A Higher Level of Performance

Manual

Gladiator

Doppler Microwave Series

Product Flow Detection

Circular Polarisation

For more information, please visit >

www.hawkmeasure.com

Contents

WARNING

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation, or handling of internal circuit boards or devices:

Handling Procedure:

1. Power to unit must be removed prior to commencement of any work.
2. Personnel must be grounded, via wrist strap or other safe, suitable means, before any printed circuit board or other internal devices are installed, removed or adjusted.
3. Printed circuit boards must be transported in a conductive bag or other conductive container. Boards must not be removed from protective container until the immediate time of installation. Removed boards must be placed immediately in a protective container for transport, storage, or return to factory.

Principle of Operation

The HAWK Gladiator Doppler Microwave flow switch is used in process applications requiring highly reliable non-contact, non intrusive product flow detection and movement. The system operates by sending out bursts of microwave energy toward the target product being monitored. The target product will reflect some of the microwave energy back to the system where it is processed to determine if the product is flowing or moving. The system uses the Doppler principle to determine if the product is moving by monitoring small charges in the reflected signal frequency.

When product flow is detected or stops the user set delay period begins and then the relay output is switched for alarm or control purposes. The system also has adjustable Sensitivity to compensate for product dielectrics or movement speeds that may partially reflect the microwave energy. The relay can be set to either energize or de-energise when product flow is detected. LED indicators are provided to indicate flow detection and relay status.

Typical Uses

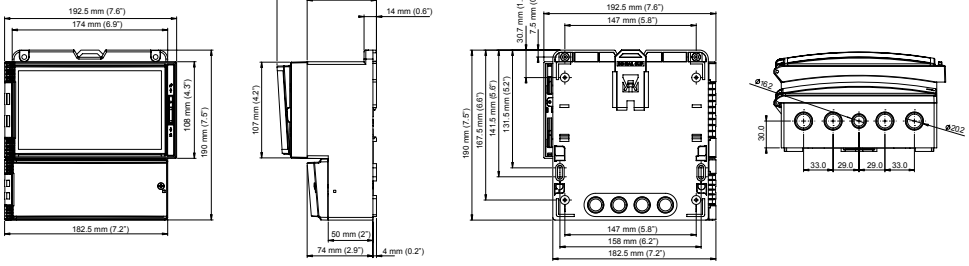
Detection of moving materials or moving objects where the microwave energy will be reflected back to the sender/receiver from the falling material or moving objects, where a switch point or continuous output is required.

Features

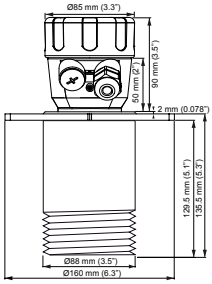
- State of the art Circular transmission
- Flow / No Flow detection
- LCD push button setup / diagnostics on remote amplifier
- Simple sensitivity adjustment and calibration
- Remote sensor or Integral ‘all in one’ types
- Relay outputs: Integral (1 + failsafe) Remote (2)
- Remote test function
- Adjustable 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.

Remote Microwave System

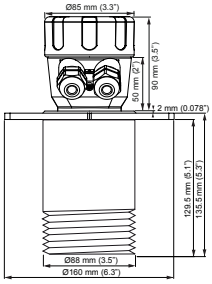
Remote Amplifier



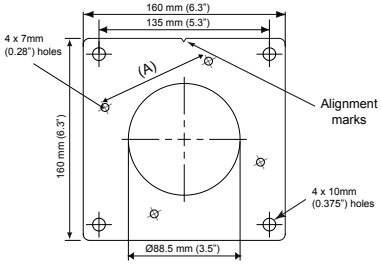
Remote Sensor



Integral Sensor



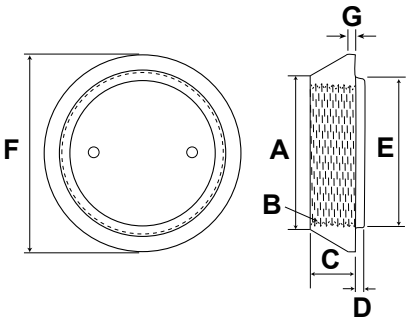
Mounting Bracket



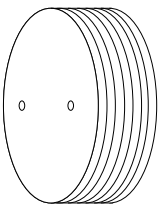
MA Series Weldments and Windows (UHMW / PTFE)

