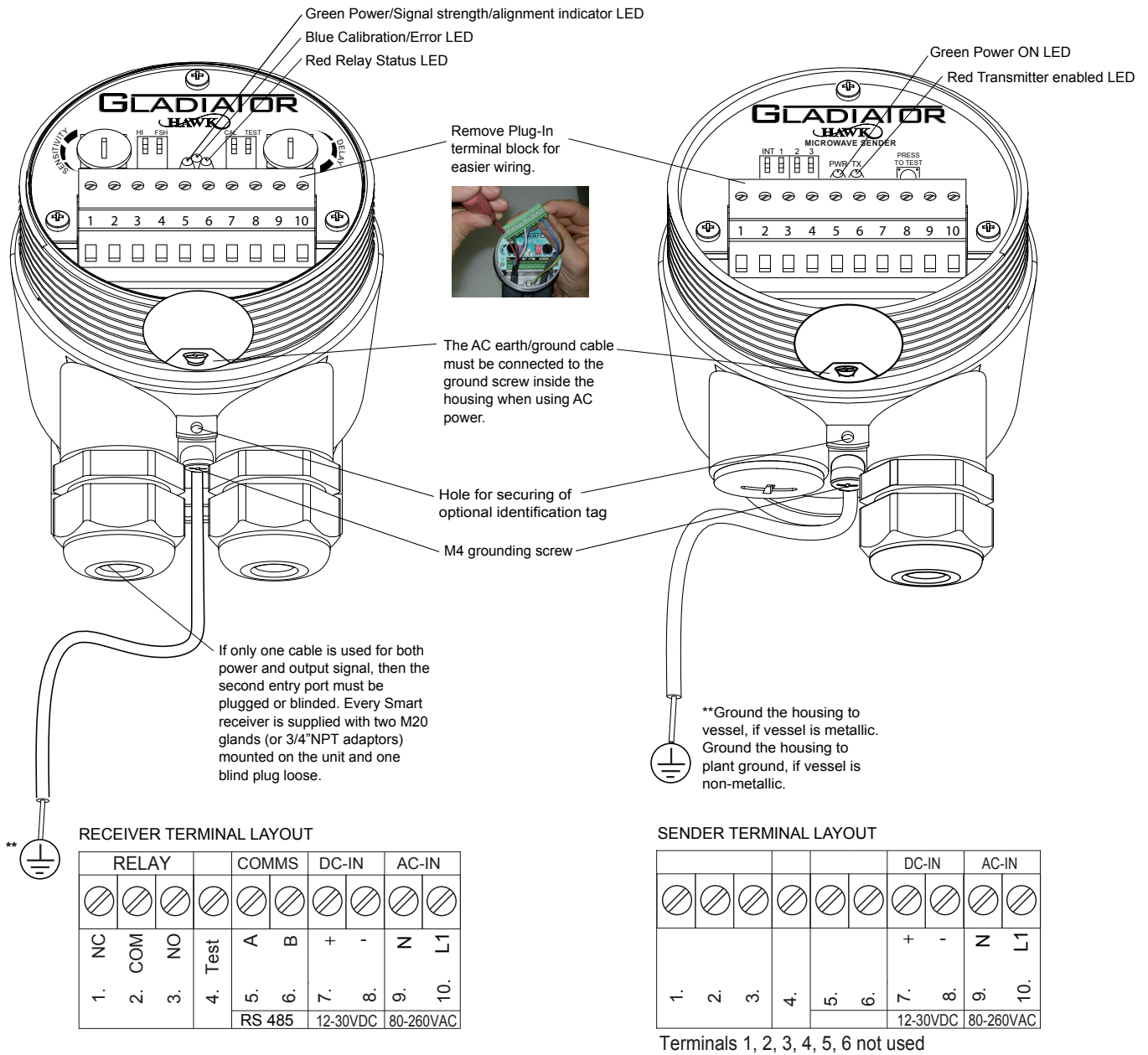
Alternate Cable Colour Equivalents			
Pairs	HAWK	Belden 3120A	Dekoron
Pair 1	Red Black	Red Black	White 1 Black 1
Pair 2	White Blue	Yellow Green	White 2 Black 2
Pair 3	Brown ---	Brown White (not used)	White 3 Black 3 (not used)
Pair 4	not used	not used	not used



Smart Integral System Connection - Customer Supplied Cable

Receiver

Sender



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.



