Data Sheet

Gladiator
Acoustic Switch & Auto Spray Cleaner
Non-contact Self Cleaning Blocked Chute Detection

For more information, please visit >
www.hawkmeasure.com
Principle of Operation

The Gladiator Acoustic Switch uses Acoustic Wave technology in a new Sender / Receiver form for blocked chute detection and anti collision for heavy machinery. The Gladiator Amplifier powers two AW Transducers which use special HAWK developed software where both units pulse and receive each other’s Acoustic echoes. When the path between the Transducers is blocked, the units immediately detect the presence / absence change of the return signal and trigger a communications relay for indication or control purposes. The Transducers work both together and independently to detect pulse interference giving twice the application security.

HAWK’s Acoustic Wave Transducers are self cleaning. The Acoustic Switch is designed for continuous operation in dusty, wet environments where other technologies fail. The power of each pulse (pressure wave) blows the water, moisture and build-up off the face of the diaphragm.

Typical Uses

• Blocked chute detection in wet or dry environments
• Wet screen blocked chute detection
• Nucleonic / tilt switch replacement
• High level alarm / Low level alarm
• Truck / machine detection
  (ROM bins, Primary Crusher Dump Pockets)
• Sewage sludge handling
• Point level switch.

Function

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

Primary Areas of Application

• Brewing
• Cement
• Chemical
• Fertilizer
• Food & Beverage
• Glass
• Mining & Metals
• Packaging
• Paper
• Pharmaceutical
• Plastics
• Refining
• Sugar
• Water & Wastewater
• Sewage Sludge
• Power Generation (coal fired).

Features

• No contact with the product required
• Self cleaning transducers
• Heavy duty titanium version available
• Designed for dusty, wet environments
• LCD setup / diagnostics on remote amplifier
• Simple ‘1-minute’ setup
• 2 Relay outputs
• Adjustable ON and OFF delays
• Remote 3G connection option & support
• Remote amplifier to sensor separation up to 500 meters (1640ft).
Our on-going commitment is to provide **Industry Leading Technology** and **Cost Effective Solutions**.
Typical Applications
Gladiator Acoustic Switch Series

Process Protection - Blocked Chute

Bulk Solids
- Material flow blockage detection
- Designed for wet & dusty environments
- Self cleaning Transducers dislodge & prevent build up
- Heavy duty Titanium version for product impact resistance
- Apron Feeder
- Reclaim conveyor blocked
- Jam protection
- Slurry
- Sludge product
Remote Amplifier

Remote Transducer with Spray Cleaner

With GAWSLV-3-X and FA4A-4 Flange

Remote Transducer

With FA4A-4-ASC Flange

Mounting Flange

**STANDARD 4" ANSI FLANGE DIMENSIONS**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>FLANGE TYPE</th>
<th>A (PCD)</th>
<th>B (OD)</th>
<th>C (Hole)</th>
<th>No. Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>FA4</td>
<td>190.5</td>
<td>228</td>
<td>19</td>
<td>8</td>
</tr>
</tbody>
</table>

Sensor face threaded to end of steel thread (10mm cavity)

Spray Sleeve ISOVIEW FOR REFERENCE ONLY

Dimensions

Gladiator Acoustic Switch Series
Dimensions / Mounting

Gladiator Acoustic Switch Series

AWRT-JB Junction Box

![Diagram of AWRT-JB Junction Box dimensions and mounting options]

Typical Mounting

With GAWSLV-3-X UHMW sleeve and FA4A-4 Flange

With Spray Cleaner and FA4A-4-ASC Flange

Adjustable Flange Range

Minimum Range

400mm (15.8”)
System Information / Wiring
Gladiator Acoustic Switch Series

System Components

Amplifier

Junction Box

Acoustic Switch 15kHz Remote Transducers with UHMW sleeve and Flange

Acoustic Switch 15kHz Remote Transducers with Spray Sleeve and Flange

Gladiator Remote Amplifier Wiring

Solenoid wiring for Spray Cleaner

Use long nose pliers to extract terminals

“AC-In is replaced by 36-60VDC with Power Input Option ‘C’.