Weldment with UHMW / PTFE Windows

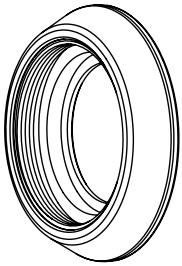
Weldment is welded to the vessel. Window threads into Weldment



Window

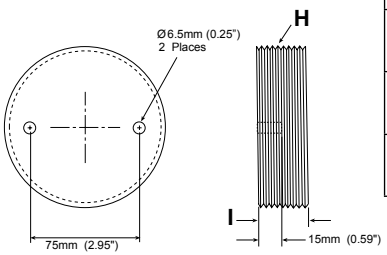


Weldment



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”)

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”)

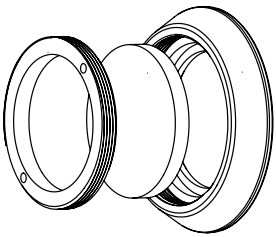
Weldment / Window Parts			
Part Number	**Size**	**Window**	**Weldment**
MA0	3”		✓
MA3	3”	✓	✓
MA4	4”	✓	✓
MA5	6”	✓	✓
MA6	3”	✓	✓
MA7	4”	✓	✓
MA8	6”	✓	✓
MA18	4”		✓
MA19	3”		✓
MA20	4”	✓	
MA21	3”	✓	
MA22	4”		✓

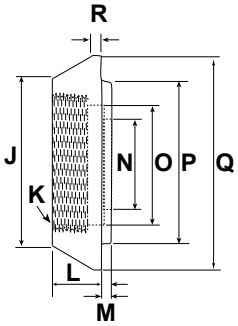
MA Series Weldments and Windows (Ceramic)

Weldment with Ceramic Windows

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

Locking Window Weldment Retainer

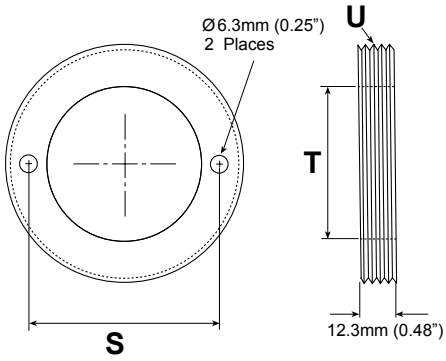




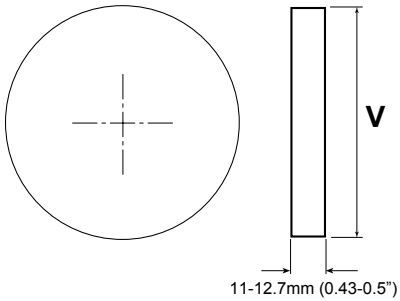
Weldment / Window Parts			
Part Number	**Size**	**Window**	**Weldment**
MA16	3”	✓	✓
MA17	4”	✓	✓

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”)

Locking Retainer



Ceramic Window

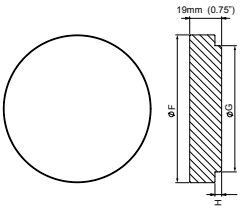


MD Series Weldments and Windows

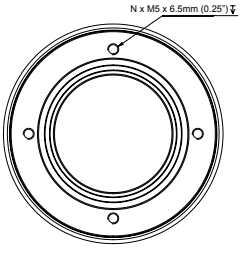
Weldment with UHMW or PTFE Windows

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

UHMW / PTFE Window



Weldment



Assembled Piece

Part No[1].	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

[1]X = Weldment Material Selection

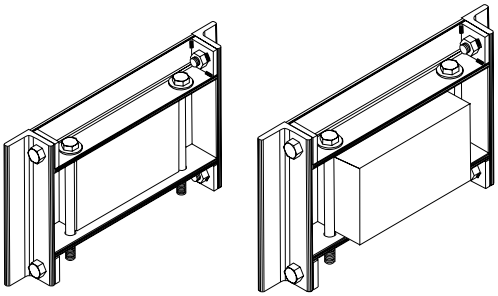
Part No[1].	Window Material	F		G		H		P.C.D		No. Holes
		mm	in	mm	in	mm	in	mm	in	
MD3-X	UHMW	89	3.5	76	3.0	4	1.6	99	3.9	4
MD4-X	UHMW	115	4.5	102	4.0	4	1.6	125	4.9	6
MD5-X	UHMW	170	6.7	153	6.0	4.5	1.8	180	7.1	6
MD6-X	PTFE	89	3.5	76	3.0	4	1.6	99	3.9	4
MD7-X	PTFE	115	4.5	102	4.0	4	1.6	125	4.9	6
MD8-X	PTFE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

