

OPERATING INSTRUCTIONS

FINN-POWER

FP20 IS/AS

FP20 VS

FP110 IS/AS

FP110 VS

FP120 IS/AS

FP120 VS

FP120S IS/AS

FP120S VS

FP140 IS/AS

FP140 VS

FP140X IS/AS

FP140X VS

MANUFACTURING YEAR _____

CE

RELEASED 06/00

KEEP THIS MANUAL FOR FUTURE NEEDS

THE MACHINE HAS BEEN DESIGNED FOR CRIMPING HOSE FITTINGS. LILLBACKA POWERCO SHALL NOT BE HELD LIABLE FOR ANY PRODUCT WHICH HAS BEEN CRIMPED ON THE MACHINE. THE MACHINE HAS BEEN DESIGNED TO OPERATE IN ROOM TEMPERATURE, IN DRY INDOOR CONDITIONS AND IN SUFFICIENT ILLUMINATION. USING THE MACHINE FOR ANY OTHER PURPOSE IS NOT ALLOWED WITHOUT WRITTEN CONSENT FROM THE FACTORY.

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GENERAL


This operation manual covers FINN-POWER FP –models of crimping machines. The model of your machine is marked on the front page.

FP –models are an electrically operated hydraulic crimping machines for industrial (FP140X –model) and hydraulic hose assemblies.

The crimping machines comprise a crimping head, a hydraulic unit and a base.

Transport

The packed machine is transported on a pallet, which is easy to move and lift by a fork-lift truck. After unpacking, the machine can be lifted from the lifting eye.

The marking  on the package indicates the mass centre of the machine.

Size of package for FP120 S-model:

x = 101, y = 150, z = 178 cm.

Size of package for other models:

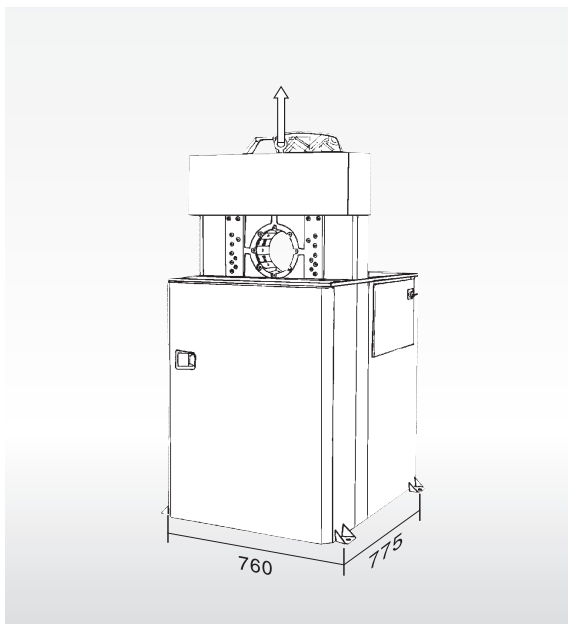
x = 107, y = 97, z = 178 cm

Storage

The manufacturer has protected the machine against corrosion by using the Zerust method. The machined parts have been treated with Axxatec 77C protective agent. A Zerust vapor capsule has been put into the electric box, and the machine has been packed into a bag made of Zerust film.

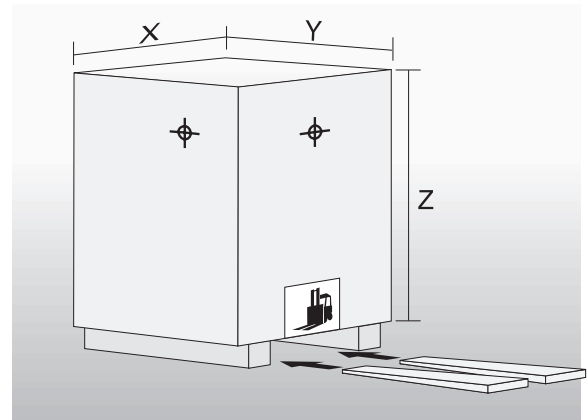
The protection is effective for months if the package is not opened. After opening it, the protection of the wrapping film ceases. If the machine is not yet brought into use, it must be reprotected against corrosion. The machine is to be stored in dry indoor conditions.

Remove the protective agent according to the instructions enclosed in the package.

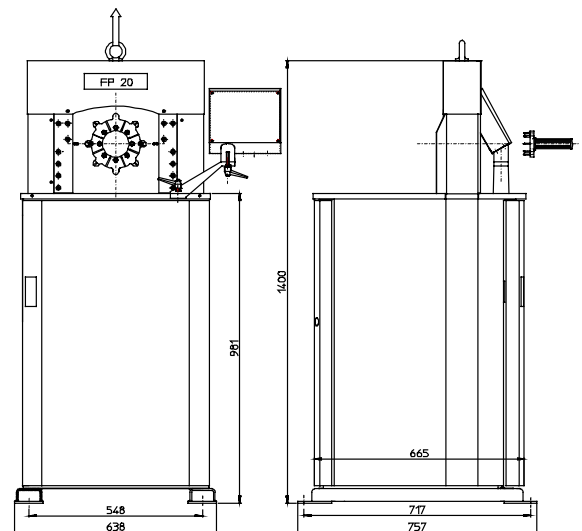


Other FP -models

Insta_fp.eps



Pakkkaus2.eps



Mounting of FP20

FP20as.hgl

Mounting

The crimping machine can be lifted from the lifting eye after it has been unpacked.

Mount the machine on an even floor level, which is steady enough to carry the weight of the machine.

It is recommended to screw the machine on the floor with four M12 wedge anchors. Boreholes in the floor: Ø12 mm, depth 55 mm.

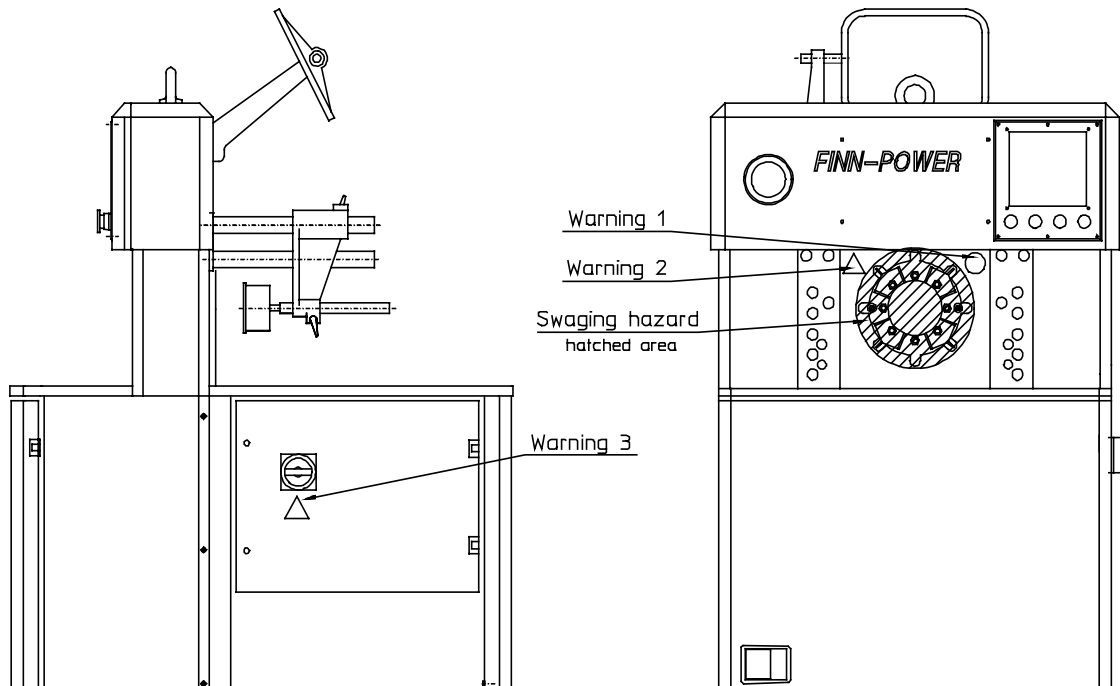
WARNINGS

General

The machine is intended for professional use. It is to be operated only by a trained operator who has understood the dangers involved in the operation.

Openings between the dies exceed 6 mm, thus being large enough to let fingers go between the dies and get crimped. It is, therefore, **ABSOLUTELY** necessary to follow operating instructions and warnings indicated by the stickers on the machine when changing dies and crimping fittings.

Danger zones

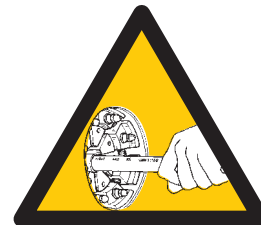


fp120v.hgl



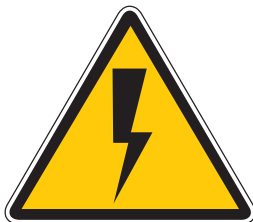
003199.eps

WARNING 1
Do not put your hands inside the dies while the motor is running!



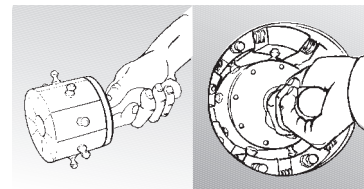
003306.eps

WARNING 2
When crimping a fitting, hold the hose far enough to avoid crimping your hand!



003002.eps

WARNING 3
High voltage.
The electric box is to be opened only by a professional electrician!



Keptool.eps

WARNING 4
When changing dies with the quick change tool, hold the handle as shown in the figures above. Make sure your hand will not get between the dies!

COMMISSIONING

Oil fill

Fill the oil tank to centre line of the oil level sight glass in the side plate (FP20: to centre line of the indicators in the dipstick) with hydraulic oil like Shell Tellus T 46 or equivalent. Volume of the tank is approx. 130 litres (FP20 85 litres). It is recommended to pump the oil into the tank through a 20µ filter, because new oil in drums is not pure.

Electrical connection

CAUTION! Check that the machine voltage (see type plate) is equal to your supply voltage. For proper installation to local code, consult a licensed contractor.

Bring the supply cable in through the hole in the side plate. Secure the cable with a stress relief plug.

Connect the phase conductors to the respective L1, L2 and L3 terminals in the supply disconnecting device. Connect the earth connection to the ground terminal on the fixing plate. Check the connection against the wiring diagram enclosed in the spare parts list.

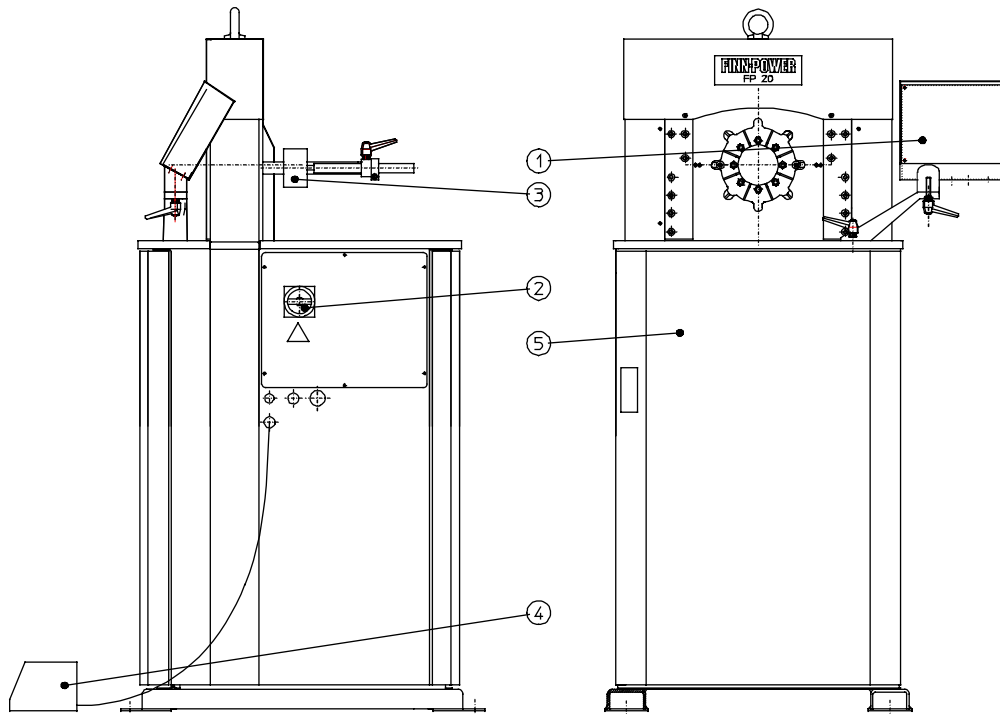
Check that the motor rotation is parallel with the arrow on the motor. In case the motor rotates in wrong direction, two phase conductors in the supply disconnecting device must be interchanged.