Cross-Talk Prevention - Sequencing two remote systems

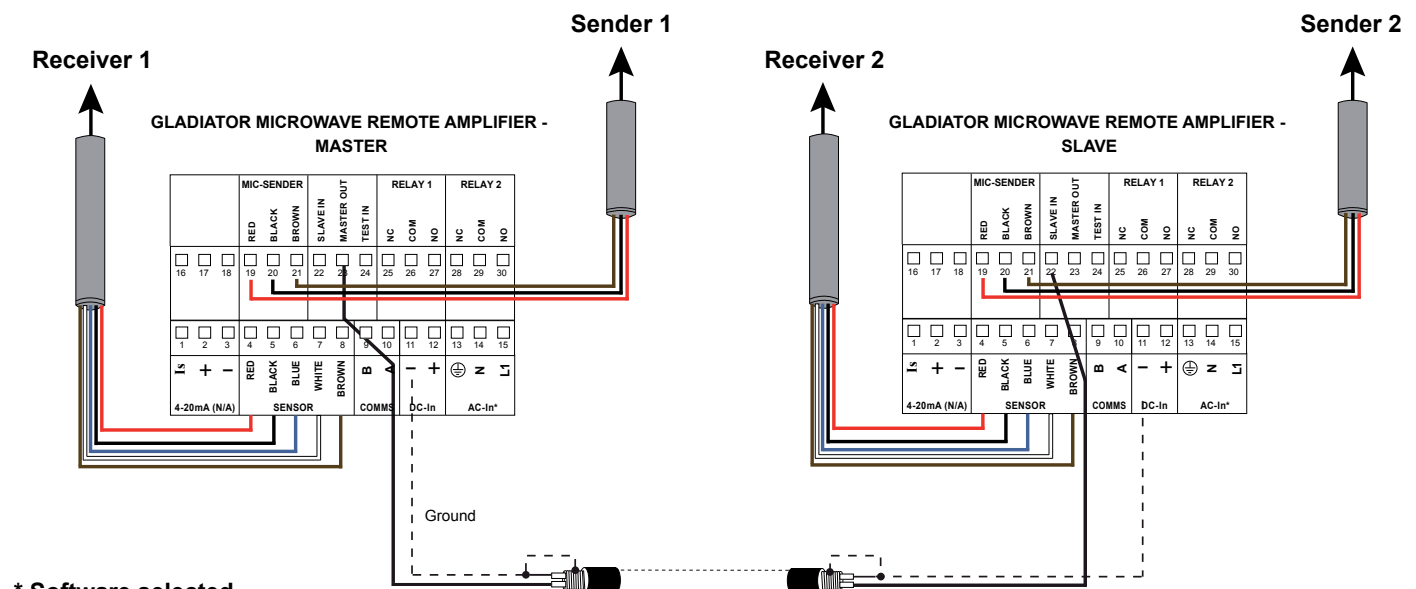
To prevent possible interference between two remote beam blockage detection systems mounted in close proximity, one system must be selected as a 'Master' and the other as a 'Slave'. The Operation Mode selection can be found in the advanced menu of the remote amplifier for each system.

Operation Mode has 3 selections:

1. Remote - normal unsequenced (single system) operation.
2. Master - controlling system in a sequenced group of two units.
3. Slave - controlled system in a sequenced group of two units.

