



Powering Business Worldwide

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1 Preliminary comments

1.1 Manufacturer of the unit

This operating manual is a constituent part of the scope of supply. We reserve the right to make changes to the data and illustrations referred to in this operating manual resulting from further technical development.

This manual contains information necessary for the proper setup and operation of the Mark IX series power swaging machines. This manual must be read and understood by the person (s) responsible for this equipment if functionality and long service life are to be assured.

Reprinting, translation, duplication and copying in any form, also as excerpts, require the prior written approval of the manufacturer.

This operating manual is not updated.

Manufacturer of the unit:
Eaton Industries LP
Hauptstrasse 150
53797 Lohmar
Germany
Phone: +49 (0)2246 1009101
www.eaton.com

1.2 Machine type, year built, serial number

Type: Mark IX Series Power Swaging Machine for hydraulic assembly

Year built: See type plate of machine

Serial number: See type plate of machine

1.3 Hazard and information symbols used

The following symbols are used in this operating manual.

- Q Note: Designates information for users.
- R Attention! Designates hazards through material damage
- S Danger! Designates hazards to life and limb for operators or third parties.

1.4 Warranty

The warranty of the machine is 24 months from purchase date.

Warranty becomes null and void

- If damages or malfunctions are caused by using spare parts that had not been approved by the manufacturer
- If damages or malfunctions occur through failure to comply with this operating manual if the unit is used in a way that had not been intended
- If damages or malfunctions occur through incorrect maintenance or repair work by persons who have neither been trained nor authorised to do this.

2 Scope of supply

The following components are included in the scope of supply:

- Power Swaging Machine
 - Including pump motor unit

Type specification:

4530-009S2	110/220 V	Single Phase/50 Hz
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- Power supply ready to plug
- Hydraulic unit filled with oil
- Documentation
 - Operating manual
- Breather cap
- Manual control valve handle

3 Appropriate use

This machine is designed expressly for the purpose of swaging Synflex approved couplings and hose together using appropriate Synflex die sets and pushers. Eaton Corporation cannot be responsible for property damage or personal injury that may result from swaging other brands of fittings and hose together nor from the intentional misuse of this device.

The unit has been designed for use in enclosed rooms.

The unit must be used and operated in accordance with the details given in this operating manual. Any other form of use in not appropriate and can lead to injury and material damage, including damage to the press.

4 Obligations of the owner

The owner of the unit must ensure that it is only used for the intended purpose so that hazards of all kinds to life and limb for the operators or third parties can be avoided.

The owner must ensure that the relevant accident prevention regulations and other safety-related rules are complied with.

The owner must ensure that the operating manual of the unit is accessible to the operator at all times. He must ensure that the operator has read the entire operating manual and has understood its contents.

The owner is to draw up a standard operating procedure in which the work flows at the unit are defined.

5 Safety information

- S It is forbidden to change the adjustment on the hydraulic valve block as this may change safety relevant speed settings.
- S Only suitably instructed operator personnel with the appropriate training may operate the unit.
- S Only suitably instructed service personnel with the appropriate training and using suitable tools may carry out repair and maintenance work on the unit.
- S The relevant applicable regulations concerning accident prevention and safety at work must be complied with during operation, maintenance and repair of the unit.
- S The electrical control box may only be opened by electrically instructed persons.
- S Any unexpected changes change the overall design and concept of the unit. It is therefore forbidden to convert or modify the unit on your own initiative.
- S If any defects or damage are found in the unit it may not be used any further until the defects have been corrected.

6 Residual risks

The unit was designed and manufactured to the current state of the technical art. Despite that, the following residual risks can still occur even during correct and appropriate use of the unit:

- The supply to the electrical control box is always live up to the main switch.

7 Labelling points

7.1 Warning sign "Warning of dangerous electrical voltage"



There are dangers from electrical voltages when opening the control panel and also the control cabinet of the unit.

Both control cabinets have the warning sign "warning of dangerous electrical voltage".

- S The control cabinet may only be opened by a trained electrician.

7.2 Prohibition sign "Machine only to be operated by one person"



There are dangers from operating the unit by two operators. Therefore the machine may only be operated by one person.

On the front side of the hydraulic cylinder there is a prohibition sign "Machine only to be operated by one person".

7.3 Warning sign "Warning of hand injury"



There are dangers from reaching into moving mechanical parts during operation or activating the hydraulic function during maintenance, cleaning etc.

On the front side of the hydraulic cylinder there is a warning sign "Warning of hand injury".

7.4 Type plate

The type contains the following information

- Type (Typ):
- Supply voltage (Spannung)
- Power (Leistung)
- Year built (Baujahr)
- Machine number (Masch. Nr.)
- CE marking

Typ:	CE
Spannung:	
Leistung:	
Baujahr:	
Masch. Nr:	
EATON Industries LP - Warehouse Lohmar- Hauptstr. 150 - 53797 Lohmar	

8 Technical data, factory settings, standards

8.1 Technical data

Designation	Value
Supply voltage	
4530-009S2	110/220V, single phase / 50Hz
Ambient temperature	10 – 35 °C
Weight	60,5 kg
Max. lowering speed (without pressing)	42,0 mm/s
Max. lowering speed (during pressing)	7,0 mm/s
Max. lifting speed	42,0 mm/s

8.2 Factory settings

The pressure relief valves on the Directive Control Valve block are adjusted at the factory.

