



# WorkCenter F3, PR022 and E0-KARRYFORM for E02-FORM



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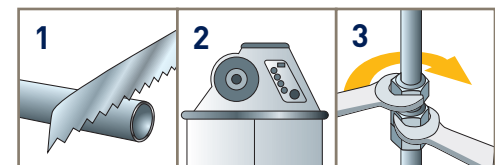
# The systematic forming process

## EO2-FORM – the positive-locking high-pressure tube fittings

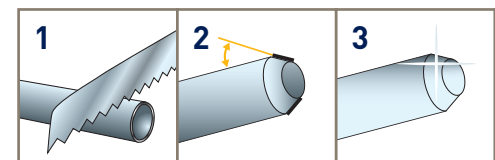
Nowadays many hydraulics users are benefitting from the freedom of leakage and enormously high pressure resistance of the EO-2 connector. EO2-FORM is an attractive solution for high-pressure tube fittings, bringing together as it does all the advantages of brazing, welding and well-proven EO-2 technology. Load capacity and low tightening torques are achieved by means of this special cold-forming process. Like EO-2, EO2-FORM with their permanent soft-sealing, also contributes to eliminating leak problems in fluid systems. Thanks to EO2-FORM technology, the soft-sealing EO-2 programme is even usable where cutting ring fittings are not usually employed – above all, where there are more demanding requirements for tear-out safety in water hydraulic steelworks, cranes, lifts and the offshore

industry. The EO2-FORM process is quicker and more convenient compared with welding or brazing. Neither specialised tube treatment, heating nor chemicals are needed. Furthermore, the EO-2 sealing ring is available in FKM material, enabling the connector to also be used for high temperatures or aggressive media.

- **Positive-locking fitting with high operational safety.**
- **Approved for safety-important areas such as: hydraulic presses, cranes, lifts and hydraulic steelworks.**
- **Ideal alternative to the welding connectors used in shipbuilding, offshore and heavy machinery construction.**
- **Product family: same EO retaining nut and seal for EO-2 and EO2-FORM.**



The operations in the FORM process compared with conventional welding.



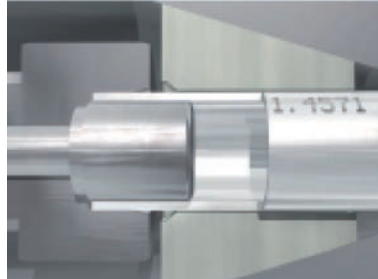


# The forming process

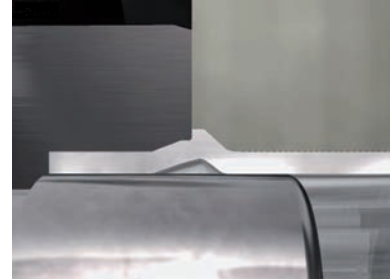
Forming instead of welding.



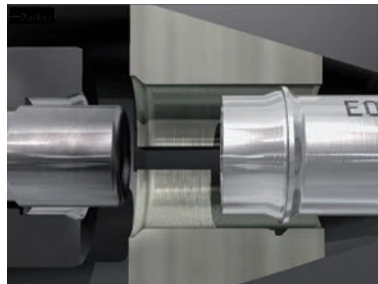
1. The tube end is prepared and fitted with an EO retaining nut.



