COLD FLANGING MACHINE RIBO 25×4000

Supplied to: TECHNOIMPEX - BUDAPEST

MANUFACT. NO. 2364

I M P O R T A N T

THROUGH KNOWLEDGE OF THE MACHINE AND STRICT OBSERVANCE OF THESE INSTRUCTIONS ARE ESSENTIAL FOR GOOD WORK AND LONG SERVICE. IT IS ABSOLUTELY NECESSARY FOR OPERATING PERSONNEL TO READ ATTENTIVELY THESE INSTRUCTIONS BEFORE USING THE MACHINE

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THIS MACHINE IS COVERED WITH PATENT IN ALL COUNTRIES THAT HAVE SIGNED THE INTERNATIONAL AGREEMENT OF PARIS ON MARCH 20, 1833 AND FURTHER CHANGEMENTS.

IN SOME COUNTRIES THE OFFICIAL PATENT HAS ALREADY BEEN GRANTED, IN OTHERS IT IS UNDER EXAMINATION OF THE PATENT OFFICE. THEREFORE THE USE OF THE PRESENT INSTRUCTION MANUAL IS STRICTLY RESERVED TO THE USER OF THE MACHINE AND SHOULD NOT BE SHOWN ENTIRELY OR PARTIALLY TO ANYONE.

THE USERS WHO DO NOT FOLLOW THIS REQUEST WILL NOT BE ENTITLED TO RECEIVE INFORMATION CONCERNING THE USE, REPAIR OF THE MACHINE AND IMPROVEMENTS THAT MIGHT BE DEVISED.

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ERECTION INSTRUCTIONS

The machine must be mounted on smooth cement foundation which shall be built in accordance with our Drawings Nos 24347/82 and 15481/65
The machine must be perfectly leveled (the axis of the bed-plate must lie in a horizontal plane); for checking the level use a machinist spirit level with an accuracy of 0,05 mm per meter (1 in 20,000). Level checking should be made on the bed-plate and on the uprights.
If necessary act on leveling screws (item 62) (see note below) ans shim the bedplate up by placing thin shims between the bed-plate and t' e foundation pad.
Grout under the bedplate when the machine is satisfactorily leveled.

OPERATING INSTRUCTIONS

As the cement foundation has set, tighten again the foundation bolts.
The machine shall be supplied by a three phase 380 Volts, 50 cycles source.
The main feeder leads shall be run to the machine control Centre (item No. 18) and connected to main terminals.
Before operating the machine make sure that all motors rotate in the same direction indicated by the arrow on the control board, (item No. 66); this test shall be made by controlling forming roll rotation (item No. 14)
For this test run operate as follows:

1) Insert the key in the lock switch (item No. 44) turning left until light appears in the indicating lamps (item No. 97)
2) Press the button (item No. 52) markes START, check if forming roll (item No. 14) rotate in the clockwise direction (supposing you are watching from the bedplate end)
   If forming roll rotation is correct, all other motors should have correct rotation.

FORMING ROLL ROTATION

Forming roll can be changed to suit the different knuckle radii.
Its rotation is effected by means of a motor(item No.)
The reduction gears (item No. 2) allows three rotation speeds by acting on the lever (item No. 67). Never change the gear while motor is running.
Table No. 1 indicates the recommended speeds with regard to thickness and diameter of heads to be flanged.

NOTE: Items numbers indicated in this manual correspond to items listed in Drawing No. 25454/82

T A B L E No.1

SPEED	DIAMETER OF HEADS	THICKNESS
1st (low)	1000 ÷ 2000 mm	15 - 25 mm
2nd (medium)	1000 ÷ 2000 mm 2000 ÷ 3000 mm 3000 ÷ 4000 mm	5 - 15 mm 6 - 25 mm 8 - 25 mm
3rd (high)	2500 ÷ 4000 mm	5 - 20 mm

In particular we recommend the use of the 2nd speed for the flanging of medium thickness stainless steel heads and the 3rd speed for flanging light stainless steel heads.

