



CRYPTO AG. ZUG

(Switzerland - Suisse)

I No. 3099

Service Instructions and Maintenance for Ciphering Machines Type CX-52

(The reference numbers apply to the spare parts catalogue L-013.
Thus e.g. 15/4 refers to picture 15 page 4.)

A. Service Instructions

To dismount the machine for a complete overhauling, follow the instructions in the order given below.

- 1) Unlock the machine using the key with two slots in the grip and open both the outer cover 15/1 and the inner lid 15/4.
- 2) Loosen the screw 10/3 at the back bottom of the right hand bearing plate 10/1 so that the inner lid 15/4 can be removed.
- 3) Unscrew the three screws 15/3 with which the hinges for the outer cover are fastened to the baseplate of the machine.
- 4) Pull out the release latch 7/9, turn the machine upside down and take away the bottom cover plate 16/1. Remove the paper roll 17/11. Turn it back to normal position.
- 5) Press the button 14/12 marked "0" and turn the operating knob 12A/4 of the typewheel 12A/1 counterclockwise, until stopped, and open the typewheel cover 13A/1. Pull out the positioning shaft 11/17 towards the right and remove the typewheel and the six pinwheel groups 11/1.
- 6) Unscrew the two screws 14/13 and 14/15 on the left side of the machine and pull out the side cover 14/1 to the left.



- 7) The typewheel cover 13A/1 is freed by pressing the shaft pivot 13A/4 towards the left with a pointed tool.
- 8) To remove the FV device, first pull out the locking arm 8C/19 for the typewheel cover. Remove the distance clip 8B/18 and push the bushing 8B/19 towards the rear. Pull out the FV device assembly towards the front and then slightly toward the left, so that the forward end of the shaft 8B/12 will come out from the forward bearing slot in which the bushing 8B/19 was lodged.
- 9) Pull out the two ink roller holders 8C/20 and 8C/23.
- 10) Remove the paper guard 8B/1 by unscrewing the two screws 8B/2.
- 11) To remove the printing assembly, first take away the clip 8A/16, the screw 8B/10, the spring 8A/9 and the C-D knob 8B/8.

Press the forward upper ends of the printing levers 8A/20 and 8A/22 slightly, so that their rear ends will go free of the cam unit 9/1: now the complete printing assembly, consisting of the C-D unit 8A/19, the printing levers 8A/20 and 8A/22, the friction roller cradle 8A/15, the friction roller 8A/17 and the paper feed roller 8A/18 can be pulled out together.

- 12) To dismount the cam unit etc., press the lower end of the drum release pawl 8C/6 and revolve the bar drum 9/5 slowly until the bar No. 16 will come uppermost, which makes the taper pin 9/2 accessible which keeps the cam unit fixed to the shaft 9/10. Drive out this pin. Take care that the paper feed arm 8A/10 does not touch the shaft for the paper feed roller and pull out the cam unit 9/1 towards the left. The 5-letter grouper 8A/14 is now pulled off the shaft. Then unhook the spring 8A/13 and remove the paper feed arm 8A/10.
- 13) Remove the top cradle 10/21 after unscrewing the screw 8C/12 and the nut 8C/13.
- 14) Dismount the right bearing plate 10/1 from the baseplate, by unscrewing the screws 10/4 and after lifting it slightly from the base in order to free it from the guiding pins, pull it towards the right so it will come free of the bar drum shaft.

- 15) Now, to remove the bar drum 9/5 press down the retractor cradle 7/7 and pull out the drum towards the right.
- 16) Dismount the left bearing plate 8A/2 after unscrewing the four screws 8A/3. Note that the guiding pins are fixed in the bearing plate.
- 17) Remove the journal plate 8C/1 from the left bearing plate 8A/2 by unscrewing the three screws 8C/5 and pulling the journal plate and the bearing plate apart. The check pawl with the intermediate gear 8C/15 can now be pulled off its shaft gearing. To take away the ratched arm 8C/9 unhook the spring 8C/11 and remove the clip 8C/10. The drum release pawl 8C/6 is removed after unscrewing the screw 8C/8 and unh cking the spring 8C/7.
- 18) All parts must be carefully washed in gasoline. With regard to the oiling of moving parts, proceed in accordance with oiling instructions (see Maintenance).