Quick Fix-package

Included with the machine, there is a Quick Fix-package, which has some basic parts for that machine model.

OPERATION

Control identification FP20



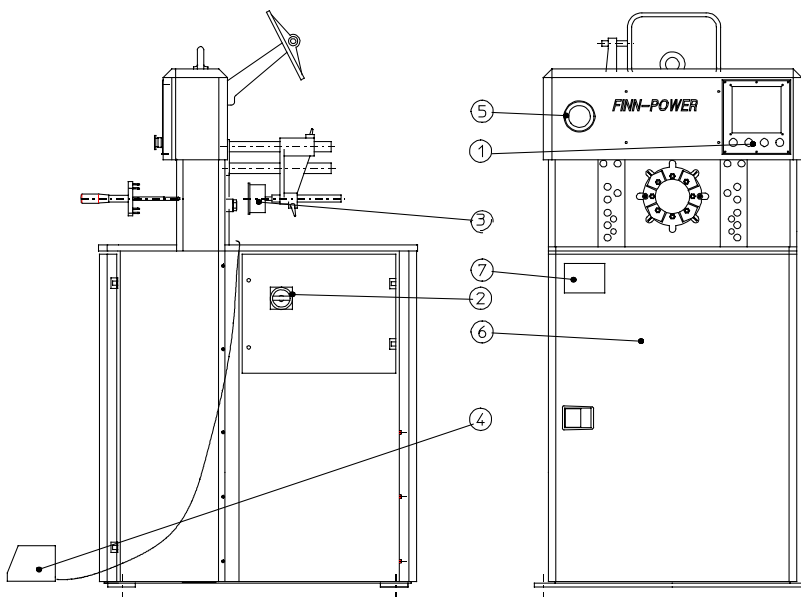
1. **Control panel.**
2. **Supply disconnecting device** is used to disconnect the machine from power supply. The device itself can be made dead only by disconnecting the plug or supply cable from the mains.
3. When the **stop device** is pressed, the dies will perform a crimping-retraction cycle.
4. When the **foot pedal** is pressed, the dies will perform a crimping-retraction cycle. (Optional)
5. **Storage locker for die sets**

The main operating area of the machine is in front of the controls.

FP20kl.hgl

Control identification FP110, FP120, FP140 and FP140X

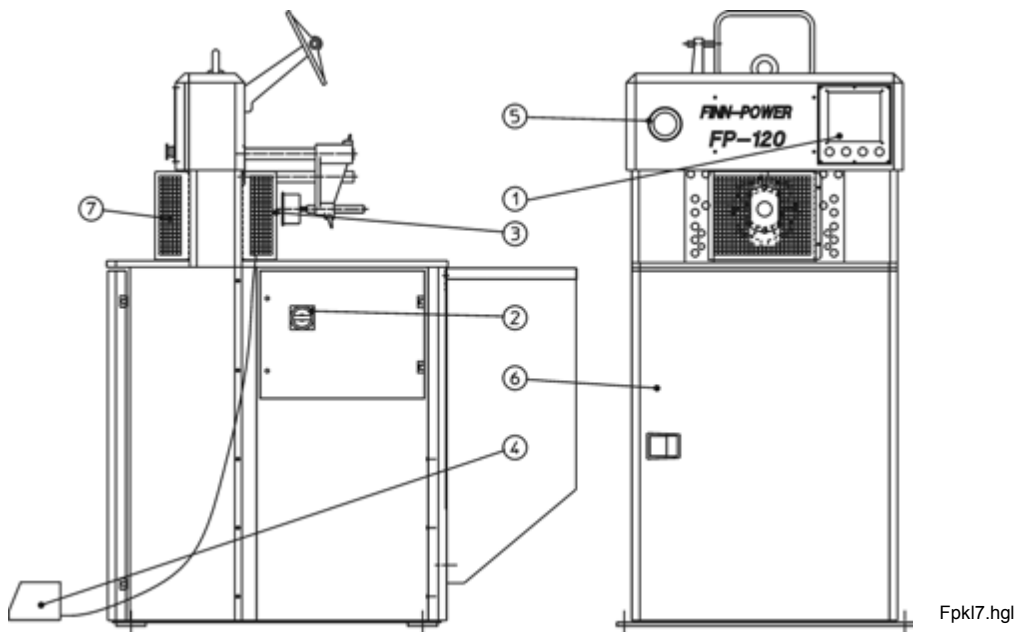
1. **Control panel.**
2. **Supply disconnecting device** is used to disconnect the machine from power supply. The device itself can be made dead only by disconnecting the plug or supply cable from the mains.
3. When the **stop device** is pressed, the dies will perform a crimping-retraction cycle.
4. When the **foot pedal** is pressed, the dies will perform a crimping-retraction cycle. (Optional)
5. **Pressure gauge** indicates the pressure in the hydraulic system during crimping.
6. **Storage locker for die sets**
7. **Die chart** with crimping diameter range for die set and corresponding dial adjustment values (IS/AS models).



fp120kl.hgl

The main operating area of the machine is in front of the controls.

Control identification FP120S

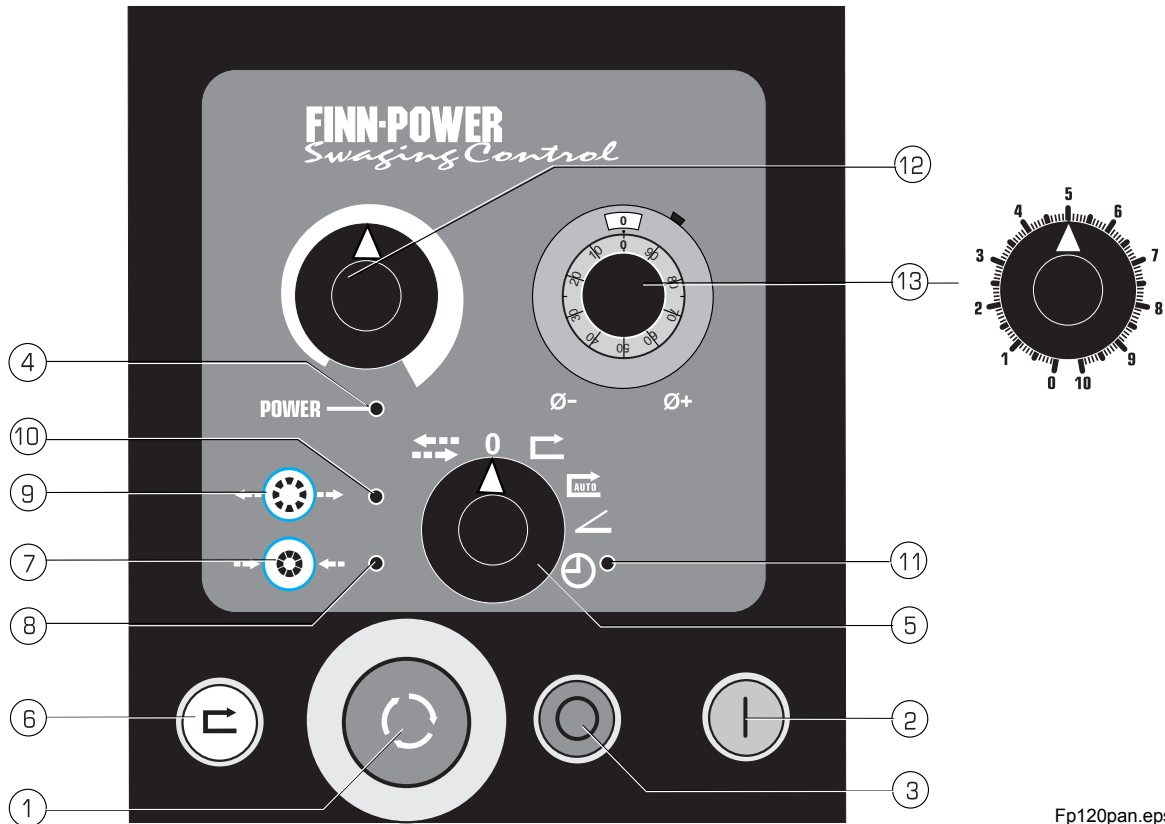


Fpkl7.hgl

1. **Control panel**
2. **Supply disconnecting device** is used to disconnect the machine from power supply. The device itself can be made dead only by disconnecting the plug or supply cable from the mains.
3. When the **stop device** is pressed, the dies will perform a crimping-retraction cycle.
4. When the **foot pedal** is pressed, the dies will perform a crimping-retraction cycle. (Optional)
5. **Pressure gauge** indicates the pressure in the hydraulic system during crimping.
6. **Storage locker for die sets**
7. With the **finger guard** open, the machine can only operate at low speed.

The main operating area of the machine is in front of the controls.

Control panel IS/AS



Fp120pan.eps

1. EMERGENCY STOP

Press this button in an emergency or when you for some other reason want to stop the machine quickly. Pressing the emergency stop push-button stops all machine functions. The button is released by turning it clockwise (as indicated by the arrow). After an emergency stop, go on working in manual mode. Open the dies to the set retraction position, after which you can continue in the normal way if the machine is otherwise in working order.

2. START

Press to start electric motor and control unit.

3. STOP


This button is used to stop the machine in a normal situation. It stops both the control and the motor.


4. CONTROL OPERATIONAL


The signal lamp is illuminated when operating voltage is available and the control is ready for use.

5. MODE SELECTOR


The crimping head does not operate when the mode selector is in position 0. The mode selector should be in 0-position when the machine is started.

MANUAL  : Master dies can be opened by pressing retraction button 9 and closed by pressing crimping button 7. Manual mode is used when changing dies and adjusting settings. Ees-taas.wmf



SEMI-AUTOMATIC  : Crimping movement gets started when the semi-automatic crimping button 6 is pressed. The movement can be interrupted by releasing the button. If need be, dies can be opened by using retraction button 9. Crimping goes on when the button is repressed. After reaching the crimping diameter, dies return to the retraction position irrespective of whether the button is pressed or not. Cycle.wmf

AUTOMATIC  : Crimping starts when the fitting is pressed against the stop device. The movement stops if the stop device is not adequately pressed by the fitting. It can also be stopped by withdrawing the fitting from the stop device before it is gripped by dies. If need be, dies can be opened by using retraction button 9. Crimping goes on when the fitting is repressed against the stop device. After reaching the crimping diameter, dies return to the retraction position irrespective of whether the fitting is pressed against the stop device or not.

Autopres.wmf

FOOT PEDAL  : Crimping starts when the foot pedal is pressed. The movement can be interrupted by lifting the foot from the pedal. If need be, dies can be opened by using retraction button 9. Crimping goes on when the foot pedal is repressed. After reaching the crimping diameter, dies return to the retraction position irrespective of the position of the foot pedal.

Foot-pdl.wmf

CRIMPING DELAY  : In automatic modes, a crimping delay can be set in order to improve the forming of the fitting. The delay is activated by turning the mode selector to the delay position , which makes the signal lamp beside the symbol light. After this the mode selector is turned to a position indicating the intended mode of crimping.

