Σ SIGMA
LOGISTIC SOLUTIONS
Leading Provider of Support Information Solutions

Contact Details:
Tel.   012 348 9222
Email.   info@sigmalog.co.za

Release Date:
13 May 2019

Press Release

The Importance of Good Technical Illustrations
"Why do we need illustrations when a photograph will do?"

The Technical Illustrator
The technical illustrator is a specialist whose skills complement the technical author to help inform and instruct the reader of the technical manual. From the early days when all illustrations were produced at a drawing board using pen and ink, today's technical illustrator uses software such as Adobe Illustrator, Arbortext IsoDraw, and Corel Designer to create sophisticated, line-based, visual material.
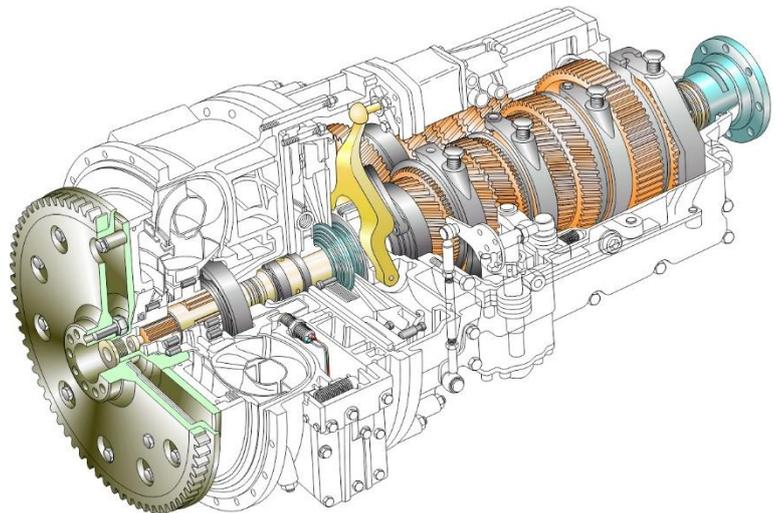
The technical illustrator has at his disposal many techniques to help the reader to understand the product or process. There are the choice of flat views, perspective views or parallel line/isometric views; the choice of full cutaways or partial cutaways; the use of ghosting, shading or colour; and the use of different line weights. Each of these elements has a vital role to play in conveying information to the reader, and in lifting the quality of the visual image above that of using just a plain digital photograph.

The technical illustrator's skills also spread into the manipulation of digital photographs and scanned images through image software such as Adobe PhotoShop.

The Exchange of Information
In the old days illustrations were created from scratch using engineering drawing, photographs, and sketches. An important aspect of the digital age is the ability that once digital information has been created, it can be reworked, added to or amended using other software.

SIGMA LOGISTIC SOLUTIONS (PTY) LTD
Directors : KM Mokoape (Chairman), WC Swanepoel (Managing), PB van der Merwe

For example, a CAD designer can design a component in software such as SolidWorks, AutoCAD or ProEngineer and this information can then be imported into an illustrating program where it can be rotated as required, the manufacturing information removed, and shading and annotations added for it to be used in a maintenance manual. This offers major cost and time savings.

The CAD data also usually contains all the component information (e.g. fasteners, seals etc.) allowing the technical illustrator to dissect or explode the parts and the assembly order for use in parts manuals or prescriptive text as required.
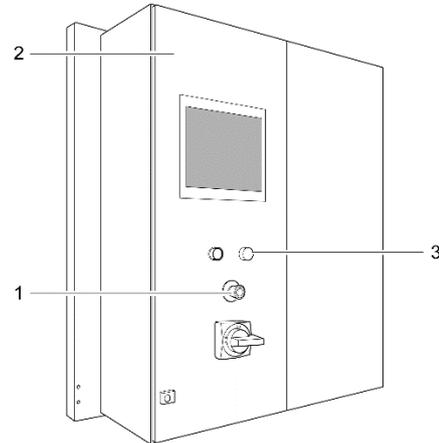
Perspective and Isometric Views

Reality is viewed in perspective – where items that are further away from the viewer appear smaller, items that are closer appear larger, and where there may be one or more vanishing points. Although this approach can be used for technical illustrations, it is usually preferable to use a parallel line approach, otherwise known as an isometric view. The isometric view is the most commonly used method for displaying spatial objects in technical illustrating.

