E-training

"Welcome to the K Controls e-training course designed to deliver useful "Pneumatic Valve Actuation" application information in small instalments."

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Pneumatic actuator equipment interfaces

Fitting ancillaries to pneumatic actuators

Ancillary equipment for monitoring or controlling valve or damper position is usually fitted to the top, end or side of a pneumatic actuator.

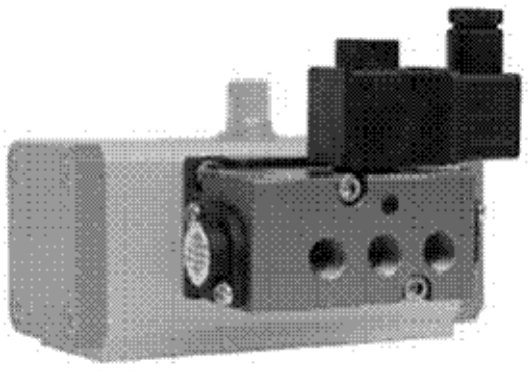
Historically each actuator was designed with unique proprietary interfaces that made the job of fitting switches, positioners and solenoids quite costly and time consuming. During the 1990's the chemical industry in Germany took the initiative and developed a number of standard interfaces. These standards quickly became popular in the European market and were subsequently adopted in the USA and then in other parts of the world. This enables a single item of ancillary monitoring and control equipment to be specified and then quickly and easily fitted, plant wide, to many different sizes and types of actuators. This in turn can ensure a consistent, safe and reliable approach to linking the actuators with the control system. It can also be useful when upgrading (retrofitting) ancillaries on existing actuated valves so the plant confirms to the latest safety standards e.g. ATEX.

The main standards for pneumatic actuators and the organisations that developed them are described below:

NAMUR – The Automation Systems Interest Group of the Process Industry

NAMUR was founded at Leverkusen, Germany, on 3 November 1949 as the body to represent the interests of the users of measurement and control technology in the chemical industry. At the second meeting in December 1949, the founding members of the working group settled on the name: "Standardisation association for measurement and control in the chemical industries" — this leads to the acronym NAMUR "Normen Arbeitsgen Mess Und Regeltechnik" in German. NAMUR is an association of users of process control technology; manufacturers of process control technology, hardware and software are not eligible as members.

NAMUR Interface standard for solenoids



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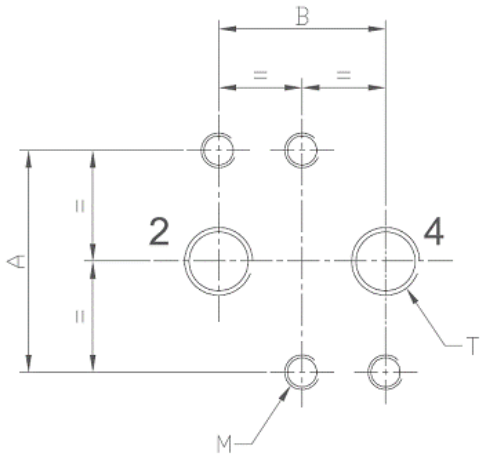
T	A	B	M
1/4"	32	24	M5
1/2"	45	40	M6

Dimensions in mm



VDI - The Association of German Engineers

VDI was founded in 1856 and is now the largest engineering association in Western Europe.

VDE - The Association for Electrical, Electronic & Information Technologies

Founded in Germany in 1893 membership includes engineers, scientists, technicians and students together with corporations and institutions.

VDI/VDE - The Society for Measurement and Automatic Control

The Society for Measurement and Automatic Control (GMA) is a joint organization of the VDE and the VDI focusing on process measurement and control.

NAMUR and VDI/VDE co-operate which is why the Namur solenoid interface standard appears as part of VDI/VDE 3845

VDI/VDE 3845 (September 2004) has the title "Industrial Process Control Valves – Interfaces between valves, actuators and auxiliary equipment"

The main sections of the standard deal with:

Interfaces between valves and actuators – quarter turn
Interfaces between valves and actuators – linear movement
Interfaces between rotary (quarter turn) actuators and auxiliary equipment (positioners, signal transmitters and solenoid valves)
Interfaces between actuators with linear movement and auxiliary equipment (positioners, signal transmitters and solenoid valves)

As an example VDI/VDE 3845 defines the A, B and C dimensions in the diagram below together with the slot size. Actuators then require one of four mounting standard mounting kits that are usually available with or without an integrated visual indicator.