The delay has been set to last approx. 2 seconds. It occurs after the crimping diameter has been reached but before the retraction movement, i.e. the dies are kept closed for the time of delay, after which they are opened. To inactivate the delay, turn the mode selector briefly to 0-position or stop the motor.

clock.eps

6. SEMI-AUTOMATIC CRIMPING

This button starts crimping movement provided that master dies have reached the set retraction position (signal lamp 10 is illuminated) and semi-automatic mode has been selected.

7. CRIMPING BUTTON

The dies will close when this button is pressed. The dies move until the button is released or the set crimping diameter has been reached. When using this button, manual mode must be selected. When the machine is started with the mode selector in manual mode, crimping cannot be started using the crimping button before first selecting 0-position or opening dies with retraction button 9. Dies will not open if they are already in the set retraction position (signal lamp 10 illuminated).

8. CRIMPING DIAMETER REACHED

The signal lamp is illuminated when the dies have reached the set crimping diameter.

9. RETRACTION BUTTON

The dies will open when this button is pressed. The dies open until the button is released or the set retraction diameter has been reached. When using this button, manual mode must be selected.

10. RETRACTION DIAMETER REACHED

The signal lamp is illuminated when the dies have reached the set retraction diameter, i.e. retraction position. Automatic mode cannot get started unless the retraction position has been reached.

11. DELAY SIGNAL LAMP

The signal lamp is illuminated when the delay function is active.

12. RETRACTION DIAMETER CONTROL

The dial is used to adjust the retraction diameter of master dies after the crimping cycle. Adjust the retraction large enough so that the fitting to be crimped is easy to insert between the dies but the "extra" movement is as short as possible. The retraction becomes larger when the dial is turned clockwise.

13. CRIMPING DIAMETER CONTROL

The crimping diameter is defined by means of this dial and the die set that is used. The dial covers 0...10 mm. The measuring scale is divided into divisions of either 0.01 mm or 0.1 mm. The crimping diameter increases when the dial is turned clockwise. If the dial is of multi-turn type, as in IS-models, one turn is equivalent to a 1 mm change in the crimping diameter. In AS-models the diameter changes by 1 mm between two digits.

Control panel VS



Fp120vs.eps

1. EMERGENCY STOP

Press this button in an emergency or when you for some other reason want to stop the machine quickly. Pressing the emergency stop push-button stops all machine functions. The button is released by turning it clockwise (as indicated by the arrow). After an emergency stop, you can go on working if the machine otherwise is in working order. Open the dies to the set retraction position in manual mode, after which you can select another operating mode.

2. START

Press to start electric motor and control unit.

3. STOP


This button is used to stop the machine in a normal situation. It stops both the control and the motor.

4. ENTER BUTTON E

5. SELECTOR

All selections and control functions of the VS control are performed by means of the selector and enter button **E**. The desired display adjustable from the selector is selected by turning the selector and activated by pressing **E** button. The display then gets a bold shaded outline and the display value can be modified by turning the selector. The new value comes into force after pressing **E**. The display turns partly shaded again, after which another display can be selected by turning the selector.

6. SEMI-AUTOMATIC CRIMPING

This button starts crimping movement provided that the symbol of semi-automatic crimping  is shown on the mode display.

Cycle.wmf

7. CRIMPING BUTTON

The dies will close when this button is pressed. The dies move until the button is released or the set crimping diameter has been reached.

When using this button, manual mode must be selected.

8. RETRACTION BUTTON

The dies will open when this button is pressed. The dies open until the button is released or the set retraction diameter has been reached.

This button can be used either in manual mode or in semi-automatic and foot pedal modes in a situation when you want to open dies in the middle of crimping.

9. CRIMPING DIAMETER

The crimping diameter is defined by selecting a value on this display and by means of the die set used. The crimping range extends from the minimum crimping diameter of the smallest die set programmed up to the maximum crimping diameter of the largest die set programmed. It is divided into divisions of 0.1 mm. In addition, the crimping diameter can be modified by correction adjustment.

10. DIE SET

When the crimping diameter is being adjusted, VS control automatically recommends a die set best suited for the selected diameter. If desired, the operator may use another die set covering the diameter in question. Thus he may manage to avoid changing die sets but the crimping result will not be as good as if the recommended die set would have been used.

11. CORRECTION

Different fittings require more or less crimping force. The machine frame design, however, contracts and expands according to the required crimping force. That is why the crimping diameter must be corrected in order to reach the intended crimping result. It is recommended to use the correction function in modifying the crimping diameter so that the correct crimping diameter for the fitting in question could be saved on the crimping diameter display for the next time it is needed.

12. RETRACTION DIAMETER

The retraction diameter indicates the opening of master dies after the crimping cycle. Adjust the retraction large enough so that the fitting to be crimped is easy to insert between the dies but the "extra" movement is as short as possible. The retraction value is the diameter of the opening between the dies in millimetres.

13. CRIMP COUNTER

The counter counts crimps either from zero or from a set value onwards.

14. FITTING TYPE

Crimping data of your own or of the fitting manufacturer can be stored in the memory of the control unit. You can name a fitting type as you like or use fitting types of the fitting manufacturer.

15. PRESSURE SWITCH AND CRIMPING DELAY

Pressure switch function and crimping delay on / off. See VS control, page 9.

16. RECALL OF STORED CRIMPING DATA

The crimping data of a certain fitting type can be recalled from the control unit memory. See VS control, page 6.

17. STORING OF CRIMPING DATA


Crimping data are stored in the memory for the next time to be used. It is worth while naming a fitting type to facilitate finding it again. See VS control, page 8.


18. SETUPS


Set-ups of crimping delay, pressure switch, mm/inch and calibration. See VS control, page 10.


19. MODE SELECTION


See VS control, page 9.

MANUAL  : Master dies can be opened by pressing retraction button 8 and closed by pressing crimping button 7. Manual mode is used when changing dies and adjusting settings. Ees-taas.wmf

SEMI-AUTOMATIC  : Crimping movement gets started when the semi-automatic crimping button 6 is pressed. The movement can be interrupted by releasing the button. If need be, dies can be opened by using retraction button 8. Crimping goes on when the button is repressed. After reaching the crimping diameter, dies return to the retraction position irrespective of whether the button is pressed or not. Cycle.wmf

AUTOMATIC  : Crimping starts when the fitting is pressed against the stop device. The movement stops if the stop device is not adequately pressed by the fitting. It can also be stopped by withdrawing the fitting from the stop device before it is gripped by dies. If need be, dies can be opened by using retraction button 8. Crimping goes on when the fitting is repressed against the stop device. After reaching the crimping diameter, dies return to the retraction position irrespective of whether the fitting is pressed against the stop device or not. Vsstop.wmf

FOOT PEDAL  : Crimping starts when the foot pedal is pressed. The movement can be interrupted by lifting the foot from the pedal. If need be, dies can be opened by using retraction button 8. Crimping goes on when the foot pedal is repressed. After reaching the crimping diameter, dies return to the retraction position irrespective of the position of the foot pedal. Vs_pedal.wmf

TOOL CHANGE  : The VS control advises the operator to change the die set. See VS control, page 11. Vs-fork.eps

Test run IS/AS

- To avoid accidents, make sure that there are no foreign objects between the dies.
- Start the motor.
- Set the crimping diameter dial at 0.0
- During the first crimping cycles air in the cylinders may make the piston/dies move irregularly and at high speed. Cycle the press a few times till the motion becomes even.
- In case the dies do not move in either direction, the motor rotates in wrong direction. Correct by interchanging two phase conductors in the supply disconnecting device.
- Test the operation of each switch and dial in the panel according to Chapter " Control panel".

Test run VS

- To avoid accidents, make sure that there are no foreign objects between the dies.
- Start the motor.
- Set the crimping diameter to 10.0 and the retraction to the maximum value.
- During the first crimping cycles air in the cylinders may make the piston/dies move irregularly and at high speed. Cycle the press a few times till the motion becomes even.
- In case the dies do not move in either direction, the motor rotates in wrong direction. Correct by interchanging two phase conductors in the supply disconnecting device.
- Test the operation of each button and adjustment in the panel according to Chapter "Control panel". Read thoroughly through also the VS control operating instructions.

Die sets FP140 and FP140X

Use only original Finn-Power die sets in Finn-Power crimping machines.

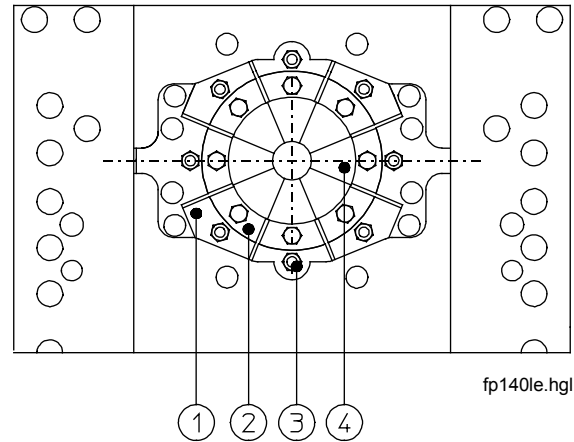
FP 140 crimping machine is designed for crimping large fittings using FP 140 dies, but also standard dies of series 18506 can be used (4).

For standard die sets, adapter dies (2) must be installed in the machine's master dies (1).

- Prior to installing dies, clean the contact surfaces of both the die set and master dies properly.
- Open the dies in manual mode.
- Stop the motor from the stop button.

CAUTION! THE MOTOR SHALL ALWAYS BE STOPPED DURING INSTALLATION OF DIES.

- Hold the adapter die so that its screw is towards you.
- Loosen the screw in the master die (3).
- Install the adapter die so that the die set pin hits the hole in the master die.
- Tighten the screw (3).



FP140 DIE SETS FOR FP140 AND FP140X

FP140 die sets for large fittings are attached directly to the master dies. FP140 die sets are manufactured with following dimensions:

D	L	Die set No	Crimping range
84	110	18860/84	84 ... 92 mm
92	110	18860/92	92 ... 100 mm
100	110	18860/100	100 ... 108 mm
108	110	18860/108	108 ... 116 mm
116	110	18860/116	116 ... 124 mm

In addition to the standard die sets and FP140 die sets, a wide range of special die sets is available on request.

Selecting the die set FP20

Use only original Finn-Power die sets in Finn-Power crimping machines.

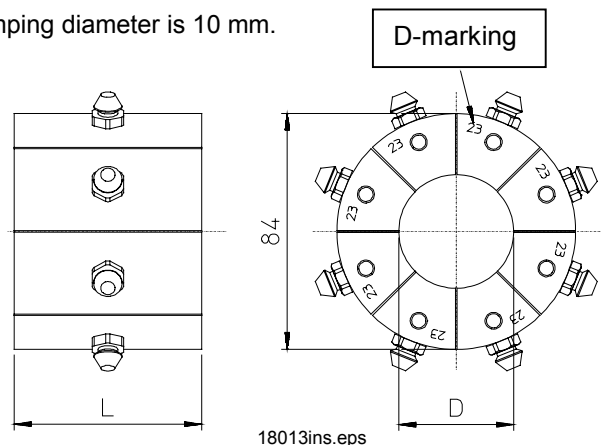
Refer to the fitting manufacturer's specifications for proper crimping diameter for the fitting.

Each die set has its own crimping range. Follow it to assure the roundest possible crimping result.

The minimum crimping diameter **D** is marked on each die set.

Example: with die set No 18013/10 the minimum crimping diameter is 10 mm.

D	L	Die set No	Crimping range
10	55	18013/10	10...12 mm
12	55	18013/12	12...14 mm
14	55	18013/14	14...16 mm
16	75	18013/16L	16...19 mm
19	75	18013/19L	19...23 mm
23	75	18013/23L	23...27 mm
27	75	18013/27L	27...31 mm
31	75	18013/31L	31...36 mm
36	75	18013/36	36...41 mm
41	75	18013/41	41...47 mm
47	85	18013/47	47...54 mm
54	85	18013/54	54...61 mm



In addition to the standard die sets, a wide range of special die sets is available on request.

