



EO-3[®] – A World First

The innovative fitting system with visual assembly status recognition for tube and hose applications

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



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A New Fittings System

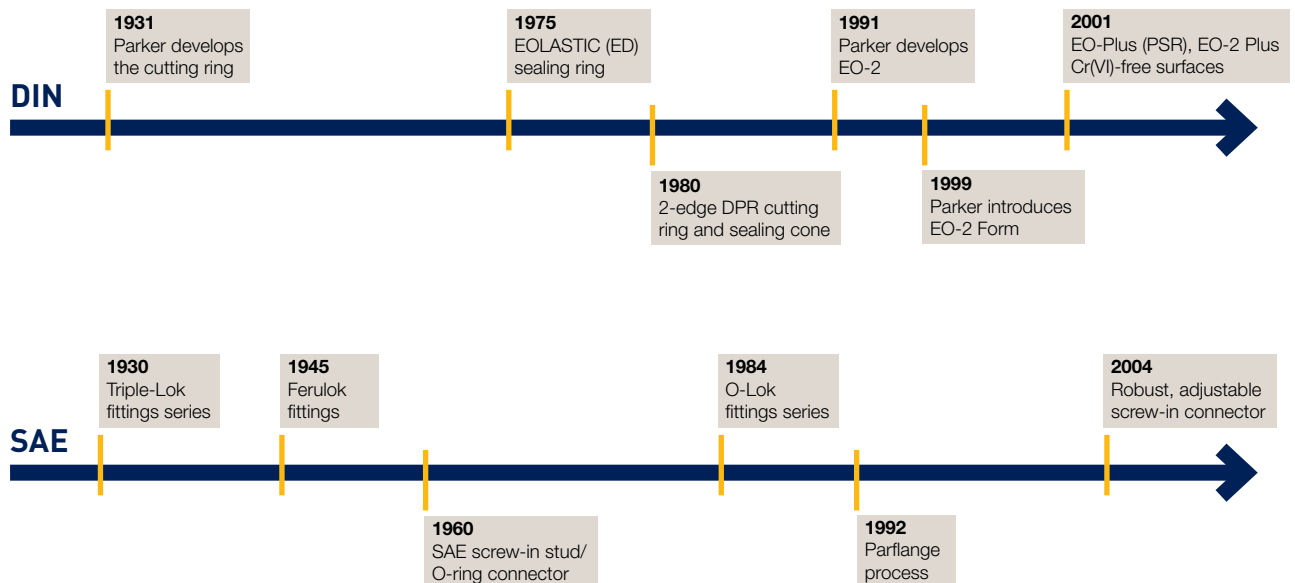
Just what the world of technology has been waiting for

As a connector component, any fitting is only as good as the effectiveness of the assembly process and therefore depends on how it has been assembled. In recent years, new geometries and material compositions have increasingly improved performance, reliability and ease of assembly. In this field Parker has constantly set new standards in the marketplace.

With the development of the EO-3° fitting, Parker now introduces another very important milestone in the history of connector technology. Our customers' practical experience provided the impetus for the development of the EO-3° system with the message that potential assembly errors, such as over- or under-tightening, should be eliminated. Practical experience often shows that fittings are in large part not expertly assembled. Changing personnel, inexperienced personnel, a shortage of skilled workers and increasingly difficult installation conditions lead to failed assemblies. The consequences are leakage, costly downtime and expensive reworking – or even accidents.

The advantages of the new fitting are clearly apparent with its greater simplicity, speed and safety. With its new thread technology, EO-3° can be assembled more easily and faster than other commercially available fittings systems and the assembly outcome of EO-3° is, for the first time ever, easily discernible from the outside; every user is now in a position to directly control work safety and machine reliability.

A tradition of one innovation after another



EO-3[®] – The Optimum System

Many applications can benefit from it

“Fit and forget” is a familiar slogan that was selected by Parker for its Ermeto connector systems. It is an expression which is still as valid as ever. Both the decades-long experience with fittings technology for high-pressure applications and also the intensive information exchange with users from a wide variety of industries, deliver the basic concept for the new EO-3[®] technology. Furthermore, the basic technical advantages of a variety of connector systems were analysed and brought together in the EO-3[®] system.