- S Danger of injury! The adjustment of the relief valves determines the swaging speed and is therefore a safety relevant issue. It is forbidden to change the adjustment settings.

8.3 Standards

The contents of and information from the following directives and regulations are complied with in the design and construction of this unit:

- EN 982 Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics
- EN 1037 Safety of machinery - Prevention of unexpected start-up
- EN 60204-1 Safety of machinery - Electrical equipment of machines
- EN ISO 12100 Safety of machinery - General principles for design
- EN ISO 13849-1 Safety of machinery - Safety-related parts of control systems
- EN ISO 13849-2 Safety of machinery - Safety-related parts of control systems - Part 2: Validation
- EN ISO 14121-1 Safety of machinery - Risk assessment

9 Transport

9.1 Initial transport

- R Danger of Injury! The weight of the unit is 60,5 kg
The unit is delivered to the end customer in a pallet box.
To transport the unit safely proceed as follows:

- Use a use a fork lift truck or lifting carriage to transport the unit to the intended workplace

9.2 Transport to another place after first use

- R Danger of Injury! The weight of the unit is 60,5 kg
- Switch the unit off by pushing the "Power ON" switch to position "OFF"
 - Remove the breather cap from the hydraulic reservoir
 - Re-install the pipe plug to prevent loss of hydraulic fluid through the breather cap. Make sure the plug is well tightened.
 - Remove the fixing bolts to the workbench from the unit

- S Risk of tipping over! Risk of dropping! Do not leave the unit unbolted on the workbench.
 - One person: use a lifting jack / belt to lift the unit onto a pallet
 - Or: two persons: lift the unit onto a pallet with two persons
 - Fix the unit safely on the pallet
 - Use a use a fork lift truck or lifting carriage to transport the unit to the intended workplace

10 Initial installation and setup

10.1 Mechanical installation

To install the unit on a bench proceed as follows:

- Unpack the unit from the pallet box
- Prepare the workbench with appropriate boreholes to mount the unit

- R Risk of dropping! The weight of the unit is 60,5 kg. To place the unit on a workbench:

- One person: use a lifting jack / belt to lift the unit onto an appropriate workbench
- Or: two persons: lift the unit onto an appropriate workbench with two persons
- Install the bolts and tighten them

- S Risk of tipping over! Risk of dropping! Do not leave the unit unbolted on the workbench.

10.2 Breather cap installation

- R Danger of damage! Do not attempt to operate the unit without installing the breather cap.

To replace the pipe plug with the breather cap, proceed as follows

- Remove the pipe plug (1) from the hydraulic reservoir



- Install breather cap (2), found in the bag attached to the unit
- While installing the breather cap, check to insure that the hydraulic fluid level is near the top of the reservoir, (approximately 3 cm below the breather hole)



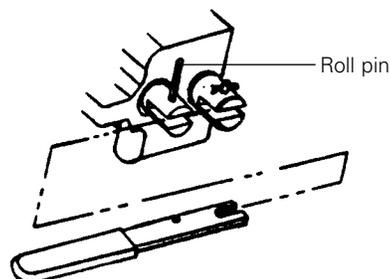
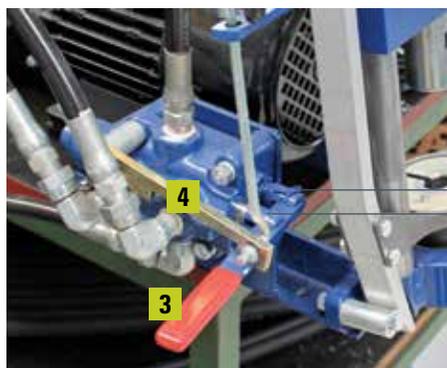
10.3 Manual Control Valve Handle installation

The Manual Control Valve Handle (3) must be properly installed to the Directional Control Valve before the unit can be operated. The handle is found in the bag attached to the unit.

The Directional Control Valve is found on the left side of the unit.

To install the manual control valve handle proceed as follows:

- Raise and secure the trip latch mechanism (4) so that it is out of the way
- Position the handle (3) in the Directional Control Valve as shown; make sure the hole in the handle is oriented toward the valve stem.
- With the handle in the position in the valve stem and clevis pivot, line up the hole in the handle and with the roll pin that is already partially installed in the valve stem
- Carefully tap the roll pin down through the hole in the handle until the pin is flush with the top of the stem (use a hammer)



10.4 Installation of dies and pushers

R Operating the unit without proper die sets and pushers may cause permanent damage to the cylinder.

