BLOCKsignalling

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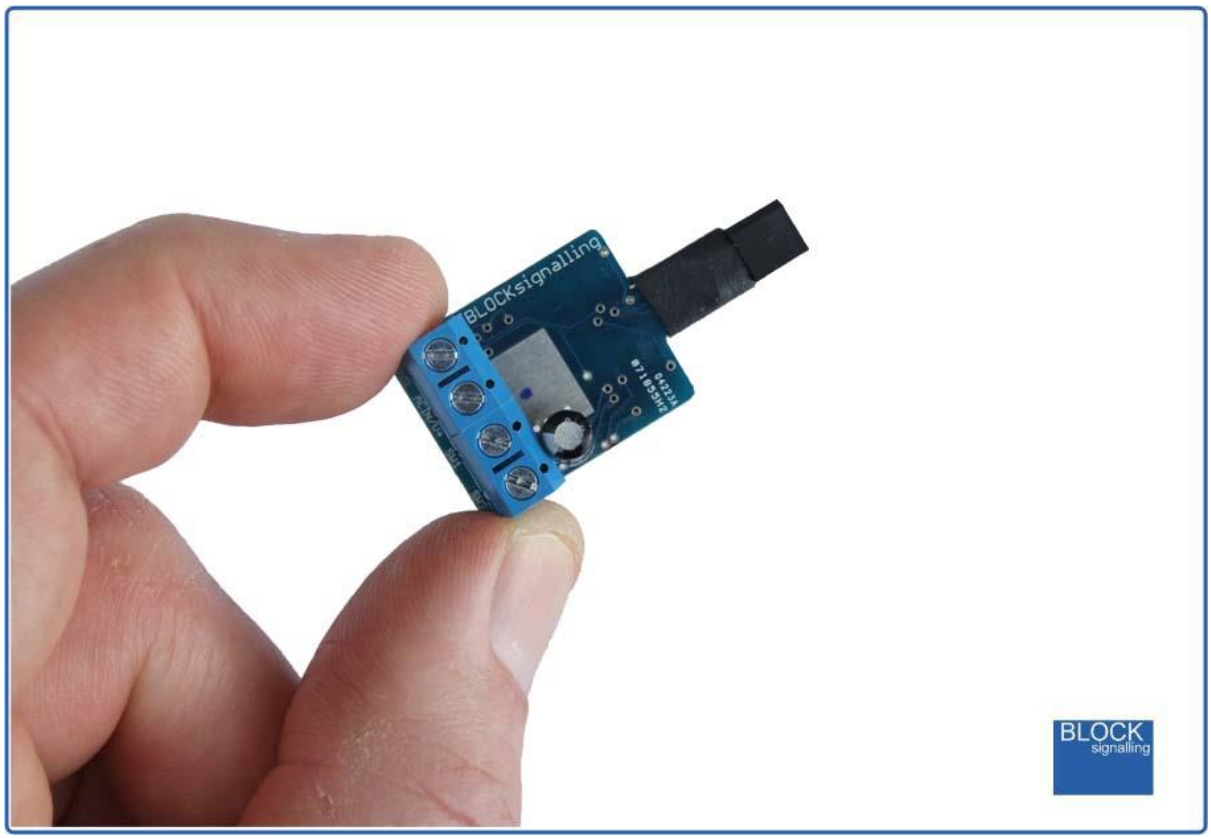
BLOCKsignalling Semaphore Switcher DAP1-NS



- A quick and easy way to add automation to your Semaphore signals.
- Controlling Dapol semaphore signals has never been easier.
- Only 4 wires to connect and you are up and running.
- No soldering or programming required (but you can adjust things if you want to).
- Operates from 9V to 12V DC or 12V to 16V AC.