2. The tube is inserted into the tools and the process started.

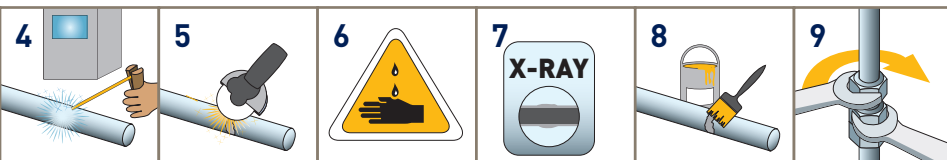
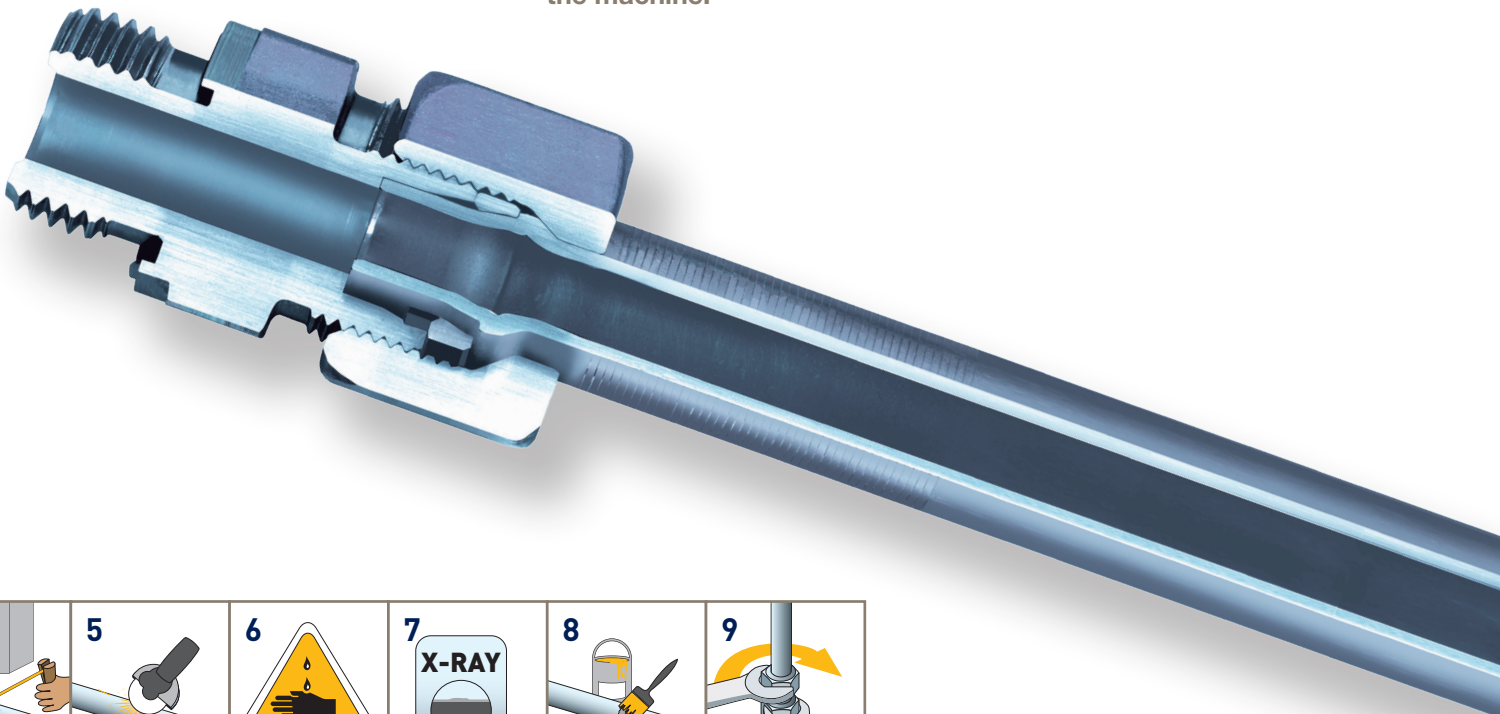


3. The contour of the termination is determined by the geometry of the tools. The forming process is completed.



4. The tube end is unclamped and can be removed from the machine.

Cutting sample of an EO2-FORM fitting



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# The E02-FORM WorkCenter F3

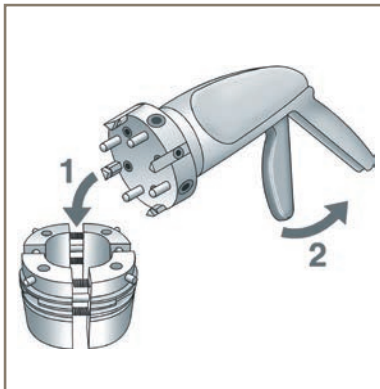
All aboard.

The E02-FORM 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 setups and tool changes easier. Thanks to automatic tool recognition,

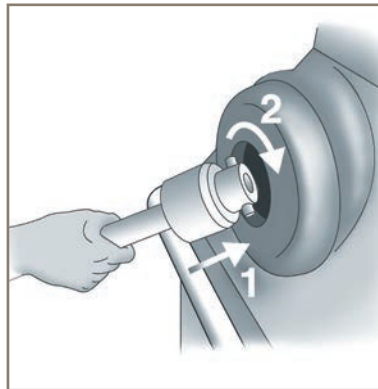
the operator has only to press the start button, whereupon the tube is formed into the correct shape in one pass. This means that E02-FORM connections are extremely simple to manufacture. The E02-FORM F3 is so reliable because of its powerful hydraulic drive and robust forming tools.