[1]X = Weldment Material Selection

Weldments and Windows (Ceramic Tile & Firebrick Assemblies)

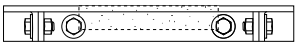
Weldment with Ceramic Windows

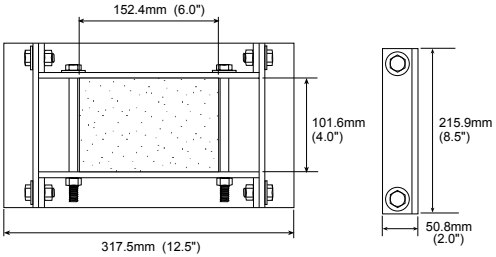
Weldment is welded to the vessel. Window is locked into Weldment with Locking Retainer



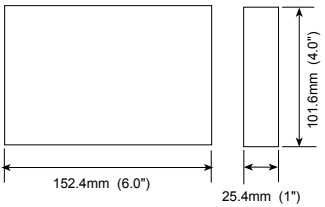
Weldment / Window Parts			
Part Number	**Size**	**Window**	**Weldment**
MA9	Special	✓	✓
MA10	Special	✓	✓
MA16	3”	✓	✓
MA17	4”	✓	✓

Mounting Assemblies

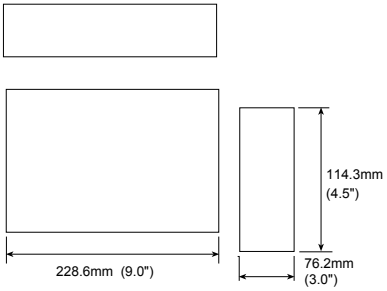




Ceramic Tile

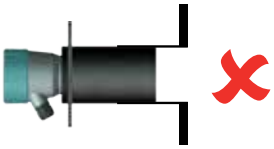


Firebrick



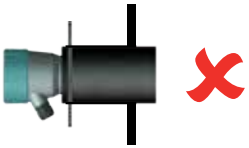
General Guidelines

1. When looking for a mounting location it is important to locate and mount the interior of the window/sensor face for each unit flush with the vessel wall and where minimal build-up will occur. The system can penetrate through generous amounts of buildup of various products, however, the better the position, the more reliably it will operate. A cavity in the vessel mount position where build up is possible will result in a 'plug' forming in front of the beam path resulting in unit performance issues.



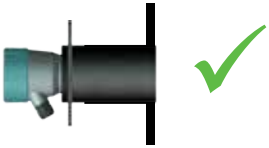
Do not mount with cavity

2. Microwave energy cannot penetrate through steel linings or other conductive linings. You must cut a viewing hole and use an appropriate windowed weldment.



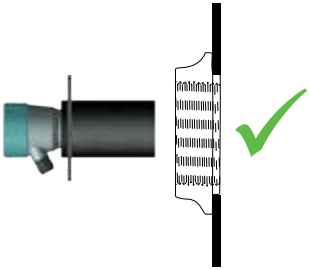
Do not mount where sensor can be damaged by material

3. For high vibration applications, it is necessary to isolate the electronics to keep them from long term damage. This is most often accomplished using UHMW or Teflon windowed weldments in the vessel walls, and mounting the Microwave to a separate stable structure (I-beam, handrail) to isolate them from vibration. Isolation shock mounts can also be provided to help protect the electronics.