AWRT-JB-01 Junction Box

Connect colour to colour

AMP TX1 TX2

RED BLACK BLUE WHITE

RED BLACK BLUE WHITE

RED BLACK BLUE WHITE

RELAY 1 RELAY 2

RELAY 1 RELAY 2

RELAY 1 RELAY 2
Overview

Gladiator Acoustic Switch Series

GAWC-SYS1 Acoustic Cleaner Components

Note: Full cleaner package GAWC-SYS1 includes all converters, reducers, connecters, 30m of 12mm tube, 20m of 6mm tube, solenoid and FAA4-4-ASC flanges. It does not include other electronics (transducers, amplifier, junction box).

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Solenoid</td>
<td>GAWC-SL</td>
</tr>
<tr>
<td>B 0.5” to 4 x 1/4” connector</td>
<td>GAWC-4P</td>
</tr>
<tr>
<td>C1 Hawk Transducer</td>
<td>AWRT15_______AS*</td>
</tr>
<tr>
<td>C2 Cleaner Sub-assembly</td>
<td>GAWC-X</td>
</tr>
<tr>
<td>D1 Ø 12mm tube</td>
<td>GAWC-12MMLz</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>D2 Ø 6mm tube</td>
<td>GAWC-06MMLz</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

z = Specify length in metres

*Consult Acoustic Switch datasheet for full transducer part numbering

Max. water pressure 14bar (1400kpa)
Min. water pressure 1bar (100kpa)

Wiring Diagram for Solenoid Plug Socket
1N4004 Diode
System Overview
Gladiator Acoustic Switch Series

GAWC-SYS2 Acoustic Cleaner Components

Note: Full cleaner package GAWC-SYS2 includes all converters, reducers, connectors, 30m of 12mm tube, 20m of 6mm tube, solenoid and FAA4-4-ASC flanges. It does not include other electronics (transducers, amplifier, junction box).

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Heavy Duty Burkett Valve &amp; Solenoid</td>
<td>GAWC-SL2</td>
</tr>
<tr>
<td>B 0.5&quot; to 4 x 1/4&quot; connector</td>
<td>GAWC-4P</td>
</tr>
<tr>
<td>C1 Hawk Transducer</td>
<td>AWRT15_______AS</td>
</tr>
<tr>
<td>C2 Cleaner Sub-assembly</td>
<td>GAWC-X</td>
</tr>
<tr>
<td>D1 Ø 12mm tube</td>
<td>GAWC-12MMLz</td>
</tr>
<tr>
<td></td>
<td>Supplied in single piece</td>
</tr>
<tr>
<td></td>
<td>Total length = distance of part A to part B x 2</td>
</tr>
<tr>
<td></td>
<td>(one length per transducer)</td>
</tr>
<tr>
<td>D2 Ø 6mm tube</td>
<td>GAWC-06MMLz</td>
</tr>
<tr>
<td></td>
<td>Supplied in single piece</td>
</tr>
<tr>
<td></td>
<td>Total length = distance of part B to part C x 8</td>
</tr>
<tr>
<td></td>
<td>(Four equal lengths per transducer)</td>
</tr>
</tbody>
</table>

\[z = \text{Specify length in metres}\]

Max. water pressure 16bar (1600kpa)
Min. water pressure 1bar (100kpa)

Wiring Diagram for Solenoid Plug Socket
1N4004 Diode
Remote Amplifier

GSA  Remote Gladiator System Amplifier

Housing
S  Standard polycarbonate electronics housing

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

Output Options
S  Switch, 1 level relay, 1 failsafe relay, with Modbus

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

Mounting Flange

FA4A-4  HAWK 4” ANSI flange with decoupled connection flange for acoustic switch sleeve

FA4A-4-ASC  HAWK 4” ANSI flange with decoupled connection flange for spray cleaner sleeve

Remote Transducer

AWRT  Acoustic Wave Remote Transducer
15  15kHz for applications with heavy duty self cleaning requirements

Transducer Diaphragm / Sleeve Material
T  Teflon / UHMW (applications suitable for Teflon (no sensor face wear))
Y  Titanium face / UHMW (applications with possible sensor face wear eg crushers)