Convenient  
“one button operation“.



Practical pistol holder for simple change of forming die sets.

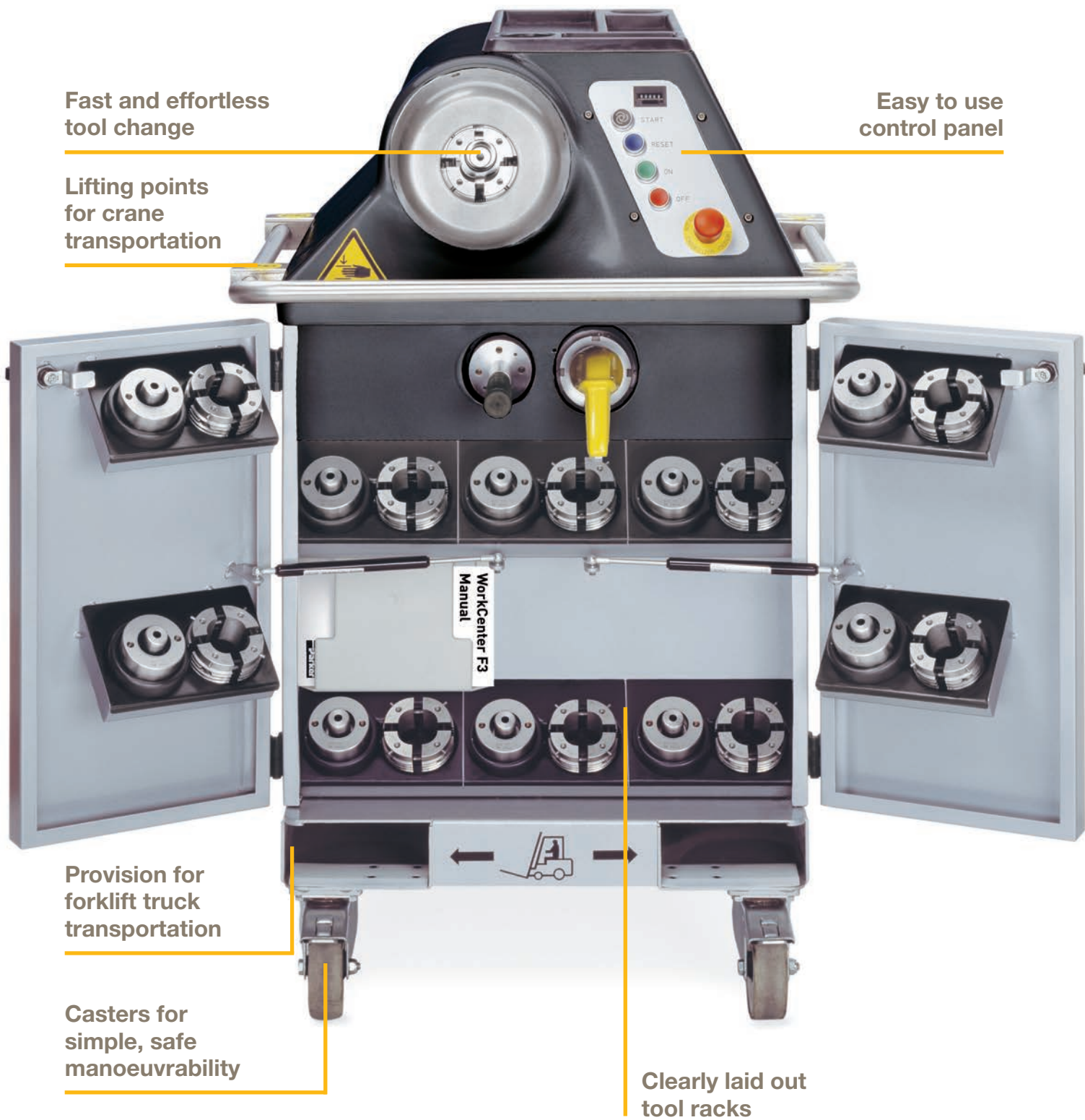


Bayonet fitting for secure insertion of the forming pin.



The machine can be easily integrated into any existing workshop set-up.

- 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.