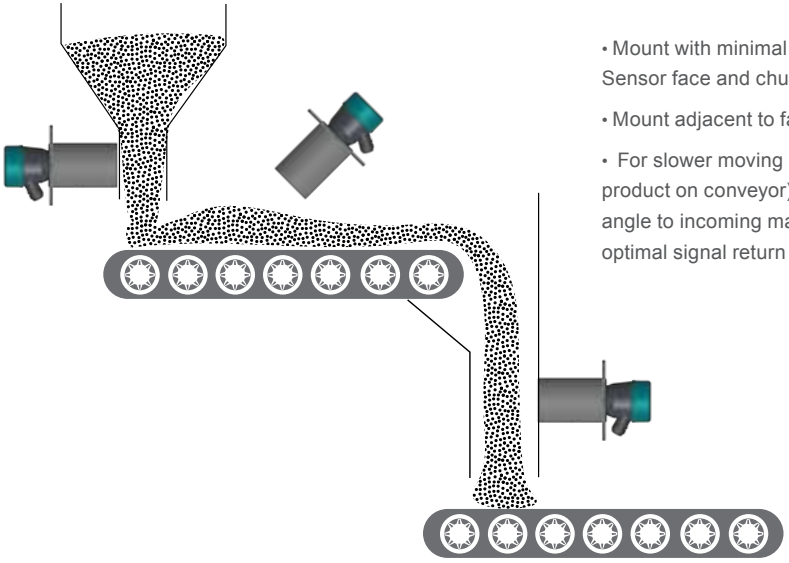
Mount flush with wall in safe location

4. For high temperature applications (precipitators, cement cyclones, etc.), it is necessary to ensure that the sensors do not exceed maximum temperature. This is normally achieved by installation of temperature resistant windows of ceramic or firebrick, and positioning of the Sender and Receiver in line with the windows.



Mount behind flush Window/ Weldments

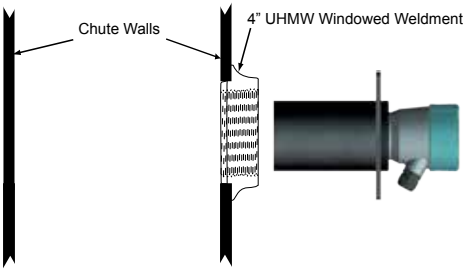
General Guidelines



- Mount with minimal distance between Sensor face and chute wall.
- Mount adjacent to falling product flow
- For slower moving materials (such as product on conveyor) mount at 45 degree angle to incoming material direction for optimal signal return

Mounting With Windowed Weldments

Windowed Weldments are designed to protect the Microwave from the hazards of the application. The weldment is welded to the chute/application wall, and then the window is threaded or locked into position. The Microwave pulse will pass through plastics and ceramics. However it will not pass through metallic type lining.



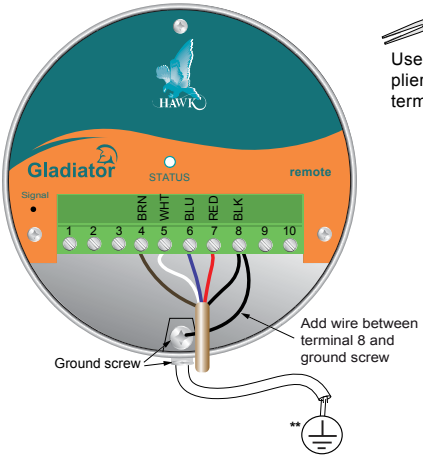
Remote System Connection - HAWK Supplied Cable

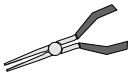
- The black wire of HAWK supplied cable comes with one end GND and the other GND / SHLD together.
- The GND / SHLD end is a larger cable which has been heat shrunk. The GND only end is the same size as the other cables.
- The GND / SHLD end must be connected to the amplifier.

Sender / Receiver
(GND only end)

Amplifier
(GND / SHLD end)

Remote Sensor





Use long nose pliers to extract terminals

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
	19	20	21	22	23	24	25	26	27	28	29	30
	Sender											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	IS	+	–	RED	BLACK	BLUE	WHITE	BROWN	B	A	–	+	⏚	N	L1
	4-20mA			SENSOR					COMMS		DC-In		AC-In*		

*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.

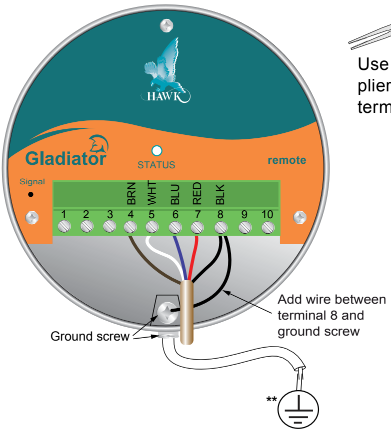
Remote Receiver

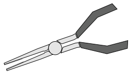
Status LED

- Green when powered
- High illumination = no movement detected
- Low / flickering illumination = flow detected

