

Greater safety: avoiding accidents with state-of-the-art safety technology

#### In use

Soft-start and exhaust valve MS6-SV, clamping units KEC-...-S and DNCKE-S

#### Benefits

- Reliable pressurising and exhausting with the MS6-SV
- Braking with KEC-...-S and DNCKE-S

## Safety first

Safety standards are becoming more and more important. The requirements span the entire control sequence – from compressed air preparation through drives and valves to controllers. Consequently, the industry's declared objective is to make processes and systems as safe as possible.





**Klaus Gabriel, safety technology expert at Festo:**

“The safety functions for pneumatics can be summarised in approximately 10 functions. For these safety functions, we offer either individual products or complete solutions for realising safety functions in a system. Safety measures that can be integrated in a product offer our customers many advantages.

As a result, elaborate calculations and certification of conformity with standards are no longer required, saving a lot of time and expert knowledge.”

■ Increased safety standards and the new machine directive coming into effect at the end of 2009 make safety technology a much discussed topic. Safety is a hot topic for Festo too, both in the process industry and in industrial automation and is relevant for all automation levels and products. Machines have to be constructed in such a way as to avoid physical damage. Certain safety measures can prevent hazards in all operating states of a machine. At the same time, the use of safety technology minimises the risk of liability.

**Forewarned is forearmed**

The machine directive prescribes risk assessment and possibly risk reduction for machines. The risk assessment then serves as a basis for deriving and defining safety measures. The primary goal when designing a new system is to identify risks in advance and, if possible, to eliminate them through appropriate planning. Since risk can never be eliminated fully, this residual risk must be minimised or eliminated by means of technical safety measures, for example using safety-related pneumatics. These safety goals are achieved

using various safety functions. In this context, reliable operation of the machine in all modes and phases of the machine's service life must be taken into consideration. For this reason, safety-related pneumatics offer solutions for commissioning through automatic and manual operation to emergency functions such as reliable stopping or exhausting.

**The three steps of risk analysis**

According to EN ISO 12100, a risk analysis essentially comprises three steps: first the machine's limits are determined, next the

risk situations are identified and finally the risk assessment is carried out. Depending on the outcome of the risk assessment, either design-based safety measures or technical safety measures must be defined. This process is repeated over and over until the residual risk is reduced to an acceptable level.

As a general rule, the simpler the safety technology used in the application, the more efficient it is. The complexity of the safety technology is typically determined by the range of risk possibilities

**Key safety related standards at a glance**

**Mechanical:**

- Forced control (contours, cams)
- Pneumatics
- Hydraulics

old: EN 954

new: EN ISO 13849-1

**Electrical, electronic:**

- Sensors
- Relays
- Controllers (hard-wired logic)

DIN EN IEC 61508 series

Mechanical engineering DIN EN IEC 62061, process industry DIN EN IEC 61511

**Programmable, electronic:**

- Programmable mini control systems
- Reliable bus systems
- PLC safety

that require individual attention. Standardised implementation of safety technology is therefore very difficult.

Two examples for greater safety:

### 1. Braking with KEC-...-S and DNCKE-S

Whether in response to power failure, a requirement of the safety function, intermediate stops for service units, pressure failure or drop, the clamping unit KEC-...-S provides braking action within precisely defined tolerances by means of a clamping component acting on a rod by spring force. It provides this action over sustained periods, in applications involving varying loads, irrespective of fluctuations in the operating pressure and unaffected by system leaks.

Both the clamping unit DNCKE-S and the clamping unit KEC-...-S are approved as holding devices and as brakes for use in safety-relevant control systems. With appropriate additional measures, however, they can also be used for accident prevention in control systems of a higher category. The components are certified by the BGIA (Occupational Safety and Health Institute), affirming their particular suitability for safety requirements.

### 2. Reliable pressurising and exhausting using MS6-SV

The BGIA-certified soft-start and exhaust valve MS6-SV serves as a decentralised/centralised unit for supplying machines and systems with compressed air. It is a self-testing redundant mechatron-

ic system according to the requirements of ISO 13849-1. This means that the pneumatic safety measure of reliable exhausting is ensured even if defects occur within the valve. But that's not all – the safety check of the piston rod position is performed directly by the valve during the self test. This means less complicated wiring, which simplifies installation. ■



#### Clamping unit KEC-...-S

- Sizes: 16, 20, 25 mm
- Static holding forces: 1,300; 3,200; 8,000 N
- Assembly: Wide selection of mounting options

#### Cylinder with clamping unit DNCKE-S

- Function: Double-acting
- Sensing
- Dimensions: ISO 15552 and VDMA (apart from the length)
- Piston diameter: 40, 63, 100 mm
- Stroke length: 10 ... 2,000 mm
- Static holding forces: 1,300; 3,200; 8,000 N
- Cushioning: Adjustable pneumatic end-position cushioning
- Assembly: Wide selection of mounting options

#### Soft-start and exhaust valve MS6-SV

- Safety measure: Gradual pressurisation, adjustable (soft start), fast reliable exhausting
- Size: MS6
- With/without safety silencer
- With/without pressure gauge
- With/without pressure sensor SDE1
- With indicator output (floating)
- With LED status display

## is 1201

Safety technology –  
pneumatic positioning

### Attention: New machine directive!

The new machine directive comes into force on 29.12.2009. There will be no transition period. EU countries are required to incorporate the machine directive into national law by the end of 2009. Among other things, it contains safety and health protection requirements for the design and construction of machines. The manufacturer is furthermore required to carry out a risk assessment. To this end, the manufacturer is required to determine the limits of the machine, to identify hazardous situations and to estimate and evaluate risks. The system manufacturer is obliged to implement suitable safety measures to reduce the risk to an acceptable level.