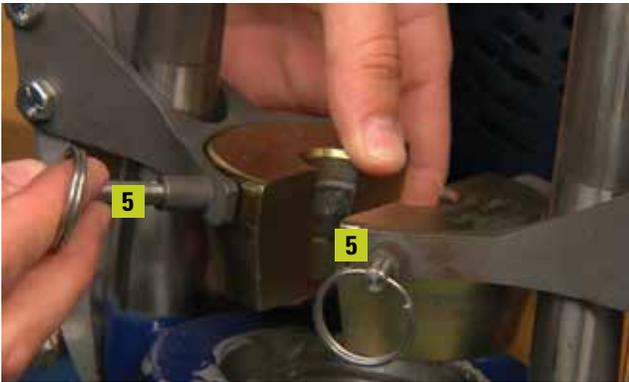
The proper choice of die sets and pushers for the particular coupling to be swaged may be de-termined by referring to the current Synflex catalog.

Before installing the two die halves, make sure that they are signed with corresponding numbers.



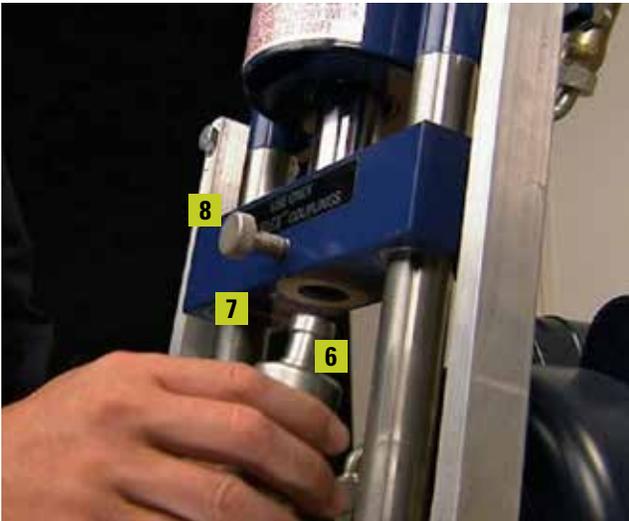
To install the swage die proceed as follows:

- Insert the right and left side die half by three holes found in the outer diameter
- Install the detent pins, Item (5)



To install the pusher proceed as follows:

- Insert the knob end of the pusher (6) into the bottom of the swager pusher block (7)
- Secure it with the thumb screw (8) or spring plunger



10.5 Plugging in electrical outlet

R Before connecting the unit to main power supply make sure that it is switched off. Make sure correct voltage supply is available.

- Insert the power supply plug to the mains power supply.

The swager can now be switched on and run to see if everything operates properly.

10.6 Lubricating the swage die

S Risk of injury! Before lubricating the swage dies, make sure the unit is switched OFF.

Q Danger of sensitisation! Wear appropriate gloves when lubricating.

- Coat the die cavities with the appropriate swage lubricant to prevent unnecessary wear

10.7 Switching the unit on

To switch the unit on, move the power switch into position "ON"

The pump starts running and the working process can be started.

11 Operating the Swager unit

When switching on the unit, the swaging cylinder should be in the full up position.

11.1 Moving the cylinder up

In case it is not in full up position, proceed as follows:

- Push the manual Control Valve Handle towards the Directive Control Valve block.
The cylinder moves to full up position.

11.2 Inserting the hose assembly

- With right hand: insert the hose assembly with the coupling inserted up through the die base and die set into the pusher until it is seated
- Hold the hose assembly in position

11.3 Swaging process

- With left hand: pull and hold the Manual Control Valve Handle towards yourself
The cylinder starts the downward stroke and the proper sequence of setting the dies into the die base and the swaging operation will occur.
The pusher is bottomed against the dies to ensure full engagement of the coupling on the hose.
- After swaging operation is complete, release the Manual Control Valve Handle
The downward movement will be stopped.
- Push the Manual Control Valve Handle towards the Directive Control Valve block
The cylinder will start to retract and the latching lever will hold the valve handle in this position until the retraction portion of the cycle is completed at which time the latching lever will automatically disengage.

11.4 Stop downward movement

To stop the downward movement proceed as follows:

- Release the Manual Control Valve Handle
The movement stops.

11.5 Shut down in case of emergency

In case of emergency proceed as follows:

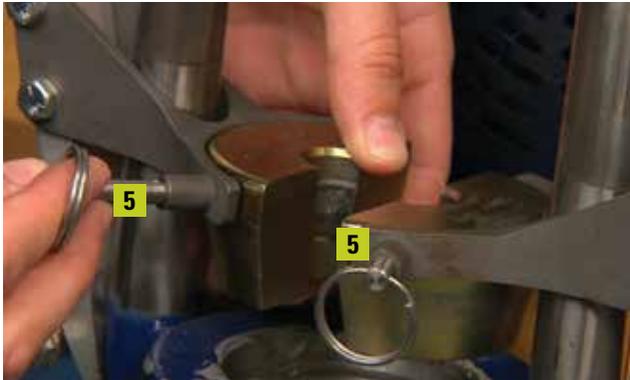
- Turn off the unit at the "Power ON" switch

11.6 Changing dies and pushers

S Risk of injury! Before changing dies and pushers, switch the unit off with the main power switch.