Remote System Connection - Customer Supplied Cable

Remote Sensor

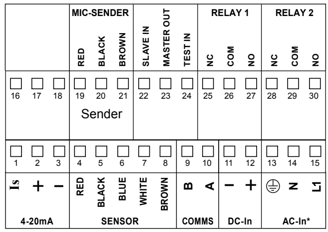




Use long nose pliers to extract terminals

Gladiator Remote Amplifier

Inputs model dependent



*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

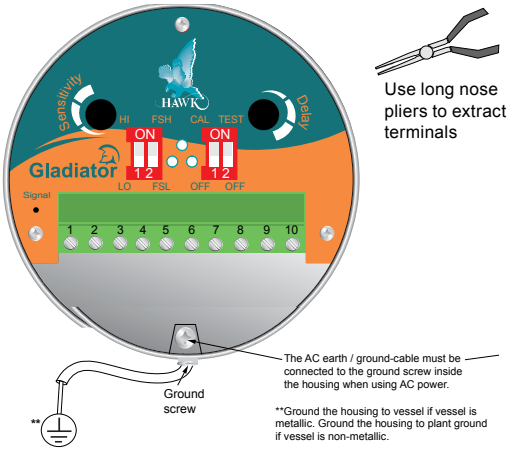
- Green when powered
- High illumination = no movement detected
- Low / flickering illumination = flow detected

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

Integral System Connection



The AC earth / ground-cable must be connected to the ground screw inside the housing when using AC power.

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

Use long nose pliers to extract terminals

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

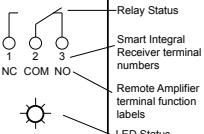
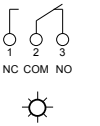
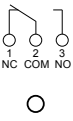
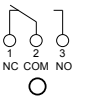
Note

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.

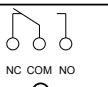
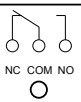
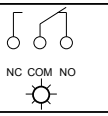
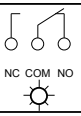
Wiring - Relay Functions

Switch contact actions.

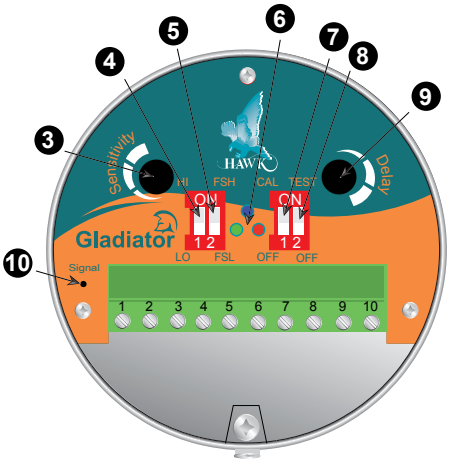
Relay - (Integral Version)
Relay 1 - (Remote Version)

	Relay Action	
	FailSafe Low FSL	FailSafe High FSH (default)
State 1 — No product flow detected		
State 2 — Product flow detected		
POWER FAILURE		

FailSafe Switch Contact Action
Relay 2 - Remote version only. For Integral units, the Test terminal can act as a solid state output with a similar function.

POWER FAILURE OR INTERNAL FAILURE		
SYSTEM OPERATING NORMALLY		

Integral System



(3) Sensitivity dial

- In 'Hi' switch mode used to set unit Gain
- In 'Lo' switch mode used to adjust unit sensitivity

(4) Hi / Lo switch

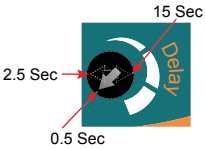
- Hi mode for High Sensitivity to movement
- Lo mode for low sensitivity to movement.

(5) FSH / FSL switch

- FSH relay normally closed.
- FSL relay normally open.

(6) Status LEDs

- Green: Solid LED indicates no movement
  Flashing / Flickering LED indicates movement
- Red: Relay indication. Illuminated when closed.



(7) Cal switch

- Fluorescent light frequency filter. Cal (up) for 120Hz. Off (down) for 100Hz

(8) Test switch

- Can be used for a failsafe / test relay.

(9) Delay pot

- Rotate clockwise to increase Relay on/off delay time.

Remote System

1. Mount the units according to Mounting Guidelines

To protect from surges, ensure that an external ground wire is connected between the outside ground screw on the Gladiator housing and the vessel or other ground source.

2. Power the unit

3. Set the Sensitivity parameters.

Typically start with a high value (such as 95%).

4. Set the Relay Switch %Perform

A low value (<5%) is typical for most applications. When the Sensor Value % exceeds this point the relay will switch

5. Select Relay Action

The Relay can switch ‘ON’ or ‘OFF’ as when material flow is detected. Select Failsafe Hi for normally closed relay, or Failsafe Low for normally open relay.

