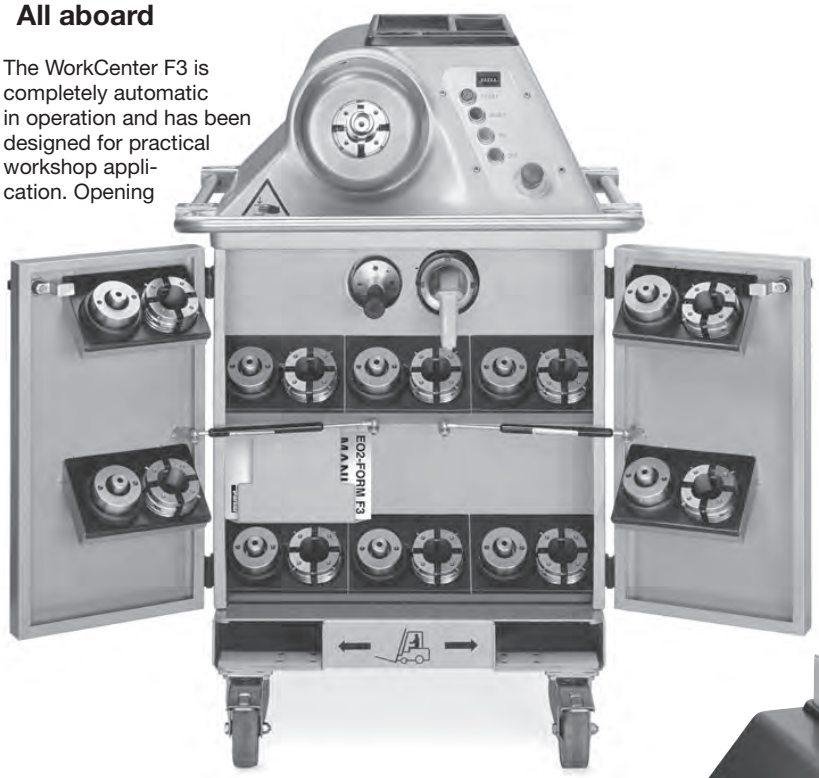
The WorkCenter F3

All aboard

The WorkCenter F3 is completely automatic in operation and has been designed for practical workshop application. Opening the doors turns the machine into a totally equipped WorkCenter. The tool storage area is located in the front – the tools are neatly laid out and easily viewed. No other workbenches or tool racks are required. Special convenient-to-handle tools make the machine set-ups and tool changes easier. Thanks to automatic tool recognition, the operator has only to press the start button, whereupon the tube is formed into the correct shape in one pass. This means that EO2-FORM connections are extremely simple to manufacture. The WorkCenter F3 is so reliable because of its powerful hydraulic drive and robust forming tools.



- Workshop machine for universal use
- 6 to 38/42 mm tube OD
- Cycle time approx. 20 seconds
- Especially advantageous for: Hydraulic presses, cranes and lifts, heavy machinery, shipbuilding, offshore and hydraulic steelworks

The WorkCenter PRO22

Mass production without tears

The WorkCenter PRO22 is based on proven EO2-FORM technology and was specially designed for the economic production of EO2-FORM tube fittings. Compared with the WorkCenter F3, the PRO22 production machine works considerably more efficiently and can machine tighter tube bends. Because of its powerful drive and efficient cooling, continuous mass production on a shift-work basis is provided for. In addition, the machine is especially quiet and vibration-free in operation. Small to medium tubes from 6 to 22 mm can be accommodated on the new machine. The compact assembly head enables even tight tube bends to be machined.

- Production machine for economical and fail-safe manufacturing
- 6 to 22 mm tube OD
- Cycle time approx. 6 seconds
- Advantageous for applications such as: manufacturers of agricultural machinery, construction machines, trucks, fork lift trucks and other mass-produced hydraulic equipment



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EO-KARRYFORM

Lightweight. Portable. Cost Saving.