SLIDING CARRIAGE

Sliding carriage (item No.72) slides in the bed of the machine by means of an electric motor (item No.38). It will stop at either end through the action of limit switches (item No68). Sliding carriage can be adjusted by pressing buttons (item No49)

PNEUMATIC SYSTEM (Drawings No.2505/82 and 2545/82)

The locking device for the head (item No.65) being flanged as well as the guide rolls (item No.12) are operated through compressed air cylinders (max. pressure 6 Atm).
The pneumatic system is composed of:

1) A filter-reducer-lubricating set (item No.64) provides for the adjustment of the pressure required for locking the head
2) A four way distributor (item No42) to operate the cylinder (item No6) of the locking device which consists of the cylinder (Item No.6) applied to a carriage (item No.65) It will stop at either end through the action of limit switches (item No.74)
   Sliding carriage can be adjusted by pressing the buttons item No.
3) A three way distributor (item No41) to operate a cylinder (item No.11) for the vertical adjustment of guide rolls (item No.12); said rolls can be substituted with others covered with rubber for flanging stainless steel, copper, and other light alloys.
   Substitution of roll (item No.12) is easily obtained by taking out the two rings (item No.69) fixed by means of screws and changing the rolls.
4) A pressure reducer (item No.75) to adjust the pressure of guide rolls against the head according with material being formed. The pressure is controlled by means of a pressure gauge (item No.40)

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HYDRAULIC SYSTEM (Drwgs Nos.25354/82 25454/82)

Flanging roll adjustments are by means of three cylinders as follows:

- Cylinder (item No. 17) for the horizontal adjustments through distributor item No.54
- Cylinder (item No.15) for vertical adjustments through the distributor item No.57
- Cylinder (item No.19) for vertical adjustments of the axis of the cylinder item No.17 through the distributor item No.

The obtained position of the horizontal cylinder can be checked on the graduated scale item No.89.
An hydraulic center (item No.20) supplies oil at the required pressure.
The hydraulic center includes two pumps; pump A (item No. 35) and pump B (item No. 32) which are started by push buttons items No 48 and 47 respectively.
The handwheel valve (item No.37) controls the pressure of the oil from pump B which is shown by the pressure (item No.61). The required output and consequently the adjustment speed is controlled by the handwheel valve (item No. 58) connected on the circuit of pump B.
Distributors (items Nos. 54 and 53) are on the circuit of pump A, similar for items 57 and 60 on the circuit of pump B.
In the tubings of the oil recollection to the hydraulic center are placed two adjustable valves (items Nos 23 and 28) which create a counterpressure of about 3-4 Atm. The above valves are regulated during test run of the machine at our factory and should never be touched thereafter.
In the tubings feeding the cylinder (item No.17) for the horizontal adjustments of flanging roll is placed a handwheel valve (item 46) which acts as a circulation valve and allows the passage of the oil contained in the rear part of cylinder (item No.17) to the front part of same when distributor (item No.54) is closed.
By the action of this valve at the pressure indicated by the pressure gauge (item No. 55), flanging roll (item No.13) can return should the pressure exerted against the head be too high as a consequence of the vertical adjustment reached by cylinder item No.15 operated by the distributor item No.57 /

WORKING PRESSURE

The maximum pressure for flanging heads 1" thick is 60 Kgs/sq.cm. (850 lbs.sq.in.)
It would damage the machine as well as the workpiece the use of higher pressure.
Pressure shall be reduced accordingly for lighter material.