Additional wiring must be installed between the two amplifiers as shown below. A connection must be made between the 'Master Out' terminal of the amplifier selected to operate as the Master and 'Slave In' terminal of the unit selected to operate as the Slave. The cable shield and / or a second connection must link the DC-IN '-' terminals of the two units.

- Smart integral systems are not intended to be sequenced.
- If systems are to be installed in close proximity to one another, remote types should be used to allow sequencing.
- Sequencing of more than 2 systems near one another must be done using a GMSEQ sequencing unit connected to all systems as described in the manual.



Mounting / Installation

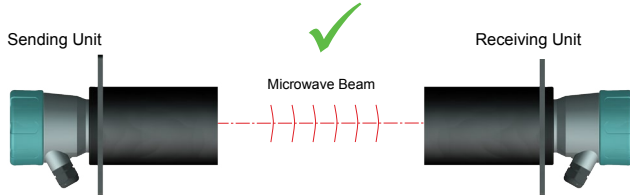
Gladiator Microwave Smart Switch Series



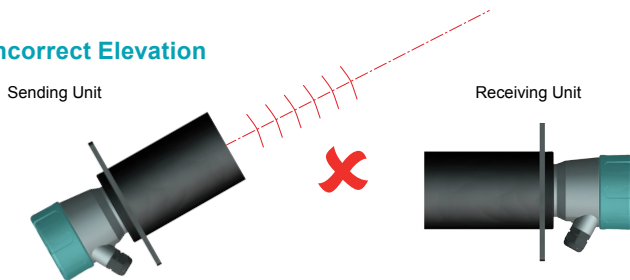
Correct Mounting Angle

Correct Elevation

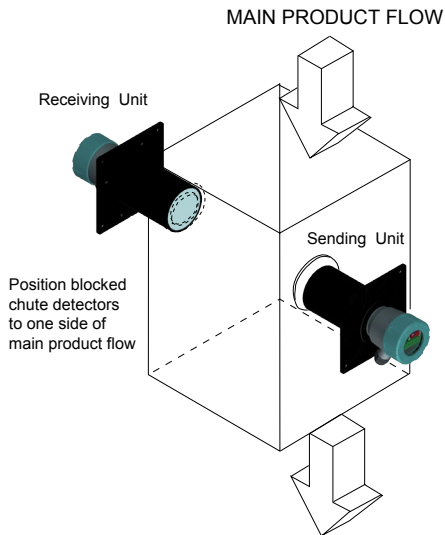
Maximum Signal Strength to Receiver is indicated by maximum brightness of Green LED on Receiver.