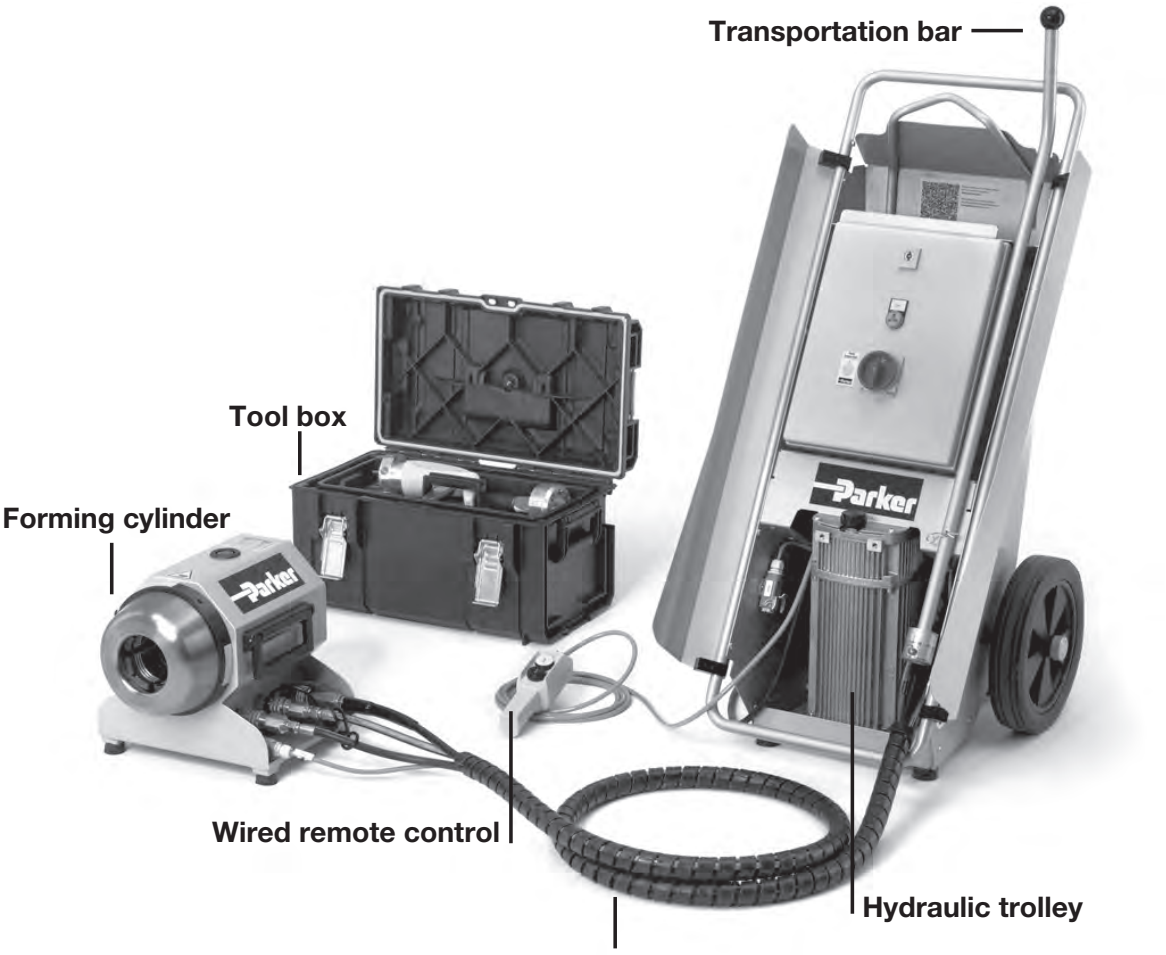
With the portable EO-KARRYFORM forming machine tear-out resistant tube connectors in steel and stainless steel can be done directly at the point of installation.

The EO-KARRYFORM can produce tubes with outside diameters ranging from six to 42 mm. The EO-KARRYFORM consists of a hydraulic drive unit in a mobile trolley and a forming cylinder, which can be safely connected by means of Parker hydraulic hoses and quick couplings. The tools, consisting of clamping dies and forming pins plus insertion tools, are transportable separately in a dedicated tool box. This lightweight machine, weighs approximately 135 kg, allowing it to be quickly and safely transported in, for example, a suitable van to the assembly point.

The EO-KARRYFORM concept is cost saving because F3 and PRO22 WorkCenter tools can also be used for forming processes. Cycle time is approximately 20 seconds and the smallest 180° elbow is 115 mm. This new machine can be easily deployed for both mobile service on-site directly at the assembly point, and also for conventional workshop operation.