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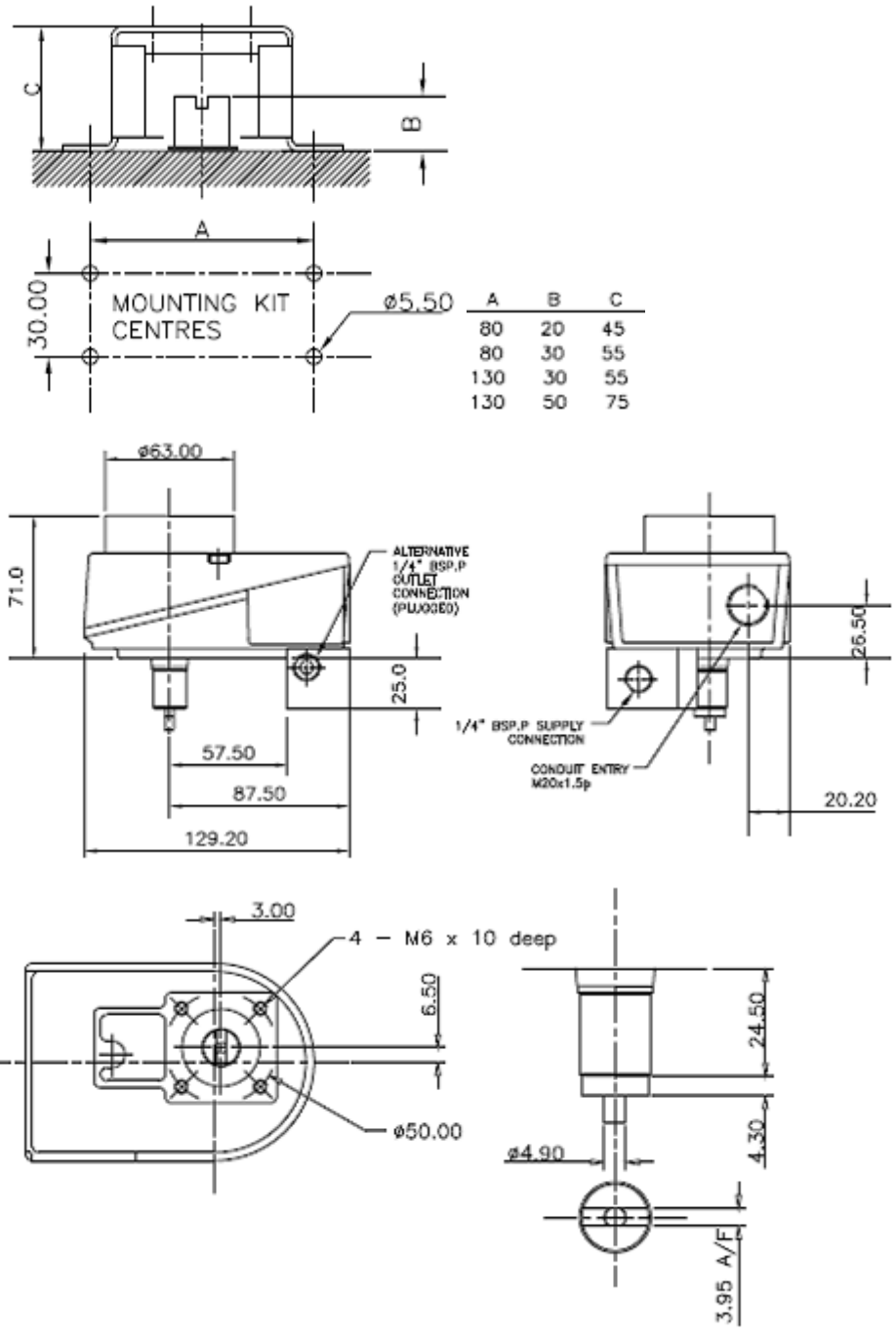

VDI/VDE 3847 is a relatively recent standard that defines the standardised mechanical and pneumatic interface between a positioner and a linear actuator. This interface allows pipeless mounting and positioners that confirm to this standard are interchangeable. The overall dimensions of the actuator and positioner are reduced and two point fixing allows the positioner to be fitted or replaced quickly.