In general the recommended pressures are:

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Thickness from	5	to	7 mm	pressure from	8	to	12 Kgs/sq.cm.
thickness from	8	to	11 mm	pressure from	15	to	20 Kgs/sq.cm.
thickness from	12	to	14 mm	pressure from	25	to	30 Kgs/sq.cm.
thicknees from	15	to	18 mm	pressure from	35	to	40 Kgs/sq.cm.
thickness from	19	to	21 mm	pressure from	45	to	50 Kgs/sq.cm.
thickness from	22	to	25 mm	pressure from	55	to	60 Kgs/sq.cm

CAPACITY OF THE MACHINE

The capacity of the machine is stated in the table No. 27155/82 i.e.:

- heads having diameter from 1000 to 4000
- knuckle radius from 80 to 400
- thickness from 5 to 25

LUBRICATION

Should be done at least every 20 working hours by means of the grease gun supplied with the machine.
the type of grease to be used is SHELL ALVANIA GREASE 3 or equivalent.
It is particularly recommended to keep well lubricated top and lower guideways, the screws for the adjustment of sliding carriage and the screws of top carriage for head clamping device.

GEAR BOX LUBRICATION

Before starting the machine fill the top and lower part of the gear box with "SHELL MACOMA OIL 33" or equivalent.
The top part "C" is filled through nipple cap item No. 76 with about 40 lts. ( ) of oil. Check the oil level on the apposite gauge (item No. 77) . Some of the gears enclosed in the tank "C" are lubricated by splashing, others by spraying through the piston pump item No. 78
The lower part "D" is lubricated by the splash method. It is filled with about 12 liters( ) of oil through the tap (item No 79) until its level reaches the filler plug item No 80
Use "SHELL MACOMA OIL 33" or equivalent.
The oil should be changed every 1000 working hours, approx.
For drainage of the oil contained in the tanks "C" and "D" take off drain taps items Nos. 81 and 82 respectively.

HYDRAULIC CENTER

In general the machine is supplied with the cylinders and the hydraulic center tank (item No 20) filled with oil.
During filling operation it is possible the forming of air bubbles which may cause irregular running of same cylinders.
This can be avoided by means of breathers placed in the caps of the vertical cylinders and on the top part of the horizontal cylinder. In case of air bubble forming in the tubings, loosen the inleet screws of distributors.

The type of oil to be used is "SHELL TELLUS OIL 27" or equivalent.
The reservoir (item No.20) of the hydraulic center is filled through one of the two caps (items Nos. 25 and 30). Min. and max. level can be checked on the rod placed on each of the above taps.
For drainage of the oil contained in the reservoir take off drain tap (item No.63)
The approx total quantity of oil required for the whole system is 300 lts

COOLING OF THE OIL

In the case containing the hydraulic centre (item No.20) there is a cooling device (by means of water circulation)
On the case cover there are two nipples (items Nos.33 and 34) for connection to inlet and outlet pipes.
Above the inlet pipe it may be useful to place a cock in order to regulate the quantity of water required for keeping the oil temperature below 50° C.

MAKING DISHED HEADS FLANGINGS

In order to obtain the best results we recommend using carbon steel material having max. tensile strength 40 Kgs/sq.mm, elongation between 26 and 35%.
Of course the machine can work material up to 50 + 52 Kgs/sq.mm. and lower elongation property. However when flanging these materials flanging operation is less easy.
The following sequence is recommended:

a) Prepare a disk having a diameter corresponding to the development of the head. This diameter can be obtained from the formula and exemples shown in the table No. 23132/70 which however is approx. only as the elongation of material during flanging operation depends on the plasticity of same as well as on the experience of the operator.
   Disks to be flanged should not have slots or deep notches on the external edge.
   In order to avoid breakings we recommend grinding the edge of heads.
b) Make the dishing on a press or by other means
c) Make a hole 40 mm diameter in the center of the head
d) Mount forming roll (item 14) according with the desired knuckle radius.
   As the roll is very heavy, handling should be by means of the apposite tooling (item No.83)
   By moving the handle (item No.84) it is possible to set this tool according with the axis of the bedplate or at 90° from it.
   The two above positions are required respectively when mounting or removing the roll from its shaft and for charging or discharging the roll from the tool.
   The ring item 85 which clamps the roll is mounted and removed through the tool bore while the roll is supported by the tool.

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By means of sliding carriage (item 72) and by acting conveniently on the distributor (item 53) the roll is taken to the correct position for being mounted.

