

### Overview

Frequently the number of discrete alarm points required in a system exceeds the number of controller hardware inputs available or justifiable. In this situation it is often desirable to summarize certain alarms into a single system input. This input will be switched on when the number of monitored alarm contacts reach a defined threshold. The DS8 only alarms when the inputs reach a predefined number.

The DS8 plugs into either the BP2, BP4, BP4V or BP8 backplane. The DS8 accepts up to eight independent dry switch contacts on easy-to-use connectors on the front of the module. Each switch input has an associated LED associated so a quick glance allows the technician to determine which inputs are on. An eight position DIP switch allows you to set the alarm threshold. A switchable NO/NC dry contact is used for the output.

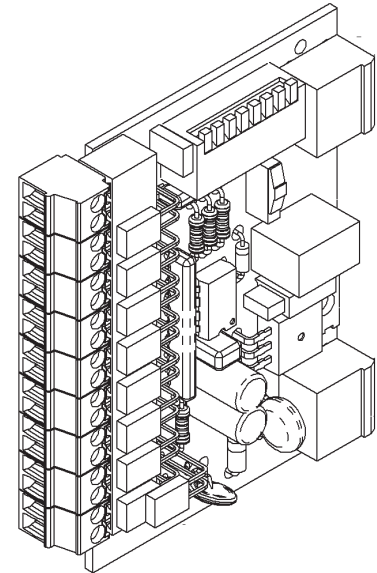


Fig. 1: DS8 - Discrete Summary Module

### Mounting

The DS8 plugs into either a BP2, BP4, BP4V, or BP8 backplane as shown in Fig 2.