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IEC - International Electrotechnical Commission

IEC Part 534-6 (Namur)

This standard deals with the mounting details for positioner attachment to linear control valve actuators.

CEN - European Committee for Standardization

We understand that CEN are working on a standard that will extend the VDI/VDE 3845 requirements.

A working group of CEN Technical Committee 69 “Industrial valves” (CEN/TC 69/WG 1/SG 10) are working on a number of new standards:

- “EN 15081” "Industrial valves – Mounting kits for part-turn valve actuator attachment"
- "Industrial valves – Actuators – Part 1: Terminology and definitions of actuators for industrial valves"
- "Industrial valves – Actuators – Part 2: Electric actuators for industrial valves – Basic requirements"
- "Industrial valves – Actuators – Part 3: Pneumatic part-turn actuators for industrial valves – Basic requirements"
- "Industrial valves – Actuators – Part 4: Hydraulic part-turn actuators for industrial valves – Basic requirements"

EN 15081:2007 was published in October 2007. The CEN members have until the end of April 2008 to implement this standard. The four other draft standards are working documents. They have not yet been submitted to any formal procedure. They are still under development within CEN/TC 69/WG 1/SG 10.

The ISO - International Organization for Standardisation

ISO (from the Greek word “ISOS” for “equal”) co-ordinates the work of the national standards institutes of 157 countries via a Central Secretariat in Geneva, Switzerland

Standard ISO 5211: 2001 “Industrial valves - Part-turn actuator attachments”

The standard specifies requirements for the attachment of part-turn actuators, with or without gearboxes, to industrial valves.
(Not all valves and actuators have to conform to this standard)

The standard specifies:

Flange dimensions necessary for the attachment of part-turn actuators to industrial valves or to intermediate supports.
Drive component dimensions of part-turn actuators so they can be attached to the driven components.
Torque reference values for the defined interfaces and couplings.

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ISO 5210 deals with multi-turn interfaces

DIN - Deutsches Institut für Normung e. V.

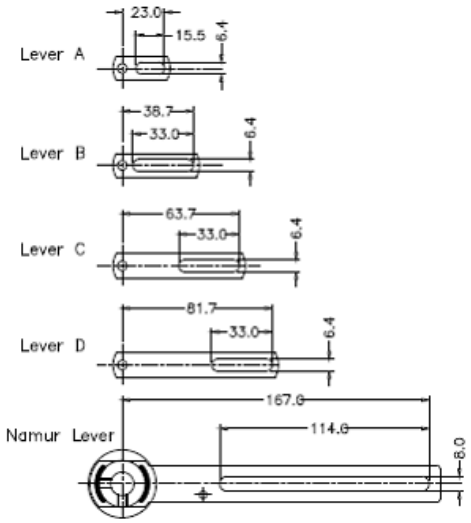
DIN 3337 defines a 45 degree offset for the actuator output drive that is used in conjunction with ISO 5211 mounting.

VDI/VDE 3845/3847 and the NAMUR interface enable users to interchange switchboxes, solenoids, position transmitters and positioners as they wish.

Many users would also like to have completely interchangeable valves and actuators but this still could be some way off unless potential conflicts between ISO 5211 and "prEN 15081" are resolved.

Linear Valve Mounting Kits

Linear valves, such as control valves, globe valves, knife gate valves, or diaphragm valves, do not always conform to the standard mounting patterns defined in VDI/VDE 3845 or 3847 and are not often supplied with a Namur solenoid interface. Therefore, custom designed mounting kits are necessary to attach monitoring and control devices to the actuators. To simplify matters the ancillary equipment can be supplied with a slotted drive lever and the solenoid can be supplied as part of an integrated switch and solenoid assembly.



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