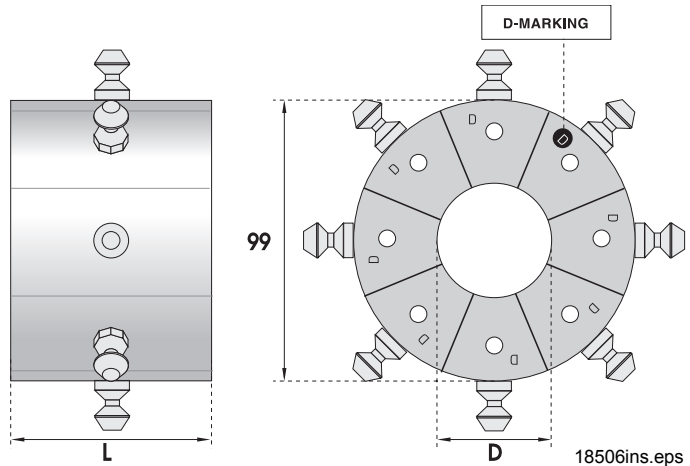
Selecting the die set FP110, FP120, FP120S, FP140, FP140X

Use only original Finn-Power die sets in Finn-Power crimping machines.

Refer to the fitting manufacturer's specifications for proper crimping diameter for the fitting. Each die set has its own crimping range. Follow it to assure the roundest possible crimping result. The minimum crimping diameter **D** is marked on each die set.

Example: with die set No 18506/10 the minimum crimping diameter is 10 mm.

D	L	Die set No	Crimping range
10	55	18506/10	10 ... 12 mm
12	55	18506/12	12 ... 14 mm
14	55	18506/14	14 ... 16 mm
16	55	18506/16	16 ... 19 mm
19	55	18506/19	19 ... 22 mm
22	70	18506/22	22 ... 26 mm
26	70	18506/26	26 ... 30 mm
30	70	18506/30	30 ... 34 mm
34	75	18506/34	34 ... 39 mm
39	75	18506/39	39 ... 45 mm
45	90	18506/45	45 ... 51 mm
51	90	18506/51	51 ... 57 mm
57	100	18506/57	57 ... 63 mm
63	110	18506/63	63 ... 69 mm
69	110	18506/69	69 ... 75 mm
74	110	18506/74	74 ... 80 mm
78	110	18506/78	78 ... 87 mm



In addition to the standard die sets, a wide range of special die sets is available on request.

Installing the die set

QUICK CHANGE FP20

QUICK CHANGE IS/AS

Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- After that, start the motor and select manual mode.
- Set the crimping diameter dial to 0.0.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool as shown in figure 1, and make sure your hand will not get between the dies.
- Mount the die set between master dies (Fig. 2) and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their places (Fig. 3).
- Remove the tool (Fig. 4). The dies are now ready for use
- Die set is removed from the press in reverse order: close the dies, insert the tool into the die set, open the master dies and place the set back in the locker.

Fig. 1

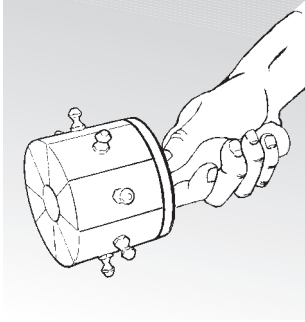


Fig. 2

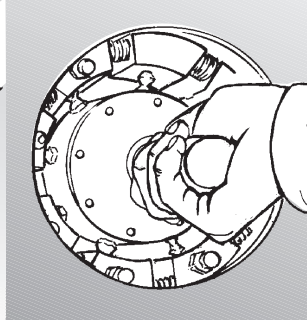


Fig. 3

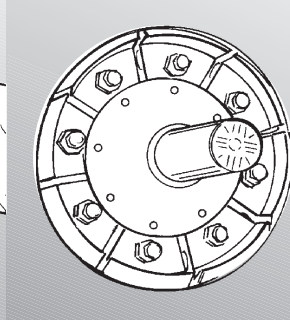
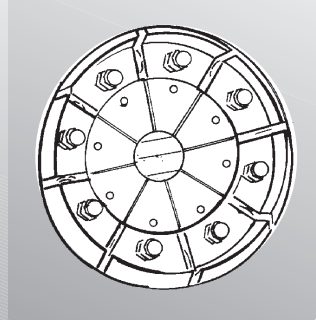


Fig. 4



Qc-homma.eps

QUICK CHANGE VS

Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- Select TOOL CHANGE MODE.
- See also VS control, Chapter "Tool change screen" on page 11.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool as shown in figure 1, and make sure your hand will not get between the dies.
- Mount the die set between the master dies (Fig.2), and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their positions (Fig. 3).
- Remove the quick change tool (Fig. 4). Open the dies to the retraction position. The dies are now ready for use.
- Die set is removed from the press in reverse order: close the dies, insert the tool into the die set, open the master dies and place the set back in the locker.

QUICK CHANGE FP110 AND FP120

QUICK CHANGE IS/AS

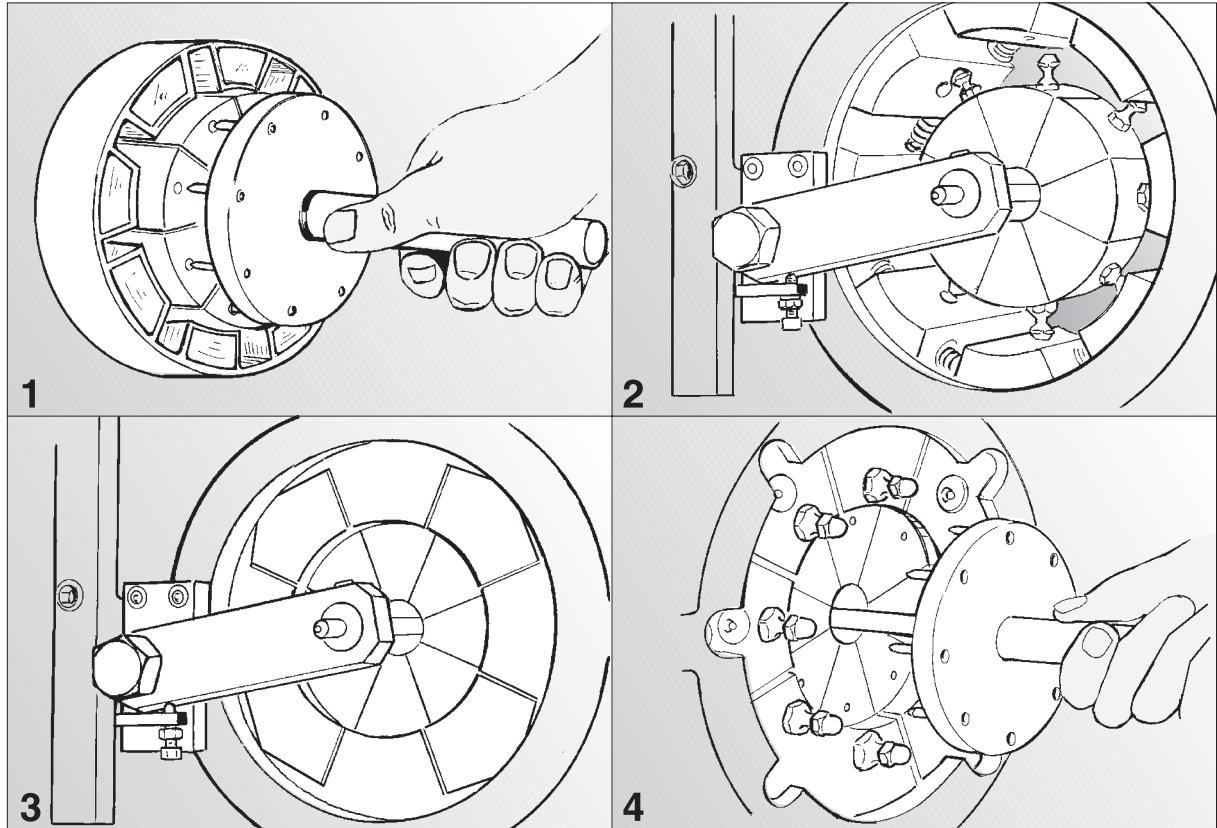
Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

Note! Changing the die set 18506/10 with the quick change tool is not recommendable. The die set may get broken due to the tool rod's diameter. The die set no 18506/74 and larger die sets have not the quick change possibility. These dies are too thin for quick change tool holes.

- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- After that, start the motor and select manual mode.
- Set the crimping diameter dial to 0.0.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool as shown in figure 1, and make sure your hand will not get between the dies.
- Turn down the centering lever behind the dies (Fig.3)
- Mount the die set between master dies so that the tool rod is fitted deep enough in the centering hole (Fig. 2) and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their places (Fig. 3).
- Remove the tool (Fig. 4). The dies are now ready for use
- Die set is removed from the press in reverse order: close the dies, insert the tool into the die set, open the master dies and place the set back in the locker.



QC110.eps

QUICK CHANGE VS

Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

Note! Changing the die set 18506/10 with the quick change tool is not recommendable. The die set may get broken due to the tool rod's diameter. The die set no 18506/74 and larger die sets have not the quick change possibility. These dies are too thin for quick change tool holes.

- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- Select TOOL CHANGE MODE.
- See also VS control, Chapter "Tool change screen" on page 11.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool as shown in figure 1, and make sure your hand will not get between the dies.
- Turn down the centering lever behind the dies (Fig. 3).
- Mount the die set between the master dies so that the tool rod is fitted deep enough in the centering hole (Fig.2), and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their positions (Fig. 3).
- Remove the quick change tool (Fig. 4). Open the dies to the retraction position. The dies are now ready for use.
- Die set is removed from the press in reverse order: close the dies, insert the tool into the die set, open the master dies and place the set back in the locker.

QUICK CHANGE FP120S

QUICK CHANGE IS/AS

Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

Note! Changing the die set 18506/10 with the quick change tool is not recommendable. The die set may get broken due to the tool rod's diameter. The die set no 18506/74 and larger die sets have not the quick change possibility. These dies are too thin for quick change tool holes.

- Open the finger guard on the forepart. With the fingerguard open, the machine can only operate at low speed.
- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- After that, start the motor and select manual mode.
- Set the crimping diameter dial to 0.0.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool as shown in figure 2, and make sure your hand will not get between the dies.
- Mount the die set between master dies so that the die set pin hits the hole in the master die and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their places (Fig. 3).
- Remove the tool. The dies are now ready for use.
- Close the finger guard (Fig. 4).
- Die set is removed from the press in reverse order: open the finger guard, close the dies, insert the tool into the die set, open the master dies, place the set back in the locker and close the finger guard.



Fig.1

Fig.2



Fig.3

Fig.4

QUICK CHANGE VS

Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

Note! Changing the die set 18506/10 with the quick change tool is not recommendable. The die set may get broken due to the tool rod's diameter. The die set no 18506/74 and larger die sets have not the quick change possibility. These dies are too thin for quick change tool holes.

- Open the finger guard on the forepart. With the finger guard open, the machine can only operate at low speed.
- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- Select TOOL CHANGE MODE.
- See also VS control, Chapter "Tool change screen" on page 11.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool as shown in figure 2, and make sure your hand will not get between the dies.
- Mount the die set between the master dies so that the die set pin hits the hole in the master die and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their positions (Fig. 3).
- Remove the quick change tool. Open the dies to the retraction position. The dies are now ready for use.
- Close the finger guard (Fig. 4).

