

# TKX

**ABS FOR  
TRUCKS • TRACTORS • BUSES • COACHES**

Setting the pace for an industry in motion



**INNOVATIVE VEHICLE TECHNOLOGY**

**Haldex**



# HALDEX **Tk<sup>x</sup>**

## Designed to meet world demands.

Haldex has traditionally been at the forefront of innovation in braking technology. In 1969, we were the first manufacturer in the world to introduce an ABS. An ABS for trucks followed in 1976. Since then, Haldex has continued to develop the technology in response to customer needs and by anticipating market trends.

Haldex expertise can be found at work every day in sophisticated and proven ABS applications, advanced valve technology, electronic braking systems, advanced diagnostics, automatic brake adjustment, disc brakes, electronically controlled air management systems, electronically controlled air suspension, 4WD traction systems and more. All backed by the resources of the Haldex Group, with more than 4,000 people based at over 30 locations worldwide.

Now Haldex **Tk<sup>x</sup>** ABS has been introduced to meet or exceed exacting international standards – including the latest ECE Regulation 13-09, and it uses the latest technology and materials to move ABS technology forward to the next generation, delivering outstanding performance, simple installation, minimal maintenance and reduced cost to vehicle manufacturers.

- New single solenoid in-line valve. Based on a newly patented technology created by Haldex for electronic braking systems. The new valve is more efficient than conventional twin-solenoid valves, it's also easier to fit and is more cost effective than comparable products.
- Powerful new ECU. The new 100-pin 32-bit SF1 microcontroller is the most powerful yet seen in a Haldex ABS product.
- New materials. Corrosion-free, lightweight and durable engineering grade plastic has been used to house the key components of **Tk<sup>x</sup>**.
- Fast, easy installation. Using standard connectors, **Tk<sup>x</sup>** has been designed with ease of installation as a key objective.



# SINGLE SOLENOID IN LINE VALVE

**Designed for high performance and reduced cost.**

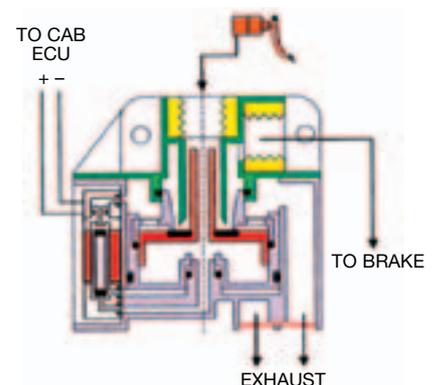
**Tk<sup>X</sup>** represents the first major advance in the key elements of ABS design for more than 20 years. As well as using advanced technology and materials, **Tk<sup>X</sup>** has been designed for easy and rapid installation – helping to reduce vehicle manufacturing costs.

## Single Solenoid In-line Valve

In traditional ABS, in-line valves are used to control the brake pressures. These valves usually have two diaphragms controlled by two solenoids to operate the four basic stages of ABS: 'dump', 'hold', 'fast apply' and 'slow apply'. Large, difficult to fit and costly relay valves have also been used in some systems. In **Tk<sup>X</sup>**, the very latest Haldex technology has been used to create a new valve that controls all of the four basic stages of ABS using a single solenoid. The solenoid drives a two-stage piston that delivers hold, dump, fast apply and slow apply at different stages of the piston's operation. Sophisticated Haldex electronics and software is used to automatically manage the solenoid's operation. By using a single solenoid instead of two, **Tk<sup>X</sup>** provides a more cost-effective means of installing a high quality, highly reliable ABS.

## Advanced ECU

The Electronic Control Unit utilises a new 100-pin, 32-bit microcontroller which includes 16k of RAM and 256k of ROM; capable of processing up to 18 million instructions per second. The new microcontroller is a version of the device used in the Haldex EB+ electronic braking system for trailers. The cab-mounted ECU features on-board CAN, an industry-standard multiway connector and water-proofed and sealed electronics.





