



WÄRTSILÄ RTA INJECTION TIMING AUTOMATION



The Wärtsilä RTA injection timing automation (RITA) system provides automated realtime adjustment of the cylinder firing pressures to the optimal set-point. This can mean up to 1.5% fuel savings.

Vessel operation today is focused on the reduction of fuel oil consumption and ensuring compliance with current emission legislation, while minimising maintenance effort. RTA type two-stroke diesel engines are operated in a so called 'open loop' control, requiring manual adjustments of injection timing by means of a Fuel Quality Setting (FQS). This calls for frequent measurements of cylinder pressure and performance data (e.g. after a new fuel was bunkered or after an engine overhaul) by the crew on board the vessel. These manual adjustments are often not done on a regular basis. Consequently, the engine does not operate at its optimal point, resulting in higher-than-optimal fuel oil consumption.

OPTIMAL PERFORMANCE IN ALL CONDITIONS

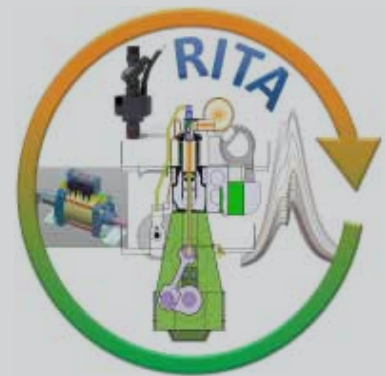
Wärtsilä RTA injection timing automation system ensures that the engine is operated according to its original shop test performance. The permanently working 'closed loop' control allows the engine to run at its optimal set-point. The system works automatically in real time, and is independent of the fuel used and the ambient conditions on board.

FIRING PRESSURE ADJUSTMENT

The optimal firing pressure set-point is calculated to match site conditions at each actual operating point of the engine. This ensures that cylinder pressure is adjusted according to the design criteria, and the engine is not overloaded while full fuel saving potential is exploited.

ADAPTATION TO CHANGES

Real-time adaptation to climate and day/night changes is handled via additional temperature and pressure sensors installed upstream of the turbocharger compressor and in the scavenge air receiver.



KEY BENEFITS OF RITA

- Up to 1.5% fuel savings
- Automated 'closed loop' control
- Adjustment of maximal firing pressures according to load and ambient conditions
- Operation within design criteria (according to IMO emission regulations)
- Easy to install

“The most important benefit that we gained is that we achieved the expected 1.5% reduction of fuel consumption. Both the simplicity of the system and the fact that it gives us a clear understanding of the fuel saving function are truly positive. This solution supports us in our efforts to optimise the operational costs of the engines by reducing the fuel consumption. Would we recommend other ship owners to do a similar installation? Yes, without a doubt.”

Fleet Manager
Columbus Shipmanagement, a daughter company of Hamburg Süd



APPLICATION

With Intelligent Injection Control (ICC), the same functionality can be applied to the Wärtsilä RTflex and W-X engines. The proven closed loop concept for electronically controlled engines has now been adapted and made available also for conventional RTA engines.

The RITA system has been retrofitted to a variety of different engine types, installed or ordered on the following engine types:

**32 x RTA96C; 5 x RTA84C; 1 x RTA72U;
5 x RTA62U**

Estimated savings

MV “B” 9RTA96C-B (51'480KW@102RPM)

The calculation of potential fuel savings is based on performance measurements and the load profile of the engine.

LOAD OPERATING PROFILE:

- 25% of the time at 25% engine load
 - 35% of the time at 50% engine load
 - 15% of the time at 70% engine load
- In total 6,000 hrs/year (Fuel cost 400 US\$/ton)

Engine Load	rpm	Hours Year	Savings Hour (liter)	Savings Year (ton)	Savings US\$
25%	62	1'800	45	77	30'800
50%	82	2'200	30	63	25'200
70%	84	1'000	10	9	3'600
75%	92		Not measured	Not measured	

CONCLUSIONS

MV “B” Savings are well over 59,000 US\$/year.

The total savings for the considered fleet (9x 9RTA96C-B) are **531,000 US\$/year**

Expected payback period 11 months