QUICK CHANGE FP140 AND FP140X

QUICK CHANGE IS/AS

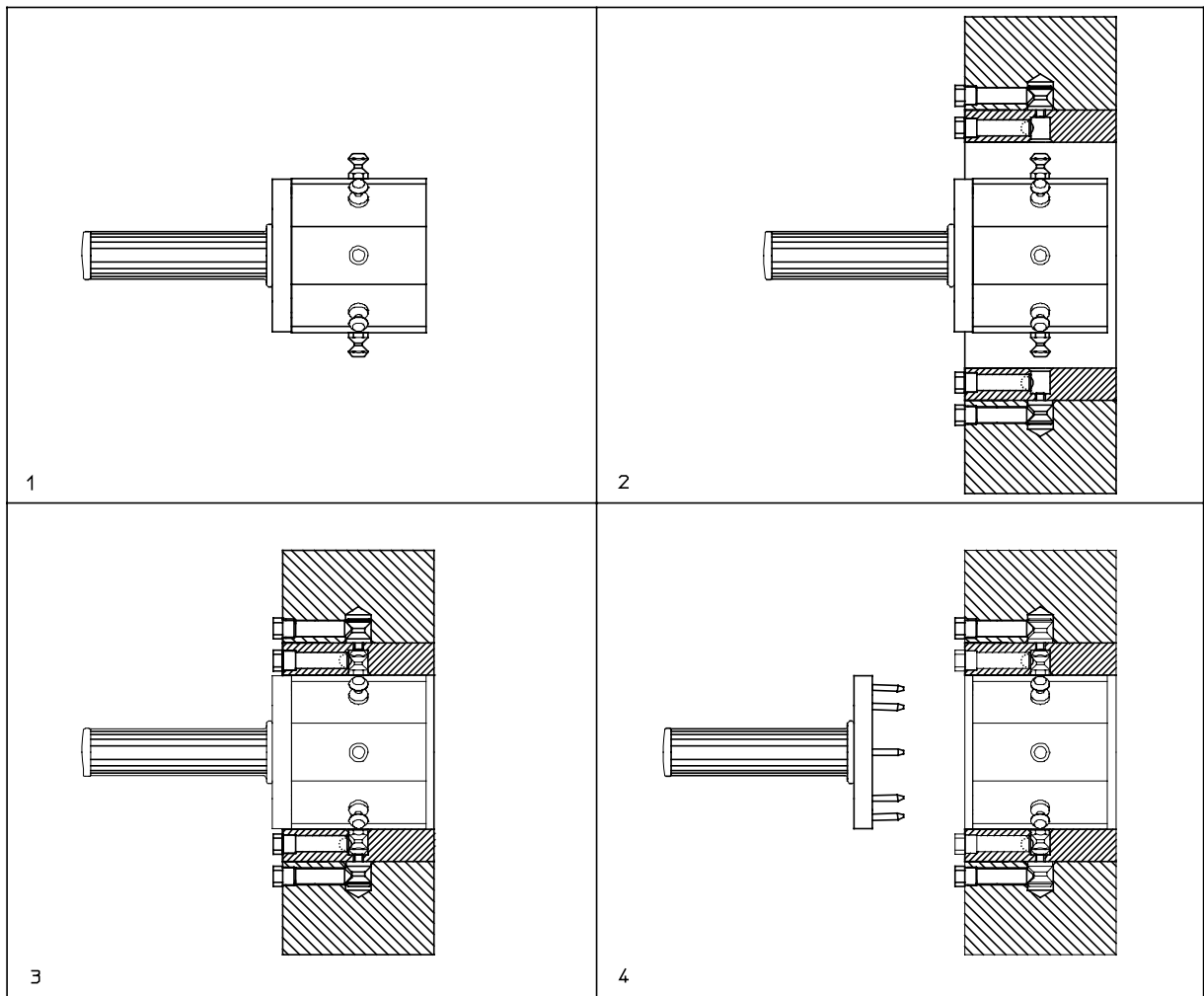
Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

Note! The die set no 18506/74 and larger die sets have not the quick change possibility. These dies are too thin for quick change tool holes.

- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- After that, start the motor and select manual mode.
- Open the master dies up to ca. Ø 140 mm.
- Set the crimping diameter dial to 0.0.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool so that your hand will not get between the dies.
- Mount the die set between master dies so that the die set pin hits the hole in the master die (Fig. 2) and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their places (Fig. 3).
- Remove the quick change tool (Fig. 4) by pulling it straight outwards. The dies are now ready for use.
- Die set is removed from the press in reverse order: close the dies, insert the tool into the die set, open the master dies and place the set back in the locker.



QC110.eps

QUICK CHANGE VS

Die sets are stored in the storage locker and installed in the master dies with a quick change tool one set at a time.

Note! The die set no 18506/74 and larger die sets have not the quick change possibility. These dies are too thin for quick change tool holes.

- Before installing dies, make sure that the master dies are clean.
- **STOP THE MOTOR PRIOR TO CLEANING DIES.**
- Select TOOL CHANGE MODE.
- See also VS control, Chapter "Tool change screen" on page 11.
- Open the master dies.
- Insert the pins of the tool into the die set in the locker, turn the tool clockwise and pull the whole set out (Fig. 1).
- Hold the handle of the quick change tool so that your hand will not get between the dies.
- Mount the die set between the master dies so that the die set pin hits the hole in the master die (Fig. 2) and start closing the dies in manual mode.

TO AVOID DAMAGING MASTER DIES, MAKE SURE THAT ALL DIE SET PINS HIT IN THEIR HOLES.

- Close the master dies completely until the pins are locked in their positions (Fig. 3).
- Remove the quick change tool (Fig. 4). Open the dies to the retraction position. The dies are now ready for use.
- Die set is removed from the press in reverse order: close the dies, insert the tool into the die set, open the master dies and place the set back in the locker.

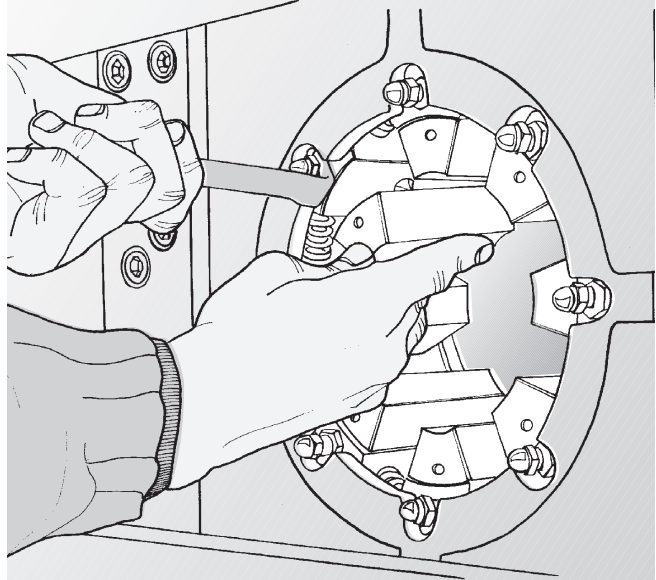
CHANGE OF A SINGLE DIE FP20, FP110, FP120, FP120S

Dies can also be changed one by one with a change tool:

- Select MANUAL MODE.
- Open the master dies and **STOP THE MOTOR.**
- FP120S: open the finger cover.

CAUTION! ALWAYS TURN OFF THE POWER PRIOR TO INSTALLATION OR CHANGE OF DIES WITH THE CHANGE TOOL.

- Prior to installing dies, clean the contact surfaces of both the die set and master dies properly to avoid damaging the surfaces.
- Pull the pull pin in the master die with the tool delivered together with the machine (see figure).
- Insert the die with the retaining pin into the master die, die number always towards you.
- Release the pull pin.
- After installing all the dies, make sure they are straight and properly seated in the master dies.
- FP120S: close the finger cover.



Fork1xx.eps

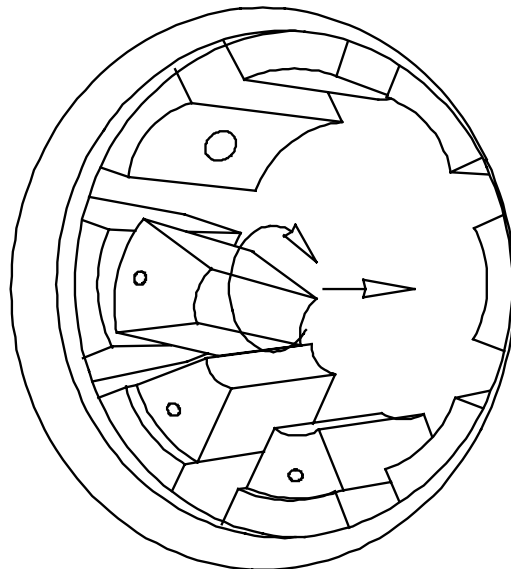
CHANGE OF A SINGLE DIE FP140 AND FP140X

Dies can also be changed one by one:

- Select MANUAL MODE.
- Open the master dies and **STOP THE MOTOR.**

CAUTION! ALWAYS TURN OFF THE POWER PRIOR TO INSTALLATION OR CHANGE OF DIES MANUALLY.

- Prior to installing dies, clean the contact surfaces of both the die set and master dies properly to avoid damaging the surfaces.
- Insert the die with the die set pin into the master die, die number always towards you.
- After installing all the dies, make sure they are straight and properly seated in the master dies.
- Remove the die by turning it round the die set pin and pulling it parallel to the die set pin, so that the die set pin comes out of the hole.



P50leva.hgl

Setting the crimping diameter FP20















SETTING THE CRIMPING DIAMETER IS/AS

From the crimping diameter chart on the door of the die set storage locker you can see the die set numbers and the corresponding crimping ranges.

The upper section of the chart shows the corresponding dial position for each crimping diameter in the columns. The upper dial positions are for AS and lower for IS-models.

Crimping diameters in the grey zone of the chart are not recommended.

The crimping diameter dial has been calibrated at the factory so that when the dial is set at 0.0, the resulting diameter will be the minimum diameter of the die set installed, i.e. with die set No FP20-16 the crimping diameter will be 16 mm, No FP20-19 gives a diameter of 19 mm etc.

								
	∅ min	+1mm	+2mm	+3mm	+4mm	+5mm	+6mm	+7mm
DIE SET No								
20-10	10	11	12					
20-12	12	13	14					
20-14	14	15	16	17				
20-16	16	17	18	19	20			
20-19	19	20	21	22	23	24	CHECK NEXT DIE SIZE	
20-23	23	24	25	26	27	28		
20-27	27	28	29	30	31	32		
20-31	31	32	33	34	35	36		37
20-36	36	37	38	39	40	41	42	
20-41	41	42	43	44	45	46	47	48
20-47	47	48	49	50	51	52	53	54
20-54	54	55	56	57	58	59	60	61

20chart_IS_AS_new.eps

The crimping diameter increases when the dial is turned clockwise. In IS-models one turn is equivalent to a 1 mm change in the crimping diameter. In AS-models the diameter change is 1 mm between two digits. The measuring scale of the dial is divided into divisions of either 0.01 mm in IS-models or 0.1 mm in AS-models.

EXAMPLE: The crimping diameter of the fitting should be 20.6 mm. Select die set No FP20-19 (min crimping diameter 19 mm) according to the die chart. Turn the IS-dial to position 1.60 (upper scale 1, lower 60). The AS-dial is turned to position 1.6. This setting will give the crimping diameter 20.6 mm (19 + 1.6 mm).

The machine has been calibrated at the factory with 40 bar pressure. This means that when you are crimping a fitting requiring 40 bar pressure, the measuring scale of the crimping diameter dial provides an accuracy of +/- 0.1 mm (possible elastic recovery of the fitting not regarded). When fittings requiring higher pressure are crimped, the crimping diameter may become larger than the value on the scale due to machine deflections. Then the crimping diameter has to be corrected by changing the scale value.

SETTING THE CRIMPING DIAMETER VS

- While the crimping diameter display is surrounded by the cursor, activate it by pressing **E**.
- Select the desired crimping diameter by turning the selector and press **E**.
- Check the die set used and change it if need be.
- When required, set the retraction diameter in the same way.

The machine has been calibrated at the factory with 40 bar pressure. This means that when you are crimping a fitting requiring 40 bar pressure, the measuring scale of the crimping diameter dial provides an accuracy of +/- 0.1 mm (possible elastic recovery of the fitting not regarded).