Application areas for EO-3[®]:



Users can secure a whole raft of money – saving advantages when they install EO-3[®] fittings:

- Leakage can be prevented with the help of unambiguous assembly inspection
- Distinctly increased machine performance and reliability
- EO-3[®] meets the increased safety and quality requirements now in force
- Additional costs of reworking are substantially avoided
- EO-3[®] increases the quality of the end-product
- Company image is enhanced due to better products
- No oil loss – an important contribution to environmental protection



These arguments support the immediate installation of EO-3[®] in a very wide range of operating conditions – whether energy, agriculture, paper machinery or oil and gas extraction; the EO-3[®] system will satisfy the highest requirements for quality and function. “Fit and forget” sums it all up.



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Clear to See Arguments

This is EO-3[®]



Indicator ring for unambiguous assembly outcomes

- Gives security to the assembler
- Leakage due to over- or under-tightening is prevented



A connector for tubing and hose lines

- A reliable system for many applications



Safer, more rapid assembly due to lower expenditure of energy

- A taper thread as the new thread standard
- Reduction of assembly time



Optimum safety due to tearout-proof connector technology

- Machine tube forming with EO forming technology



Compact design

- Smaller nut spanner sizes in comparison with traditional standards
- Ideal in restricted access conditions



Sealing ring cannot be lost or damaged

- Soft seal integrated in the cone
- Elastomer seal with optimum sealing behaviour, even with high dynamics in the system
- Increased safety due to the fact that loss of, or damage to, the seal is prevented



No torque spanner or extension required

- Tool costs reduced, assembly accelerated



Easy access when installation space restricted

- Octagonal instead of standard hexagonal nut from tube size 25 mm and up

EO-3[®] – Technical Advantages

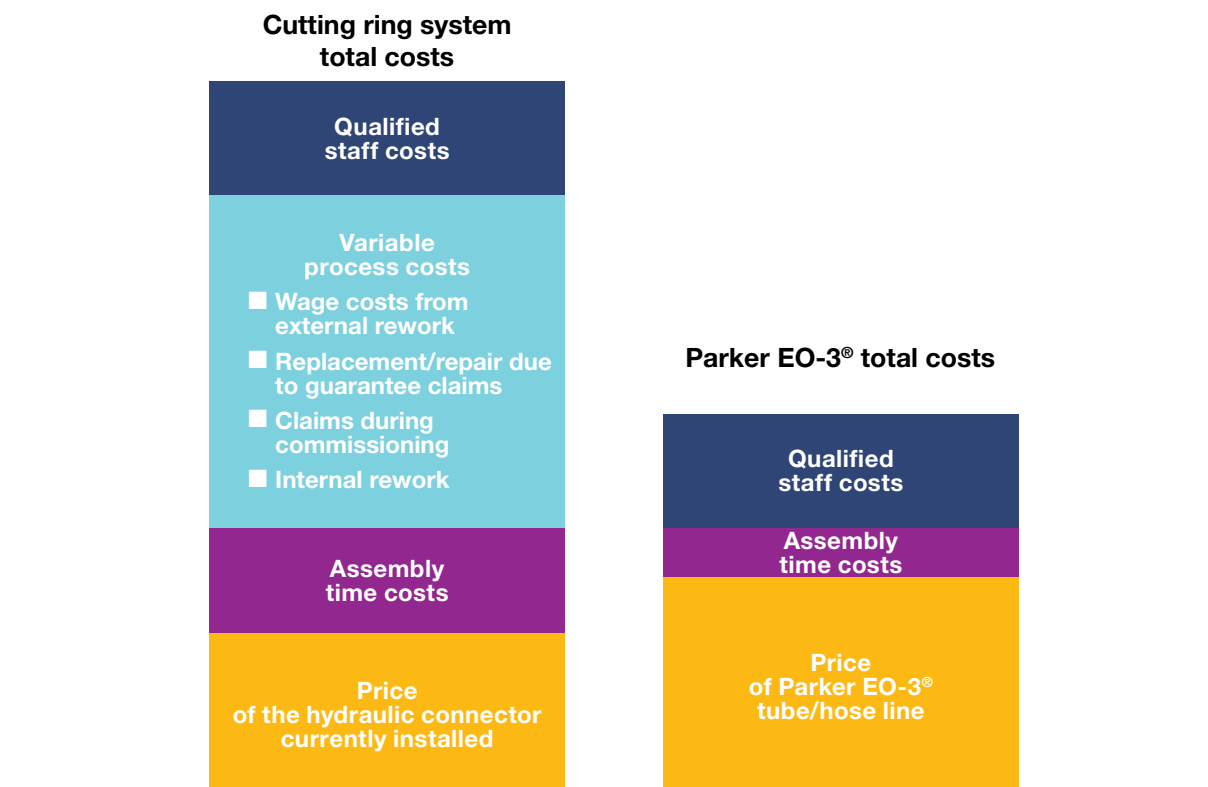
Worth significant cash savings

Customer benefits from installing Parker EO-3[®]