Transducer Housing Material
4  Polypropylene

Thread Standards for End cap
X  Not Available

Mounting Thread
X  15kHz - GAWSLV-3-X sleeve mounted (3.5” BSP thread to suit FA4A-4 flange)

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

Connection
C  IP68 Sealed unit with cable

Cable Length
15  15m cable (standard)
30  30m cable

Accessories
X  UHMW sleeve

Software Options
AS  Gladiator Acoustic Switch

Junction Box

AWRT-JB-01  HAWK multi purpose junction box for dual transducer applications

AWRT-JB-06  HAWK multi purpose junction box for dual transducer applications with 6m cable

Extra Cable (Length in metres)

CA-TXCC-R-
C15
C30
C50
C100

Hazardous area approvals and intrinsically safe options available, contact your local distributor or head sales office for further information.
Cleaning System (GAWC-SYS1)

GAWC-SYS1 cleaner package consists of
- GAWC-X
- GAWC-SL
- GAWC-4P
- GAWC-12MML
- GAWC-06MML

Cleaning System Mounting Flange

FA4A-4-ASC

Cleaning System (GAWC-SYS2)

GAWC-SYS2 cleaner package consists of
- GAWC-X
- GAWC-SL2
- GAWC-4P
- GAWC-12MML
- GAWC-06MML

Z = specify pipe length in metres

See ‘GAWC-SYS1 or 2 Acoustic Cleaner Components’ for length requirements

Water Pressure
- Minimum: 1bar (100kpa)
- Maximum: 14bar (1400kpa) (GAWC-SYS1 with Festo valve)
- Maximum: 16bar (1600kpa) (GAWC-SYS2 with Burkett valve).

Water Quality
- System requires good water quality. Install filter if required.

Water Usage
- Approximately 200ml per second per transducer (water pressure dependent).

Solenoid coil MD-2-24VDC-PC - #549903

<table>
<thead>
<tr>
<th>Feature</th>
<th>Values</th>
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<tbody>
<tr>
<td>Assembly position</td>
<td>Any</td>
</tr>
<tr>
<td>Switching position indicator</td>
<td>No</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>100%</td>
</tr>
<tr>
<td>Characteristic coil data</td>
<td>24V DC: 6.8W</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20...50°C</td>
</tr>
<tr>
<td>Max. tightening torque for fitting</td>
<td>0.5 Nm</td>
</tr>
<tr>
<td>Product weight</td>
<td>110 g</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>Per DIN EN 175301-803</td>
</tr>
<tr>
<td>Mounting type</td>
<td>With knurled nut</td>
</tr>
<tr>
<td>Material information, solenoid coil</td>
<td>Duroplast</td>
</tr>
<tr>
<td></td>
<td>Copper</td>
</tr>
<tr>
<td></td>
<td>Steel</td>
</tr>
<tr>
<td>Material information, coil</td>
<td>Copper</td>
</tr>
</tbody>
</table>
Specifications

**Gladiator Acoustic Switch Series**

### Operating Voltage
- 12-30VDC (residual ripple no greater than 100mV)
- 90-260VAC
- 36-60VDC.

### Power Consumption
- <0.8W @ 24VDC
- <6W @ 48VDC
- <5VA @ 240VAC
- <3VA @ 115VAC.

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

### Relay Outputs: (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)
- Remote Transducers: -20°C (-4°F) to 80°C (176°F).

### 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.

### Maximum Range
- Blocked Chutes:
  - Maximum: 15m (50ft)
  - Minimum: 400mm (32”).

### Transducer to Amplifier Separation
- Up to 500m (1640ft) using specified extension cable (Belden 3084A).

### Maximum Operating Pressure
- 2 BAR.

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

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

### 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.

### Mounting
- 15kHz Blocked Chute
  - Transducer 4” ANSI flange with decoupled thread piece
  - Remote Amplifier Back mount, DIN rail mount
  - Pipe Specification: 4-00” Z40 ID = 100mm Black Pipe.

### Typical Weight

<table>
<thead>
<tr>
<th></th>
<th>kg</th>
<th>lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>15kHz Transducer</td>
<td>8</td>
<td>17.6</td>
</tr>
<tr>
<td>Remote Amplifier</td>
<td>1</td>
<td>2.2</td>
</tr>
</tbody>
</table>

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