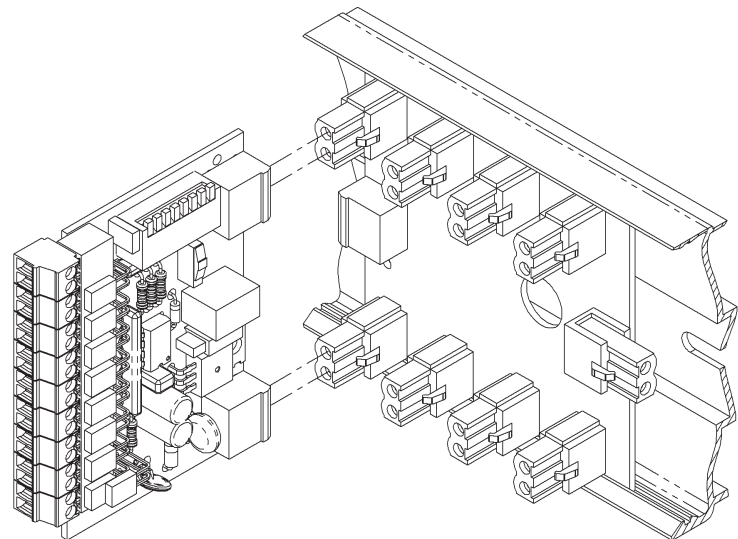


Fig. 2: DS8 module plugging into a BP4 Backplane

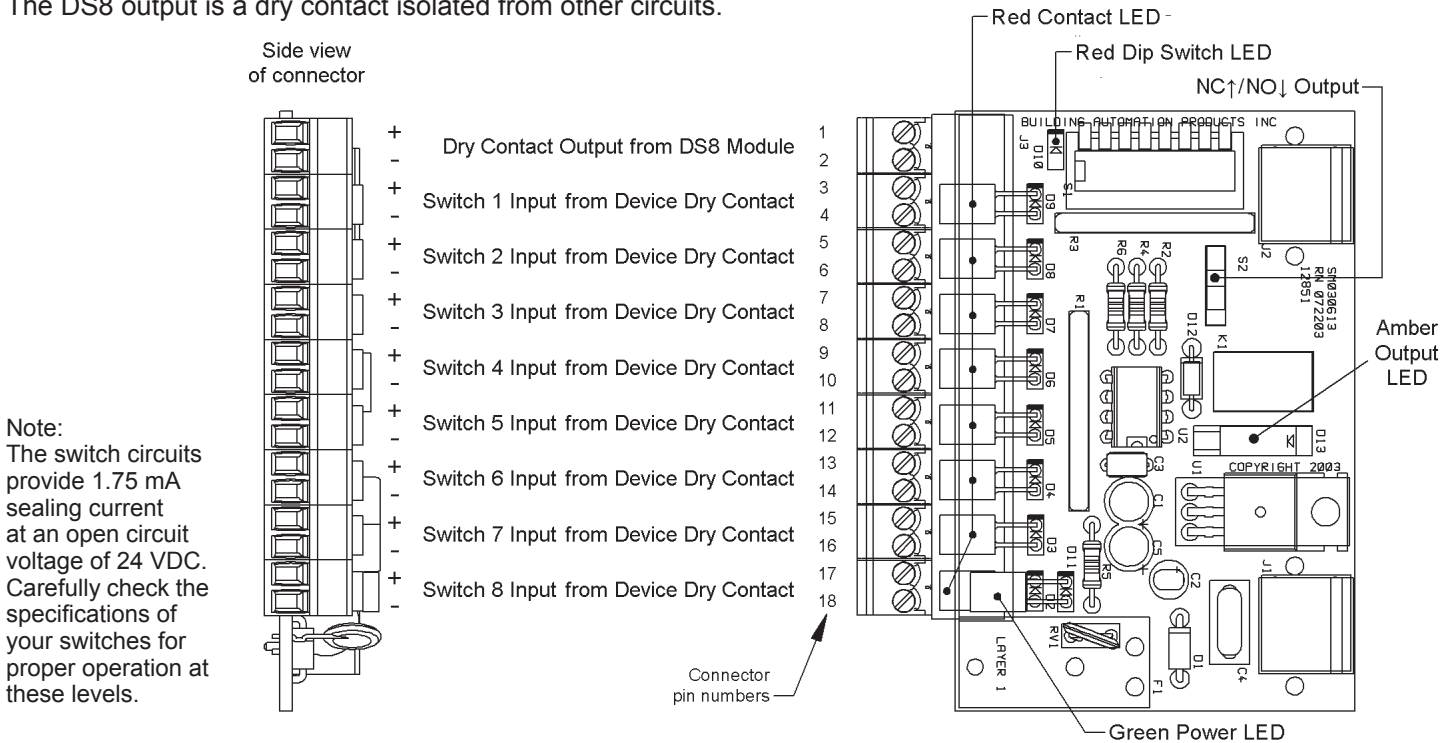
### Specifications

Power Voltage: ..... 24 to 34 VDC or 20 to 24 VAC  
Power Current: ..... 35 mA maximum (1.2VA max )  
Input Sensing Voltage:..... 24 VDC  
Input Sensing Current:..... 2.4 mA  
Output:..... Dry relay contacts, NEC Class 2 circuits only  
Output Current:..... 1 mA to 1 Amp

Specifications subject to change without notice.

### Termination

Switch inputs are dry contacts isolated from other circuits.  
 The DS8 output is a dry contact isolated from other circuits.



Note:  
 The switch circuits provide 1.75 mA sealing current at an open circuit voltage of 24 VDC. Carefully check the specifications of your switches for proper operation at these levels.