Further important components for the analysis of the total cost reduction are:

- Internal rework due to incorrect assembly
- External rework, e.g. guarantee claims

These instances are analysed and calculated together with the customer.



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EO-3[®] – Weld-less Tube Lines

Energy-efficient forming technology for tubing connections

EO-3[®] connections are formed with the proven F3 WorkCenter. This machine is fully automatic and is designed for practical use in workshops. Thanks to its high-performance hydraulic drive and robust forming tools, this machine works very reliably.

At the front of the machine there is a tool magazine in which the tools can be easily viewed and kept clean. Additional tool racks are not required. Special additional tools facilitate machine set-up and tool change. Thanks to automatic tool recognition the user needs only to press the start button for the tube to be converted to the appropriate form in one single pass.



The F3 WorkCenter

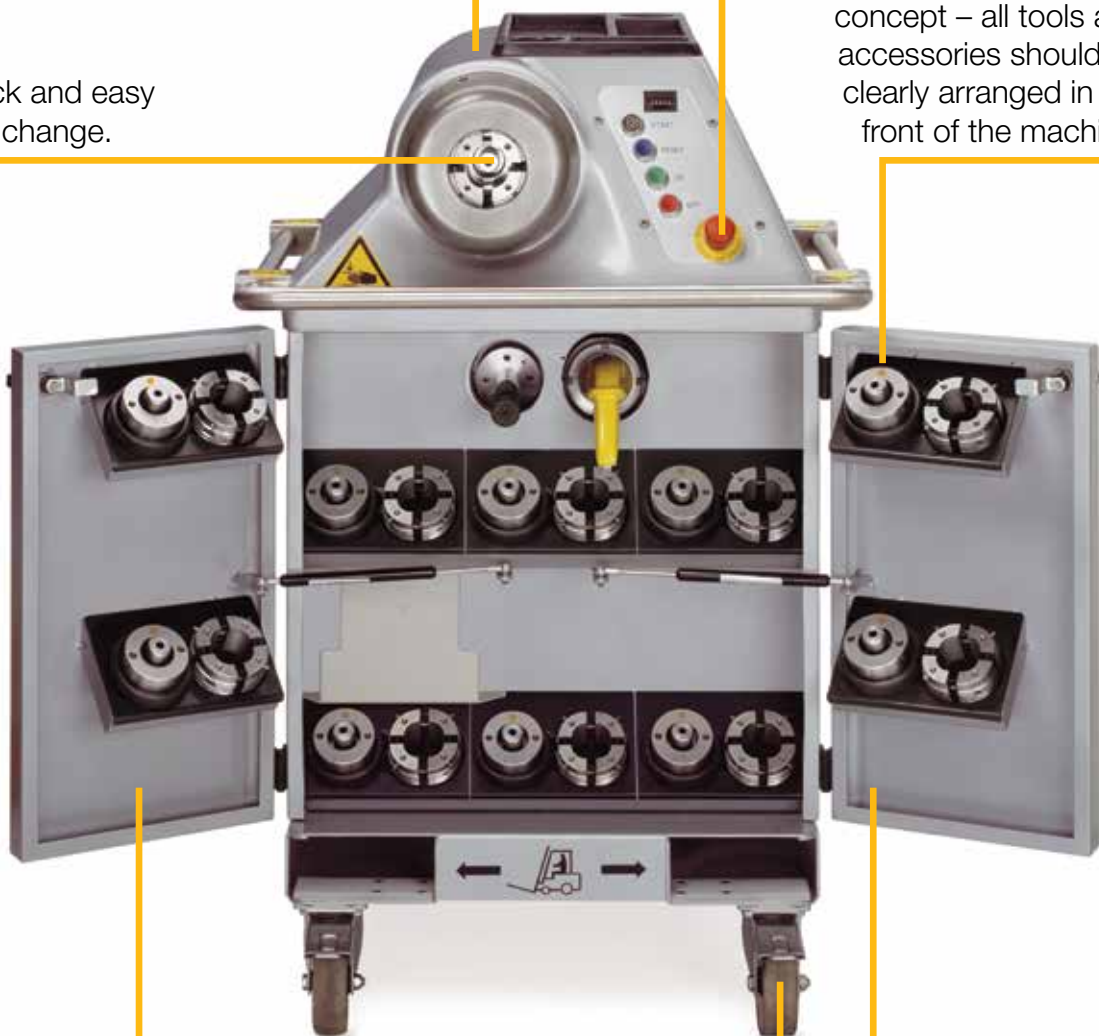
Convincing advantages in operation

Ideal for restricted space conditions. The compact clamping tool also permits the forming of short tube ends with tight bend radii.

Only press start button and the machine does the forming operation. Finish with the “zero position” or “reset” functions.

Quick and easy tool change.

The WorkCenter concept – all tools and accessories should be clearly arranged in the front of the machine.



Saves time and money compared with classical welding.

Easy and safe transportation thanks to casters and handling rail.

Clean – the EO-3® forming process operates cleanly and safely.

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EO-3® – Assembly Status Recognition

Visible target leads to good management

“Do you have a consistent and mandatory procedure for assembly operations in your team?”

“How do you actually operate the assembly process – do you follow a manufacturer’s recommendations?”

“How do you check whether the assembly operation has been correctly carried out?”

These are some of the typical questions we ask our customers during practical assembly training. The answers are many and varied – just like the assembly outcomes which we check when doing field work. In many companies assembly is by “good feeling”. Sometimes it has a solid base of many years’ experience but often depends on how things

are on the day and on qualifications for the job. Making matters worse are awkward installation conditions due to poor access and lack of assembly space. Technical problem analysis frequently reveals the same old problem – assembly! Under- and over-tightening and even loose connections are typical assembly errors. It is even more exasperating when these problems are not discovered during final inspection and come to light only after delivery. Accurate error statistics are rarely available but the number of unreported cases here is very high.