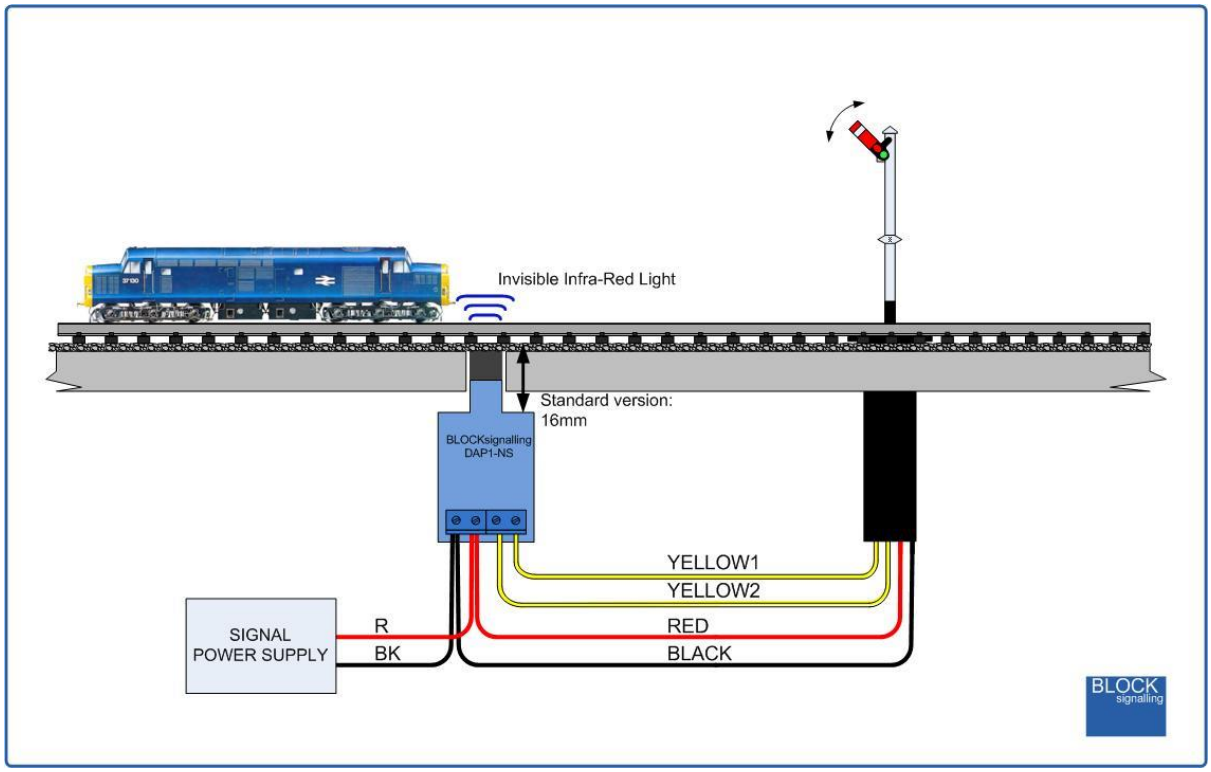
Dapol signals have an actuator in the base which is powered from a 16V AC supply connected to the red and black wires, although many modellers use a 12V DC supply without any problems (just make sure the positive connection is to the red wire otherwise the signal lamp will not light).

To operate the signal the two remaining yellow wires are briefly shorted together using a miniature push-button switch or similar. The DAP1-NS connects to the signal and automates the operation so that when a train passes over the infra-red sensor, the signal is operated.

The four terminals on the module accept the four wires from the signal, with the power feed doubling up on the first two terminals.

Simply drill an 8mm hole through the baseboard between the sleepers and insert the sensor from below (the sensor only needs a 2mm gap to see between the sleepers so there should be no problems with N gauge).

Invisible infra-red light is projected upwards and any trains passing overhead will trigger the circuit and will operate the signal automatically. You can test this by waving your hand over the sensor, and the signal should operate.



Connecting Up

The module has four terminals.

GND This is one side of the AC supply input feeding the module (or the negative feed if a DC supply is being used)

ACIN/V+ This is the other side of the AC supply input feeding the module (or the positive feed if a DC supply is being used)

SW1 This is one side of the switch built-in to the DAP1-NS

SW2 This is the other side of the switch built-in to the DAP1-NS

The module will operate reliably with a power supply in the range of 9V to 12V DC or 12V to 16V AC.

Operation

With the power switched on, the red led on the PCB should flicker rapidly (see the section on Connecting Up if this does not happen).

When first connected, the signal needs to be synchronised to the module. From that point on, the module will remember the signal position, even when the power is switched off.

If the signal is not synchronised, press the push button on the PCB, and the signal will be switched to the opposite state (note: this is only possible when the module is powered up and waiting for a train to arrive).

If the signal is currently clear (the signal arm is not horizontal) then press the push button on the PCB to change the signal to danger, with the signal arm horizontal.

If a train now passes over the sensor, or you wave your hand close to the sensor, the led on the PCB should stop flickering for one second, and the signal should move.

The PCB led now flickers at a slower rate, and this indicates that the module is now looking for the end of the train to clear the sensor. Gaps between carriages of up to 4 seconds are ignored (see the programming section below if you want to adjust this).