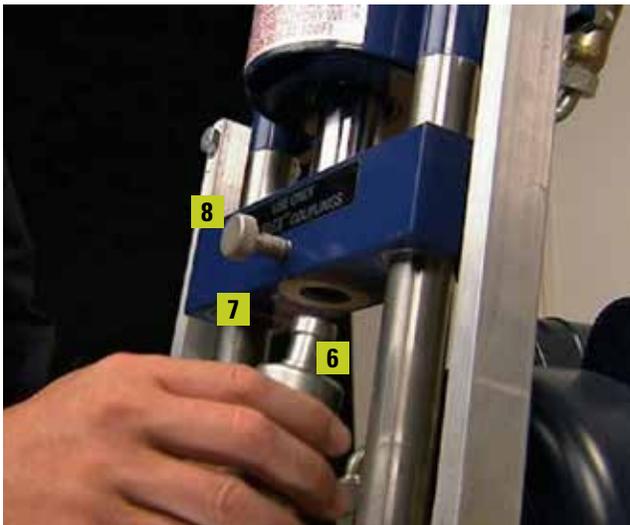
To remove the swage die proceed as follows:

- Pull the detent pin (5) on left side
- Remove the left side die from the outer diameter
- Pull the detent pin (5) on left right
- Remove the right side die from the outer diameter



To remove the pusher proceed as follows:

- Loosen the pusher with the thumb screw (8) or spring plunger
- Pull the pusher (6) out of the bottom of the swager pusher block (7)
- Install new dies and pushers (see chapter 10.4 on page 11)



11.7 Cleaning the unit

S Risk of injury! Before changing dies and pushers, switch the unit off with the main power switch.

11.8 Switching the unit off

To switch the unit off, proceed as follows

- Make sure the Manual Control Valve Handle of the Directive Control Valve block is in center position (movement locked)
- Move the "Power ON" switch to position "OFF".

12 Maintenance and adjustment work

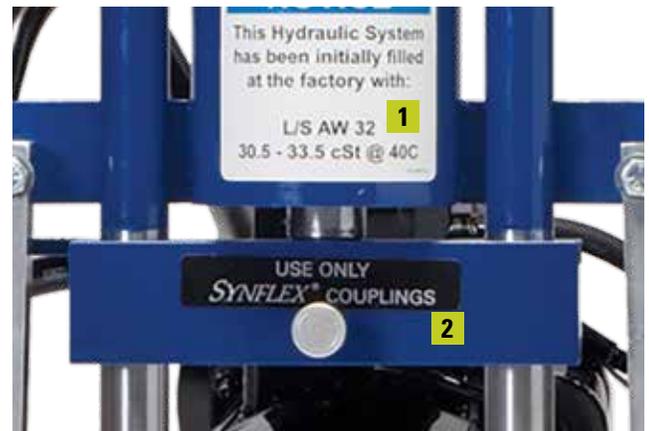
12.1 Preparing the unit for maintenance work

- S Before carrying out any maintenance work:
- Turn off the unit at the "Power ON" switch

12.2 Adjustment of Automatic Return Stop Position

The Automatic Return Stop determines the upper position of the cylinder.

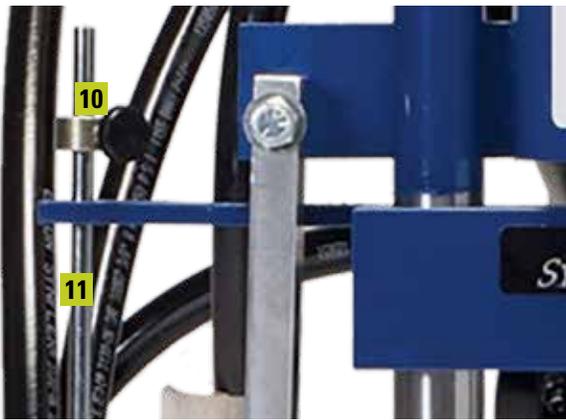
- S The Automatic Return Stop Position must be adjusted so that there is a clearance between Cylinder (1) and Support (2).



To adjust the Automatic Return Stop Position proceed as follows:

- Install the proper die set and pusher
- Pull the Manual Control Valve Handle to fully bottom them in the swager
- Push the Manual Control Valve Handle to retract (raise) them in short increments
- When the die opening allows, insert the hose assembly into the swager, seating the coupling end in the pusher recess
- Continue to retract the swager until there is 1,9 mm between the bottom of the coupling skirt and the top face of the dies
- Loosen the Trip Rod Tightening Knob (9), on the Trip Rod Collar (10) attached to the Trip Rod (11).





- Allow the collar and/or trip rod mechanism to drop
- Retighten the tightening knob
- Run the unit a full cycle checking to see that the return stop functions properly on the return stroke.

The swaged assembly should pass through the open dies without becoming caught or hung up in the die set. Re-adjust if necessary.

S Danger of injury! Always adjust the lift rod collar so that the return stop position guarantees a minimum remaining distance between the top face of the pusher block and the bottom of the cylinder of 40 mm.



12.3 General Maintenance Instruction

The unit is designed and built to give the user long service life with minimum maintenance cost. By performing the following maintenance procedures, the unit should function satisfactorily for years with trouble free service.