When fittings requiring higher pressure are crimped, the crimping diameter may become larger than the value on the scale due to machine deflections. Then the crimping diameter has to be corrected using the correction function.

Setting the crimping diameter FP110, FP120, FP120S, FP140, FP140X

SETTING THE CRIMPING DIAMETER IS/AS

From the crimping diameter chart on the door of the die set storage locker you can see the die set numbers and the corresponding crimping ranges.

The upper section of the chart shows the corresponding dial position for each crimping diameter in the columns. The upper dial positions are for AS and lower for IS-models.

Crimping diameters in the grey zone of the chart are not recommended.

The crimping diameter dial has been calibrated at the factory so that when the dial is set at 0.0, the resulting diameter will be the minimum diameter of the die set installed, i.e. with die set No 32-16 the crimping diameter will be 16 mm, No 32-19 gives a diameter of 19 mm etc.

DIE SET NO	Crimping Diameter (mm)									
	∅ min	+1mm	+2mm	+3mm	+4mm	+5mm	+6mm	+7mm	+8mm	+9mm
32-10	10	11	12	13						
32-12	12	13	14	15						
32-14	14	15	16	17						
32-16	16	17	18	19	20					
32-19	19	20	21	22	23					
32-22	22	23	24	25	26	27				
32-26	26	27	28	29	30	31				
32-30	30	31	32	33	34	35				
32-34	34	35	36	37	38	39	40			
32-39	39	40	41	42	43	44	45	46		
32-45	45	46	47	48	49	50	51	52		
32-51	51	52	53	54	55	56	57	58		
32-57	57	58	59	60	61	62	63	64		
32-63	63	64	65	66	67	68	69	70		
32-69	69	70	71	72	73	74	75	76		
32-74	74	75	76	77	78	79	80	81		
32-78	78	79	80	81	82	83	84	85	86	87

32-chart.eps

The crimping diameter increases

when the dial is turned clockwise. In IS-models one turn is equivalent to a 1 mm change in the crimping diameter. In AS-models the diameter change is 1 mm between two digits. The measuring scale of the dial is divided into divisions of either 0.01 mm in IS-models or 0.1 mm in AS-models.

EXAMPLE: The crimping diameter of the fitting should be 20.6 mm. Select die set No 32-19 (min crimping diameter 19 mm) according to the die chart. Turn the IS-dial to position 1.60 (upper scale 1, lower 60). The AS-dial is turned to position 1.6. This setting will give the crimping diameter 20.6 mm (19 + 1.6 mm).

The machine has been calibrated at the factory with 40 bar pressure. This means that when you are crimping a fitting requiring 40 bar pressure, the measuring scale of the crimping diameter dial provides an accuracy of +/- 0.1 mm (possible elastic recovery of the fitting not regarded).

When fittings requiring higher pressure are crimped, the crimping diameter may become larger than the value on the scale due to machine deflections. Then the crimping diameter has to be corrected by changing the scale value.

SETTING THE CRIMPING DIAMETER VS

- While the crimping diameter display is surrounded by the cursor, activate it by pressing **E**.
- Select the desired crimping diameter by turning the selector and press **E**.
- Check the die set used and change it if need be.
- When required, set the retraction diameter in the same way.

The machine has been calibrated at the factory with 40 bar pressure. This means that when you are crimping a fitting requiring 40 bar pressure, the measuring scale of the crimping diameter dial provides an accuracy of +/- 0.1 mm (possible elastic recovery of the fitting not regarded).

When fittings requiring higher pressure are crimped, the crimping diameter may become larger than the value on the scale due to machine deflections. Then the crimping diameter has to be corrected using the correction function.

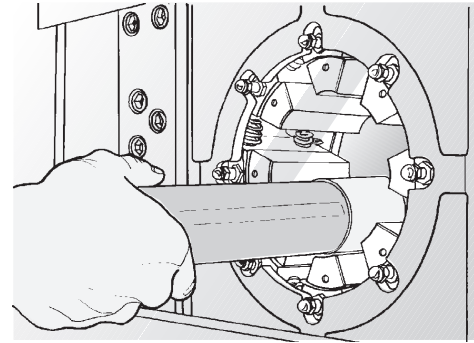
Crimping

WHEN CRIMPING A FITTING, HOLD THE HOSE FAR ENOUGH TO AVOID CRIMPING YOUR HAND!

MANUAL MODE Eestaas.eps

Manual mode is used during die set change, set-up and test run.

1. Select MANUAL MODE.
2. Press the start button.
3. Adjust the recommended crimping diameter.
4. Press the crimping button until the dies hold the fitting lightly.
5. Adjust the retraction diameter when required.
6. Press the crimping button until the dies stop.
7. Open the dies and remove the fitting.
8. Check the crimping diameter.
9. If necessary, perform fine adjustment with the crimping diameter dial (IS/AS model) / using the correction function (VS model).



SEMI-AUTOMATIC MODE Cycle.wmf

Semi-automatic mode is used when performing small quantities of crimps.

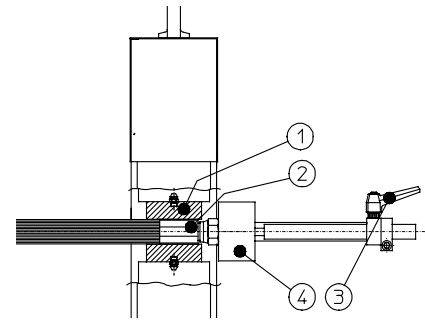
1. Adjust the crimping and retraction diameters.
2. Select SEMI-AUTOMATIC MODE.
3. Insert the hose assembly between the dies.
4. Press the semi-automatic crimping button, and dies perform a crimping-retraction cycle. The cycle can be interrupted by releasing the button. If need be, dies can be opened by using the retraction button.

Keephos3.eps

AUTOMATIC MODE IS/AS VS Autopress.wmf/ Vsstop.wmf

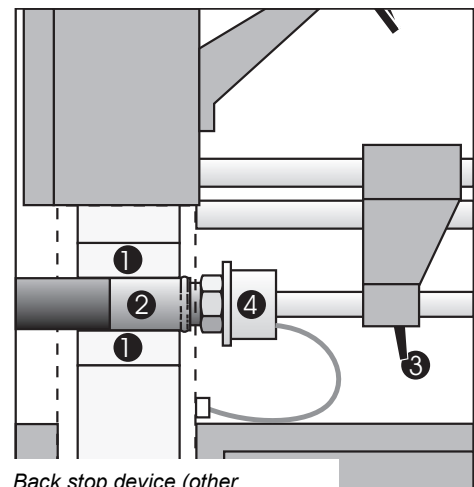
Automatic mode is best suited for serial production. Pressing the fitting against the stop device starts the crimping movement.

1. Select MANUAL MODE.
2. Set the required crimping diameter.
3. Insert the fitting (2) between the dies (1) to the correct position as shown in the figure.
4. Crimp the dies lightly until they hold the fitting properly.
5. Loosen the locking lever (3) and push the stop device (4) against the fitting so that the spring-loaded stop device is compressed, making the limit switch inside it actuate. Tighten the locking lever.
6. Open the dies until the fitting loosens.
7. Select AUTOMATIC MODE.
8. When the stop device is pressed, the machine performs a crimp and returns to the set retraction.
9. The movement stops if the fitting is not adequately pressed against the stop device. If need be, dies can then be opened by using the retraction button.
10. After dies have gripped the fitting, the crimping movement can be stopped only by the emergency stop push-button.
11. Make sure that there are no foreign objects between the dies.
12. Make a test crimp by pressing the fitting against the stop device.
13. Check the crimping diameter and correct the position of the stop device if necessary.



Back stop device (FP20)

FP20osto.hgl



Back stop device (other models)

110stop2.eps

To protect your hands from getting crimped, don't ever touch the stop device !

As an alternative, a foot pedal can be installed in the stop device plug, eg when large fittings are crimped and more space is needed behind the machine. The foot pedal enables holding the hose assembly with both hands.

In FOOT PEDAL mode dies will move as long as the pedal is pressed or till the set crimping diameter has been reached. The crimping movement can be interrupted by lifting the foot from the pedal. If need be, dies can be opened by using the retraction button.

Adjustment of retraction diameter IS/AS

1. Turn the mode selector to 0-position.
2. Start the machine by pressing the start button
3. Select manual mode.
4. Press the crimping button until the dies are completely closed.
5. Turn the retraction diameter control dial counterclockwise up to the minimum.
6. Select semi-automatic mode.
7. Turn the retraction diameter control dial gradually clockwise. While the dial is turned, the dies will open. Insert the uncrimped fitting between the dies as soon as the opening is large enough. Release the retraction diameter control dial at that position, which then becomes the final setting.

Final deceleration FP 120

To improve the crimping result, models FP 120 are equipped with a slow down of 1...2 mm at the end of the crimp. The slow down has been set at the factory and cannot be altered by the operator. For heavier fittings the machine has a pressure valve to turn the deceleration on at a pressure of approx 100 bar.

The slow down is activated either 1...2 mm before the set crimping diameter or at a pressure of approx 100 bar, depending on which one is reached first. The deceleration function is fully automatic.

If the machine does not work

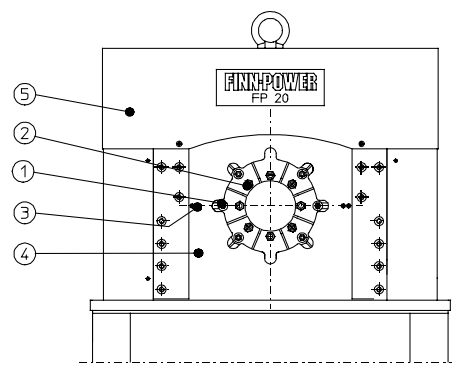
- Check that the emergency stop push-button is released.
- Make sure the supply disconnecting device is in position 1.
- Check that the plug is in the socket.
- In automatic modes the dies must be in the retraction position (signal lamp 10 illuminated), otherwise the crimping cycle will not get started (IS/AS models) / If the motor is running but the machine does not crimp, check that the crimping diameter dial is plugged in (VS model).
- If still not working, contact a serviceman.

PREVENTIVE MAINTENANCE

- The following maintenance operations can be performed by the operator according to the instructions below. However, electrical works and repairs like changing seals or the pump must only be carried out by a qualified specialist.
- **PRIOR TO ANY SERVICING OPERATION, TURN THE SUPPLY DISCONNECTING DEVICE TO POSITION "0"**
- **BEFORE CHANGING THE SUPPLY DISCONNECTING DEVICE, DISCONNECT THE PLUG OR SUPPLY CABLE FROM THE MAINS !**

Greasing and cleaning FP20

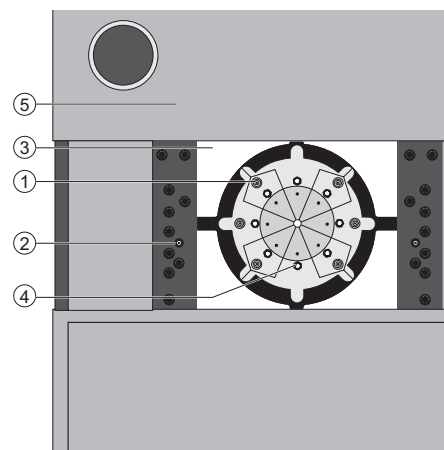
- Lubricate the master dies daily with pressure-proof grease like Molub Alloy OG-H or equivalent.
- Close the master dies loosely before lubricating them.
- Grease (1) master dies through 6 grease nipples.
- Lubricate often with a small amount of grease rather than seldom with much grease.
- Due to metal scurf that loosens from the fittings to be crimped, the master dies are to be cleaned carefully at intervals of approx 500 operation hours.
- To facilitate the cleaning, remove the die covers as follows:
 1. Remove the locking pins (2).
 2. Remove the upper box (5).
 3. Loosen the fixing screws of the wedge (3).
 4. Lift the die covers (4) up and remove them.
 5. Replace the parts.