EO-3® assembled hand-tight



Yellow window completely visible after final assembly



Contours in the indicator rings for the drag ring function



During over-tightening the yellow window remains in place through the drag ring effect

These experiences guided us to develop with EO-3® a fitting system that easily and unambiguously shows assembly status that is visible all-round from the outside. This puts every user in the position where he can assemble with precision and establish the quality of connections very rapidly; finally, he also has the possibility of visual acceptance at the end of the assembly conveyor.

EO-3® – repair and maintenance

Applicable and replaceable practically anywhere



EO-3® offers a reliable connection solution also in cases of repair or repeat assemblies. The practical technician has only to simply tighten the EO-3® connector and check whether the viewing window is full. In these cases the yellow viewing window is also a clear signal for a professionally executed assembly process.

For repair purposes it can be necessary to resort to other fittings systems available in the DIN or SAE standard ranges. In such a case an EO-3® adaptor makes up the connection.



EO-3[®] – Technology Overview

Flexible in application

- EO-3[®] system – for tube connections and hose applications
- Tube sizes – all the common tube outside diameters from 06 mm to 42 mm with the commercially available tube wall thicknesses
- Series – EO-3[®] dispenses with standard series classification of LL, L and S
- Pressure rating – uniformly 420 bar for all tube sizes. Exceptions are typical L series such as 22, 28, 35, 42 at 250 bar. Qualification of pressure ratings corresponds to ISO 8434 requirements
- Tube connector thread standard – taper thread specially developed by Parker for EO-3[®]. Flank and taper dimensions are exactly matched to assembly performance (i.e. stroke and force) and also to the tear-out and shear resistance of a tube connector
- Fitting material – steel
- Tube material – conventional hydraulic steel tube material, e.g. E235 (ST37) or E355 (ST52.4) standard to DIN EN 10305-4
- Elastomer material – NBR
- Surface treatment – Parker chromium6-free corrosion protection
- Temperature resistance – -40 °C to +120 °C (analogous to NBR)
- Media compatibility – analogous to NBR material
- Energy efficiency – via matched bores with improved flow properties



Please see further details
in our CAT/4131 catalogue
www.parker.com/eo3

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EO-3[®] – Worth Knowing

Any questions? Here are the answers!