- After approximately one hour continuous operation, the temperature of the unit can be expected to raise approximately 38°C above ambient temperature. If extreme high temperatures are developed, the oil reservoir level should be checked for sufficient fluid level as indicated in the Breather Cap Installation instructions. The plumbing should be checked for possible restrictions, such as kinked hose.
- Periodically check the hydraulic hoses to see that they are in good condition. There should be no evidence of damage such as cuts, tears or bagginess in the outer sheath. Again, kinked hoses should be avoided. Replace any hose assembly that appears suspect.
- Every four months check the oil level as previously stated with the unit turned off.
- Check the mechanical moving parts to see that they operate properly and are not excessively worn. Replace components that exhibit excessive wear or have become bent or broken.
- Regularly wipe the unit with a clean rag to keep it clean.

12.4 Die Alignment in the Swager Base

The die alignment is adjusted at the factory, but if at any time it is noted that the dies are not of equal height when seated in the swager base, adjustment is necessary.



To adjust the alignment of the die, proceed as follows:

- Loosen the four mounting bolts (12) on each side on the Die Lifting Fingers (13, 14)
- Push each Lifting Finger down by hand as far as the bolt holes will allow
- Install a die set and a pusher and start the unit
- Pull and hold the Manual Control Valve Handle towards yourself as if swaging a coupling

The pusher should have pushed the die halves into the die bowl and the top of the die set should be even or flat.

- Retighten the four mounting bolts
- Push the Manual Control Valve Handle towards the valve block so that the pusher retracts upward and the die halves are lifted out of the swager base
- Start the swaging operation again, noting if the die halves are seated properly with equal height in the swager base before the pusher makes contact with them

If the die halves are still not seating properly, some adjustment to the Alignment Rolls may be required.

12.5 Adjustment of Alignment Rolls

The lower angled ends of the two Die Lifting Guide Arms (15) are adjusted with very little clearance, but must slide freely.

This is to ensure that the die set halves will enter the swager base evenly and without catching the top edge of the base. Adjustment is provided by the eccentric Alignment Rolls (14) located to the lower outside of the Guide Arms on the swager frame.



To adjust the Alignment Rolls, proceed as follows:

With a die set and pusher installed:

- Turn on the unit
- Pull and hold the Manual Control Valve Handle towards yourself to apply full down force
- With the swager in the full downward position, loosen the Alignment Roll mounting bolts
- Rotate the Rolls to reposition the Guide Arms as necessary to provide proper alignment
- Tighten the mounting bolts

The Guide Arms must still slide freely.

- Run the pusher and die set up and down to verify that the die set is seating properly and not catching on the swager base.
- If the problem persists, examine the Guide Arms, Lifting Fingers and the related mounting points to make sure nothing is bent or broken.

12.6 Refill hydraulic oil reservoir

To refill or top up the hydraulic oil, proceed as follows:

- Turn off the unit at the “Power ON” switch
- R Wear appropriate gloves.
- Remove the breather cap from the hydraulic reservoir
 - Refill appropriate hydraulic oil until the the hydraulic fluid level is near the top of the reservoir, (approximately 3 cm below the breather hole)
- R Remove spilled oil using a cleaning rag

12.7 Replacement Parts

Use the accompanying drawing and parts list to identify components that may need replacement. Call the distributor the swager was purchased from or the factory to obtain pricing.