Fast and effortless tool change

Easy to use control panel

Lifting points for crane transportation

Provision for forklift truck transportation

Casters for simple, safe manoeuvrability

Clearly laid out tool racks

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# The EO2-FORM WorkCenter PRO22

Mass production without tears.

The EO2-FORM 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 EO2-FORM F3 WorkCenter, the PRO22 production machine works considerably more efficiently and can machine tighter tube bends.

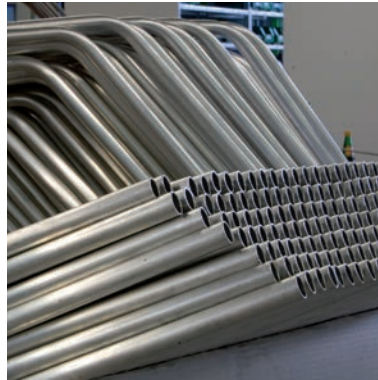
Because of its powerful drive and efficient cooling, continuous mass production on a shift-work basis is provided for. In addition, the machine is especially quiet and vibration-free in operation.



Oil sponge enables tube end to be moistened.



Excess oil and debris are collected in a drawer.



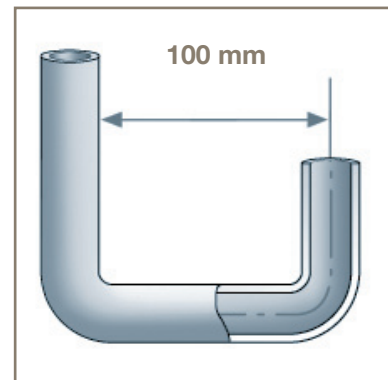
The WorkCenter is designed for professional series production.

## Freedom from leaks without high extra costs.

In mass production nowadays, cutting ring connectors, as well as EO-2, are still usually employed. Because of the increasing stress on securing freedom from leaks, such users are now also interested in positive-locking, soft-sealing solutions. EO2-FORM provides greater value-for-money than EO-2.

## Compact assembly head for tight tube bends.

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.



Also suitable for particularly tight tube bends.

- 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.

Practical storage area

Powerful oil cooler

Compact mounting head for forming tight tube bends

Oil sponge

Workpiece counter

Drawer

Rapid, quiet drive

Integrated tool storage area



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# EO-KARRYFORM forming machine

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 release 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.



Mobile hydraulic trolley



Usage of transportation bar



Wired remote control



Tool box

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



Transportation bar

Tool box

EO-KARRYFORM forming cylinder



Wired remote control

Hydraulic trolley

Parker hydraulic hoses with quick couplings

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# Technical data

E02-FORM F3 and PRO22	
<b>Machine</b>	
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
<b>Tube specification</b>	
Steel tubing	see Technical Handbook 4100, p. B15
Stainless steel tubing	see Technical Handbook 4100, p. B15
Other materials	CuNiFe, duplex and others on request
Boiler tube	Tubes for turbine construction on request
<b>Tools</b>	
Clamping die sets	Interchangeable "MF3" single part clamping 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
<b>Function</b>	
Tool change	Manual
Setting	Automatic tool recognition and pressure setting
Tube clamping	Hydraulic
Forming	Hydraulic
Controls	Automatic sequence: after pressing START button: clamp – form – withdraw – unclamp
<b>Environmental conditions</b>	
Working temperature	+10 . . . +50°C
Relative humidity	max. 90%, non-condensing



Type	E02-FORM F3	E02-FORM PRO22
<b>Specifications</b>		
Type	Universal workshop machine	Powerful production machine
Design	WorkCenter	WorkCenter
Application	Alternative to welding	Efficient mass production
Weight	approx. 330 kg	approx. 375 kg
Dimensions (B x L x H)	800 (open: 1,300) x 660 x 1,150	800 (open: 1,300) x 1,130 x 1,200
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
Electric motor drive rating	4 kW	4 kW
Oil cooler	Optional	Standard
<b>Performance data</b>		
Steel tube	6 x 1 . . . 38 x 7 / 42 x 4	6 x 1 . . . 20 x 2 / 22 x 2
Stainless steel tube	6 x 1 . . . 38 x 5 / 42 x 3	6 x 1 . . . 20 x 2 / 22 x 2
Minimum width U-bend	approx. 135 mm	approx. 100 mm
Cycle time	15 – 20 sec.	ca. 6 sec.
Economic production batch size	max. 100 formings/hour max. 200 formings/hour (with oil cooler)	max. 600 formings/hour
<b>Applications</b>		
	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.