Is the viewing window always reliable, even when I over-tighten EO-3[®]?	Yes! If the viewing window is in the right position, both rings turn further in synchronisation due to the drag ring function. “Over-assembly” should not be confused here with “destroy”. It only means that more force than necessary was applied.
Can I over-assemble EO-3[®]?	See above. An “up to block position” provides a mechanical assembly stop. “Assemble till destroyed” is thereby virtually eliminated.
How does EO-3[®] behave during repeat assembly?	The repeat assembly process functions reliably. The indicator function remains in place, albeit the necessary effort and actual assembly stroke can differ, depending on the first assembly. Furthermore, there is no wear or widening of the internal cone.
Can I re-assemble a connector which has been over-tightened?	Yes, with over-assembly the indicator rings show the position of the last assembly. If the fitting is undone and then assembled again, the function of assembly indication remains intact.
Assembly is relatively easy – can EO-3[®] now also be loosened more quickly?	The loosening moments have a relationship with the assembly moments and are therefore lower. If the assembly is correct, loosening during operation cannot occur. This has been verified with dynamic testing of both tube and hose connections.
How does EO-3[®] behave when there are hose movements, especially torsion?	Hose assembly must be such that relative motion of machine components does not produce twisting.
Is the forming of EO-3[®] comparable with EO2-FORM?	Yes, both are positive-locking systems. Differences exist in the form of the seal. With EO2-FORM the sealing ring is fitted onto the tube. With EO-3 [®] an O-ring is already inserted into the fitting body.
Is the sealing ring in the fitting sufficiently protected from mechanical influences?	Yes, the O-ring is housed in the fitting body and is very well protected.
Does EO-3[®] remain leak-proof even when the O-ring is damaged?	Yes. Long-lasting hydraulic sealing with a damaged or missing O-ring can nevertheless be assured. For a permanently hostile situation the O-ring should be changed.
What are the temperature properties of the indicator ring?	The indicator rings are made from glass-reinforced polyamide. This material is suitable for temperatures from -40 °C up to +120 °C.
How media resistant are the indicator rings and the yellow viewing window?	The ozone-resistant indicator rings do not come into contact with the hydraulic medium due to the fact that they are situated on the outside of the fitting. But environmental media must be allowed for. The indicator rings are resistant to mineral oils and fats, water and popular detergents.
What can be done if the indicator ring in a manufactured hose or tube assembly is missing or destroyed?	The connector can be assembled without performance reductions like a sealing cone connector. The assembly indication function however is no longer operative.

Is EO-3° compatible with existing systems?	EO-3° can be connected to established DIN systems via an adaptor. In other respects EO-3° has its own technical standard.
Is the indicator ring ozone-resistant?	Yes, the indicator ring is manufactured from black, ozone-resistant polyamide. Adverse effect by ozone is not critical, because the indicator ring has no primary sealing function.
What do I do in the event of a repair if no EO-3° is available?	Either the whole tube/hose assembly including the screw-in connector should be exchanged or an EO-3° norm adaptor employed.
Do I still need a torque spanner for assembly?	No! This tool is no longer required. The fitting can be assembled by eye (or by sight).
Can I actually assemble faster?	Yes, because of the taper thread the nut can be screwed on with fewer turns.
How does EO-3° behave if the tube or hose line is not 100% aligned?	EO-3° can better compensate for alignment errors than DIN fittings. Thanks to the taper thread, the hose or tube connector can also be assembled when small alignment errors are present.
Must I specially prepare the tube end?	Tube preparation is identical to that for DIN or SAE fittings. (See assembly instructions).
Has the port thread also changed?	No - the screw-in side follows the usual standards and norms.
How and how long should EO-3° be stored?	Storage capabilities: dry and dust-free. Exclusion of light and ozone because of the seal. Under optimum conditions NBR seals can be stored for 5 years and FKM for 10 years.
Which tubing can I use for EO-3°?	Steel tubing, seamlessly cold drawn and bright annealed to DIN EN ISO 10305-4.
Can stainless steel tubing be utilised?	EO-3° is for now only available in steel.
Can EO-3° be over-painted?	Yes, but assembly inspection should take place before painting because the colour markings of the indicator rings would also be over-painted.
Can painted EO-3° connectors be repeat assembled?	Yes, with painted EO-3° connectors the original assembly position can again be recognised. Assembly has been correctly carried out when the paint completely fills the viewing window and no other unpainted areas are visible.

Parker Worldwide



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