A Higher Level of Performance

Data Sheet

# Gladiator

## Acoustic Switch Series

Auto Spray Cleaner

## Concept

The Gladiator Acoustic Switch has received a firmware update to utilise the **Relay 2** as a trigger mechanism to notify the user or activate a cleaning system based on time or conditions within the chute which require cleaning.

There are three software options using two diffferent concepts. The first concept is based on total Gain used and the second is based on a Time interval.

The options are located in the **Advanced** menu as a sub menu for **Relay2Action**.

The selectable software options are as follows:

**[Maintnce Chk]** - The unit will switch on the relay when total **Gain** is greater than the **CleanGainHigh** % - the relay will switch off when **Gain** falls below **CleanGain-Low** %.

**[GainOpt Clng]** - When total **Gain** exceeds the **Clean-GainHigh** point the unit activates the relay for 1/2 of the **On Delay** time and then switches off. The unit will then count the **Clean Time** interval time before repeat the process until total **Gain** is below **CleanGainLow** point.

**[TimeOpt Clng]** - At every **Clean Time** interval the unit will switch on the relay for 1/2 of the **On Delay** time and then switch off.

> **Important Note:**
> Relay1Action (Quickset) must be set to FailSafeHigh

## Terminology Reference & Details

**Gain -** Gain is a term used to describe the sensitivity of the unit. When conditions in a chute worsen then unit automatically increases Gain to maintain a full signal between each sensor.

The amount of Gain the unit is using is at any time a viewable diagnostic - While the unit is pulsing press the up or down arrow until the top line reads Gain. It's current value will be also be on the top line.

### Switch On Delay
Delay before activating primary relay (Relay 1). Delay time adjustable in 'Quickset'

### Maintenance Check
Use as a 'pre alarm' that the unit may require cleaning or maintenance.

### Gain Option Cleaner
Use to activate a water spray when the unit is using high amounts of gain to maintain its signal. Use the water spray to clear out crusting and cupping which can form over the sensor face. The spray duration will be half of the switch on delay time to avoid false trips. Recommend at least 3 second switch on delay.
The Clean Time interval is used if the first spray does not result in Gain falling below the low Gain point. The unit will wait for this time period until attempting the next spray.

### Time Option Cleaner
Use to activate a water spray using a timer interval only. The spray duration will be half of the switch on delay time to avoid false trips

## Setup Example - Time Based

In 'Quickset' Set 'On Delay' to 4.0 seconds - this will provide a 2.0 second water blast.

In 'Advanced' set 'Relay2Action to 'TimeOptCln' with a 'Clean Timer' of 30min.

Every 30 minutes the sensors will be sprayed for 2 seconds.

## Setup Example - Gain Based

In 'Quickset' Set 'On Delay' to 4.0 seconds - this will provide a 2.0 second water blast.

In 'Advanced' set 'Relay2Action to 'GainOptCln' with a 'CleanGainHi' of 80%, 'CleanGainLo' of 70% and 'Clean Timer' to 5.0min