Fig. 3: DS8 Component Locator

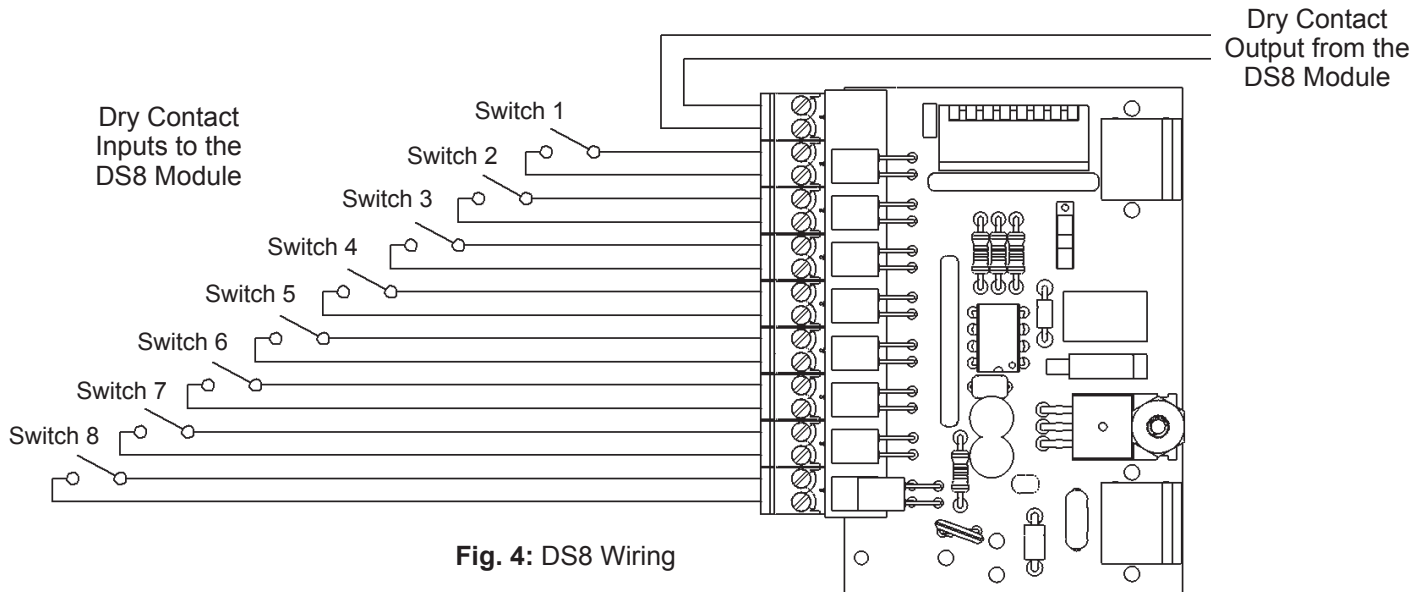


Fig. 4: DS8 Wiring

#### Note on Termination:

The male connectors that plug into the header on the board use rising block screw terminals to hold the wires. It is possible for the block to be in a partially up position allowing the wire to be inserted under the block. Be sure that the male connector screws are turned fully counterclockwise before inserting the wire. Lightly tug on each wire after tightening to verify proper termination.

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### Operation

Each switch input has an associated LED located next to its terminals. When the input switch is closed, the LED will light.

DIP switch S1 sets the output activation threshold (see Table 1). Push each individual switch in toward the circuit board to set it to the ON position. Pull each individual switch out away from the circuit board to set it to the OFF position. (See printing on the switch body.) LED D10 will light whenever any DIP switch is set to the ON position.

The DS8 output will activate whenever the number of closed input switches equals or exceeds the S1 switch setting (see Table 1). It does not matter which input switches are closed, just the total number of them.

The DS8 output is a relay contact across Pin 1 and Pin 2 of main terminal block. Switch S2 determines whether this relay contact is normally closed (NC) or normally closed (NO). When S2's slider is toward DIP switch S1 (UP), the output is normally closed. When S2's slider is away from DIP switch S1 (DOWN), the output is normally open. The amber LED (D13) lights when the output is activated. (See Fig. 3 for location of amber LED.)

The DS8 output relay contacts are rated at 1 Amp at 24 VAC or 24 VDC. Only NEC Class 2 loads are allowed. The contacts are gold-plated silver and may be used to drive circuits of as little as 1 mA.

Note: The switch circuits provide 1.75 mA sealing current at an open circuit voltage of 24 VDC. Carefully check the specifications of your switches for proper operation at these levels.

Number of closed inputs required to activate output	S1 switches in the ON position
1	None or 1
2	1, 2
3	1, 2, 3
4	1, 2, 3, 4
5	1, 2, 3, 4, 5
6	1, 2, 3, 4, 5, 6
7	1, 2, 3, 4, 5, 6, 7
8	1, 2, 3, 4, 5, 6, 7, 8

### Applications

The DS8 is used to summarize multiple dry contacts into one dry contact while displaying which contacts are closed via LEDs on the card. It can be set up to monitor normally open (NO) contacts or normally closed (NC) contacts, but not a mix of both at the same time. The basic purpose is to minimize (expensive) input requirements on controllers while still providing visual indication of the many monitored contacts.

Each module can monitor up to eight input contacts and then provide an output contact if a user-defined threshold of input contacts close. A single module can monitor up to 8 contacts, but multiple modules can be chained together to monitor dozens of contacts. (Note: If a threshold limit is required, then chaining the cards together is not recommended since the threshold can only be set on a per-module basis.)

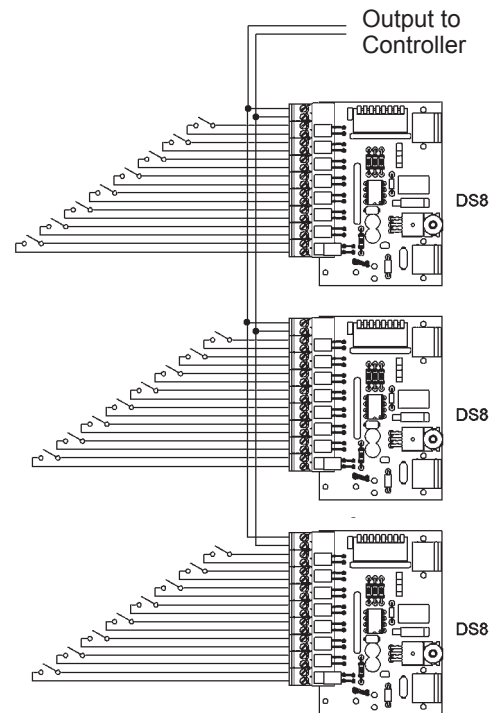
The output contact from the DS8 can be used as an input on many BAPI ETA modules including the MXV, DS6R, SS-AC, IRM4 or PE4. The IRM4 can also be used to invert field contacts from NO to NC, or vice versa, prior to bringing them into the DS8 since all the inputs to each DS8 need to be either NO or NC but not mixed.