Integral System

1. Mount the units according to Mounting Requirements

1.1 If units are AC powered ensure proper grounding is connected to ground screw.

2. Power the unit

3. Select the required relay action

The Relay can switch 'ON' (FSL) or 'OFF' (FSH) FSH is recommended (ordinarily on/energized, switches off/DEN when no movement is detected.

4. Choose Hi / Lo Sensitivity mode

For Hi Sensitivity setup - use the Sensitivity dial to adjust Sensitivity to movement (clockwise to increase sensitivity)

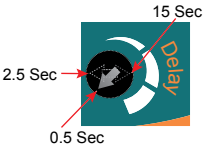
For Lo Sensitivity setup - First set the switch to Hi mode and the rotate the dial to set Gain setting (clockwise increases Gain making the unit more sensitive to movement). After this, set switch to Lo mode. You can now rotate Sensitivity dial to adjust Sensitivity to movement (clockwise to increase sensitivity).

Most applications should start in 'Hi' mode with pot fully clockwise.

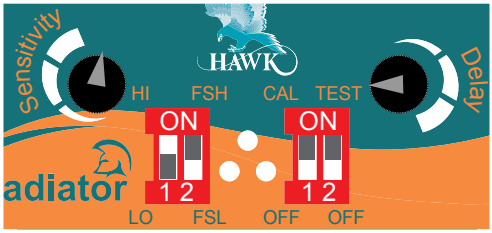
5. Set Delay timer

Choose relay delay time.

Approximate values indicated



Typical Setup



Sensitivity Pot: 1-2 o'clock

Sensitivity Switch: Hi

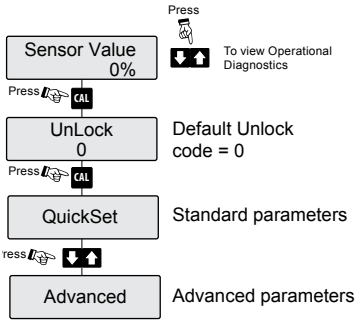
Delay Pot: 9 o'clock

Operational Diagnostics

Diagnostic	Description	Notes
Sensor Value	Sensor value indicates the amount of detected movement ranging 0-100%. When this % exceeds the Switch On% the relay will trigger	
SW On	For the level relay to switch to state '2', the Sensor value must exceed this SW On % for the duration of the on delay time.	
SW Off	For the level relay to switch to state '1', the Sensor value must drop below this SW Off % for the duration of the off delay time.	Switch mode 'Auto' will automatically set the SW Off % to 2/3rds of SW On %
Max	The maximum recorded Sensor value % since last log reset	
Min	The minimum recorded Sensor value % since last log reset	
Delay	Dynamic switch delay time indication	
Temp	Measured temperature inside the Sensor	
• Normal • Failed	• Unit in normal operation • Unit is in failsafe condition	
Signal	Signal strength measured in Hz. This value increases during faster movement	
Gain	Gain% applied. This is set via the 'Sensitivity' parameter.	
Noise	Noise interference in V - Noise from interfering received frequencies or along the communications wiring.	

Main Menus & Interface

Note: Parameters may vary depending on older software revisions



CAL **Select / Edit / Save**

RUN **Run / Return / Escape**

Scroll up / down

Quickset Menu - Parameters

Parameter	Description	Options
Sensitivity	Sensitivity to movement. This is the primary setup parameter. The higher the value the easier it is for the system to detect movement.	0-100%
Switch Point	For the level relay to switch to state , the Sensor value must exceed this SW On % for the duration of the on delay time.	Switch Off% will default to 2/3rds of this value
On Delay Adj	Set on delay time for the first relay.	• Adjustable in seconds
Off Delay Adj	Set off delay time for the first relay.	• Adjustable in seconds
Relay1Action	Adjust the Relay action to be energised or de-energised during normal operation	• FailSafe Hi • FailSafe Low
Lock Code	Set a lock code to prevent unauthorised access	• Default 0