Using an isometric view, the object or assembly is drawn at a 45° angle allowing components to be extracted, exploded, and reused multiple times without the size, angle or perspective changing.

In addition, when drawn to scale, all measurements and the sizes of objects have a direct relationship to each other – meaning large items appear larger than smaller items regardless of how far away they are from the centre of the object.
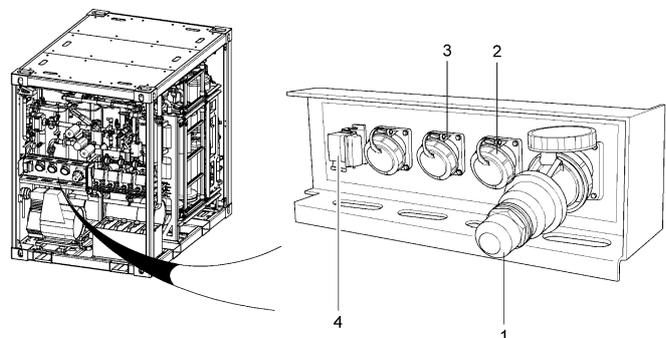
Being able to reuse common items or items already constructed in isometric view, saves time and effort and allows the items to be used across multiple illustrations and manuals.

A Perspective View
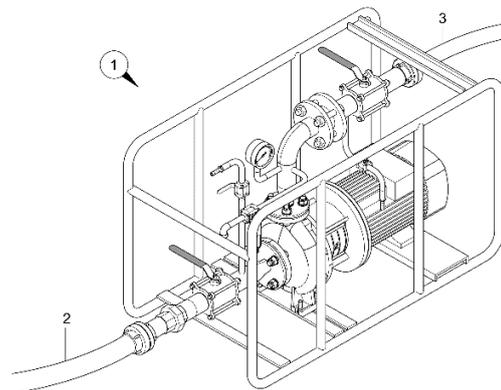
An Isometric View

Isometric and Perspective Views Used Together

Cutaways, Ghosting, and Exploded Views

The technical illustrator uses partial cutaways or full cutaways to peek under the skin of an item to reveal the components that lie beneath. When source material from a CAD model is used, this is much easier as the orientation and location of all the items that lie beneath the skin is accurate.

Ghosting is similar technique to using a cutaway but instead of actually cutting away the outer cover, it is made transparent or partially transparent to reveal the items underneath. For example the bonnet of a car could be ghosted to reveal the engine underneath or the car doors could be ghosted to reveal the seats and the interior. Due to the time and cost involved in preparing ghosted images, ghosting is usually employed on items such as cover artwork, posters and promotional material, not specifically in technical manuals.

Exploded views are typically used in illustrated parts catalogues to show the relationship of parts to one another, and in maintenance manuals to show the sequence of assembly or disassembly of parts. In an isometric illustration, parts are exploded or moved along an assembly line or axis in sequence.
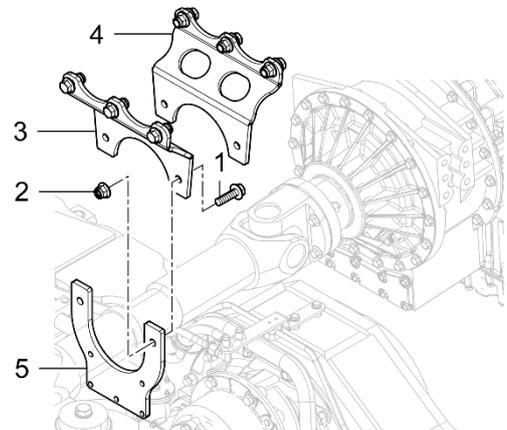
Line Weights, Callouts, Annotations, and Emphasis

The technical illustrator uses differing solid line weights to convey shape and form to line art. The "thick and thin" technique uses two line weights – thick lines are typically used for the outline of the object and thin lines for the surface detail. The specific line weights vary per specification or company style guide but thick lines are typically twice the thickness of the thin lines. Dashed lines are used to show centre lines and axes along which items are exploded.