Once it is determined the train has completely cleared the sensor, there is a final short delay (also programmable if you wish) before the PCB led is extinguished for one second and the signal returns to its original state.

Programming

The module will operate the signal straight out of the packet. There is no need for any programming, but if you want to adjust some of the settings, it is possible to reprogram individual settings to suit.

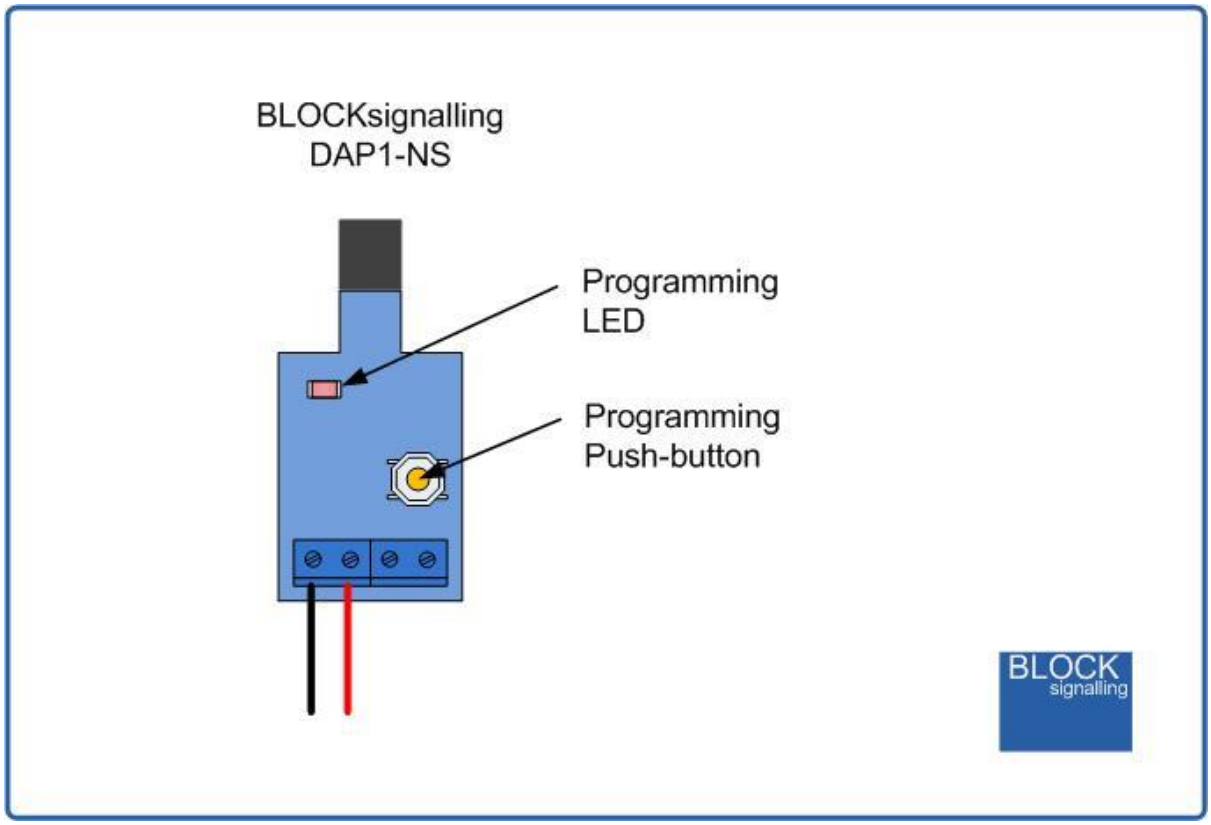
Programming is performed holding down the Push Button when switching on the power.

The red led on the PCB flashes at 1 second intervals. When the required number of flashes is seen (see later for the list of possible choices) the button is released to store the first value. At this point the led comes on for five seconds to confirm the value is stored.

The led then starts flashing again, and this time the button needs to be pressed to store the second value.

Once the two values to be stored are entered, the led flashes 10 times rapidly, and the module starts operating.

Most values entered can range between 1 and 255 (see below for limits). If more are seen, or the programming is aborted by switching off, then the programming must be repeated.



Selecting Clear Approach Signalling (Default Mode)

This is the default mode when the module is delivered.

In this mode, the signal is normally in the Danger position.