# Technical data

	EO-KARRYFORM
<b>Machine</b>	
Designated use	Cold forming of tube ends for tube connections
Method	Axial swaging
Suitable for	EO2-FORM form fittings to DIN EN ISO 8434-1 Hose connections to DIN 71550
<b>Tube specification</b>	
Steel tubing	see Technical Handbook 4100, p. B15
Stainless steel tubing	see Technical Handbook 4100, p. B15
Other materials	CuNiFe, duplex and others on request
Boiler tube	Tubes for turbine construction on request
<b>Tools</b>	
Clamping die sets	Interchangeable "MF3" single part clamping 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
<b>Function</b>	
Tool change	manual
Setting	Pressure setting acc. to pressure table
Tube clamping	Hydraulic
Forming	Hydraulic
Controls	Automatic sequence by holding START button pressed: clamp – form – withdraw – unclamp
<b>Environmental conditions</b>	
Working temperature	+10 . . . +40°C
Relative humidity	max. 90%, non-condensing



	EO-KARRYFORM
<b>Type</b>	
<b>Specifications</b>	
Type	Portable forming machine
Design	Portable machine for repair and workshop tasks
Application	Alternative to welding
Weight	Hydraulic drive unit: 69 kg Forming cylinder: 67,5 kg Tool box: approx. 10 kg
Dimensions (B x L x H)	EO-KARRYFORM Hydraulic drive unit: 500 x 600 x 1200 EO-KARRYFORM Forming Cylinder: 330 x 420 x 325 Tool Box: 335 x 550 x 310 Length of hydraulic hoses: 3150
Electrical supply	230 V, 50 Hz, 1 phase
Electric motor drive rating	1.1 kW
<b>Performance data</b>	
Steel tube	ST37.4 6 x 1 . . . 38 x 5 / 42 x 4
Stainless steel tube	1.4571 6 x 1 . . . 38 x 4 / 42 x 3
Minimum width U-bend	approx. 115 mm
Cycle time	15 - 20 sec.
Economic production batch size	max. 100 formings/hour
<b>Applications</b>	
Ideal for repair, installation projects and workshop tasks for small batches. Tubes of all sizes.	



# Ordering machines and accessories

Machine Type	Order code F3	Order code PRO22
WorkCenter F3 basic unit for forming tube ends, ready to operate with magnetic gripper, holder and operator's handbook, but without tools, packed in a special transport box		
<b>Universal F3 WorkCenter</b> Tube OD 6-38/42mm 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
Lubrication for forming pin: EO-NIROMONT liquid (250 ccm) EO-NIROMONT liquid lubricant in a brush-in-cap can (250 ccm) EO-NIROMONT forming tool lubricant refill (1 L)	EONIROMONTFLUESSX EONIROMONTAPPLICATOR LUBSS	EONIROMONTFLUESSX EONIROMONTAPPLICATOR LUBSS
Oil cooler kit	F3/COOLERKIT	included
Foot switch	F3/FOOTSWITCH	F3/FOOTSWITCH
Magnetic gripper for forming pin	F3/PINHOLDER	F3/PINHOLDER
Holder for forming die set	F3/DIEHOLDER	F3/DIEHOLDER
Clamping segments for die set	F3/DIECLAMP	F3/DIECLAMP
Clamping segment spring, Ø 8 mm	F3/DIECLAMPSPRING8	F3/DIECLAMPSPRING8
Clamping segment spring, Ø 12 mm	F3/DIECLAMPSPRING12	F3/DIECLAMPSPRING12
Operation manual: UK, DE, FR, IT, SWE	4033	EO2FORMPRO/MANUAL
Standard preventive maintenance	EO2FORMF3/INSPECTION	EO2FORMF3/INSPECTION
<b>Machine housing</b>		
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/DOORSRING	F3/DOORSRING
Tool tray for inner tool compartment (top), 6x	F3/TOOLTRAYIN	F3/TOOLTRAYIN
Tool tray for inner tool compartment (bottom), 6x	F3/0883611	F3/0883611
Die insert for tool compartment in doors, 2x	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
<b>Sticker</b>		
Door label	F3/STICKERPARKER	F3/STICKERPARKER
Short instruction on side	F3/STICKERINSTRUC	F3/STICKERINSTRUC
Lubrication on front	F3/STICKERLUB	F3/STICKERLUB
Crane attachment (1 piece)	F3/STICKERCRANE	F3/STICKERCRANE
Forklift on front	F3/STICKERFORK	F3/STICKERFORK
<b>Operation panel</b>		
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
<b>Tool components</b>		
Bayonet bolt for forming pin	F2/PINBOLT	F2/PINBOLT
Screw for clamping die segments	F3/DIESCREW	F3/DIESCREW
Spare part kit for clamping die set (4x Pin Ø4, 4x Spring Ø8, 4x Spring Ø12, 4x Screws)	F3/DIEKIT	F3/DIEKIT