- Portable machine for the production of tear-out tube connections
- 6 to 38/42 mm tube OD
- Cycle time approx. 20 seconds
- Benefical for: Workshops, directly at the assembly point

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WorkCenter F3, PRO22 and EO-KARRYFORM

Technical Data	
Machine	**WorkCenter F3, PRO22 and EO-KARRYFORM**
Designated use	Cold forming of tube ends for tube connections
Method	Axial swaging
Suitable for	EO tube fittings to DIN EN ISO 8434-1
	Hose Connections to DIN 71550
Tube specification	
Steel tubing	E235 / ST37.4; E355 / ST52.4
Stainless steel tubing	1.4571
Other materials	CuNiFe, duplex and others on request
Boiler tube	Tubes for turbine construction on request
Tools	Interchangeable
Forming die sets	“MF3” single part forming die sets, one type for each tube OD
Forming pin	“BF3” forming pin with inner mandrel, one type each per tube OD, wall thickness and material
Function	
Tool change	Manual
Setting	WorkCenter: Automatic tool recognition and pressure setting EO-KARRYFORM: Pressure setting acc. to pressure table
Tube clamping	Hydraulic
Forming	Hydraulic
Controls	Automatic sequence: after pressing START button: Clamp – form – withdraw – unclamp
Environmental conditions	
Working temperature	WorkCenter: +10 … +50°C EO-KARRYFORM: +10 ... +40°C
Relative humidity	Msc. 90%, non-condensing

Type	WorkCenter F3	WorkCenter PRO22	EO-KARRYFORM
Specifications			
Type	Universal workshop machine	Powerful production machine	Portable forming machine
Design	WorkCenter	WorkCenter	Portable machine for repair and workshop tasks
Application	Alternative to welding	Efficient mass production	Alternative to welding
Weight	Approx. 330 kg	Approx. 375 kg	Hydraulic drive unit: 69 kg Forming cylinder: 67.5 kg Tool box: approx. 10 kg
Dimensions (L×B×H)	660 × 800 (open: 1,300)×1,150	660 × 800 (open: 1,300)×1,200	Drive Unit: 500 x 600 x 1200 Forming cylinder: 330 x 420 x 325 Tool box: 335 x 550 x 310 Length of hydraulic hoses: 3150
Electrical supply	400 V, 50 Hz, 3 phase 230 V, 50 Hz, 3 phase 440 V, 60 Hz, 3 phase	400 V, 50 Hz, 3 phase	230 V, 50 Hz, 1 phase
Electric motor drive rating	4 kW	4 kW	1.1 kW
Oil cooler	Optional	Standard	—
Performance data			
Steel tube	6×1 ... 38×7/42×4	6×1 … 20×2/22×2	6×1 ... 38×5/42×4
Stainless steel tube	6×1 … 38×5/42×3	6×1 … 20×2/22×2	6×1 … 38×4/42×3
Minimum width U-bend	Approx. 135 mm	Approx. 100 mm	Approx. 115 mm
Cycle time	15–20 sec.	Ca. 6 sec.	15–20 sec.
Economic production quantitiy	Max. 100 formings/hour Max. 200 forming/hour (with oil cooler)	Max. 600 formings/hour	Max. 100 formings/hour
Applications	Ideal for project and workshop tasks, small batches and on-site installations. Tubes of all sizes.	Economic mass production of small to medium tube dimensions	Ideal for repair, installation projects and workshop tasks for small batches. Tubes of all sizes.

Features, advantages and benefits

1. **Process / Product concept** – The EO2-FORM technology is not a stand-alone machine or a new fitting system. It is a product extension of the EO-2 range which has existed since 1993. Exactly the same, proven seal elements are used.

2. **Workcenter concept** – All tools, handling devices, lubricants and the operator manual are well organised inside the machine. Once the doors are opened, the machine turns into a stand-alone workcenter for tube preparation. On the top shelf, there are practical compartments for rules, pens, lubricant and standard EO-boxes with nuts and sealing rings. No additional workbenches or shelves for tooling are required.

3. **Easy operation** – One single START-button is all that needs to be operated to run a forming cycle completely. No “zero position” or “reset” activities have to be performed in-between two forming cycles. For efficient mass production, a foot switch is available. A label on the machine head shows all operation steps in pictograms and all important dimensions in charts.