Advanced Menu - Parameters

Parameter	Description	Sub Menu
Switch Mode	• Auto - Switch On% set in Quickset, Switch Off% automatically configured • Manual - Manually adjust Switch On and Switch Off % • Off - Switch mode disabled in Analog (Density) mode	• Switch On% • Switch Off%
Relay2Action	Set Relay2Action as one of the below: • **Failsafe** - Relay2 triggers on failsafe conditions • **Relay2** - Mirrors Relay1 action to act as a second / backup relay for the system	
View Log	View measured max/min values log	
Reset Log	Re-set log	
Comms Type	Adjust baud rate and Device ID. All GSA units by default include Modbus.	• DeviceNet (not functional) • Profibus (not functional) • HART (not functional) • Modbus
Back Light	Turn on / off LCD backlight	
Operating Mode	• Remote: Default setting for standard remote system • Master: Set system to Master mode for 2 system anti-crosstalk • Slave: Set system to Slave mode for 2 system anti-crosstalk	For further information see 'Cross Talk Prevention / Sequencer Wiring' section
Display Span		
Probe Avg	Probe Avg is a output damping parameter. Increase to smooth out unwanted fluctuations or instability.	
LoadDefaults	Reset system to defaults (amplifier and/or sensor)	
InputVolChk	Used for power related failsafe. When active the unit will switch to failsafe mode if input voltage drops below required power. When not active unit will display 'Input Voltage too low' on the display if input voltage drops below required power.	

Integral Receiver Test Switch Functions

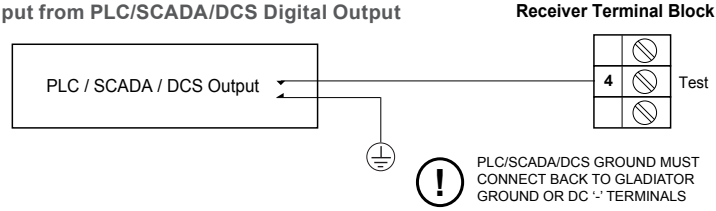
The test terminal has two potential modes of operation for Integral units and always operates in the test input mode for Remote units. Remote units have a separate, failsafe relay contact, which is always functional.

Test Input Mode

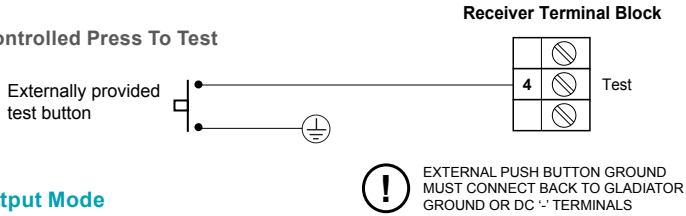
Test Switch: ON

Test terminal acts as an input for remote testing of the instrument's switching function. Used to check for malfunction of unit from a remote position, PLC, SCADA etc.

Test Input from PLC/SCADA/DCS Digital Output



Operator Controlled Press To Test

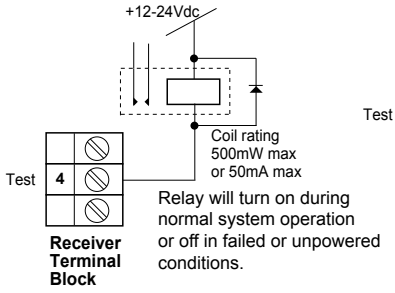


Failsafe Output Mode

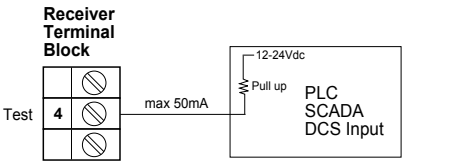
Test Switch: OFF

Test terminal will provide an output which is able to switch an external failsafe relay or PLC/SCADA/DCS input. During normal system operation this terminal will internally switch a solid state (transistor) output to ground (or DC '-'). If power fails or an internal system failure occurs, the terminal will act as an open circuit.

To switch an external relay



To a PLC input



Input will detect '0' state during normal system operation, or '1' in failed or unpowered conditions.

Troubleshooting

Unit not responding to movement

• Increase Sensitivity and reduce Switch Point. The system should will detect a moving hand very easily

• Ensure the sensor face is as close to the application movement as possible

• If the system is operating correctly increase 'Probe Avg' to create a smoother displayed value.

• Check for build up or obstructions

If the system does not respond to pressing the 'Test' button

• There may be a potential hardware fault.

• First confirm wiring runs are correct (see Error 01 codes for further information on wiring checks).

• Swap our hardware with functional spare or remove hardware and perform isolated bench test on the units.

Relays & LCD intermittently dimming and dropping out.

• Check incoming voltage with a multimeter in line. Confirm it is as per Specification

• If the unit is AC powered put a multimeter over the DC +/- terminals. The unit generates a diagnostic DC voltage in these terminals. If powered by AC. This should read at least 8V consistently.

• If this is unstable and dropping below 7V while your incoming AC is stable there is likely a problem with the internal power supply. Contact your local distributor or HAWK.

