SWARCO is a growing international group providing the complete range of products, systems, services and solutions for road safety and intelligent traffic management.

With almost five decades of experience in the industry, the corporation supports the growing mobility needs of society with turnkey systems and solutions in road marking, urban and interurban traffic control, parking, public transport, infomobility and street lighting. Cooperative systems, V2I communication, electromobility, and integrated software solutions for the Smart City are the latest, future-oriented fields in the group's portfolio.

www.swarco.com

**SWARCO TRAFFIC SYSTEMS GMBH**
Kelterstrasse 67
D-72669 Unterensingen
T. +49-7022-6025-200
F. +49-7022-6025-199
E. office.sts@swarco.de
www.swarco.com

# SWARCO X-LINE

The intelligent platform for energy-efficient intersections

www.swarco.com

# MANAGING INTERSECTIONS THE INTELLIGENT WAY: SWARCO X-LINE

Excellence in traffic management places the highest demands on people and technology. That's why we developed SWARCO X-LINE: the intelligent platform for traffic-signal-controlled intersections.

SWARCO X-LINE works with decentralized intelligence and controls traffic light systems via a CAN-based network (Control Area Network). This opens up a wealth of new functions and expansion possibilities for the user in the future.

# TOMORROW'S INTERSECTION CONTROL TODAY: SWARCO X-LINE

## Thinking intersection control further

With the new SWARCO X-LINE platform, the concept of the Internet of Things is finding its way into municipal intersection management. This is exactly the right time to do so, because compliance with increasingly stringent air pollution control regulations and the growing networking of autonomous and non-autonomous vehicles will require ever more efficient municipal traffic control systems and signalling systems in the future.

## Modernization without traffic jams

Another major advantage of SWARCO X-LINE, in combination with ACTROS ECUs, is that the existing cable infrastructure can be reused. As a result, you save on civil engineering and costly road safety measures during the conversion of the plant - and thus also on unpopular construction sites, traffic jams and the associated additional pollution of the air by nitrogen oxides and particulate matter. In addition, the copper cables that are not needed saves on raw materials.

## Prevention replaces repair

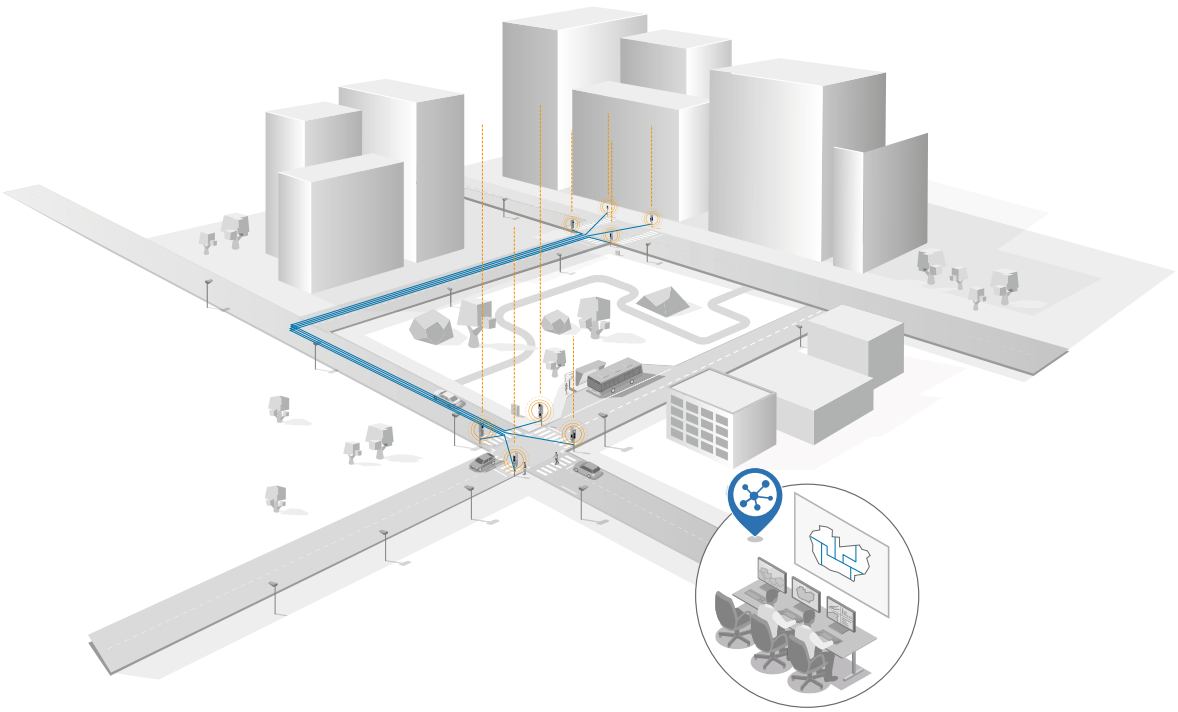
And the new system also fulfils its inherent task of safe and reliable signalling better than ever before. Traditional signal heads controlled via an electrical interface can only indicate if they are currently working or not.