SETTING OF THE HEAD ON THE MACHINE

Place the head on its support (item 10), move sliding carriage (item No 72) by pressing pushbuttons (item 49) in order to introduce between rolls the edge of the head which has to be formed.
The cylinder (item No. 8)should be conveniently adjusted in height through distributor item No. 53 in order to have the inside of the head in close contact with forming roll. Care should be taken as the axis of the head should be parallel to the bedplate of the machine.
The graduated scale (Item No. 73) will be very useful to the operator for mass production of flanged heads having identical diameters.
Correct positioning of sliding carriage (item No. 72) in order to have the required finished diameter is obtained following the instructions contained in the table No. 25078/82. This is convenient when flanging the first of a number of heads as for identical sizes, the first flanging will give all necessary data for easy forming of the whole lot.
Here is the correct sequence for mass production of identical workpieces:

1) Check the diameter "D" of the dished head,

2) Calculate the amount of straight portion "A" using the formula given in our table No. 25078/82. Formula No. 1 should be used when of the finished head interest is given to the outside diameter, formula No. 2 when interest is for the inside diameter of finished head.

3) Put a square (item B) against the flat portion of the roll (point B) then move the head to assume the position which allows the length "A", previously determined.

4) Set the pointer (item No. 70) on the predetermined diameter by means of the adjustment screw (item No. 86).

   To move sliding carriage (item No. 72) during flanging operation (this may be necessary when flanging to large radii), the operator must bear in mind that in order to obtain the final diameter carriage must return to its predetermined position which can be read on graduated scale (item No. 71).

If the operator has to make flangings to large radii, he knows he will have to adjust the carriage (as shown in Fig. 4) of Dwg. 24759/70. Therefore when positioning the carriage in order to provide a point of contact M1 of head being flanged with forming roll (item No. 14)the operator must consider this adjustment which is normally 1,5 times the plate thickness. After some experience the operator will easily determine the above adjustments.

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LOCKING OF THE HEAD

By means of the buttons (item No.50) move top sliding carriage (item No.65) so that the bearing plate (item No.7) is perfectly alined with the corresponding lower bearing plate.
Now operate as follows:

a) Push the lever of the distributor (item No.42) downwards in order to give the required pressure to the cylinder (item No 6)
b) As the head is locked, lift the guide rolls (item No.12) to contact the head; by moving upwards the lever of the distributor (item No.41)
c) By means of the pressure regulator (item No.75) sufficient pressure should be exerted without marking the external surface of the head; pressure is controlled by means of a pressure gauge (item No.40)

FORMING OF THE FLANGE - see Dwg. No. 24835/82

After having completed the above sequence operate as follows:

a) Press the start buttons (item No.48) for the pump "A" and item No.47) for the pump "B"
b) Pull the distributor lever (item No.60) downwards in order to lower the axis of the orizontal cylinder (item No.17) as much as possible.
c) Move flanging roll (item No.13) to contact the head against forming roll (item No.14) as in Fig. 1 of Drawing No.24835/82

IMPORTANT: the tangential point of forming roll (item 13) against the plate shall be "M" while the tangential point of flanging roll (item No.13) is "P".
The distance between "M" and "P" should not be less than once the thickness of material being flanged.

Start the machine by pressing the button (item n°52).
By using your right hand move the distributor lever (item No.54) in order to raise slowly the roll.
The resultant of the above two movements will make possible flanging roll (item No.13) to follow the head as it adheres against the profile of forming roll (item No.14)
When this operation is half completed (approx) in order to complete the flange and obtain the necessary straight collar, the axis of the horizontal cylinder (item No.17) should be raised by means pf the distributor lever (item No.60)
The cylinder should be raised as much as possible when making flangings to large radii. This adjustment can be checked on the graduated scale (item No.89)
Also in this case some experience will make easy for the operator to know the correct adjustment.
Before changing the position of the above cylinder (item No.17) stop flanging process and move flanging roll (item No.13) away from the head.
Afterwards you can proceed and complete the flange by simply moving the levers of the two distributors, items Nos.54 and.57 .