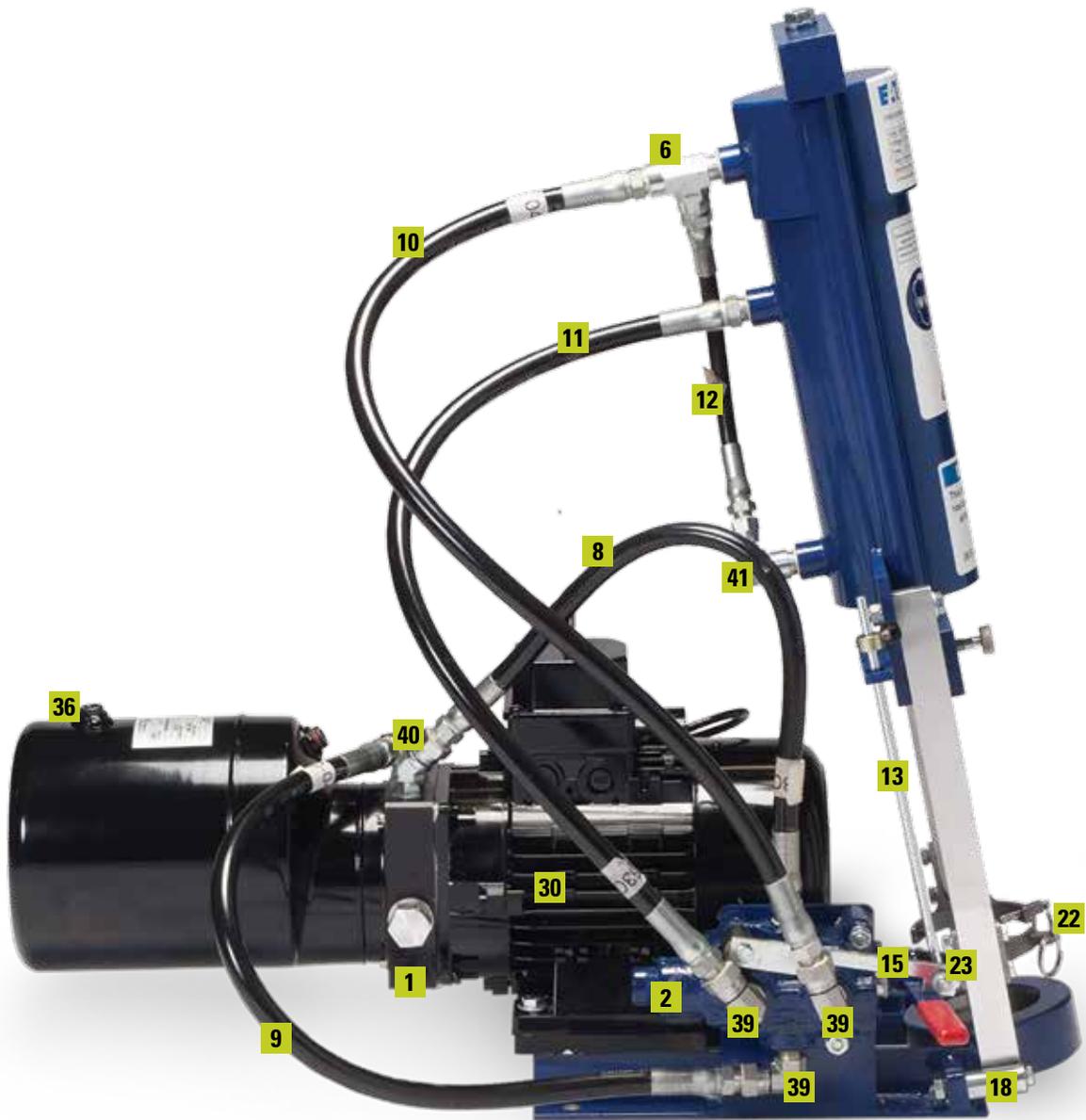
12.8 Hydraulic oil specification

The hydraulic reservoir is filled at factory. If additional fluid is required or would ever need to be replaced, it should meet the following general requirements:

Type: Renolin AW68 or an equivalent hydraulic fluid
 Recommended temperature: 50-65 °C
 Maximum temperature: 90°C
 Flash Point: 220°C
 Viscosity: 70 mPas
 Viscosity Index: 95

13 Troubleshooting

Problem	Probable Cause	Corrective Action
Incomplete Swage	Oil by-pass through cylinder	Replace or rebuild cylinder
Incomplete Swage	Oil by-pass through control valve	Replace control valve
Excessively slow piston cycle	Low fluid level reservoir	Fill with recommended oil
Excessively slow piston cycle	Contaminated intake screen	Remove reservoir and clean the screen on pump intakes, refill reservoir with clean oil
Dies are not aligned in die base	Die holding frames out of adjustment	Refer to adjustment procedure
Dies are not aligned in die base	Bent guide bar	Replace guide bar
Dies catch on die base during down cycle	Eccentric guide bushing out of adjustment	Refer to adjustment procedure
Dies catch on die base during down cycle	Bent guide bar	Replace guide bar
Motor stops during swaging	Faulty wiring	Contact factory representative
Motor stops during swaging	Low voltage	Insure that swager is connected directly to voltage outlet or through an extension cord of suitable size
Motor will not operate	Faulty switch	Replace toggle switch
Motor will not operate	Faulty motor	Replace motor
Motor will not operate	Loose wires	Check wiring on switch
Motor runs but cylinder will not cycle	Inoperative pump	Replace pump
Motor runs but cylinder will not cycle	Contaminated screen	Remove reservoir and clean the screen on the pump intake, refill reservoir with clean oil.
Motor runs but cylinder will not cycle	Oil by-pass through cylinder	Replace or rebuild cylinder
Motor runs but cylinder will not cycle	Oil by-pass through control valve	Replace or rebuild control valve
Motor runs but cylinder will not cycle	Motor runs backwards	check wiring
Swaging dies separate during swage	Worn or mis-aligned die base	Install components onto new frame





- Q The Power ON switch (31) and electrical installation box can be located on top of the motor.