The new solution offers the possibility of retrieving detailed information on a critical failure in the signal head. Non-critical failures and minor incidents can also be reported. Consequently, predictive and event-triggered activities are possible, rather than just periodic maintenance. Finally, the functionality can be enhanced, applying service patches remotely via a firmware update.

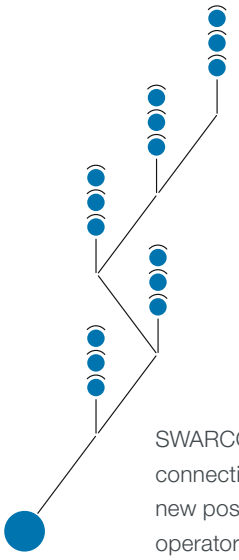
## Less energy for more power

In traditional systems, the electrical interface between traffic light controller and signal head uses the consumed energy as an indicator of whether the signal head works or not. Even in the deactivated mode (i.e. signal off) the power loss is about 6 to 5W depending on the geographical region.

The electronic interface allows a dramatic reduction in power loss to 1 or 2W, which results in an increase in power efficiency. Moreover, due to minimal power consumption of LEDs, electrical disturbances on the line can be eliminated and supervision is more robust.



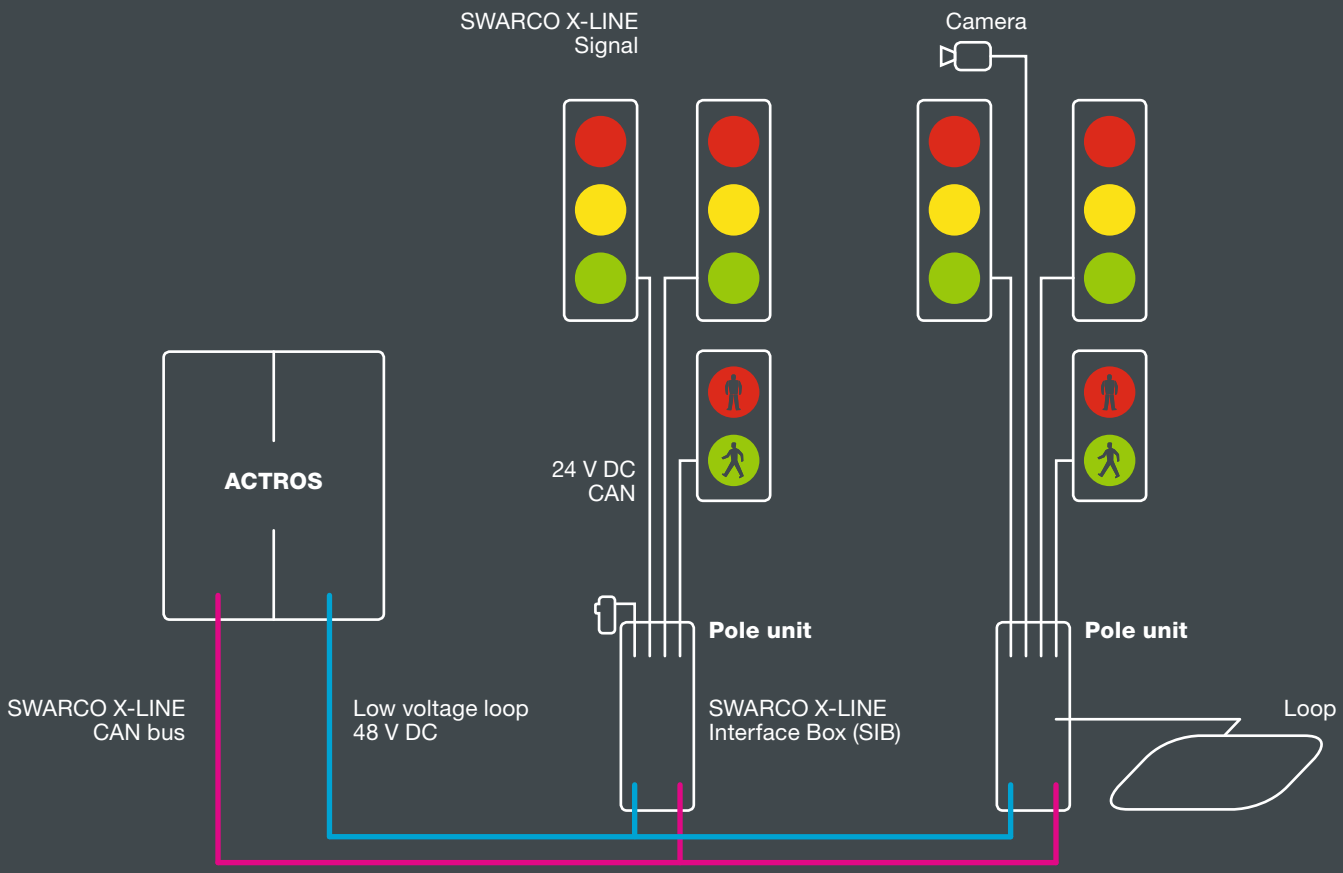
- SWARCO X-LINE is easily extendable and therefore future safe
- SWARCO X-LINE increases energy efficiency
- SWARCO X-LINE is environmentally sound by decreasing civil works and thereby minimizing traffic jams