# THE TECHNOLOGY INTERFACE

## Easy installation saves time and money.

**Tk<sup>x</sup>** has been designed specifically to meet industry needs for a modern, reliable ABS that is easy to install in as wide a range of vehicle configurations as possible.

### Chassis-mounted valve

The chassis-mounted **Tk<sup>x</sup>** in-line valve is designed to be fitted to either right-handed or left-handed applications for ease of installation using a minimal number of mounting fixings.

Inlet and delivery connections are attached to the valve using M16 and M22 metric threaded ports.

The revolutionary use of a single solenoid also means that only two wiring terminals are needed. Naturally, this helps to simplify the vehicle's wiring system.

### Cab-mounted ECU

A standard multiway connector provides a simple connection to the rest of the **Tk<sup>x</sup>** system. An on-board CAN provides the diagnostic output.

### Customised delivery to meet your needs.

As a Tier 1 automotive supplier to manufacturers around the world,

Haldex has a great deal of experience in supplying many different manufacturing systems.

Our logistics operation already supplies our products using just-in-time, lean manufacturing and other manufacturing control systems. We can easily customise deliveries to meet your needs.

### Features

#### Single Solenoid In-line Valve

- High flow rate
- No residual trapped pressure
- Fast ABS dump
- Polarised porting (M16/M22)
- Top inlet port – non handed
- Outward facing delivery port (reduced need for bracket)
- Low weight – 600g
- Single, low power (EBS technology) solenoid
- 2 core solenoid cable (0.75mm<sup>2</sup>)
- Small Solenoid connector – passes through 25mm dia hole (Din Bayonet = 32mm)
- Encapsulated solenoid housing
- Integral cable strain relief



# HALDEX **Tk<sup>x</sup>** A NEW GENERATION

## Moving forward.

**Tk<sup>x</sup>** is the latest generation of ABS from Haldex – the company at the forefront of ABS technology.

**Tk<sup>x</sup>** uses advanced electronics and valve technology to create an ABS that is easy to fit, versatile, highly reliable and far more cost-effective than conventional ABS.

Cost reduction has been achieved by delivering excellence in system design and product quality. Our purpose-built manufacturing facilities ensure that every **Tk<sup>x</sup>** unit is quality assured for total reliability.

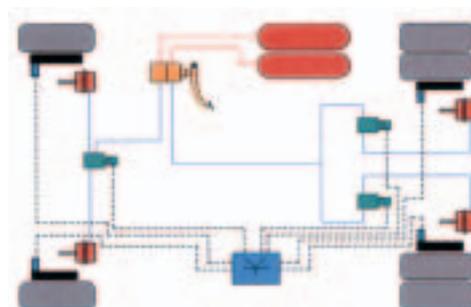
The innovative design of the lightweight, precision-engineered single solenoid in-line **Tk<sup>x</sup>** valve makes rapid installation easy. On the road, tests show that **Tk<sup>x</sup>** provides excellent performance on a wide range of different road surfaces and conditions.

Driven by the market need for an ABS that meets tough standards

such as ECE 13-09, **Tk<sup>x</sup>** delivers the performance that today's manufacturers and buyers demand.

For more information on how **Tk<sup>x</sup>** could benefit you, see the presentation contained on the CD attached to this brochure, visit our website [www.brake-eu.haldex.com](http://www.brake-eu.haldex.com) or talk directly to Haldex.

See the contact list on back cover.





# DESIGNED TO MEET A WORLDWIDE

**Meeting market needs, today and tomorrow.**

**Haldex has already invested heavily in developing Tk<sup>x</sup> – the new generation of ABS.**

We have also invested in creating new, purpose-built manufacturing facilities dedicated exclusively to Tk<sup>x</sup>. State-of-the-art robotic assembly, continuous quality control and rigorous testing ensure that every Tk<sup>x</sup> unit leaves our plant in optimum condition.

Our investment in Tk<sup>x</sup> is one more example of our commitment to delivering innovative vehicle technology that is driven by market needs. We always listen carefully to our customers. We constantly analyse market trends worldwide. And we always respond with the very best solution.