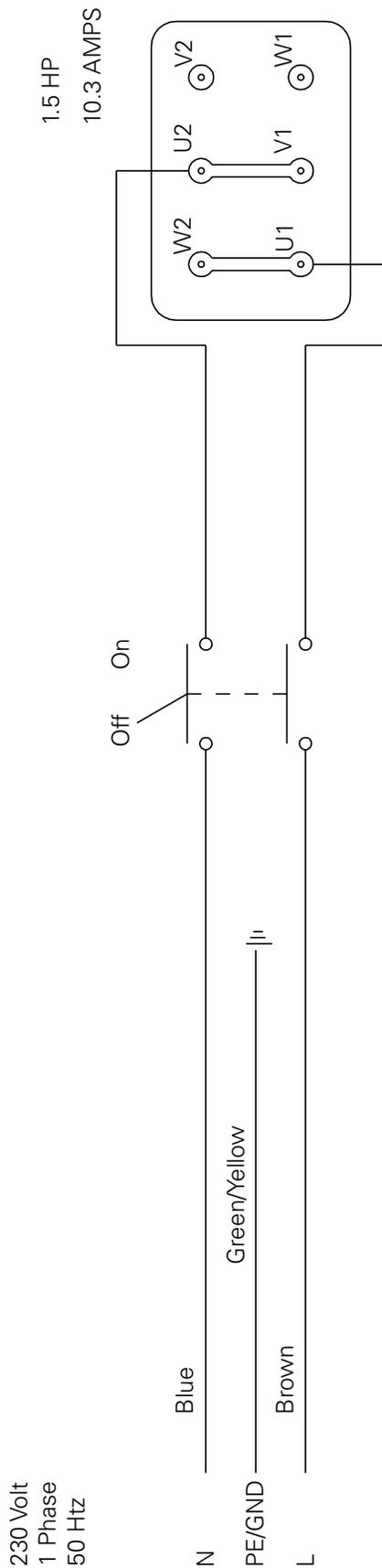
14 Component description

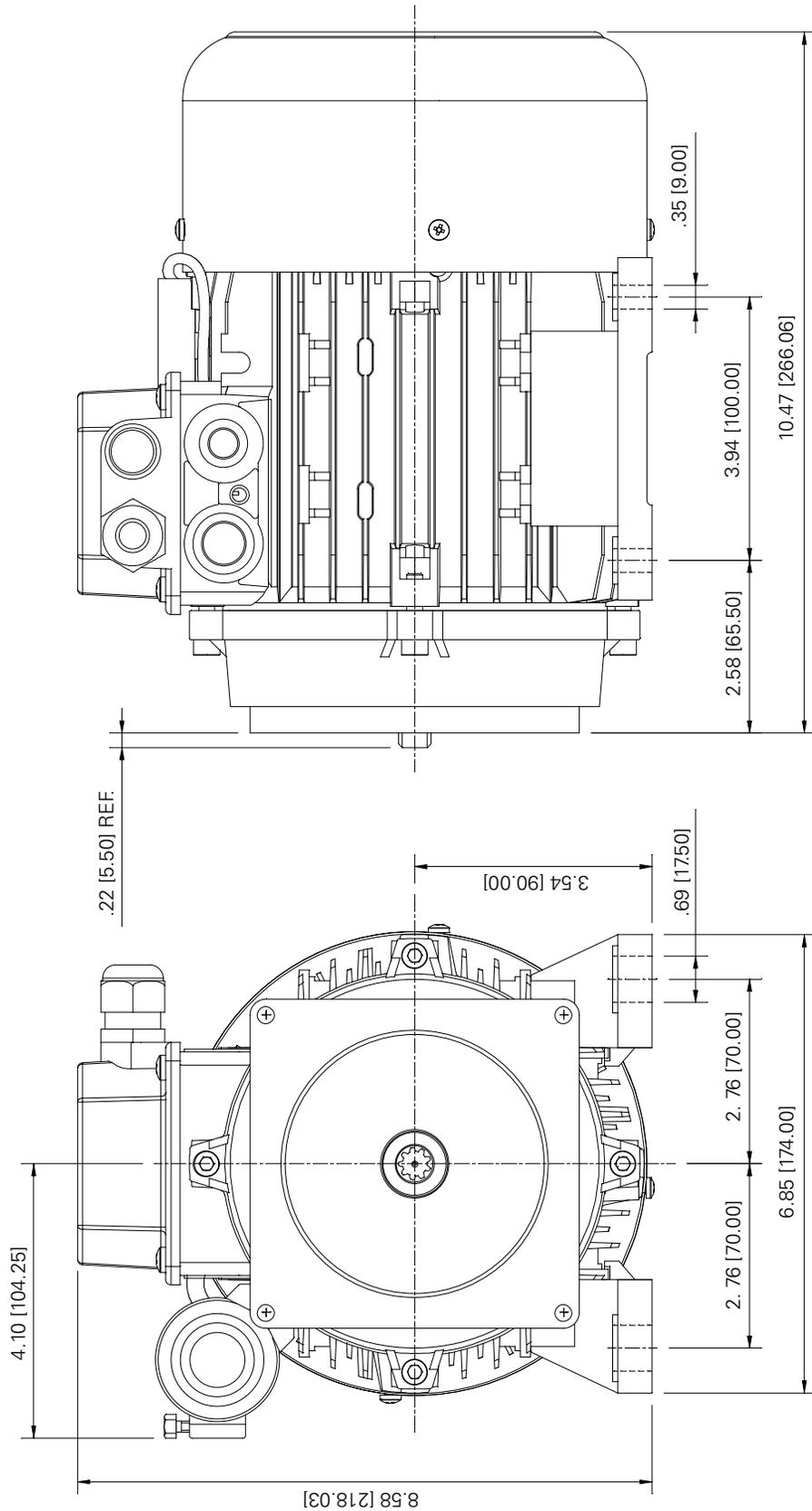
Parts

No.	Description	Part No.
1a.	Power Unit (4530-Q09S0)	4530-00004
1b.	Power Unit (4530-Q0951)	4530-00005
1c.	Power Unit (4530-Q0952)	4530-00006
2.	Directional Control Valve	4530-00009
3.	Hydraulic Cylinder	4530-00012
4.	Oil (1.5 Gallons)	See Text
5.	Reservoir Plug	See Text
6.	Cylinder Service Tee	4530-03005
7.	Cylinder Safety Shield	4530-04004
8.	Return line pump to valve	4530-04005
9.	Pressure line pump to valve	4530-04006
10.	Hose Upper Cylinder to valve	4530-04009
11.	Hose Middle Cylinder to valve	4530-04010
12.	Hose Restrictor	4530-04013
13.	Trip Rod	4530-22013
14.	Trip Rod Collar	4530-22014
15.	Trip Latch	4530-22015
16.	Trip Latch Eccentric	4530-22016
17.	Die Lifting Guide Arm	4530-22036
18.	Alignment Rolls	4530-22037
19.	Knob Tightening, T.R. Collar	4530-23004
20.	Die Lifting Finger R.H.	4530-23005
21.	Die Lifting Finger L.H.	4530-23006
22.	Die Detent Pins	4530-23007
23.	Pal Nut	4530-23009
24.	Spring Plunger	4530-23013
25.	Paint, Blue Enamel	N/A
26.	Frame (Only)	4530-24006
27.	Cylinder Repair Kit (Not shown)	4530-40005
28.	Hydraulic Pump (Not shown)	4530-40007
29.	Reservoir Replacement Kit	4530-40008
30a.	Motor & End Bell (450-009S0)	4530-41005
30b.	Motor & End Bell (4530-009S2)	4530-41004
30c.	Motor & End Bell (4530-009S2)	4530-41003
31a.	Switch Toggle On/Off for 4530-009S0 & 4530-009S2	4530-41015
31b.	Switch Start for 4530-009S1	4530-11009
32.	Decal Oil Specification	0112-49016
33.	Decal N.F.P.A. (Not shown)	0112-49017
34.	Decal Name (SynRex)	0112-49036
35.	Decal Motor Directional Arrow (Not shown)	0112-49022
36.	Breather cap	4530-40010
37.	Handle Replacement Kit	4530-40014
38.	Gasket Reservoir (Not shown)	4530-40018
39.	Adapter 90 3/8"	3A03-06A06
40.	Adapter 90 "3/8" ORB Male to 3/8" Female Swivel	3A06-06A06
41.	Adapter 90 "3/8" Male Pipe to 1/4" NSPM Female Swivel	3A03-06A04

Hardware

Let.	Description	Qty.
A.	Bobt Hex 1/4-24 UNC X 1.50 Lg.	