FP20ras.hgl

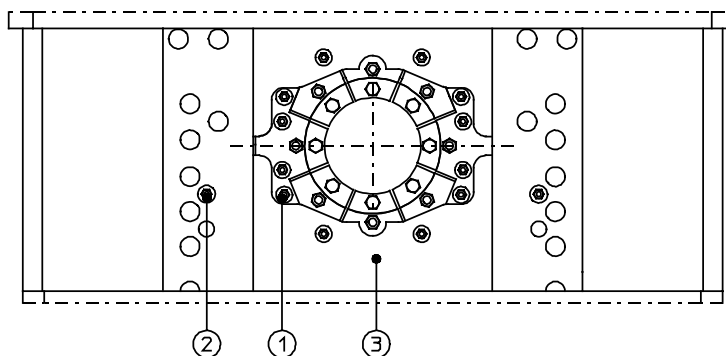
Greasing and cleaning FP110, FP120, FP120S

- Lubricate the master dies and sliding plates daily with pressure-proof grease like Molub Alloy OG-H or equivalent.
- Close the master dies loosely before lubricating them.
- Grease (1) master dies through 6 grease nipples and (2) sliding plates through 2 nipples.
- Lubricate often with a small amount of grease rather than seldom with much grease.
- Due to metal scurf that loosens from the fittings to be crimped, the master dies are to be cleaned carefully at intervals of approx. 500 operation hours.
- To facilitate the cleaning, remove the die covers as follows:
 1. Remove the locking pins (4).
 2. Remove the front plate (5) and rear box.
 3. Open the dies to the maximum.
 4. Lift the die covers (3) up and remove them.



fp140ra.hgl

Greasing and cleaning FP140, FP140X



fp140ra.hgl

- Lubricate the master dies and sliding plates daily with pressure-proof grease like Molub Alloy OG-H or equivalent.
- Close the master dies loosely before lubricating them.
- Grease (1) master dies through 12 grease nipples and (2) sliding plates through 2 nipples.
- Lubricate often with a small amount of grease rather than seldom with much grease.
- Due to metal scurf that loosens from the fittings to be crimped, the master dies are to be cleaned carefully at intervals of approx. 500 operation hours.
- To facilitate the cleaning, remove the die covers (3) as follows:
 1. Open the dies wide open.
 2. Loosen the fixing screws of the die covers and remove the covers.

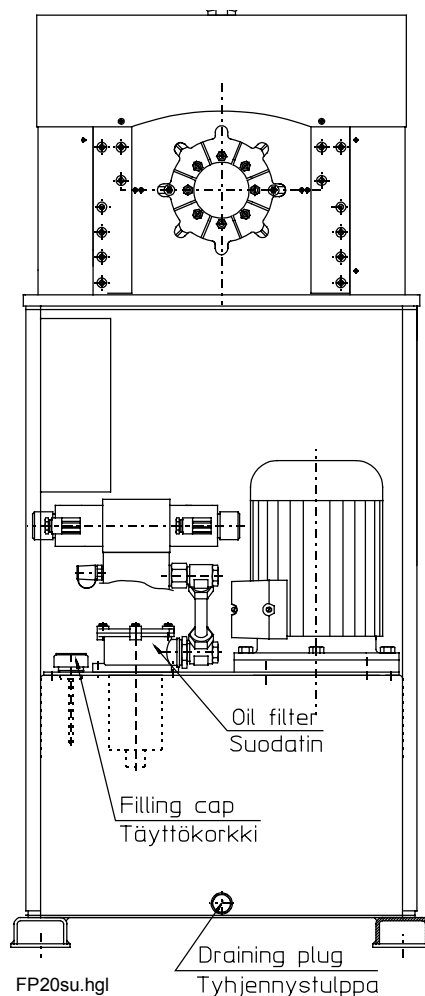
NOTE! Do not close the dies when the covers are removed so that the master dies won't drift out and the springs won't get damaged.

Cleaning of FP120 master dies

- Close the master dies.
- Loosen four fixing screws of both upper and lower die cover and remove the die covers.
- Loosen four screws of the cover plate behind the stop device and remove the cover.
- Loosen two screws of the upper and lower piece of the stop device and slide the stop device off.
- Clean the master dies.

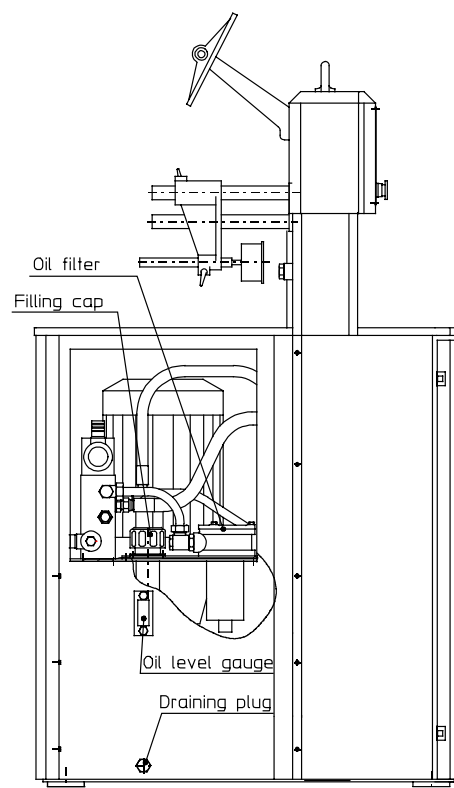
Oil change FP20

- Empty the oil tank.
- Handle the waste oil according to law.
- Fill the tank to the mark in the dipstick.
- Oil tank volume: 85 litres
- Recommended oil: Shell Tellus T 46 or equivalent
- Change hydraulic oil after the first 500 hours of operation and every 1000 hours thereafter.
- It is recommended to pump the oil into the tank through a 20 μ filter, because new oil in drums is not pure.
- If any oil has run out on the floor, wipe it away.



Oil change FP110, FP120, FP120S, FP140 FP140X

- Empty the tank of oil through the draining plug in the tank.
- Handle the waste oil according to law.
- Fill the tank to centre line of the oil level sight glass.
- Oil tank volume: 130 litres
- Recommended oil: Shell Tellus T 46 or equivalent
- Change hydraulic oil after the first 500 hours of operation and every 1000 hours thereafter.
- It is recommended to pump the oil into the tank through a 20 μ filter, because new oil in drums is not pure.
- If any oil has run out on the floor, wipe it away.



Filter change

- Open the three fixing screws in the filter cover and remove the cover.
- Remove the filter insert.
- Handle the old filter according to law.
- Put the new filter insert in its place.
- Screw the cover down.
- Filter insert must be changed together with oil.
- Purchase number: 043124.

Troubleshooting

Troubleshooting is to be carried out by a serviceman.

TROUBLE	POSSIBLE CAUSE	ACTION
Machine will not start.	1. No electric supply	Check fuses and supply cable connections.
	2. Motor protection tripped and pump condition.	Reset. If tripped again, check motor
	3. Contactor broken	Check the voltage up to the motor.
	4. No control voltage	Check fuses of transformer G1. Replace if need be.
	5. Fuses/rectifier/ transformer out of order	Check, replace.
Motor runs but no piston movement.	1. Wrong rotation direction	Interchange two phases in the supply disconnecting device.
	2. Low oil level	Check, refill.
	3. Fuses/rectifier/ transformer out of order	Check, replace.
	4. Control broken	See if LEDs are lighted. Replace the control if need be (IS/AS models) See the error code of the control unit (VS)
	5. Valve out of order	Check movability of valve steam. Check the solenoids.
	6. Pump or coupling broken	Check, replace.
Insufficient crimping force. and/or loud noise	1. Insufficient lubrication	Lubricate master dies and sliding plates.
	2. Low oil level	Check, refill.
	3. Pressure relief valve stuck. Pilot check valve leaking	Check, clean. Replace if broken.
	4. Leaking pump/pressure pipe	Check, tighten, replace.
	5. Coupling between motor and pump slipping	Check, replace.
Crimping diameter varies.	1. Insufficient lubrication	Lubricate master dies and sliding plates.
	2. Set value changed	Check.
	3. Dial loose (IS/AS models)	Check, calibrate, tighten.
	4. Sliding potentiometer loose or broken	Check, fasten, replace.
	5. Valve sticking	Check, clean.

See also VS control, Chapter "Alarm screen" on page 14.

GUARANTEE

The machines produced by Lillbacka Powerco Oy are guaranteed against defects in material and manufacture. Within the limits of the guarantee, the defective part will be replaced with a new one, or when possible, repaired free of charge.

The guarantee is valid for 12 months after commissioning, yet for a period not exceeding 18 months after delivery ex works Alahärmä, Finland.

The guarantee does not compensate for damage due to improper use, overload, neglect, or normal wear. Working and travelling costs as well as freight charges caused by guarantee repairs are not covered by the guarantee.

Guarantee repairs shall be carried out at Lillbacka Powerco Oy, Alahärmä, Finland, or by an authorized Finn-Power service. In case guarantee repair is demanded, the customer has to prove that the machine is under guarantee.

LILLBACKA POWERCO OY DO NOT WARRANT FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR FOR ANY OTHER LOSS, DAMAGE OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS.

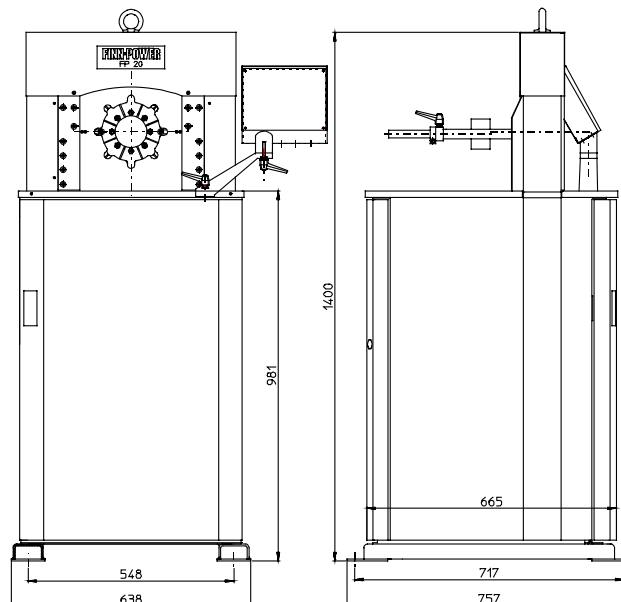
TECHNICAL DATA

Technical data FP20

		FP 20
Capacity	in	1 ½
Crimping diameter range *)	Ø (mm)	4...68
Max opening	mm	68
Master die shoe length	mm	97
Pump	l/min	29/9
Max pressure	bar	275
Crimping force	kN	1500
Theoretical production capacity	per hour	2300
Sound pressure level	dB(A)	68
Enclosure class		IP 54
Closing speed of master dies	mm/s	9.2
		Frequency 50 Hz
Motor power	kW	3
Voltage V / Current A / Fuse A		<input type="checkbox"/> 200 / 16 / 25 <input type="checkbox"/> 230 / 11.7 / 20 <input type="checkbox"/> 400 / 6.7 / 16 <input type="checkbox"/> / /
		Frequency 60 Hz
Motor power	kW	3.6
Voltage V / Current A / Fuse A		<input type="checkbox"/> 210 / 15.6 / 25 <input type="checkbox"/> 230 / 10.8 / 20 <input type="checkbox"/> 400 / 6.2 / 16 <input type="checkbox"/> / /

*)with complete standard die equipment.
Special diameters and profiles to customer's specifications.

Overall dimensions:



Weight 600 kg, excluding oil.