Annotation lines or leader lines are used to link items in the illustration with numbered annotations or explanatory text. In good technical illustrations, where an annotation line passes over detail on the illustration, a white shadow is applied to the line to create a "drop out" to distinguish the annotation line from the illustration itself (see item 3 on the "Callout" illustration).
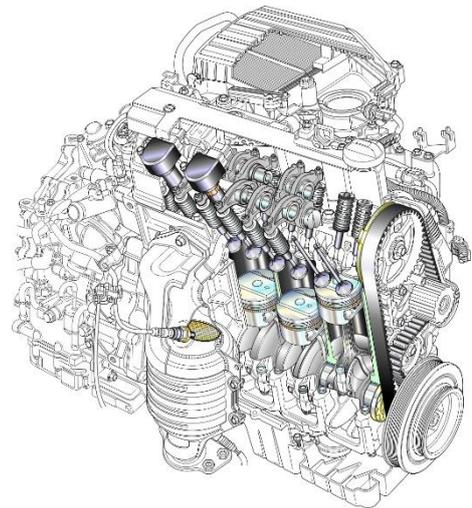
A Partial Cutaway

A Ghosted View with Annotations and Different Line Weights
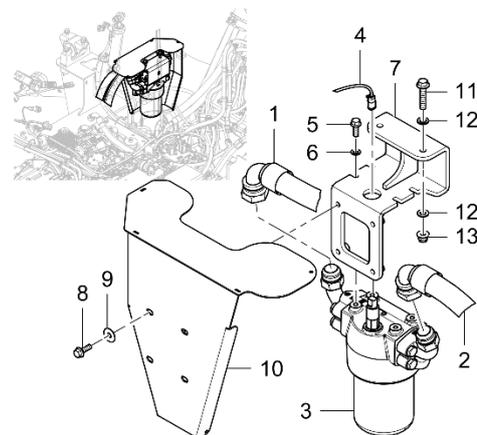
An *Exploded View with Annotations and a Ghosted Corner Location View*

Callouts are an enlarged section of an illustration that allow more detail to be shown. These may be placed in a circle or square and are linked to the callout area on the illustration by an annotation line or 'comet'. Callouts add value to the illustration and assist the reader.

The experienced technical illustrator can also add a lot more emphasis and interest to an illustration, if allowed to do so, with the subtle use of colour, shading, patterning, and highlights on threads and curved items.

A Callout with Annotations

Working With the Technical Author

The technical illustrator and the technical author work together to the benefit of the client and the end-user of the manual. The author identifies the illustrations, type of views, and annotations that he or she requires to accompany the text. The illustrator discusses the requirements with the author to find the best way of depicting the information, especially when callouts or detailing is required.
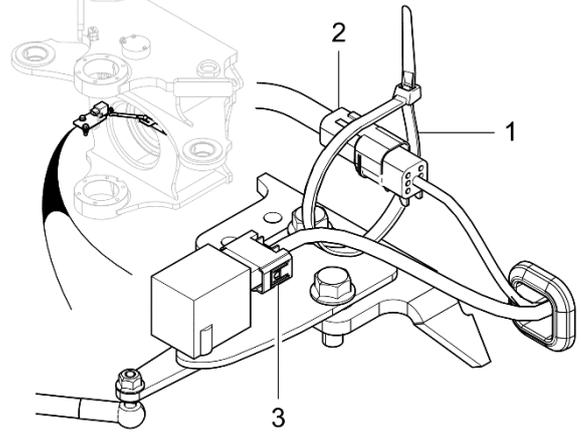
The illustrator searches existing material, libraries, CAD models, and then traces or creates the illustration from scratch to accurately portray the author's requirements.

The Final Word

It could be argued that creating technical illustrations is expensive and that digital photographs will often be sufficient. Unfortunately the digital photograph can itself suffer from quality issues (lighting and exposure) and does not photocopy well. Another important issue is that photographs are difficult to amend if changes have been made in the design, and photographs reflect reality – showing perspective and magnifying lens distortions (e.g. wide angle lenses cause converging vertical lines, and zoom lenses compress distance) – neither of which is suitable in good technical manuals.

A trained technical illustrator brings to the table a wealth of experience in how best to portray the views required by the technical author. The illustrator's artwork lifts the quality of the technical manual to another level – one that reflects the quality of the product, and adds value and ease-of-use to the end-user.

Sigma Logistic Solutions has been providing technical documentation solutions to the commercial and defence industries for more than 30 years. We are the largest dedicated supplier of technical documentation services in South Africa and count Armscor, the SANDF, PRASA, and Bell equipment among our many local clients; and Rheinmettal Air Defence, Kärcher, and Pilatus among our international clients.