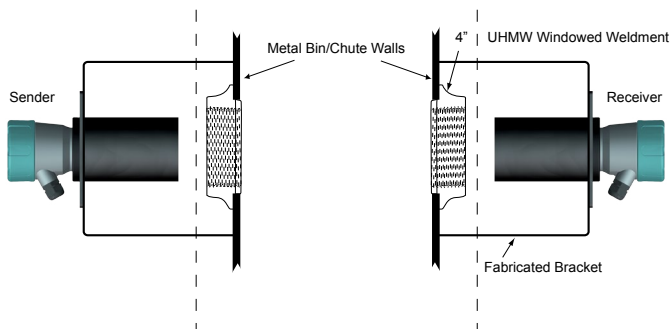
Incorrect Elevation



Blocked Chute Mounting

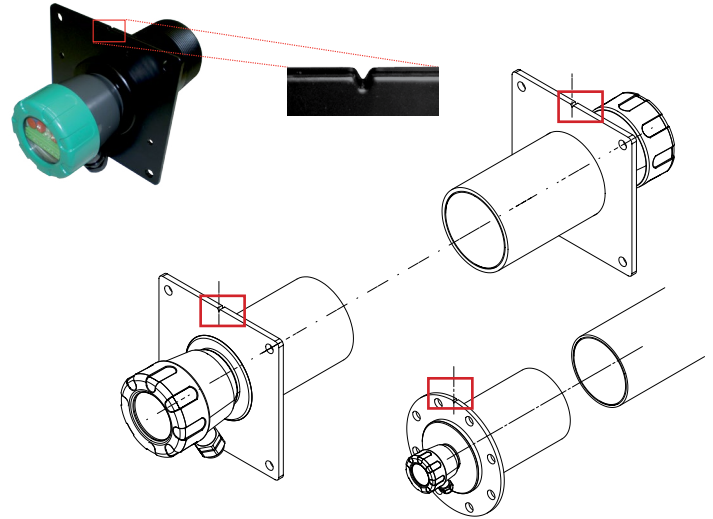


Mounting with Windowed Weldments

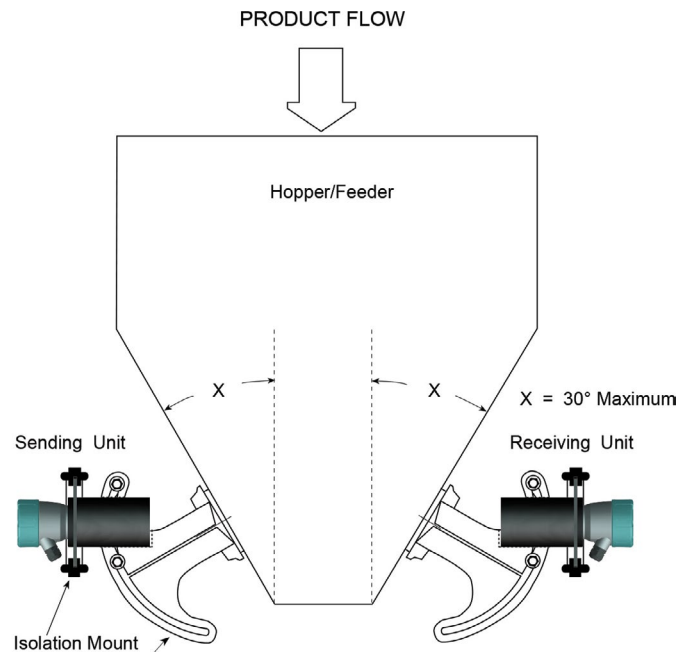


Align Sender and Receiver

Rotate so that Visual Alignment Guide is in the same position on both sender and receiver.



Installation with Adjustable Mounting



Adjustable microwave mounting bracket MA-12 or MA-13 welded to vessel wall. UHMW (MA-12) or Teflon (MA-13) Window.

Housing can be rotated within 200° after the mounting thread is tightened, to allow cable entries to face downwards or allow optimal cable clearance.



Part Numbering

Gladiator Microwave Smart 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 30-48VDC and 48-90VAC

U 12-30VDC and 90-260VAC

Output Options

S Switch. 1 level relay, 1 failsafe relay

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

GMRR Gladiator Microwave Remote Receiver

GMSHB Gladiator Microwave Sender High Power

GMRRH Gladiator Microwave Remote Receiver High Power

GMRRS Gladiator Microwave Remote Receiver with Signal Recognition Stability

Frequency

1 10 GHz

Transducer Facing Material Selection

0 UHMW Polyethylene

1 PTFE Teflon

W Wave guide connector (consult factory)

Transducer Housing Material

1 Aluminium / Mild Steel

2 Stainless Steel for GMSB / GMRR

3 Stainless Steel for GMSHB / GMRRH or GMRRS

Output Option

X Not Required - Outputs generated from GSA amplifier

Approval Standard

X Not Required

A 22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

GMSB 1 0 1 X X

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

CA-GMR 10

Part Numbering

Gladiator Microwave Smart Switch Series



Smart Integral Version

GMS	Gladiator Microwave Sender
GMSH	Gladiator Microwave Sender High Power
GMSR	Gladiator Microwave Smart (Integral) Receiver
GMSRH	Gladiator Microwave Smart (Integral) Receiver High Power
GMSRS	Gladiator Microwave Smart (Integral) Receiver with Signal Recognition Stability