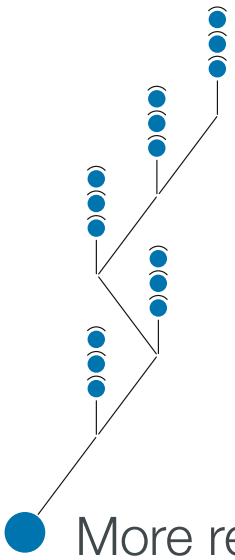
SWARCO X-LINE with series connection opens up completely new possibilities for planners, operators and road users.

# AS RELIABLE AS SAFE: SWARCO X-LINE

## This is one example of a SWARCO X-LINE application




The SWARCO X-LINE platform uses a proven industry standard with the CAN bus. It makes crossing control much simpler. Its decentralized structure and the modular network architecture allow the easy integration of new functions later on.



# More reliability, more possibilities: With the SWARCO X-LINE platform, you are already laying the foundations for the Intersection of Things.

## Open interfaces for smooth integration

The specification of the CAN-based interface is open for any integrator. The idea is to have a set of mandatory commands (e.g., switch on signal head) to guarantee interoperability among different vendors and system integrators. In addition, project-specific requirements can be met by introducing optional commands.

## Increased safety level and up-time

There are good reasons why SWARCO X-LINE is not only exceptionally innovative but also exceptionally reliable: Firstly, the solution is fully compliant with the requirements of EN61508, SIL 3, i.e. the system's residual failure probability rate is at least below 10-7 failures per hour. As a result, the platform contributes significantly to traffic safety at the intersection being inherently safe. Secondly, the platform not only mitigates the risk coming from dangerous failures (i.e. failures comprising the safety integrity of the equipment), but also handles non-dangerous failures with high occurrences resulting in a very high reliability and availability with extremely limited downtimes.

## SWARCO X-LINE gets the Internet of Things rolling

The intersection of things with its CAN-based network and full compliance with product and safety standards enables new services and supports the concept of the Internet of Things (IoT). As not only signal heads but any sensor (detectors, air quality sensors, etc.) can be connected, more data elements are collected, and services based upon these may be implemented. Additionally, connected intersections are a key element in making the infrastructure ready for connected and automated driving. Retrieving data elements from connected sensors with very low latency and bringing them to bypassing vehicles, may help to increase the situation awareness of the automated vehicles.