4. **Easy tool change** – An ergonomic, pistol-like device allows quick and easy change of the one-piece clamping die set without opening the forming head or even touching the tools. Another handle speeds up the setup process of the forming pin in the bayonet mechanism.

5. **Easy handling** – Standard tools and one set of EO-2 sealing rings are suitable for all common hydraulic tube dimensions. No special sleeves are required for thin wall or small diameter tube.

6. **Well organised** – All tools and accessories are well organised in a practical compartment inside the machine housing. Nothing gets dirty, lost or confused.

7. **Easy transport** – The machine is equipped with heavy duty wheels so that it can be moved around by one person without hard work or additional equipment. Special attachments for crane and forklift truck transport are standard. A reeling serves as handle, protection and attachment for fixing belts when transported by truck. Tools and all accessories are safely and cleanly stored inside.

8. **Easy logistics** – EO2-FORM uses the same components as EO-2. Special sets of nuts and sealing rings can be ordered with one part number (FORM …). This reduces ordering effort and contributes to achieve availability with optimum inventory.

9. **Stainless steel capabilities** – Forming pins for stainless steel tubes are specially designed for optimum forming results and surface coated for maximum lifetime. All forming pins for stainless steel tube are marked with a blue dot. Clamping dies can be used for both, steel and stainless steel tube.

10. **Approved functional system** – EO2-FORM has been on market for years. It is approved for use in shipbuilding, offshore industry, hydraulic water lock systems, press and crane manufacturing, heavy mobile equipment and general machine building. EO2-FORM is tested and approved from authorities like German Lloyd, DNV or from end-users like Daimler-Chrysler.

11. **Cost saving** – Compared to welding or brazing, EO2-FORM are much less time consuming. Special tube preparation and finishing are not necessary. Cold forming uses only a fraction of the energy needed for brazing or welding.

12. **Superior vibration resistance** – The process achieves a smooth structural transformation of the tube wall. There are no sharp edges or notches to reduce the vibration resistance.

13. **Superior mechanical strength** – The working contact area of the EO2-FORM connection is the flat front surface of the metal support ring which is made of heat-treated, high-strength steel or stainless steel. This provides superior mechanical strength without settling, loosening or need for re-tightening.

14. **Universal** – The WorkCenter can cold-form all common steel and stainless steel tube materials for hydraulic pipework. Even exotic materials such as Cu-NiFe or Duplex can be formed. The tools cover metric tube sizes from 6 to 42 mm OD.

15. **Short tube ends** – The compact clamping device and special dies are suitable for machining complex tube bends.

16. **Noise/energy loss reduction** – The process results in a smooth inner contour of the tube. Minimum pressure drop, heat and noise is created. No hidden corners allow the accumulation of air, dirt or other sources of trouble.

17. **Clean** – The process is environmental clean and safe. As no heat is used, hazards from fumes or heat do not occur.

18. **Zinc plated tubing** – The process allows the use of zinc-plated tubing. The costs of cleaning or painting are saved.

19. **Quality** – Tube clamping and tool functions are fully automated. Proper joint geometry and seal dimensions are achieved by using standard EO-2 sealing rings. Therefore high and consistent quality is achieved without manual adjustment.

20. **Proven Technology** – Since 1993, millions of EO-2 fittings have operated worldwide under heavy duty conditions, providing leak-free hydraulic systems.

21. **No restrictions** – The process allows to use EO-2 elastomeric sealing technology even for applications where bite-type connectors are not permitted by safety standards, for example hydraulic presses, cranes, lifts or ship canal systems locks.

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WorkCenter for EO2-FORM high pressure tube connections