This will trigger the water spray for 2 seconds when Gain goes above 80%. The spray will repeat every 5 minutes until Gain goes below 70%. You can view Gain while the unit is running by using the arrow key to locate the diagnostic display
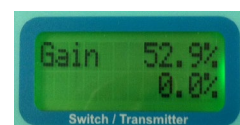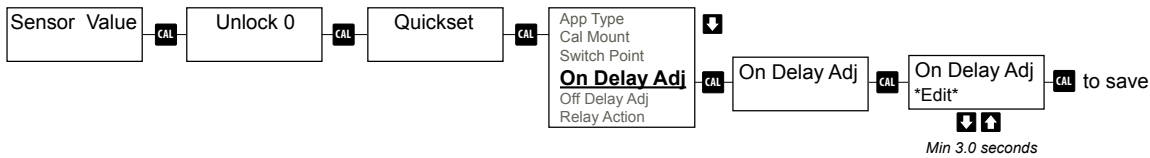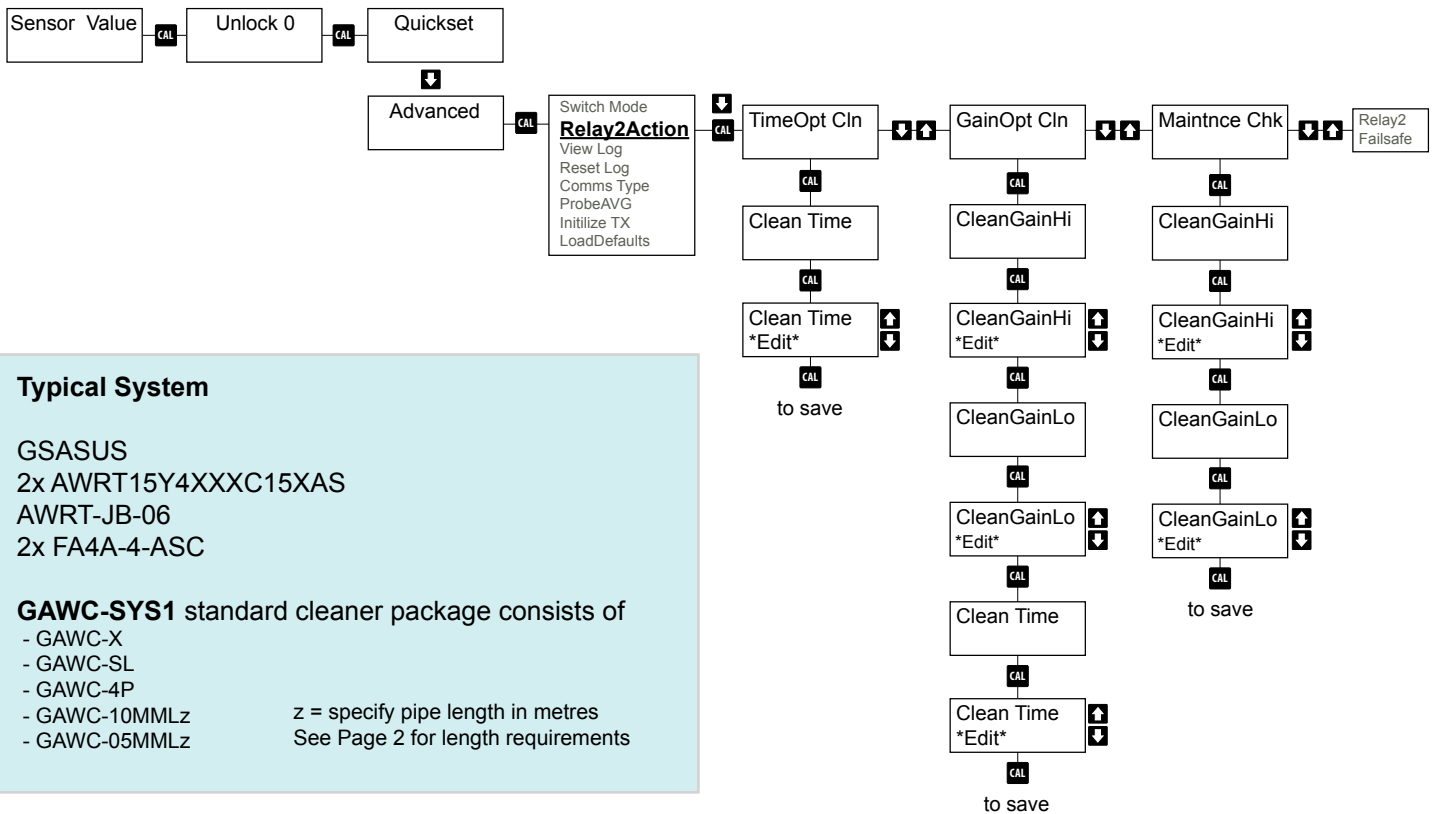
## Internal Software Flow

Note: Requires GSA unit with software revision 7.40 or later

Use **CAL** as select / proceed / save
**Arrows** to scroll between menu options

To set spray duration for Gain and Time options (1/2 of On Delay).



Sensor Value → [CAL] → Unlock 0 → [CAL] → Quickset → [CAL] →

App Type
Cal Mount
Switch Point
**On Delay Adj**
Off Delay Adj
Relay Action

→ On Delay Adj → [CAL] → On Delay Adj *Edit* → [CAL] to save

*Min 3.0 seconds*

To set Relay 2 action for one of Time, Gain or Maintenance options.



