

Ramp Metering

Shortening journey times and reducing congestion at busy motorway junctions.



System designed to support the management of congestion by preventing or delaying the onset of flow breakdown on the main carriageway without affecting the local urban traffic conditions.

Optimise Traffic Flow

Ramp Metering is one of the tools used by the Highways Agency to manage motorway traffic. It uses algorithmically controlled part-time traffic signals to manage the rate at which vehicles join the motorway. The system optimises the flow on the main carriageway by allowing the traffic to join the motorway at a measured (or metered) rate, whilst managing the queue on the slip road (or ramp) to ensure that it does not adversely affect the surrounding local roads.

Safe and Reliable

By reducing congestion, the system delivers greater throughput during peak periods, reducing bottlenecks and allowing drivers to benefit from safer and smoother journeys, and more reliable journey times.

Technology

The system comprises a Ramp Metering Controller (RMC) co-located in a type 600 cabinet with a traffic signal controller, connected to a set of signal heads mounted at the end of each ramp.

Key Features

- Rolled out to almost 90 sites across the UK
- Designed and configured based on local conditions
- Capable of integration with local traffic signal controllers at signalised roundabouts
- Capable of integration with common database systems via the Peek RM/UTMC Adapter
- Capable of deployment in areas without a full MIDAS infrastructure, using Peek's standalone MIDAS solution
- Modular design for cost effective maintenance
- Studies have shown:
 - Reduced travel time through junction for vehicles on the main carriageway
 - Increased speeds downstream of the junction
 - Relatively short delays to vehicles on the slip road
- System supports reduction in carbon emissions

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System Operation

The Ramp Metering Controller (RMC) is connected to queue, presence and release loops on the ramp. It also receives vehicle data from MIDAS outstations on the main carriageway via the Outstation Auxiliary Link (OAL). It processes this data in order to determine the traffic conditions on the ramp (in terms of flow and occupancy) and on the main carriageway (in terms of flow, speed and occupancy).

Using this processed data, together with configuration parameters, the RMC runs Main Carriageway Metering algorithms to determine the required flow rate on the ramp in order to prevent flow breakdown on the main carriageway and Queue Management algorithms to determine the required ramp flow necessary to maintain the desired queue length.

Two further algorithms, Switch On/Off and Queue Override, are also run to determine whether conditions are appropriate for ramp metering to be switched on/off and to prevent the queue on the ramp backing up on to the all purpose roads.

The RMC arbitrates the outputs from the algorithms, converts the required flow rate into signal timings and sends these to the traffic signal controller, which in turn drives the signal heads.

The RMC is equipped with a web server, allowing an operator to remotely access the site to monitor its status and, subject to access rights, alter its configuration parameters.



Environmental Credentials

Elexon Codes	Watts	Annual kW: Hr	CO2 kg pa
79 10 023 000 100	23	201	108

Hardware Description

- Interfaces to up to 20 ramp loops
- Interfaces to standard MIDAS Outstations via Outstation Auxiliary Link
- Digital IO interfaces to external devices such as VMS or local traffic signal controller
- Fully configurable for local geography, number of loops, outstations etc
- Web based interface provides secure remote access for reviewing logs, viewing and changing configuration parameters and software upgrade



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Peek is a leading supplier of intelligent transport solutions. For more than 30 years, the firm has been providing advanced traffic control products and systems, management and maintenance services for both the urban and highways markets. Peek's established and proven portfolio includes traffic management systems incorporating SCOOT, highway congestion management and enforcement systems, vehicle detection systems, exterior lighting, as well as supervisory and communications systems. Peek is ISO 9001:2008 and ISO 14001:2004 certified.

With headquarters in Basingstoke, Hampshire, Peek employs more than 500 staff throughout the UK. Peek is part of the Traffic and Infra division of Imtech NV, a global technology services provider based in the Netherlands.

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