To assemble the machine:

- 19) Mount the drum stop release pawl 8C/6 and the friction spring 8C/7, fasten the screw 8C/8 until there will be a tension between pawl and spring of about 200 gr. Place the ratchet arm 8C/9 and the clip 8C/10 on their shaft and hook on the spring 8C/11. Mount the check pawl with intermediate gear 8C/15.
- 20) The journal plate 8C/1 is mounted on the left bearing plate 8A/2 by the three screws 8C/5. Control that the check pawl with intermediate gear 8C/15 and the locking arm for relative position 8C/4 move freely.
- 21) Put the left bearing plate 8A/2 on the bottom plate and fasten it with the four screws 8A/3.
- 22) Turn the drum 9/5 until bar No. 16 will come uppermost and push the drum into its position.
- 23) Turn the drum to its starting position. Put on the driving pinion 9/16 on the right end of the drum shaft 9/10 and turn it until it stops against the heel of the commanding cam unit

- 9/15. Pull the crank and push the operating handle 10/9 into its hole in the right bearing plate 10/1. Push the bearing plate on the shaft of the drum by cautiously lifting the plate to free it from the guiding pins in the bottom plate at the same time as the cradle commanding lever 10/16 is lifted to pass the heel of the commanding cam unit. If the gear does not fit the gear segment 10/5, press the cradle commanding lever somewhat during the insertion. Then fasten the bearing plate with the two screws 10/4 and make sure that the drum turns freely.
- 24) Mount the paper feed arm 8A/10 and hook on the spring. Put the 5-letter grouper 8A/14 on to its shaft.
- 25) Turn the drum until the sector without slidebars will come uppermost, take the 5-grouper feeder 9/3 and put it on the cam unit 9/1. Check that the arm runs freely and is turned to feed the 5-letter grouper. The cam unit can then be pushed on the drum shaft if the paper feed arm 8A/10 is lifted. The large hole for the taper pin 9/2 should be placed right upwards by turning the cam unit, whereafter the pin is to be fastened. Hook on the spring 9/4.
- 26) Mount the top cradle 10/21 with the screw 8C/12 and the nut 8C/13. Check that the top cradle moves freely. Mount the inner lid locking lever 10/19 by means of the clip 10/20.
- 27) The printing levers are now to be fastened, first the secondary lever 8A/22 and then the primary lever 8A/20 on the C-D unit 8A/19 of which the movable part runs on the journal of the secondary printing lever 8A/22. The friction roller 8A/17 with the knurling to the right of the knife is guided into the slot of the friction roller cradle 8A/15, and the paper feed roller 8A/18 is placed opposite. All parts are simultaneously pushed on to their shafts, while the printing levers are kept to go free from the cam unit. Now it is necessary to check that the paper feed arm 8A/10 is pushed forward enough to fit the tooth wheel of the paper feed roller. The clip 8A/12 is fastened and the C-D knob 8B/8 is placed on its shaft. By turning the knob

it is possible to check that the detent for the two end portions of the C-D unit works. The spring 8B/9 is mounted and fixed by the screw 8B/10.