Power Supply

- B 12-30 VDC
- C 30-48VDC and 48-90VAC
- U 12-30VDC and 90-260VAC

Frequency

- 1 10 GHz

Transducer Facing Material Selection

- 0 UHMW Polyethylene
- 1 PTFE Teflon
- W Wave guide connector (consult factory)

Transducer Housing Material

- 1 Aluminium / Mild Steel (Standard)
- 2 Full stainless steel GMS or GMSR
- 3 Full stainless steel GMSH / GMSRH or GMSRS

Output Option

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

Approval Standard

- X Not Required
- A22 ATEX Grp II Cat 3 GD T85°C IP67 Tamb -40°C to 70°C

GMSR B 1 0 1 S X

MA Mounting Accessory

Type

- 0 3" Weldment, each
- 1 2" Glass window each
- 3 3" UHMW Windows & Weldment each
- 4 4" UHMW Windows & Weldment each
- 5 6" UHMW Windows & Weldment each
- 6 3" PTFE Windows & Weldment each
- 7 4" PTFE Windows & Weldment each
- 8 6" PTFE Windows & Weldment each
- 9 9' x 4,5" Fire brick each
- 10 6" x 4" ceramic brick each
- 11 Shock insulation mounts pack of 4
- 12 Adjustable mounting UHMW windows each
- 13 Adjustable mounting PTFE windows each
- 14 Remote wave guide Assembly
- 15 Flanged extension pipe (for long range applications)
- 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 Windows only each
- 21 3" UHMW Windows only each
- 22 4" Stainless steel Weldment only for UHMW each
- 25 Stainless Steel Flanged extension pipe (for long range applications)

MA 4

GMSEQ Gladiator Microwave Sequencer

Power Supply

- B 12-30VDC
- C 30-48VDC and 48-90VAC
- U 12-30VDC and 90-260VAC

GMSEQ U

HAWKLink Modem

Model

HL HAWKLink

Type

- R Remote stand alone system c/w antenna

Power Supply

- B 12-30VDC
- C 30-48VDC and 48-90VAC
- 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

Specifications

Gladiator Microwave Smart Switch Series



Operating Voltage

- Smart 12-30Vdc / Remote 12-30Vdc (residual ripple no greater than 100mV)
- Smart 80-260Vac / Remote 90-260Vac 50 / 60Hz.

Power Consumption

- <0.8W @ 24Vdc
- <5VA @ 240Vac
- <3VA @ 115Vac

Communications

- GosHawk, Modbus
- Multidrop mode can address 1-250 units over 4 wires.

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)
 - Smart 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

- Frequency: 10.525GHz
- Average Power Density: 20μW/cm² typical
- Linearly Polarised Field
- Beam angle (3db) approximately 30° (10GHz).

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: 200m (656ft)
 - 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

- 2 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

- Smart Sensors IP67
- Remote Electronics IP65 (Nema 4x)
- Remote Sensors IP67.

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
Smart Integral Units: 2 x M20 Glands / 3/4" NPTF threaded adaptors.

Mounting

- 3" male NPT thread or four 10mm (0.4") holes in flange on standard units or 6" ANSI flange on high power / SRS units
- 3" Weldments for standard mounting on vessel wall
- Flange for mounting separate from vessel wall - isolation shock mounts are available
- 4" or 6" Weldments with PTFE (teflon) or UHMW windows
- Ceramic window assemblies
- Firebrick window assemblies available on custom basis
- 2" NPT sight glass window
- Waveguides - custom assemblies available for high temperature and limited access applications.

Remote Test Input

Press to test (used to check for malfunction of unit from remote position, PLC, SCADA etc).

Weight

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

Hawk Measurement Systems

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Additional product warranty and application guarantees upon request.
Technical data subject to change without notice.

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