Sensor Value → [CAL] → Unlock 0 → [CAL] → Quickset → Advanced → [CAL] →

Switch Mode
**Relay2Action**
View Log
Reset Log
Comms Type
ProbeAVG
Initilize TX
LoadDefaults

→ [CAL] → TimeOpt Cln / GainOpt Cln / Maintnce Chk → Relay2 Failsafe

**TimeOpt Cln**
[CAL]
Clean Time
[CAL]
Clean Time *Edit*
[CAL]
to save

**GainOpt Cln**
[CAL]
CleanGainHi
[CAL]
CleanGainHi *Edit*
[CAL]
CleanGainLo
[CAL]
CleanGainLo *Edit*
[CAL]
Clean Time
[CAL]
Clean Time *Edit*
[CAL]
to save

**Maintnce Chk**
[CAL]
CleanGainHi
[CAL]
CleanGainHi *Edit*
[CAL]
CleanGainLo
[CAL]
CleanGainLo *Edit*
[CAL]
to save

**Typical System**

GSASUS
2x AWRT15Y4XXXC15XAS
AWRT-JB-06
2x FA4A-4-ASC

**GAWC-SYS1** standard cleaner package consists of
- GAWC-X
- GAWC-SL
- GAWC-4P
- GAWC-10MMLz
- GAWC-05MMLz

z = specify pipe length in metres
See Page 2 for length requirements

## Updating Software

The software for the cleaner system was released to production on 9 May 2013. If you update an older you you must:
- Flash the GSA Amplifier
- Run 'Load Defaults' to reset the amplifier to factory default. You will also be prompted to reset the sensors (select yes).
- Press RUN to return re-active the unit operation.
- Perform a power cycle - power down unit and wait 10 seconds before re-powering.

You will need to re-program the unit settings (re-select app type, delay times etc and perform a Cal Mount)
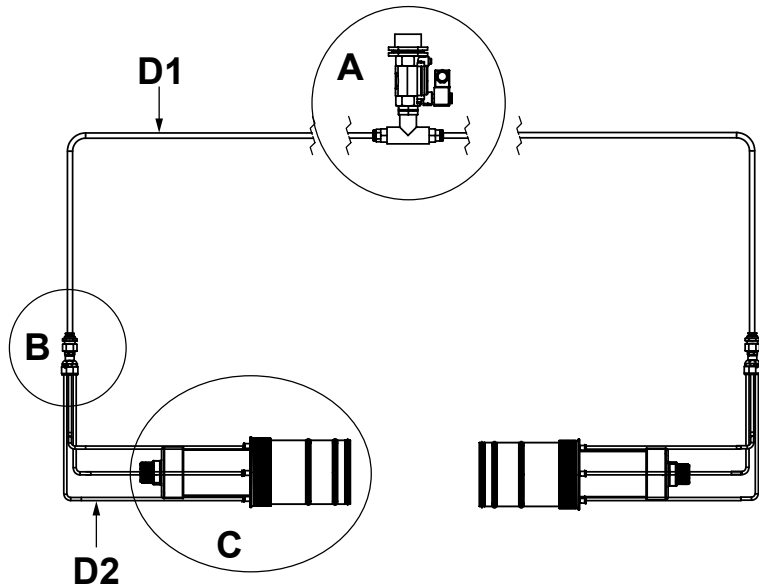
The unit is now ready to be used with the new software.

# Auto Spray Cleaner
## Gladiator Acoustic Switch Series

## System Overview - Hawk Supplied Hardware

**Note:** Full cleaner package **GAWC-SYS1** includes all converters, reducers, connecters, 30m of 10mm tube, 20m of 6mm tube, solenoid and FA4A-4-ASC flanges. It does not include other eletronics (transducers, amplifier, junction box).

| | Part Description | Part Number |
|---|---|---|
| A | Solenoid | GAWC-SL |
| B | 0.5" to 4 x 1/4" connecter | GAWC-4P |
| C1 | Hawk Transducer | AWRT15_____AS* |
| C2 | Cleaner Sub-assembly | GAWC-X |
| D1 | Ø 10mm tube<br>Supplied in single piece<br>Total length = distance of part A to part B x 2<br>(one length per transducer) | GAWC-10MMLz |
| D2 | Ø 6mm tube<br>Supplied in single piece<br>Total length = distance of part B to part C x 8<br>(Four equal lengths per transducer) | GAWC-06MMLz |