#### Many to One Application

The simplest application is where many NO alarm contacts must be monitored (dirty filter statuses, damper end switches, water leak detectors, door contacts, etc.) but only one alarm input to the controller is required. In this case an unlimited number of DS8 Modules could be used with the summary output from each module daisy-chained or wired IN PARALLEL back to the controller input (Fig. 5). If an alarm is received by the controller, a technician can go the control panel with the DS8s and see via the LEDs exactly which alarms triggered the summary output. In addition to the LEDs, having each alarm cable terminated on a separate plug on the DS8 module also aids in troubleshooting.

In the above example with NO input contacts, all the DS8 modules would

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**Fig. 5: DS8 Modules with Outputs Wired in Parallel**

Specifications subject to change without notice.

### Applications continued...

be set up with only one S1 DIP switch set to the "ON" position. In this configuration, no matter how many contacts are monitored, the first one to close will trigger the output.

If the alarm contacts that are being monitored are NC, then the summary outputs from the DS8 modules would be wired IN SERIES back to the controller (Fig. 6). The modules would be set up with as many S1 DIP switches set to the "ON" position as there are inputs wired to the module. If eight contacts are being monitored, then all eight S1 DIP switches should be set to "ON". If only five contacts are being monitored, then five S1 DIP switch should be set to "on". When viewing the DS8 modules in this configuration, the dark LEDs (with input cables connected) would indicate the alarms.

#### "All On" Status Application

The DS8 can also be used to monitor multiple status contacts and give a summary contact output to indicate that they are "All On". This would be similar to wiring all the status contacts in series back to the controller without the DS8 modules. The advantage of adding the modules is that the LEDs will indicate any devices that have failed. Having each status cable terminated on a separate plug also simplifies troubleshooting.

A common "All On" status application is where multiple lighting contactors are controlled by one point, or multiple small fans or other devices are controlled by one point (often using R49 ETA modules). In this application, wire the module outputs in series (Fig. 6) and then set the number of S1 DIP switches to "ON" as there are inputs wired to the module. When all input contacts are on, the output contact to the controller will be on. If one input contact fails, the output contact will turn off.

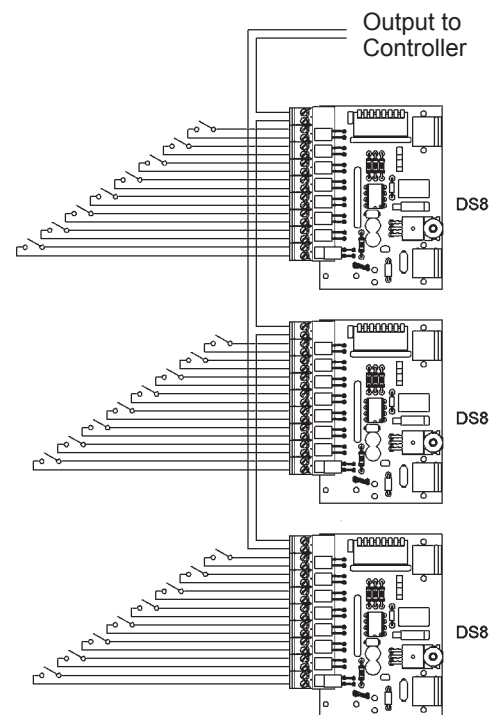


Fig. 6: DS8 Modules with Outputs Wired in Series

### Diagnostics

#### Possible Problems:

Green power LED does not light

Improper output

Switch LED does not light when switch is closed

#### Possible Solutions:

- Check to see that the DS8 Module is firmly inserted into the backplane.
- Check to see if the power cable is firmly inserted into the backplane.
- Check to see that power supply for the backplane is providing the correct power.
- Check to see if the output connector is plugged into the correct position.
- Recheck how many LEDs are on and compare to the S1 switch settings; the output will energize only when the number of input closures equals or exceeds the number of switches in the ON position on S1.
- Check to see if the Normally Open/Normally Closed control S2 is properly set.
- Check to see if the switch connector is plugged into the correct position.
- Check switch for proper operation
- Remove switch wiring from connector and replace with a shorted plug, LED should light.
- Check the return wires (Pins 4, 6, 8, 10, 12, 14, 16 or 18) for voltage.

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