Machine Type	Order code F3	Order code PRO22	Order code EO-KARRYFORM
WorkCenter basic unit for forming tube ends, ready to operate with magnetic gripper, holder and operator's handbook, but without tools, packed in a special transportation box			
Universal F3 WorkCenter Tube OD 6–38/42 mm 400 V, 50 Hz, 3 phase 230 V, 50 Hz, 3 phase 440 V, 60 Hz, 3 phase Rental (monthly usage) Leasing (24 leasing rate)	 EO2FORMF3400V EO2FORMF3230V EO2FORMF3440V EO2FORMF3RENTFEE EO2FORMF3LEASEFEE	 EO2FORM400VPRO EO2FORMPRORENTFEE EO2FORMPROLEASEFEE	
Mobile transportable device Tube OD 6-38/42 mm 230 V, 50 Hz, 1 phase Rental (monthly usage) Leasing (24 leasing rate)			 EOKARRYFORM230V EOKARRYFORMRENTFEE EOKARRYFORMLEASEFEE
Accessories Type	**Order code F3**	**Order code PRO22**	**Order code EO-KARRYFORM**
Lubrication for forming pin: EO-NIROMONT Liquid lubricant in a brush-in-cap (250 cc) 0.25 L bottle EO-NIROMONT 1L re-fill pack EO-NIROMONT	 EONIROMONTAPPLICATOR EONIROMONTFLUESSX LUBSS	 EONIROMONTAPPLICATOR EONIROMONTFLUESSX LUBSS	 EONIROMONTAPPLICATOR EONIROMONTFLUESSX LUBSS
Oil cooler kit	F3/COOLERKIT	included	–
Foot switch	F3/FOOTSWITCH	F3/FOOTSWITCH	F3/FOOTSWITCH
Magnetic gripper for forming pin	F3/PINHOLDER	F3/PINHOLDER	F3/PINHOLDER
Holder for forming die set	F3/DIEHOLDER	F3/DIEHOLDER	F3/DIEHOLDER
Clamping segments for die set	F3/DIECLAMP	F3/DIECLAMP	F3/DIECLAMP
Clamping segment spring Ø 8 mm	F3/DIECLAMPSPRING8	F3/DIECLAMPSPRING8	F3/DIECLAMPSPRING8
Clamping segment spring Ø 12 mm	F3/DIECLAMPSPRING12	F3/DIECLAMPSRING12	F3/DIECLAMPSRING12
Operation manual: UK, DE, FR, IT, SWE	4033	EO2FORMPRO/MANUAL	4034
Standard preventive maintenance	EO2FORMF3/INSPECTION	EO2FORMF3/INSPECTION	EOKARRYFORM/INSPECTION

WorkCenter are shipped in special containers which should be kept for future transports to avoid damage. Please don't dispose the transport boxes!

Machine housing Type	Order code F3	Order code PRO22	Order code EO-KARRYFORM
Top machine cover	F3/HEADCOVER	F3PRO/08836014	–
Top tray	F3/TOPTRAY	F3/TOPTRAY	–
Door lock for tool compartment	F3/DOORLOCK	F3/DOORLOCK	–
Door hinge	F3/DOORHINGE	F3/DOORHINGE	–
Shock absorber for doors	F3/DOORSPRING	F3/DOORSPRING	–
Tool tray for inner tool compartment (top), 6×	F3/TOOLTRAYIN	F3/TOOLTRAYIN	–
Tool tray for inner tool compartment (bottom), 6×	F3/0883611	F3/0883611	–
Tool tray for tool compartment in doors, 2×	F3/TOOLTRAYDOOR	F3/TOOLTRAYDOOR	–
Die insert for tool tray (use screw M6)	F3/TOOLTRAYPIN	F3/TOOLTRAYPIN	–
Holder for magnetic gripper	F3/PINHOLDERTRAY	F3/PINHOLDERTRAY	–
Holder for holder	F3/DIEHOLDERTRAY	F3/DIEHOLDERTRAY	–
Plastic guide for forklift (use screw M6)	F3/FORKGUIDE	F3/FORKGUIDE	–
Front wheel with lock	F3/FRONTWHEEL	F3/FRONTWHEEL	–
Rear wheel	F3/BACKWHEEL	F3/BACKWHEEL	–

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Sticker Type	Order code F3	Order code PRO22	Order code EO-KARRYFORM
Door label	F3/STICKERPARKER	F3PRO/STICKERPARKER	–
Short instructions on side	F3/STICKERINSTRUC	F3PRO/STICKERINSTRUC	–
Lubrication on front	F3/STICKERLUB	F3/STICKERLUB	–
Crane attachment (1 piece)	F3/STICKERCRANE	F3/STICKERCRANE	–
Forklift on front	F3/STICKERFORK	F3/STICKERFORK	–