z = Specify length in metres

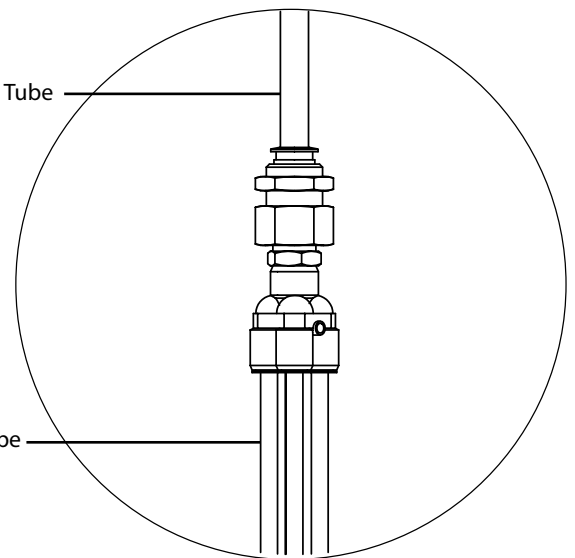\*Consult Acoustic Switch datasheet for full transducer part numbering

### Detail A

1" INT THD on Solenoid
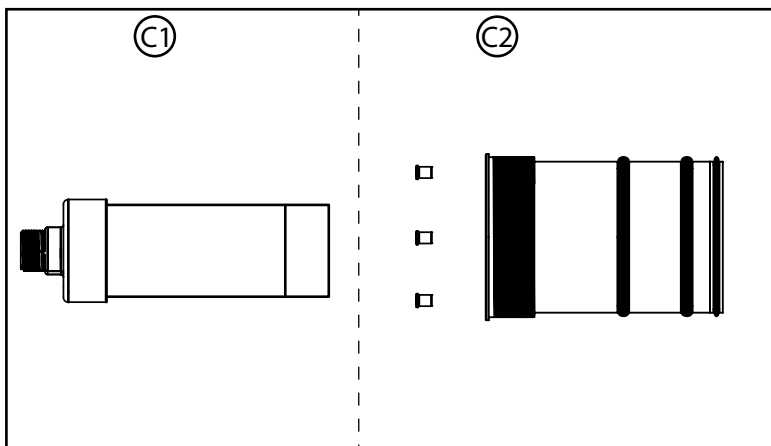Water connection size
determined by end user

Solenoid
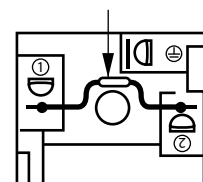Plug Socket
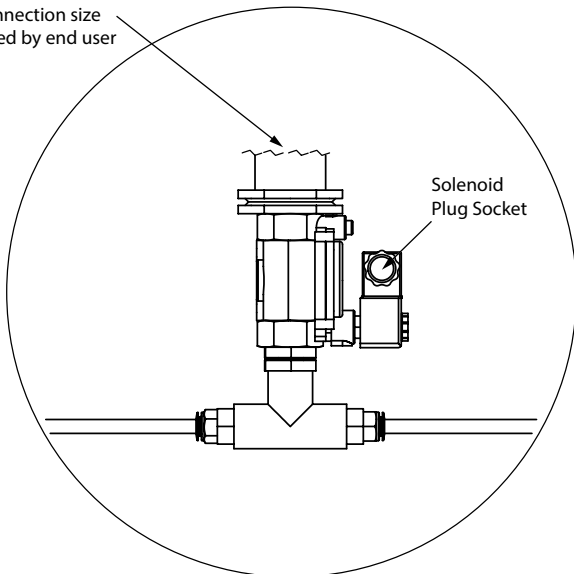
### Detail B