- 28) Fasten the paper guard 8B/1 with the two screws 8B/2.
- 29) Wind the spring 8B/17 on the F-V device 8B/11, guide it to the right and push same into its back position, pull then the bushing 8B/19 into its position and put on the distance clip 8B/18. Check that the shaft runs freely and with enough spring tension.
- 30) Wind the right spring 8C/22 of the right ink roller holder 8C/23 half a turn and push the holder in its shaft. The same steps are taken with the left spring 8C/21 and the left ink roller holder 8C/20. Mount the ink rollers with the aid of a pair of tweezers. Push the locking arm 8C/19 for the type wheel unit cover on to the same shaft.
- 31) Take the type wheel unit cover 13B/1, push the shaft pivot 13B/4 and push the lid between the friction roller cradle 8A/15 and the side of the left bearing so that the shaft runs into its hole by the pressure of the springs. The lid should stand vertically.
- 32) Check that the button "0" 14/12 is in its position on the side cover 14/1. Push the locking arm for type wheel unit cover 8C/19 forwards and the side cover is pushed to the right. To allow the shaft journal to fall into the hole of the lid, the type wheel lid is lifted a little. The next step is to turn the counter axle 14/3 at the same time as the cover is pushed further against the left bearing, and fasten the screw 14/13. The holder 14/14 for the outer cover is fastened with the screw 14/15.
- 33) Turn the drum to its starting position and put the pin wheel groups 11/1 into their places one by one, push the positioning shaft 11/17 from the right so far that the groups are fixed, then put in the type wheel 12A/1 in position and push the shaft as far in as possible.



- 34) Press the button "0" 14/12, turn the type wheel counter-clockwise until it stops, and then place the red line of the index 13B/13 exactly opposite the red point. The type wheel unit cover 13B/1 can now be closed.
- 35) The outer cover 15/1 is fixed by the three screws 15/3. Turn the machine upside down and fasten the three nuts LB6M-3.
- 36) Put the paper roll 17/11 on its shaft and pull the tape through the slot in the bottom plate. Pull out the release latch 7/9, mount the bottom cover plate 16/1, then push in the release latch and turn the machine right again.
- 37) The inner lid 15/4 is pushed from the right on its shaft whereafter the screw 15/3 is fixed.
- 38) Lift the type wheel cover (see item No. 4), pull up the paper tape and thread it between the friction roller 8A/17 and the paper feed roller 8A/18, turn the wheel forward and press the paper under the paper guide 14/10. The type wheel cover is closed (see item No. 34) and the machine is ready for use.

B. Maintenance

1) Lubrication.

At delivery the machine has all movable parts carefully lubricated and is quite ready for use. Subsequent oilings of these parts should be carried out after every 800 hours' operation, i.e. about every 3 months with 10 hours' daily operation. Particular care must be devoted to all gear wheels, gliding surfaces, levers and bearings. To obtain a thin oil film only, the lubricant should be added dropwise. To reach every part to be oiled, the left side cover 14/1 has to be removed, after which the parts are easily accessible. As a general lubricant we suggest engine oil (SAE 20) with 20 - 30 per cent Molykote Z added. If this compound lubricant is not available at the moment, be careful to use only a resin- and acid-free oil.

2) Cleaning of the machine.

The machine is easy to clean with an ordinary brush. At regular intervals, the length of which naturally depends on the degree of working, the machine should be dismantled, thoroughly cleaned and reoiled, in particular if for any reason sand or water has got into it.

3) Cleaning of the types.

Since the type wheel 12A/1 will during use get contaminated by the ink rollers, it has to be cleaned rather often to ensure legible print. The most convenient way of cleaning the types is to remove the type wheel 12A/1 from the machine and then clean it with a piece of cloth or cotton waste that has been slightly moistened with petrol.

4) Exchange of ink rollers.

When the print begins to be indistinct, it is time for changing the ink rollers. Spare ink rollers are available in the ink roller tube 17/2 placed in the outer cover 15/1. The exchange is easily done with the aid of tweezers or a similar instrument.

5) Exchange of paper rolls.

When the paper strip turns red, this indicates that it is coming to an end. A new paper roll is inserted by pulling out the release latch 7/9 to release the bottom cover plate 16/1, which is then to be removed from the machine. The rest of the old paper roll is taken out and the fresh roll is placed in exactly the same position as the old one. The free end of the paper strip is inserted in the slot in the base plate 7/1 and is then conveyed up by hand between the type wheel and the printing hammers 8/20-22. When protruding at the top, the free paper end is inserted between the friction roller holder 8A/17 and the paper feed roller 8A/18. At the same time the knurled paper feed roller must be turned.