

THE MERLIN 3000S



ENERGY EFFICIENCY IN COMMERCIAL KITCHENS

THE MERLIN RANGE
VENTILATION ON DEMAND

S&STM
NORTHERN

THE MERLIN RANGE

MERLIN 3000



The Merlin 3000S is an energy saving system designed specifically for commercial kitchens. The system acts as an interlock between the ventilation and the gas solenoid valve, while also varying the speed of the ventilation via a 0-10VDC output.

The Merlin 3000S system has 2 built-in 0-10VDC outputs. This is designed to vary the speed of the ventilation system(s) based on either, real-time gas usage via a turbine gas meter, Carbon Dioxide (CO₂) levels in the area, smoke/steam detection in the canopy using optical sensors or heat detection in the extract ductwork using a thermostat. For the best and most accurate results, all should be used together but any combination of the 4 sensors can be used.

As the CO₂ or gas usage increases in the commercial kitchen, the Merlin 3000S will increase the speed of the ventilation system to provide the perfect cooking environment. Conversely, when only minimal gas is being used and the CO₂ levels are low, the Merlin 3000S will reduce the speed of the ventilation systems, saving energy and money.

The optical sensor will increase the ventilation should it detect excess smoke or steam in the canopy along with the duct mounted heat sensor to monitor excess heat in the duct.

The Merlin 3000S also carries out its duty as a traditional ventilation interlock and gas pressure proving system alongside the ventilation on demand capabilities. This allows for one single small control panel in the kitchen, freeing up valuable real estate on the kitchen walls.

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ADVANTAGES OF THE MERLIN 3000S

- Full compliance with:
 - ✓ **BS6173:2009**
 - ✓ **IGEM/UP19**
 - ✓ **DW172**
 - ✓ **CIBSE TM50**
- Interlock with ventilation using with either Fan Current Sensors or Air PD Switches
- Optional Gas Proving function
- Controls ventilation automatically based on real-time gas consumption and CO₂ levels in the kitchen
- Uses optical and duct heat sensors to maintain optimum ventilation rate as per DW172
- Reduces ventilation rates when gas usage and CO₂ is low to reduce energy consumption
- Minimises heat loss via extraction by reducing the fan speeds when gas usage and CO₂ are minimal
- Pulsed output gas meter can be linked with other building systems to monitor the kitchen
- Reduces ventilation noise levels at times of low kitchen activity
- Clear full colour TFT display for user info and easy calibration
- Takes responsibility for sufficient ventilation control away from kitchen staff
- Maintains the air balance between supply and extract ventilation creating a negative pressure in the kitchen to control cooking odours
- Will accept Methane, LPG and CO detectors
- Can be linked to remote knock-off buttons, fire alarm and BMS
- Covered by the S&S Northern 3 year warranty

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COST SAVING OF THE MERLIN 3000S

The largest benefit of the Merlin 3000S is the ability to automatically vary the ventilation speeds based on gas consumption and CO₂ within the kitchen.

Keeping the ventilation running at a suitable speed for the cooking load, at any one time, has profound benefits on energy saving, not only from energy usage, but also from less wasted heat lost through extraction.

In order to be compliant with CIBSE TM50 (detailed below), the ventilation should never be reduced below 50% so as not to potentially damage the fan motor and to also allow optimum extraction of the grease in the air to prevent build-up on the fan.

The calculations shown by CIBSE TM50 show that it is not necessary to reduce the fan speeds lower than this, as beyond this point, there are minimal gains to be had in energy saving as demonstrated by the *affinity laws for centrifugal loads*.

Excerpts from CIBSE TM50 – 10.3.2

"Demand based or variable air volume (VAV) ventilation, is almost certainly the single most effective means of saving energy in a commercial kitchen ventilation system".

"In normal operating conditions in commercial kitchens it is highly unlikely that all of the appliances will be running at 100% capacity for an extended period of time. This means that the extraction system is removing more air than is necessary from the hood (and also the surrounding area) for most of the time".

"[Ventilation on demand] systems can achieve savings of up to 60% in fan energy usage. As less air is extracted from the kitchen when the fan speeds are reduced, the requirement for conditioned air supply is also reduced. Further savings are achieved because less hot or cold air is required from the building's heating or air conditioning plant".