FP20mit.hgl

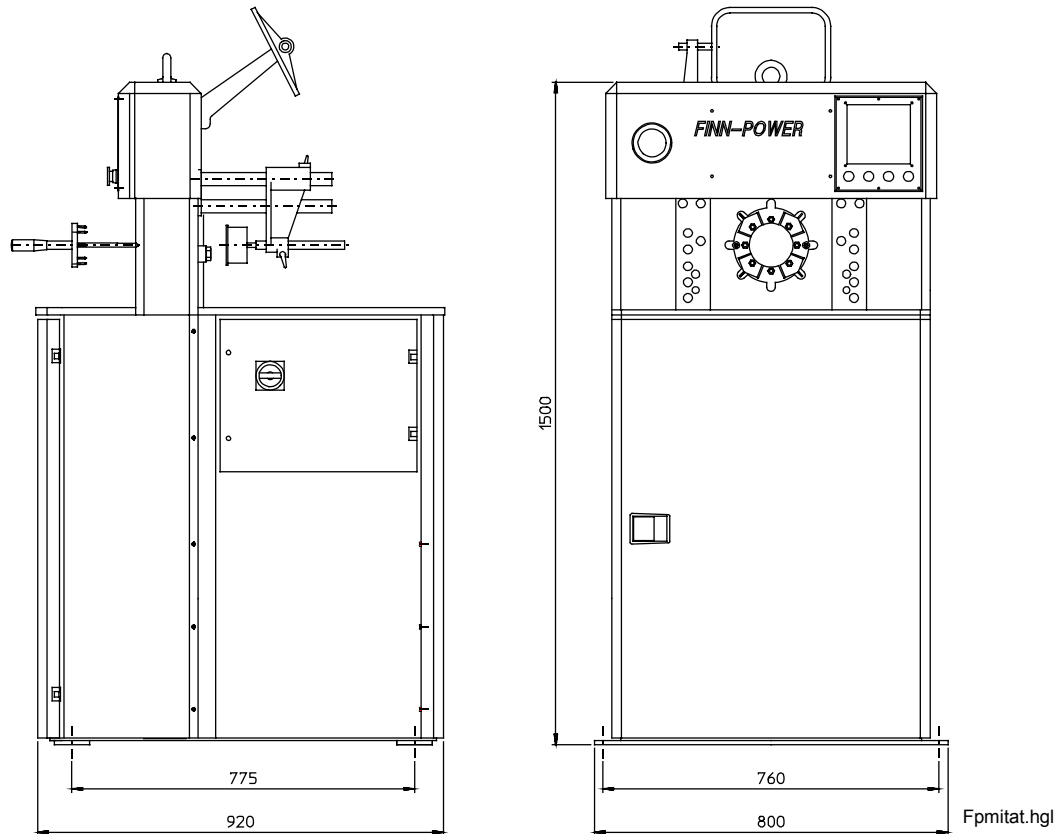
READ THE INSTRUCTIONS THOROUGHLY TO SECURE SAFE AND CORRECT OPERATION OF THE MACHINE.

Technical data FP110, FP120

		FP110	FP120
Capacity	in	2	2
Crimping diameter range *)	Ø (mm)	4...120	4...120
Max opening	mm	68	68
Master die shoe length	mm	97	97
Pump	l/min	23	48/12
Max pressure	bar	275	350
Crimping force	kN	2200	2800
Theoretical production capacity	per hour	1360	2400
Sound pressure level	dB(A)	68	68
Enclosure class		IP 54	IP 54
Closing speed of master dies	mm/s	4.7	9.7
Freq. 50 Hz			
Motor power	kW	5.5	5.5
Voltage V / Current A / Fuse A		<input type="checkbox"/> 200 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25 <input type="checkbox"/> / / /	<input type="checkbox"/> 200 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25 <input type="checkbox"/> / / /
Freq. 60 Hz			
Motor power	kW	7.5	6.6
Voltage V / Current A / Fuse A		<input type="checkbox"/> 230 / 29 / 35 <input type="checkbox"/> 400 / 16.5 / 25 <input type="checkbox"/> / / /	<input type="checkbox"/> 210 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25

*) Special diameters and profiles to customer's specifications.

Overall dimensions:



Weight 1000 kg, excluding oil.

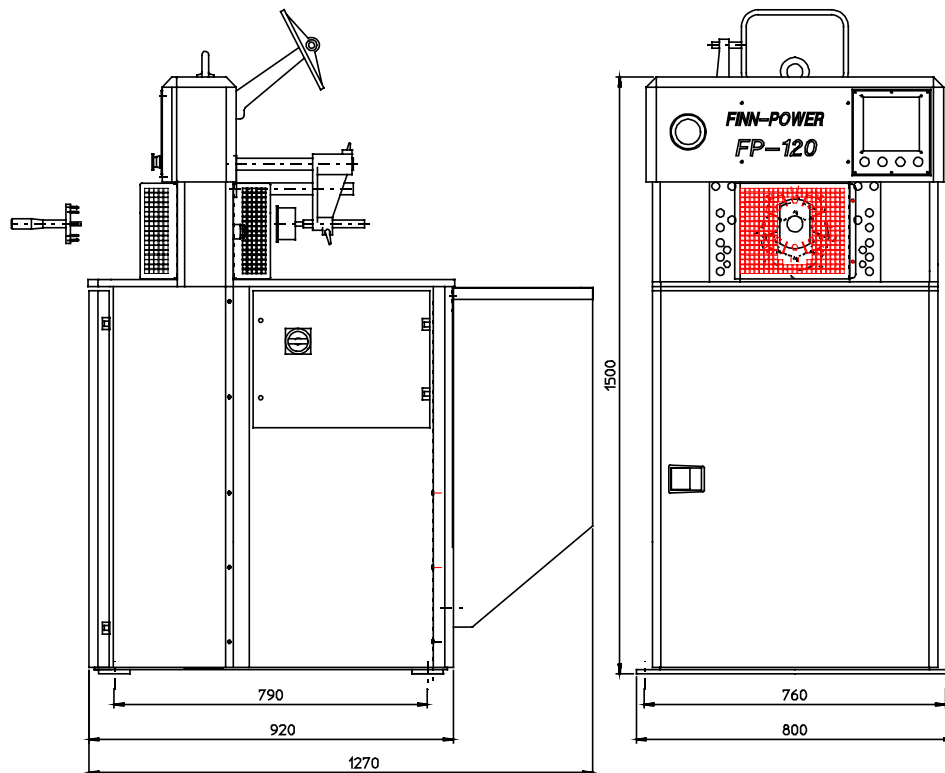
READ THE INSTRUCTIONS THOROUGHLY TO SECURE SAFE AND CORRECT OPERATION OF THE MACHINE.

Technical data FP120S

		FP120S	
Capacity	in	2	
Crimping diameter range *)	Ø (mm)	4...120	
Max opening	mm	68	
Master die shoe length	mm	97	
Pump	l/min	84/12	
Max pressure	bar	350	
Crimping force	kN	2800	
Theoretical production capacity	per hour	3000	
Sound pressure level	dB(A)	72	
Enclosure class		IP 54	
Closing speed of master dies	mm/s	50 Hz - 17.4 mm/s	60 Hz - 20.8 mm/s
		Frequency 50 Hz	
Motor power	kW	7.5	
Voltage V / Current A / Fuse A		<input type="checkbox"/> 230 / 29 / 35 <input type="checkbox"/> 400 / 16.5 / 25 <input type="checkbox"/> / / /	
		Frequency 60 Hz	
Motor power	kW	9	
Voltage V / Current A / Fuse A		<input type="checkbox"/> 230 / 29 / 35 <input type="checkbox"/> 400 / 16.5 / 25 <input type="checkbox"/> / / /	

*)with complete standard die equipment.
Special diameters and profiles to customer's specifications.

Overall dimensions:



Fpm7.hgl

Weight 1050 kg, excluding oil.

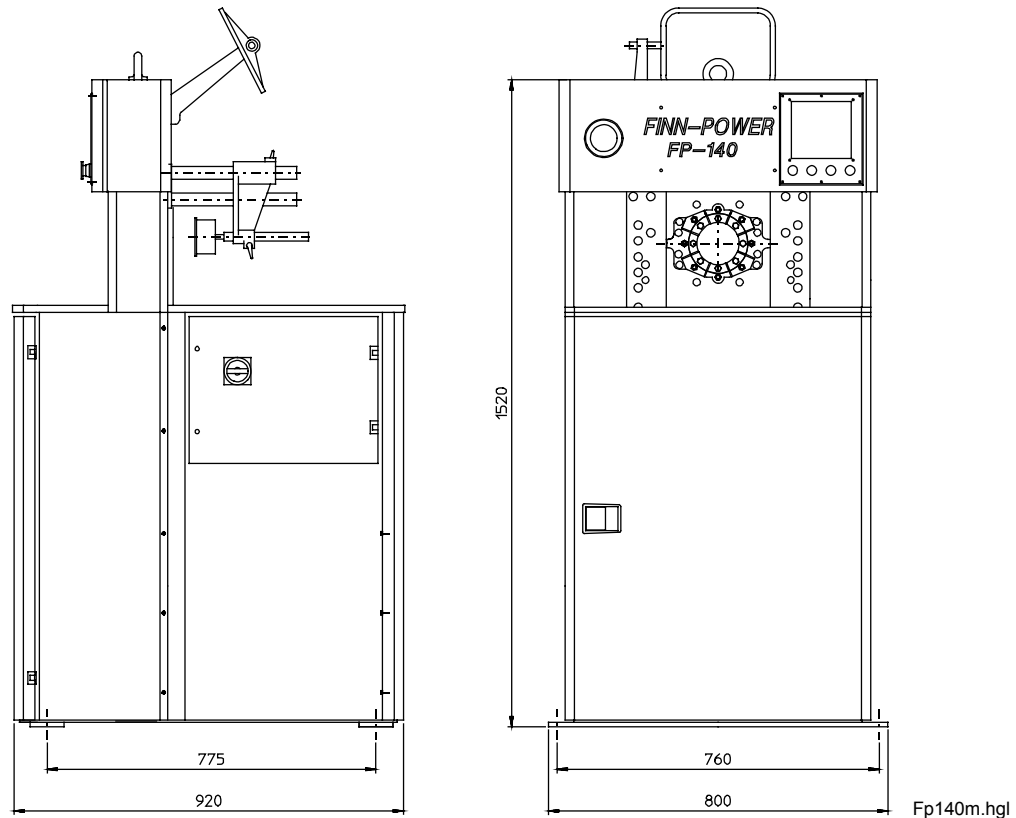
READ THE INSTRUCTIONS THOROUGHLY TO SECURE SAFE AND CORRECT OPERATION OF THE MACHINE.

Technical data FP140, FP140X

		FP140	FP140X
Capacity	in	2½	4
Crimping diameter range *)	Ø (mm)	4...160	4...160
Max opening	mm	82	82
Master die shoe length	mm	97	97
Pump	l/min	48/12	23
Max pressure	bar	350	275
Crimping force	kN	3200	2500
Theoretical production capacity	lkm/h	2000	1200
Sound pressure level	dB(A)	68	68
Enclosure class		IP 54	IP 54
Closing speed of master dies	mm/s	8.6	4.2
		Frequency 50 Hz	Frequency 50 Hz
Motor power	kW	5.5	5.5
Voltage V / Current A / Fuse A		<input type="checkbox"/> 200 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25 <input type="checkbox"/> / /	<input type="checkbox"/> 200 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25 <input type="checkbox"/> / /
		Frequency 60 Hz	Frequency 60 Hz
Motor power	kW	6.6	6.6
Voltage V / Current A / Fuse A		<input type="checkbox"/> 210 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25 <input type="checkbox"/> / /	<input type="checkbox"/> 210 / 23 / 35 <input type="checkbox"/> 230 / 20.5 / 35 <input type="checkbox"/> 400 / 11.6 / 25 <input type="checkbox"/> / /

*) Special diameters and profiles to customer's specifications.

Overall dimensions:



Weight 1000 kg, excluding oil.

READ THE INSTRUCTIONS THOROUGHLY TO SECURE SAFE AND CORRECT OPERATION OF THE MACHINE.