**D1**
Ø10mm Tube

**D2**
Ø6mm Tube

### Detail C

C1

C2

Max. water pressure 6bar (600kpa)
Min. water pressure 1bar (100kpa)
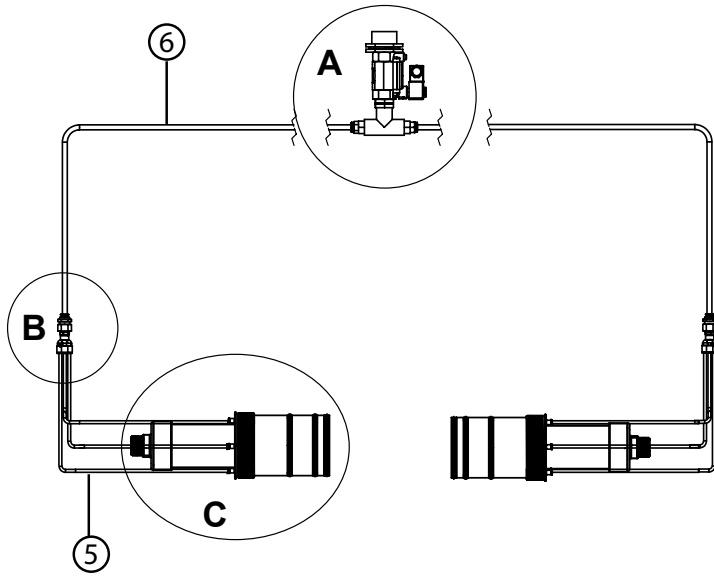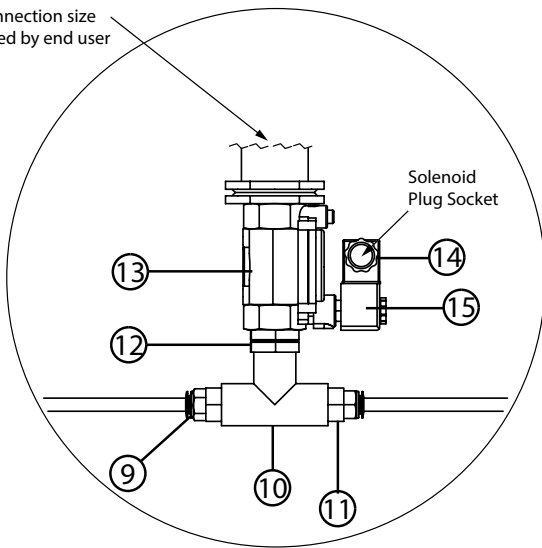
Wiring Diagram for Solenoid Plug Socket
1N4004 Diode

## System Overview - Customer Supplied Hardware



### Detail A

1" INT THD on Solenoid
Water connection size
determined by end user

Solenoid
Plug Socket

### Detail B

Ø10mm Tube

Ø6mm Tube
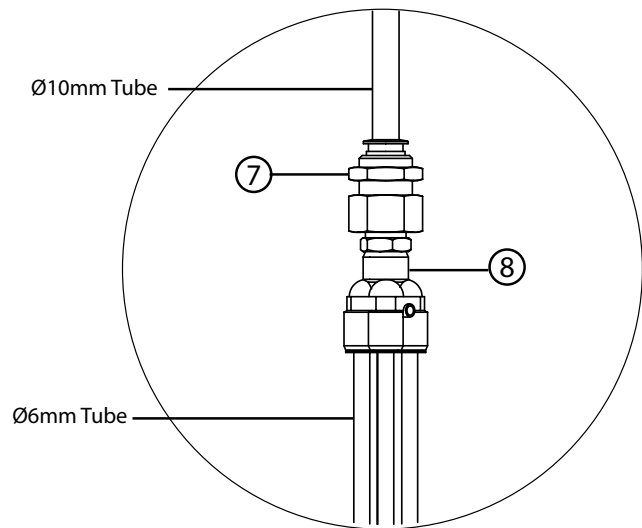
### Detail C
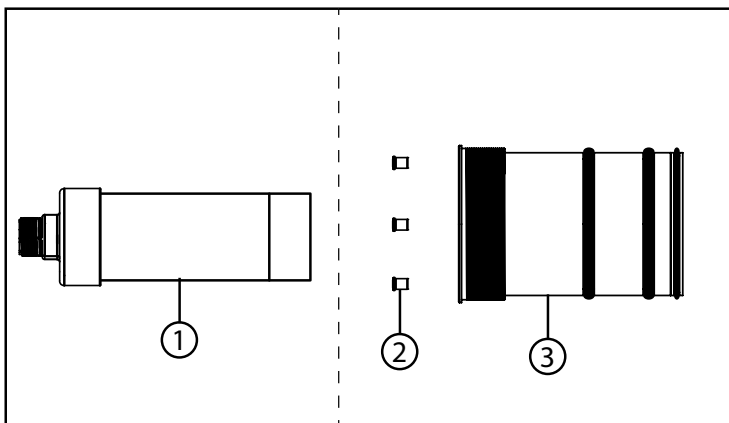
### Bill of Materials