As the train approaches the signal and crosses the sensor, the signal is switched to Clear by the module. Some time later (adjustable) the signal returns to Danger.

To select this program, switch off the power to the module and hold down the Push Button. Apply the power and continue holding the push button until 2 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 2 flashes press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the will start running the program. If you make a mistake programming, simply repeat the process.

Factory Reset

To reset the module back to factory settings, switch off the power to the module and hold down the Push Button. Apply the power and continue holding the push button until 1 flash of the led is seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 1 flash press the button. You will see a long flash of five seconds and then 10 rapid flashes. The reset procedure is then complete and the module will restart with factory settings, and run the lamp test mode. If you make a mistake programming, simply repeat the process.

Adjusting the “Return to Danger” Time

The duration that the signal remains Clear once triggered is adjustable by setting parameter 3. So for instance if you wanted the signal to be at Clear for 6 seconds once the train has passed, then set parameter 3 to a value of 6.

The full procedure is as follows:

Switch off the power to the module and hold down the Push Button. Apply the power and continue holding the push button until 3 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 6 flashes press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the will start running the program. If you make a mistake programming, simply repeat the process.

Adjusting the Release Time

When a train with multiple carriages passes over the sensor, each gap between the carriages will be seen by the sensor. Normally, the sensor must be clear for 4 seconds for the module to sense the train has cleared the sensor completely.

This delay is adjustable from 1 to 255 seconds by setting parameter 6 to the number of seconds required. So, if it is required for the sensor to be uncovered for 7 seconds before it is confirmed the train has fully cleared the sensor, then set this parameter to 7.

The full procedure is as follows:

Switch off the power to the module and hold down the Push Button. Apply the power and continue holding the push button until 6 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 7 flashes press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the will start running the program. If you make a mistake programming, simply repeat the process.

Note: once the sensor has been cleared, and the release time has expired, then the red time needs to expire before the signal returns to green and can be triggered again.

Sensitivity Setting

The module is supplied with the sensitivity pre-set to suit most installations and should not need adjustment.

In locations such as tunnels, or when the module is not being used under the track bed, then it may be desirable to adjust the detection threshold.

The sensitivity is factory set to 5, and can be adjusted from 1 to 10 (with 1 being the most sensitive and 10 being the least sensitive).

	Trigger Threshold					
	2	**3**	**4**	**5**	**6**	**7**
Aluminium Foil (shiny side)	170mm	125mm	100mm	95mm	90mm	85mm
A4 White Paper	100mm	65mm	50mm	45mm	40mm	35mm
Matt Black Card	55mm	35mm	30mm	25mm	20mm	15mm
Shiny Black Plastic	45mm	30mm	25mm	20mm	18mm	15mm

To change the sensitivity, switch off the power to the module and hold down the Push Button. Apply the power and continue holding the Push Button until 9 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have reached the desired number of flashes to set the new sensitivity, press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the module will restart. If you make a mistake programming, simply repeat the process.

Performing a factory reset will reset the sensitivity setting back to 5.

Program Flow Diagram

The diagram below shows all the programming options.

Programming is performed by holding down the Push Button when switching on the power.