Operation panel Type	Order code F3	Order code PRO22	Order code EO-KARRYFORM
Front panel counter	F3/FRONTCOUNTER	F3/FRONTCOUNTER	–
“START” switch (black with symbol)	F3/STARTSWITCH	F3/STARTSWITCH	–
“RESET” switch (blue)	F3/RESETSWITCH	F3/RESETSWITCH	–
“ON” switch (green)	F3/ONSWITCH	F3/ONSWITCH	–
“OFF” switch (red)	F3/OFFSWITCH	F3/OFFSWITCH	–
Emergency stop switch (red)	F3/STOPSWITCH	F3/STOPSWITCH	–

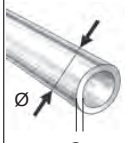
Tool Components Type	Order code F3	Order code PRO22	Order code EO-KARRYFORM
Bayonet bolt for forming pin	F2/PINBOLT	F2/PINBOLT	F2/PINBOLT
Screw for clamping die segments	F3/DIESCREW	F3/DIESCREW	F3/DIESCREW
Spare part kit for clamping die set (4× Pin Ø4, 4× Spring Ø8, 4× Spring Ø12, 4× Screws)	F3/DIEKIT	F3/DIEKIT	F3/DIEKIT

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WorkCenter for EO2-FORM high pressure tube connections

Clamping die set MF3EO2





Forming pin BF3EO2



Tube O.D. Ø	Clamping dies for steel tubes Order code	Clamping dies for stainless steel tubes Order code	Ø × s	Forming pin for steel tubes Order code	Forming pin for stainless steel tubes Order code[1)2)]
06-L/S	MF3EO2P306	MF3EO2P306	06×1.0 06×1.5 06×2.0	BF3EO206X1S BF3EO206X1.5S BF3EO206X2S	BF3EO206X1SS BF3EO206X1.5SS
08-L/S	MF3EO2P308	MF3EO2P308	08×1.0 08×1.5 08×2.0 08×2.5	BF3EO208X1S BF3EO208X1.5S BF3EO208X2S *BF3EO208X2.5S*	BF3EO208X1SS BF3EO208X1.5SS
10-L	MF3EO2P310	MF3EO2P310	10×1.0 10×1.5 10×2.0	BF3EO210LX1S BF3EO210LX1.5S BF3EO210LX2S	BF3EO210LX1SS BF3EO210LX1.5SS BF3EO210LX2SS
10-S	MF3EO2P310	MF3EO2P310	10×1.5 10×2.0 10×3.0	BF3EO210SX1.5S BF3EO210SX2S *BF3EO210SX3S*	BF3EO210SX1.5SS BF3EO210SX2SS
12-L	MF3EO2P312	MF3EO2P312	12×1.5 12×2.0	BF3EO212LX1.5S BF3EO212LX2S	BF3EO212LX1.5SS BF3EO212LX2SS
12-S	MF3EO2P312	MF3EO2P312	12×1.5 12×2.0 12×3.0	BF3EO212SX1.5S BF3EO212SX2S *BF3EO212SX3S*	BF3EO212SX1.5SS BF3EO212SX2SS
15-L	MF3EO2P315	MF3EO2P315	15×1.0 15×1.5 15×2.0	BF3EO215X1S BF3EO215X1.5S BF3EO215X2S	 BF3EO215X1.5SS BF3EO215X2SS
16-S	MF3EO2P316	MF3EO2P316SS	16×2.0 16×2.5 16×3.0	BF3EO216X2S *BF3EO216X2.5S* *BF3EO216X3S*	BF3EO216X2SS *BF3EO216X2.5SS* *BF3EO216X3SS*

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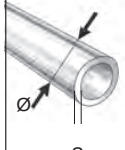
WorkCenter for EO2-FORM high pressure tube connections