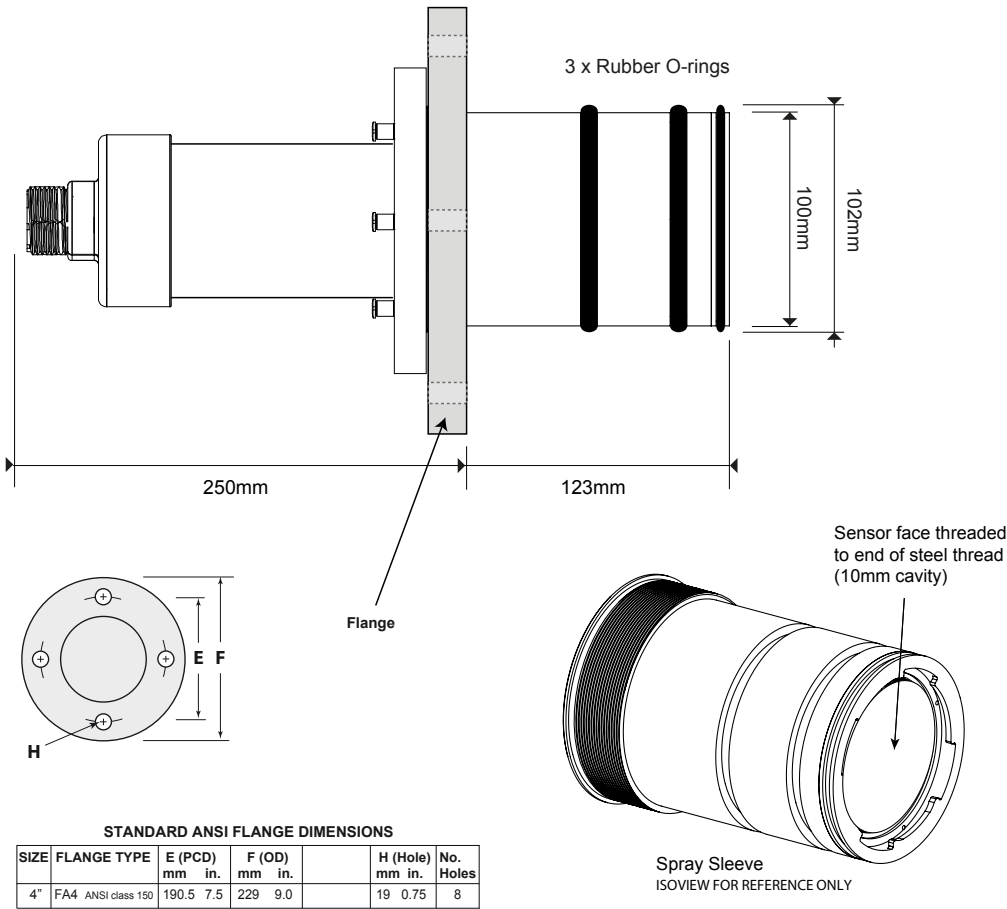| No. | Part Description | Comments | QTY |
|---|---|---|---|
| 1 | Hawk Transducer | Supplier - Hawk | 2 |
| 2 | 153317 QSM-M5-6-I | Supplier - Festo | 8 |
| 3 | Cleaner Cone Nozzle/Sleeve | Supplier - Hawk | 2 |
|  | FA4A-4-ASC Flange | Supplier - Hawk | 2 |
| 5 | 195281 PLN-6X1-SW | Supplier - Festo | Per metre |
| 6 | 195283 PLN-10X1,5-SW | Supplier - Festo | Per metre |
| 7 | 153168 QSSF-1/4-10-B | Supplier - Festo | 2 |
| 8 | 186263 QSQ-G1/4-6 | Supplier - Festo | 2 |
| 9 | 190646 QS-1/2-10 | Supplier - Festo | 2 |
| 10 | SS 1"BSPF Tee | Supplier - Festo | 1 |
| 11 | SS Reducing Bush 1"x1/2" BSPMF | Supplier - Festo | 2 |
| 12 | SS 1" BSPM Nipple | Supplier - Festo | 1 |
| 13 | 546150 VZWM-L-M22C-G1-F4 | Supplier - Festo | 1 |
| 14 | 550067 MSSD-N | Supplier - Festo | 1 |
| 15 | 549903 MD-2-24VDC-PA | Supplier - Festo | 1 |