# Ordering machines and accessories

Machine	
Type	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 transport box	
<b>Mobile transportable device</b> Tube OD 6-38/42mm 230 V, 50 Hz, 1 phase Rental (monthly usage) Leasing (24 leasing rate)	EOKARRYFORM230V EOKARRYFORMRENTFEE EOKARRYFORMLEASEFEE
Lubrication for forming pin: EO-NIROMONT liquid (250 ccm) EO-NIROMONT liquid lubricant in a brush-in-cap can (250 ccm) EO-NIROMONT forming tool lubricant refill (1 L)	EONIROMONTFLUCESSX EONIROMONTAPPLICATOR LUBSS
Foot switch	F3/FOOTSWITCH
Magnetic gripper for forming pin	F3/PINHOLDER
Holder for forming die set	F3/DIEHOLDER
Clamping segments for die set	F3/DIECLAMP
Clamping segment spring, Ø 8 mm	F3/DIECLAMPSPRING8
Clamping segment spring, Ø 12 mm	F3/DIECLAMPSPRING12
Operation manual: UK, DE, FR, IT, SWE	4034
Standard preventive maintenance	EOKARRYFORM/INSPECTION
<b>Tool components</b>	
Bayonet bolt for forming pin	F2/PINBOLT
Screw for clamping die segments	F3/DIESCREW
Spare part kit for clamping die set (4x Pin Ø4, 4x Spring Ø8, 4x Spring Ø12, 4x Screws)	F3/DIEKIT