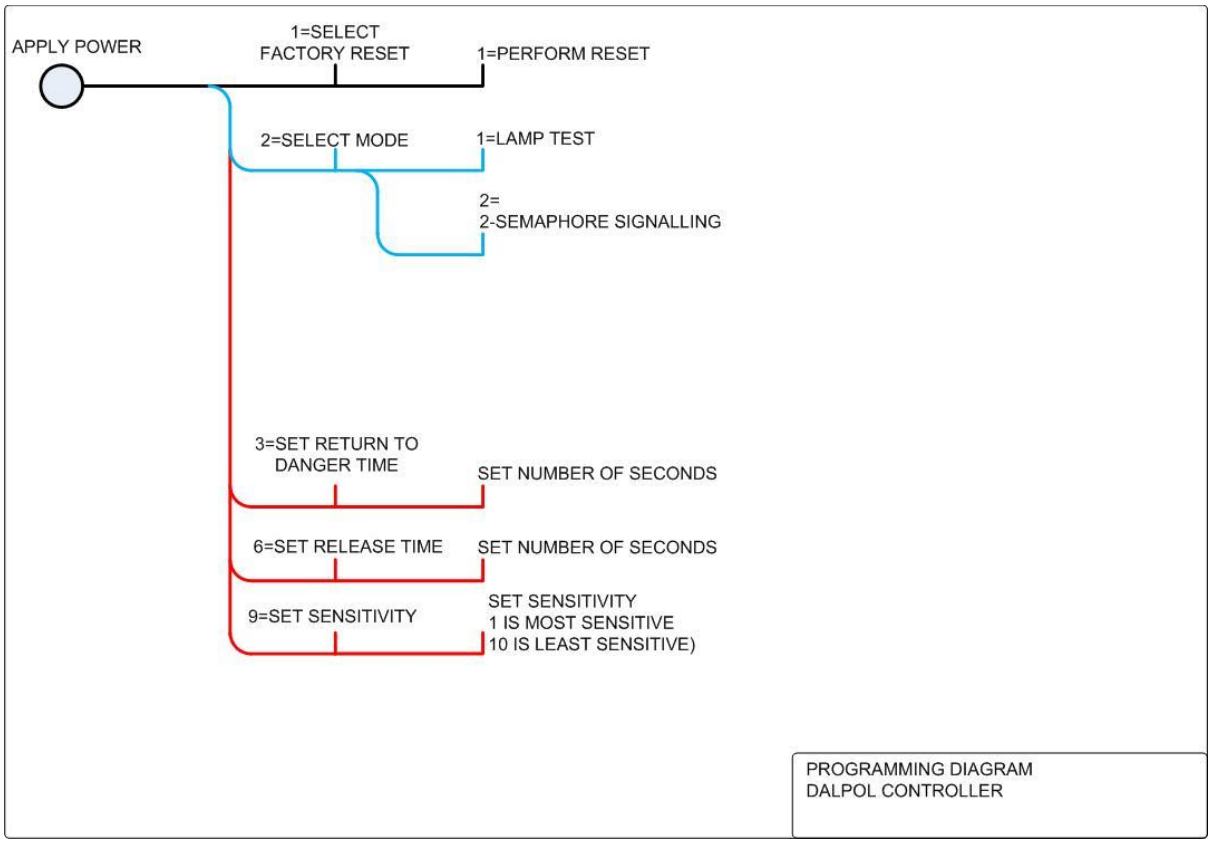
The red led on the PCB flashes at 1 second intervals. When the required number of flashes is seen (see later for the list of possible choices) the button is released to store the first value. At this point the led comes on for five seconds to confirm the value is stored.

The led then starts flashing again, and this time the button needs to be pressed to store the second value.

Once the two values to be stored are entered, the led flashes 10 times rapidly, and the module starts operating.

Most values entered can range between 1 and 255 (see below for limits). If more are seen, or the programming is aborted by switching off, then the programming must be repeated.

Following the diagram is a detailed explanation of all the settings.



Troubleshooting

To help with troubleshooting, this is the normal operation of the module.

Connect **only** the power (9V to 12V DC or 12V to 16V AC). The red led on the PCB should light for a second and then flicker rapidly (this means the sensor is looking for a train).

If you place a finger in front of the sensor, the red led will extinguish and the yellow led will light for 1 second (this is the moment the signal switches to clear).

After this the red led starts flickering again, this time at a slower rate. This means the module is looking for the train to have cleared the sensor.

Once the sensor is confirmed as clear of trains, the red led then flashes at 1 second intervals. This is timing the duration the sensor should be clear before the signal is set back to danger.

When this time has expired, the red led will extinguish and the yellow led will light for 1 second (and the signal moves back to danger), before returning to the start of the process again with the red led flickering and the module looking for a train.

If the module operates correctly, the connect the red and black signal wires to the GND and ACIN/+ terminals and repeat the test. The module should operate in the same way, and the led on the signal head should be lit. Of course the signal arm will not move at this time as the two yellow wires have not been connected yet.

Finally, connect the yellow wires to the SW1 and SW2 terminals (it doesn't matter which way the wires are connected). Repeat the test, and each time the yellow led lights, the signal should move.

The push button on the PCB can also be used to change the signal between clear and danger.

If the red led on the PCB does not operate, check the power supply polarity is correct if a DC supply is being used. The polarity is not important with AC supplies.

If the signal operates in the absence of trains, first remove the module from the layout to see if the problem continues. Obstructions in front of the sensor may cause the unit to operate unexpectedly, as can reflections from a tunnel roof.

If the yellow led operates, but the signal does not move, check the security of the yellow wire connections, and try a different signal if you have one.

If you have changed any settings, and are not sure if the module is operating correctly, perform a factory reset as described above.

Pressing the push button on the module should also cause the signal to operate.