## Dimensions

3 x Rubber O-rings

102mm

100mm

250mm

123mm

**Flange**

E  F

H

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

Spray Sleeve
ISOVIEW FOR REFERENCE ONLY

**STANDARD ANSI FLANGE DIMENSIONS**

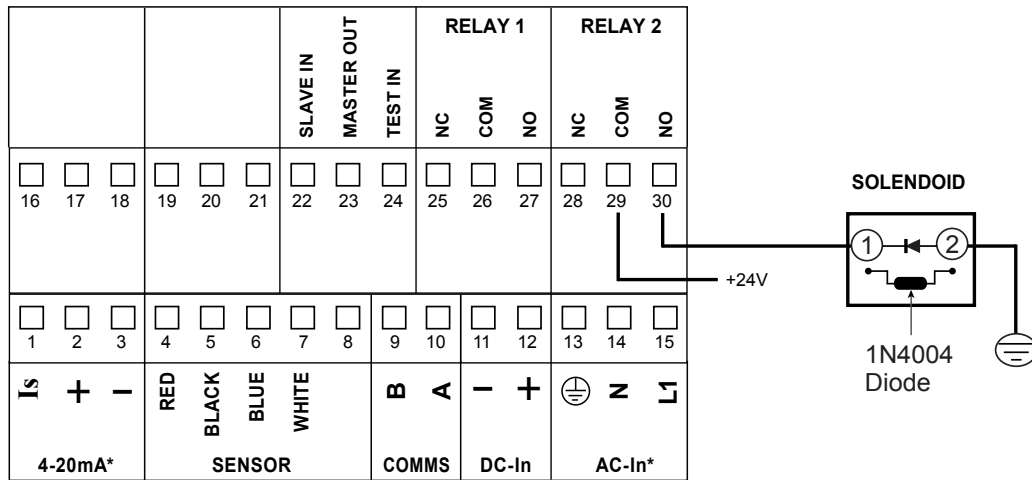| SIZE | FLANGE TYPE | E (PCD) mm   in. | F (OD) mm   in. | | H (Hole) mm  in. | No. Holes |
|------|-------------|------------------|-----------------|--|------------------|-----------|
| 4" | FA4  ANSI class 150 | 190.5  7.5 | 229    9.0 | | 19   0.75 | 8 |

## Mounting Instruction

- Sleeve face should be flush with vessel wall interior
- Sensor face must be within slight cavity of sleeve approx 10mm (end of internal thread)
- Solenoid and 4 way pipe converter should be mounted securely.
- Recommend 4 way pipe converter is kept close to mounting position on transducer - use 1" single pipe for as much distance as possible.
- Use a converter if required to interface with 1" Hawk recommended pipe connection.

## Wiring

### GSA Amplifier

| | | | | SLAVE IN | MASTER OUT | TEST IN | RELAY 1 | | | RELAY 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | NC | COM | NO | NC | COM | NO |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

+24V

**SOLENDOID**

① ▷◁ ②

1N4004 Diode

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Is | + | − | RED | BLACK | BLUE | WHITE | | B | A | − | + | ⏚ | N | L1 |
| 4-20mA* | | | SENSOR | | | | | COMMS | | DC-In | | AC-In* | | |

**Relay 1 -** Output Relay
**Relay 2 -** FailSafe/Cleaner Relay

## Specifications

**FESTO**

## Data sheet: Solenoid coil MD-2-24VDC-PA – #549903
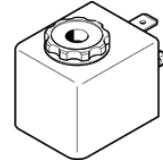
| Feature | values | | |
|---|---|---|---|
| Assembly position | Any | | |
| Switching position indicator | No | | |
| Duty cycle | 100% | | |
| Characteristic coil data | 24V DC: 6,8W | | |
| Permissible voltage fluctuation | +/- 10 % | | |
| Protection class | IP65 | | |
| Ambient temperature | -20 ... 50 °C | | |
| Max. tightening torque for fitting | 0.5 Nm | | |
| Product weight | 110 g | | |
| Electrical connection | Per DIN EN 175301-803 | | |
| Mounting type | With knurled nut | | |
| Material information, solenoid coil | Duroplast | | |
| | Copper | | |
| | Steel | | |
| Material information, coil | Copper | | |

**Water Pressure**

Max: 6bar (600kpa)
Min: 1bar (100kpa)

**Water Quality**

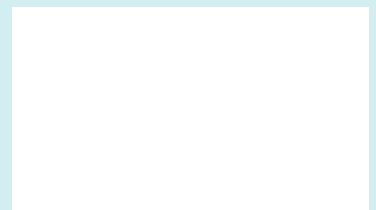System requires good water quality. Install filter if required.

**Water Useage**

Approx 200ml per second per transducer (water pressure dependant)