VENT ON DEMAND CASE STUDY

2 x 3KW Fans

Time	Static Ventilation			Merlin 3000S Fitted			
	Fan Speed %	KWh	12.5p/KWh	Fan Speed %	KWh	12.5p/KWh	
07:00 - 08:00	100	3.0	£0.38	50	3.0	£0.05	
08:00 - 09:00	100	3.0	£0.38	50	3.0	£0.05	
09:00 - 10:00	100	3.0	£0.38	50	3.0	£0.05	
10:00 - 11:00	100	3.0	£0.38	100	3.0	£0.38	
11:00 - 12:00	100	3.0	£0.38	100	3.0	£0.38	
12:00 - 13:00	100	3.0	£0.38	80	3.0	£0.19	
13:00 - 14:00	100	3.0	£0.38	80	3.0	£0.19	
14:00 - 15:00	100	3.0	£0.38	50	3.0	£0.05	
15:00 - 16:00	100	3.0	£0.38	50	3.0	£0.05	
16:00 - 17:00	100	3.0	£0.38	50	3.0	£0.05	
Daily Cost			£3.80	Daily Cost			£1.44
Saving per Day per Fan					£2.36		
Total Saving per Day for 2 Fans					£4.72		
Total Savings Per Year (Based on 1 x Supply and 1 x Extract 195 Days)					£920.40		

2 x 5KW Fans

Time	Static Ventilation			Merlin 3000S Fitted			
	Fan Speed %	KWh	12.5p/KWh	Fan Speed %	KWh	12.5p/KWh	
07:00 - 08:00	100	5.0	£0.60	50	5.0	£0.08	
08:00 - 09:00	100	5.0	£0.60	50	5.0	£0.08	
09:00 - 10:00	100	5.0	£0.60	50	5.0	£0.08	
10:00 - 11:00	100	5.0	£0.60	100	5.0	£0.60	
11:00 - 12:00	100	5.0	£0.60	100	5.0	£0.60	
12:00 - 13:00	100	5.0	£0.60	80	5.0	£0.30	
13:00 - 14:00	100	5.0	£0.60	80	5.0	£0.30	
14:00 - 15:00	100	5.0	£0.60	50	5.0	£0.08	
15:00 - 16:00	100	5.0	£0.60	50	5.0	£0.08	
16:00 - 17:00	100	5.0	£0.60	50	5.0	£0.08	
Daily Cost			£6.00	Daily Cost			£2.28
Saving per Day per Fan					£3.72		
Total Saving per Day for 2 Fans					£7.44		
Total Savings Per Year (Based on 1 x Supply and 1 x Extract 195 Days)					£1,450.80		

The figures shown are based on the figures given in CIBSE TM50 with the fan sizes and usage patterns shown. The results will vary based on, but not limited to, the specific site, gas usage and CO₂ in the cooking area. TCL and S&S Northern accept no liability and will not guarantee that any cost savings will be achieved in different circumstances.

MEET THE LINEUP...

S&S Northern provide the full range of additions to maximise the benefits of the Merlin 3000S Ventilation on Demand System

GAS SOLENOID VALVES

A gas solenoid valve is required for the isolation of the gas supply to the kitchen. We supply a large number of valves for use in a commercial kitchen from 1/2" up to 10". The valves supplied are all covered by the S&S Northern 3 year warranty and are tested and certified to European Standard EN161 Class A.



GAS METERS

A pulsed output gas meter can be supplied as the most accurate way to monitor the real-time cooking load. S&S supply these gas meters specifically suited to the needs of the Merlin 3000S and they come in a range of sizes.



GAS SENSORS

S&S Northern supply a range of gas sensors for the Merlin 3000S. These include CO₂ for monitoring the Carbon Dioxide in the cooking area. Carbon Monoxide and Methane can also be used.



DUCT THERMOSTAT

A duct mounted thermostat can be used to monitor the temperature in the ductwork. The Merlin 3000S uses this information to adjust the fan speeds accordingly.



OPTICAL SENSOR

An optical sensor mounted in the canopy detects excess smoke or steam in the cooking area. The Merlin 3000S will use the signal to ramp up the fans to clear the area.



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