Error Codes

Error 01:

- Amplifier/Transmitter can not communicate with sender/receiver.
- Error No 01 is displayed on power up with a reset loop or after unit has successfully operated and subsequently failed.
- Check wiring terminals for a loose or incorrect connection (including junction box / cable extensions).
- Check the cables for any signs of damage.
- Ensure any customer supplied cable meets HAWK specifications.
- Ensure correct power is applied to the correct terminals. DC only version units will not support AC.
- Use a multimeter to check voltage supply for the Remote Sender & Receiver on the red/black labeled terminals of the Amplifier. You should get approximately as below:

Remote Sensor 9-10VDC

- Disconnect Sender and Receiver from amplifier and use a multimeter to check kohm resistance values (approximate) across the following wires.

- White: Blue 27-32kohm
- Black: White or Blue 13-16kohm
- Brown: Blue or White 70-80kohm
- Brown: Black 60-70kohm

Error 02:

- Error Codes can also indicate communication data failures or corruption between Amplifier and Sender/Receiver.
- Ensure any junction box / wiring extensions are as per HAWK wiring guide. Make sure wiring is correct especially look to the screen (earth).

Error 03:

- Incorrect comms protocol selected in software (eg Profibus, FF). GSA units are only available with Modbus

Error 04:

- Amplifier is programmed with incorrect software. Contact your local support.

FCC Regulations

Qualifications

The Federal Communications Commission imposes strict requirements on radiating sources.

This unit is tested to, and meets these requirements, which include operating frequency and stability, harmonic and spurious generations and power output.

The HAWK Gladiator Microwave System complies with FCC Rules Part 15 for industrial controls. No licenses or approvals are required to use the system.

Requirements

(A) OSHA - 10mW/cm2of radiated power.

(B) ANSI - 5mW/cm2 of radiated power.

The HAWK Gladiator Microwave Systems have approximately 20µW/cm2 of radiated power.

Note: The HAWK Microwave Systems are well below the stringent safety standards required by both the above governing bodies. It is regarded as a SAFE level control and may be used with no special precautions.

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
X 2 x SPDT Relays & 4-20mA output
E 2 x SPDT Relays & Ethernet TCP/IP

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

GSA	S	U	S

Remote Sensor

GDMR Gladiator Doppler Microwave Remote

Frequency
1 10.525 GHz

Transducer Facing Material Selection
0 UHMW Polyethylene
1 PTFE Teflon

Transducer Housing Material
1 Aluminum / Mild Steel
2 316L Stainless Steel

Output Option
X Not Required - Outputs generated from GSA amplifier

Approval Standard
X Not Required

GDMI	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

Lengths above 100m available via special order

Integral Version

GDMI Gladiator Doppler Microwave Integral

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 Aluminum / Mild Steel
2 Full stainless steel

Output Option
X Not Required for Sender units
S 1 x SPDT relay with Modbus

Approval Standard
X Not Required

GDMI	B	1	0	1	S	X

Accessories

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

MD series includes Locking Ring

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 4 - A

MD Series Mounting Accessories - Parts

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

BASE - MD3 - A

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

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

[1]X = Material Selection

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
- <3VA @ 115VAC
- <5VA @ 240VAC

Relay Output: (1) Integral (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.

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

- Integral Sensors IP66/67
- Remote Sensors IP66/67
- Remote Electronics IP65 (NEMA 4x).

Cable Entries

- Remote Sensors: 1xM20 Gland / 3/4" NPTF threaded adapter
- Remote Amplifier: 4x20mm (0.8"), 1x16mm (0.6") knock outs
- Integral Units: 2xM20 Glands / 3/4" NPTF threaded adapters.

Mounting

- 3" 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
- Waveguides - custom assemblies available for high temperature and limited access applications.

Weight

- GSA 1kg
- GDMR 5kg
- GDMI 5kg

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 not only feel comfortable with our technology, but also to ensure a consistent and reliable solution is in place for the long term. 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.

Remote Innovation

HAWK understands the need for immediate technical assistance.

The HAWKLink 3G communication device allows any computer with Internet access and our free GosHawk diagnostic & calibration software; to dial in, calibrate, test, and check the performance of HAWK products. This innovative system allows our Global Support Team to assist with commissioning and after sales service of HAWK equipment worldwide. Measurement problems are addressed as they happen; not days or weeks later.

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 plus years of level measurement experience, and ensure that your day to day processes are efficient, understood, and always working.

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