# Tools for E02-FORM F3, PRO22 and EO-KARRYFORM

Tube OD 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 <sup>(1) (2)</sup>
06-L/S	<b>MF3EO2P306</b>	MF3EO2P306	06 × 1.0 06 × 1.5 06 × 2.0	BF3EO206X1S BF3EO206X1.5S BF3EO206X2S	BF3EO206X1SS BF3EO206X1.5SS
08-L/S	<b>MF3EO2P308</b>	MF3EO2P308	08 × 1.0 08 × 1.5 08 × 2.0 <b>08 × 2.5</b> <b>BF3EO208X2.5S</b>	BF3EO208X1S BF3EO208X1.5S BF3EO208X2S	BF3EO208X1SS BF3EO208X1.5SS
10-L	<b>MF3EO2P310</b>	MF3EO2P310	10 × 1.0 10 × 1.5 10 × 2.0	BF3EO210LX1S BF3EO210LX1.5S BF3EO210LX2S	BF3EO210LX1SS BF3EO210LX1.5SS BF3EO210LX2SS
10-S	<b>MF3EO2P310</b>	MF3EO2P310	10 × 1.5 10 × 2.0 <b>10 × 3.0</b> <b>BF3EO210SX3S</b>	BF3EO210SX1.5S BF3EO210SX2S	BF3EO210SX1.5SS BF3EO210SX2SS
12-L	<b>MF3EO2P312</b>	MF3EO2P312	12 × 1.5 12 × 2.0	BF3EO212LX1.5S BF3EO212LX2S	BF3EO212LX1.5SS BF3EO212LX2SS
12-S	<b>MF3EO2P312</b>	MF3EO2P312	12 × 1.5 12 × 2.0 <b>12 × 3.0</b> <b>BF3EO212SX3S</b>	BF3EO212SX1.5S BF3EO212SX2S	BF3EO212SX1.5SS BF3EO212SX2SS
15-L	<b>MF3EO2P315</b>	MF3EO2P315	15 × 1.0 15 × 1.5 15 × 2.0	BF3EO215X1S BF3EO215X1.5S BF3EO215X2S	BF3EO215X1.5SS BF3EO215X2SS
16-S	<b>MF3EO2P316</b>	MF3EO2P316SS	16 × 2.0 <b>16 × 2.5</b> <b>16 × 3.0</b> <b>BF3EO216X3S</b>	BF3EO216X2S	BF3EO216X2SS <b>BF3EO216X2.5SS</b> <b>BF3EO216X3SS</b>
18-L	<b>MF3EO2P318</b>	MF3EO2P318SS	18 × 1.5 18 × 2.0	BF3EO218X1.5S BF3EO218X2S	BF3EO218X1.5SS BF3EO218X2SS
20-S	<b>MF3EO2P320</b>	MF3EO2P320SS	20 × 2.0 <b>20 × 2.5</b> <b>20 × 3.0</b> <b>20 × 3.5</b> <b>BF3EO220X3.5S</b>	BF3EO220X2S	BF3EO220X2SS <b>BF3EO220X2.5SS</b> <b>BF3EO220X3SS</b>
22-L	<b>MF3EO2P322</b>	MF3EO2P322SS	22 × 1.5 22 × 2.0	BF3EO222X1.5S BF3EO222X2S	BF3EO222X1.5SS BF3EO222X2SS
25-S	<b>MF3EO2P325</b>	MF3EO2P325SS	25 × 2.0 25 × 2.5 25 × 3.0 25 × 4.0	BF3EO225X2S BF3EO225X2.5S BF3EO225X3S BF3EO225X4S	BF3EO225X2SS BF3EO225X2.5SS BF3EO225X3SS
28-L	<b>MF3EO2P328</b>	MF3EO2P328SS	28 × 2.0 <b>28 × 2.5</b> <b>28 × 3.0</b>	BF3EO228X2S	BF3EO228X2SS <b>BF3EO228X2.5SS</b>
30-S	<b>MF3EO2P330</b>	MF3EO2P330SS	30 × 2.5 30 × 3.0 30 × 4.0 30 × 5.0	BF3EO230X3S BF3EO230X4S BF3EO230X5S	BF3EO230X3SS BF3EO230X4SS
35-L	<b>MF3EO2P335</b>	MF3EO2P335SS	35 × 2.0 35 × 2.5 35 × 3.0	BF3EO235X2S BF3EO235X3S	BF3EO235X2SS BF3EO235X2.5SS BF3EO235X3SS
38-S	<b>MF3EO2P338</b>	MF3EO2P338SS	38 × 3.0 38 × 4.0 38 × 5.0 38 × 6/7	BF3EO238X3S BF3EO238X4S BF3EO238X5S BF3EO238X6+7S	BF3EO238X3SS BF3EO238X4SS BF3EO238X5SS
42-L	<b>MF3EO2P342</b>	MF3EO2P342SS	42 × 2.0 42 × 3.0	BF3EO242X2S BF3EO242X3S	BF3EO242X2SS BF3EO242X3SS



#### Compatibility:

Orange = Tools for WorkCenter F3

Black = Tools for WorkCenter F3 and PRO22



# Tools for hose connection DIN 71550

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

Please select clamping dies and forming pin according to tube dimensions and material.

<sup>1)</sup> All forming pins for stainless steel tubing are marked with a blue dot on front surface.

<sup>2)</sup> Stainless steel tools are TiN coated.

Clamping die sets which are used only for forming stainless steel tubes should be marked with the blue dot sticker to avoid being used for steel tubes.

## Tool lifetime

Assembly tools are subject to wear and must be cleaned and checked regularly (after max. 50 assembly operations).

Worn tools can cause dangerous mis-assemblies and must be replaced in good time.

Long service life will be achieved by the following::

- Regular cleaning and lubricating
- Store protected from dirt and corrosion
- Careful deburring and cleaning of tube ends
- Correct tool allocation and operation
- Using recommended lubricant

# Hose connection diameters

Tube OD Ø	Wall thickness	Lx Steel	Lx Stainless steel	D1 max	D2 min	D2 max	L1
10	1.5	2.0		10.14	11	11.5	4.5
12	1.5	2.3	2.3	12.14	13	13.5	4.5
15	2.0	2.2	2.2	15.15	16	16.5	4.5
18	1.5	2.5		18.15	19	19.5	4.5
20	2.5	3.2	3.2	20.15	21	21.5	4.5
22	1.5	2.5	2.5	22.15	23	23.5	4.5
25	2.0		3.0	25.16	26	26.5	6.5
28	1.5	3.2	3.2	28.17	30	30.5	6.5
28	2.0		4.0	28.17	30	30.5	6.5
30	1.5		4.0	30.18	32	32.5	6.5
35	2.0		4.5	35.25	37	37.5	6.5

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