B.	Bon Hex 1/4-28 UNC X 0.50 Lg.	
C.	Nut Hex 1/4" UNC	
D.	Washer Star 1/4"	
E.	Bobt Hex 5/16-18 UNC X 0.75 Lg.	
F.	Bolt Hex 5/16-18 UNC X 2.00	
G.	Bolt Hex 5/16-18 UNC X 2.50 Lg.	
H.	Bolt Hex 5/16-18 UNCX2.25 Lg.	
J.	Nut Hex 5/16-18 UNC	
K.	Lock Washer 5/16"	
L.	Washer Flat 5/16"	
M.	Washer Star 5/16"	
N.	Bolt Hex 1/2-13 UNC x 2.00 Lg.	
P.	Screw Cap HD 5/16-18 UNC x 1.00 Lg.	
Q.	Lock Washer 1/2"	





Declaration of Conformity

(EC Machinery Directive 2006/42/EC, Annex II A)

The manufacturer, EATON Fluid Power GmbH, Dr.-Reckeweg-Str. 1, 76532 Baden-Baden, Germany hereby declares that the following described machine

Mark IX Series Power Swaging Machines

Year built: see type plate

Serial number: see type plate

is in conformity with all the relevant essential health and safety requirements of the EC machinery directive 2006/42/EEC as amended and the national laws and regulations adopting this directive.

The following harmonized standards were applied in particular

- EN 982 Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics
- EN 1037 Safety of machinery - Prevention of unexpected start-up
- EN 60204-1 Safety of machinery - Electrical equipment of machines
- EN ISO 12100 Safety of machinery - General principles for design
- EN ISO 13849-1 Safety of machinery - Safety-related parts of control systems
- EN ISO 13849-2 Safety of machinery - Safety-related parts of control systems - Part 2: Validation
- EN ISO 14121-1 Safety of machinery - Risk assessment

The relevant technical documentation is compiled in accordance with part A of Annex VII and that this documentation or part hereof will be transmitted by post or electronically to a reasoned request by the national authorities.

Name of the person responsible for documentation:

Address of the person responsible for documentation: EATON Fluid Power GmbH, Dr.-Reckeweg-Str. 1, 76532 Baden-Baden



Engineering Manager

Jurgen Schmidt

Baden-Baden, 22.04.15

Engineering

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