Detailed discussion with customers formed a key part of the Tk<sup>x</sup> development process. The specification and features that have been included were in direct response to what our customers want.

We've gone further than simply meeting expectations. We have exceeded them. Haldex Tk<sup>x</sup> goes beyond the immediate need for high performance, highly reliable, low maintenance and easily installed ABS. Other capabilities include end-of-line testing using standard PC software to analyse Tk<sup>x</sup> data on your own production line.

## Features

### Electronic Controller

- Encapsulated ECU – resistance to moisture/high humidity
- Separate connectors cab wiring/chassis wiring
- Industry leading 32bit microcontroller
- 80T/100T Exciter hard-wire selectable
- CAN based diagnostics
- Blink code diagnostics
- PC diagnostics
- Hand held diagnostics readout possible
- 3M/4M options
- Compatible with most ABS speed sensors – not just the Haldex sensor

# HALDEX TK<sup>x</sup>

## Key technical Features

<b>ABS Configuration:</b>	4S/4M Optional 4S/3M Category 1 (ECE Regulation 13/09)
<b>Operating Voltage:</b>	24 Volts DC nominal 19-32 Volt range
<b>ECU:</b>	Flame retardant encapsulation. Plastic enclosure.  In-cab mounting.  AMP C-175444 unsealed connector, 34-way (12 + 22) Temperature range -40°C to +80°C
<b>EMC/RFI Approval:</b>	Directive 72/245/EEC as last amended.
<b>Modulator Valves:</b>	Haldex SSILV  In-line, chassis mount, unhandled, Inlet M16, Delivery M22
<b>Operating Medium:</b>	Air
<b>Operating Pressure:</b>	0-8.5b (9.5b max)
<b>Maximum Pressure:</b>	16bar
<b>Residual Pressure:</b>	0bar
<b>Brake Chambers:</b>	2 x T30 maximum per valve
<b>Exciter:</b>	80/100T
<b>Diagnostics:</b>	Blink codes  PC-based End of Line Test via CAN interface  Hand held diagnostics readout possible
<b>Vehicle Configuration:</b>	Tractor, Rigid, Bus, 4x2, 6x2, 6x4
<b>GVW:</b>	8.0 to 44.0 tonnes
<b>Engine Location:</b>	Front, Middle or Rear of vehicle
<b>Tyre Sizes:</b>	17.5" to 24.5" diameter wheel sizes
<b>Brake System:</b>	Full Air Air over Hydraulic

# CHALLENGE

## TKx ECU

### Specification

- Cab mounted
- Water-proofed electronics (excluding ECU multi-way connector)
- 24v negative earth (19-32VDC)
- -40 - +80°C
- Solenoid common return – wired
- Warning lamp – direct drive



INOLOGY



## Our Mission

To develop products and support packages that meet specific customer requirements. Our flexibility and competitive lead times make us the market leader in Automatic Brake Adjustment, ABS, air braking and suspension control.

## Total Support

A unique wide range of services is available from Haldex. These include expert consultancy for braking and suspension development, brake calculations, type approvals and application engineering. The aim is to deliver accurate specification for manufacturers and low cost of ownership for the operator.

Full aftermarket support includes a global parts distribution network, ensuring rapid despatch and delivery. Other support services include on-line technical advice, field visits and installation/maintenance training held on-site or at Haldex facilities.

## Research and Development

Continual, heavy investment in R&D is carried out using test facilities in England and Sweden in response to ever increasing commercial, legislative, environmental, performance and technological demands.

## Quality and Production Standards

The very latest production technology ensures the highest quality standards at all Haldex Product Centres are QS 9000 approved.



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**Haldex is an innovator in vehicle technology supplying proprietary systems and components for trucks, cars and industrial vehicles, worldwide.**

**With 4,100 employees and yearly sales exceeding 6 billion Swedish Kronor, Haldex is listed on the Stockholm Stock Exchange. ([www.haldex.com](http://www.haldex.com))**

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