Tube O.D. Ø	Clamping dies for steel tubes Order code	Clamping dies for stainless steel tubes Order code	Ø × s	Forming pin for steel tubes Order code	Forming pin for stainless steel tubes Order code[1)2)]
18-L	MF3EO2P318	MF3EO2P318SS	18×1.5 18×2.0	BF3EO218X1.5S BF3EO218X2S	BF3EO218X1.5SS BF3EO218X2SS
20-S	MF3EO2P320	MF3EO2P320SS	20×2.0 20×2.5 20×3.0 20×3.5	BF3EO220X2S *BF3EO220X2.5S* *BF3EO220X3S* *BF3EO220X3.5S*	BF3EO220X2SS *BF3EO220X2.5SS* *BF3EO220X3SS*
22-L	MF3EO2P322	MF3EO2P322SS	22×1.5 22×2.0	BF3EO222X1.5S BF3EO222X2S	BF3EO222X1.5SS BF3EO222X2SS
25-S	*MF3EO2P325*	*MF3EO2P325SS*	25×2.0 25×2.5 25×3.0 25×4.0	*BF3EO225X2S* *BF3EO225X2.5S* *BF3EO225X3S* *BF3EO225X4S*	*BF3EO225X2SS* *BF3EO225X2.5SS* *BF3EO225X3SS*
28-L	*MF3EO2P328*	*MF3EO2P328SS*	28×2.0 28×2.5 28×3.0	*BF3EO228X2S* *BF3EO228X2.5S* *BF3EO228X3S*	*BF3EO228X2SS* *BF3EO228X2.5SS*
30-S	*MF3EO2P330*	*MF3EO2P330SS*	30×2.5 30×3.0 30×4.0 30×5.0	 *BF3EO230X3S* *BF3EO230X4S* *BF3EO230X5S*	 *BF3EO230X3SS* *BF3EO230X4SS*
35-L	*MF3EO2P335*	*MF3EO2P335SS*	35×2.0 35×2.5 35×3.0	*BF3EO235X2S* *BF3EO235X3S*	*BF3EO235X2SS* *BF3EO235X2.5SS* *BF3EO235X3SS*
38-S	*MF3EO2P338*	*MF3EO2P338SS*	38×3.0 38×4.0 38×5.0 38×6/7	*BF3EO238X3S* *BF3EO238X4S* *BF3EO238X5S* *BF3EO238X6+7S*	*BF3EO238X3SS* *BF3EO238X4SS* *BF3EO238X5SS*
42-L	*MF3EO2P342*	*MF3EO2P342SS*	42×2.0 42×3.0	*BF3EO242X2S* *BF3EO242X3S*	*BF3EO242X2SS* *BF3EO242X3SS*

Tools for hose connection DIN 71550

Clamping die set MF3EO-2





Forming pin BF3EO-2



Tube O.D. Ø	Clamping dies for steel and stainless steel tubes Order code	Ø × s	Forming pin for steel tubes Order code	Forming pin for stainless steel tubes Order code[1)2)]
10	MF3EO2P310	10×1.5	BF3DIN7155010X1.5S	
12	MF3EO2P312	12×1.5	BF3DIN7155012X1.5S	BF3DIN7155012X1.5SS
15	MF3EO2P315	15×2.0	BF3DIN7155015X2S	
18	MF3EO2P318	18×1.5	BF3DIN7155018X1.5S	
20	MF3EO2P320	20×2.5	BF3DIN7155020X2.5S	
22	MF3EO2P322	22×1.5	BF3DIN7155022X1.5S	BF3DIN7155022X1.5SS
25	MF3EO2P325	25×2.0	BF3DIN7155025X2S	BF3DIN7155025X2SS
28	MF3EO2P328	28×1.5 28×2.0	BF3DIN7155028X1.5S	BF3DIN7155028X1.5SS BF3DIN7155028X2SS
30	MF3EO2P330	30×1.5		BF3DIN7155030X1.5SS
32	MF3EO2P332	32×1.5	BF3DIN7155032X1.5S	
35	MF3EO2P335	35×2.0		BF3DIN7155035X2SS

Tool compatibility:

***Italic* = Tools for EO2-FORM F3 WorkCenter**
Regular = Tools for EO2-FORM F3 and PRO22 WorkCenter

Tool lifetime
Assembly tools are subject of wear and must be regularely (max. 50 assemblies) cleaned and checked (Checking instructions see chapter E). Worn out tools can cause dangerous assembly failures and must be replaced in time. Maximum lifetime can be achieved by following factors:

Please select clamping die and forming pin according to tube dimension and material.

1) All forming pins for stainless steel tubing are marked with a blue dot on front surface.
2) Stainless steel tools are TiN coated.
Clamping die sets which are only used for stainless steel tubes should be marked with the blue dot sticker to avoid use with steel tube.

- Regular cleaning and checking
- Clean and corrosion-protected storage
- Proper de-burring and cleaning of tube end
- Proper tool selection and operation
- Use of specified lubricant

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