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When flanging to large radii, normally above 180 mm (7") the operation shall be done in two sequences in order to avoid twisting of the head caused by the large quantity of material being deformed in one pass.
Therefore the head will be placed on the machine so that the whole portion "A" previously determined as in drawing No. 25078/82 plus 1 + 1,5 times the thickness of material (which corresponds to the necessary adjustment during bending operation), is fed between the rolls.

Adjustment of the head as shown in Fig. 4 of Drawing 24835/82 is done when flanging operation is half completed (Fig.2) and after having moved away flanging roll (item No.13) as shown in Fig.3

To adjust the head towards the end of the machine as shown in Fig. No. 4 press the buttons item No.43, which start the two motors (items Nos.38 and 5) simultaneously, so obtaining combinated movement of top and lower sliding carriage.

Simultaneous motion of two sliding carriages is possible only if there is some air pressure in the cylinder (item No.6).
For this purpose there is a differential pressure gauge in the tubings feeding the cylinder (item No. 6). It acts also as a safety device as faulty handling of two sliding carriages are not possible.

When the head is conveniently positioned and locked as shown in Fig. 4, complete flanging operation as shown in Dwg. 24835/82, Fig. 5 and 6

SAFETY DEVICES

The attention of the operators is drawn particularly to the limit switches, items No.95 and No.96

The former, (item No.95) stops the cylinder (item No.8)in its max. raising point, so stopping also the pump A. To restart pump A move the lever of the distributor (item No.53) downwards then press the button which starts the pump.

The latter, (item No.96)stops flanging roll (item No.13) in its lowest position also stopping pump "A" and pump "B".
Also in this case to re-start pumps "A" and "B" reverse the position of the lever of distributor (item No.57) and press the pushbuttons (items No.47 and No.48)

TILTING TO CORRECT ANGLE

In order to use the same forming rolls (item No.14) for all types of materials (carbon steel, stainless steel, copper, aluminium etc) having different elastic properties, we had to face with the problem of varying the tilting position of forming roll (item No14)
For carbon steel plates having tensile strength between 30 and 40 Kgs.sq.mm (42000 to 57000 lbs/sq.in) the correct tilting is normally 30°. For more plastic materials such as aluminium and copper the correct tilting is normally 30° + 2/3° according with

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thickness and knuckle radius.
For clad plates in which the thickness os stainless steel is 1-3 mm (3/64" to 1/8") over mild steel having a thickness from 7 to 20 mm (9/32" to 3/4"), the correct tilting of forming roll is done through the reducer (item No.91) by means of the motor (item No.3) and pushbuttons (item No.51)

LUBRICATION OF THE REDUCER ITEM NO. 91

Grease used is "SHALL ALVANIA EP GREASE 1 or equivalent through the tap (item No.92)
Grease level will be checked through the tap (item No.93) and discharged through the tap (item No.94)
Provide for the first change of grease after 100 working hours and afterwards every 1000 working hours.

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EXPERIENCE IS VERY IMPORTANT FOR THE OPERATION OF FLANGING MACHINES. AS LONG AS OPERATORS HAVE NOT AQUIRED EXPERIENCE IT IS ADVISABLE TO MAKE FLANGINGS SLOWLY AND KEEP THE PRESSURE REDUCED.
REMEMBER THAT YOU MAY DAMAGE THE MACHINE AND THE HEAD WHILE TRYING TO MAKE THE FLANGE TOO QUICKLY IF YOU HAVE NOT AQUIRED A RELIABLE EXPERIENCE.

LDRINI S.A.
ILANO

Dimensioni ingombro pezzi da traspor
tare RIBO 25

Dis. N.
265 /82
Data 20-6-61

Scala:

Parti smontate durante il trasporto- Peso circa kg 2500
Parts dismounted for tornsportation. approx weight 2500 Kgs.

kg 24500
pezzo principale