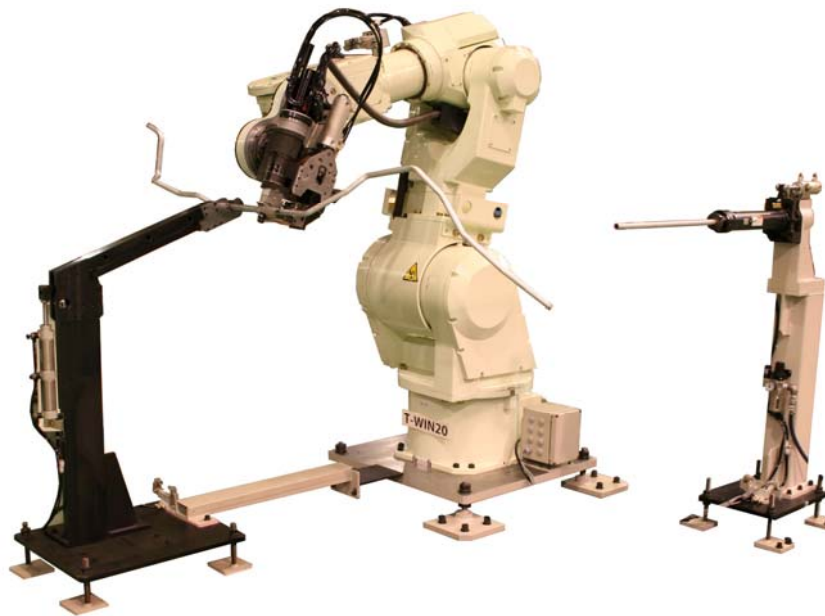


Messrs. _____

The brief guide to
T-WIN Robotic Bender
with bending head



Opton Co.Ltd.

Ver. 1

Small-sized Robotic Benders “T-WIN” “SRM” and “DRM”

For the small-sized robot benders, three major series available as followings:

① **T-WIN series**

5 variations all with 6-axis robot for DBB, POB and DOB motions

② **SRM/DRM Series**

The small-sized 3-axis robot with bending head executes POB and DOB by the robot and DBB by chuck-mounted carriage. 2 types available.

③ **1D bending not machined by, but cut-off implemented to the T-WIN.**

The two types in this series are compatible to those in ECO Bender series, thus providing machine user a convenience for either application of the machine in single production line or in FA system

For more information, please refer the table A.

【 1 】 Features

1.T-WIN Robot Benders – The Features -

- ① Bending data entry is executed same as in other Opton benders.
- ② Loading/unloading are controlled through the teaching pendant controller that is of standard to other robot benders.
- ③ The robot bending head executes the motions of DBB, POB, loading/unloading as well clearance to avoid disturbed DBB on a work piece with pre-loaded part. Advantages are vibration of work piece is very small during the process and a work piece with part pre-loaded can also be machined.
- ④ Mold dies are common to those for ECO-series benders
- ⑤ Simultaneous one bending is executed during each of loading and unloading process.
- ⑥ The robot can transfer a work piece to a separate 1-D bender as an intermediate process.
- ⑦ Higher productivity bending can be achieved by proper choice of chucking device either from chucking-at-work-end, chucking-at-work-center, chucking on a pre-mounted part or any other depending on the specification of pre-mounted part on a work piece.

- ⑧ Taking the advantage of final bending motion at time of unloading, total review production system becomes very feasible including cutting of working material, pre-mounting of parts, end-forming and quality inspection etc. Many successful cases have been established where these review for systematized facility has brought the production of varied specifications at small lot can be best met towards the productivity being enhanced to twice to as high as fivefold.
- ⑨ Floor space and initial investment cost become smaller in building FA with the robot benders instead of FA with conventional benders.
- ⑩ With the power of the surface profiler of 「Cloudforma」 and the integrated data management software 「Bendmaster」, ultimate FA system comes very realistic for pipe deformation business

2.SRM Single Robot Bender – Its features

- ① Speed-oriented bending is made for medium-sized work pieces diameter up to $\phi 150$ mm with no part pre-mounted. Good for bending brake pipe, hydraulic distribution pipe and power starting pipe, etc.
- ② The bending head devised at the end of robot extended arm executes the DOB/POB motion, loading/unloading. DBB motion is made by the travelling carriage with chuck.
- ③ Operability and bending data entry stay same as in other Opton benders. Loading/unloading is controlled through the teaching pendant controller.

3.“Duel Robot Bender” – The features -

- ① Speed-oriented bending is made for long-sized work pieces diameter up to $\phi 150$ mm with no part pre-mounted. Good for bending brake pipe, hydraulic distribution pipe and power starting pipe, etc.
- ② Time-oriented bending is made by two bending robots that start the work at two ends of a long-sized work piece simultaneously toward center of the work piece where it is supported by the center chuck
- ③ Operability and bending data entry stay same as in other Opton benders. Loading/unloading is controlled through the teaching pendant controller.

【 2 】 T-WIN Robot Bender – Variation and Performance

① Type 5

- Small bending head with acceleration gear built-in is mounted on the 6-axis robot of 15kg loading capacity.
- Two choices available for clamp-/pressure-die power source, pneumatic and electric.
- Booster is spring-driven.
- 4-stack of bending dies is accommodated.
- Applicable type of chuck depends on the requirement for the type of work.
- Max 5-storeid of loading stocker accepted. The width of the stocker is of custom-designed according to the size of machining work piece.
- The mode of DBB feed is JAB-feed regardless of work length.

② Type 8

- Small bending head with acceleration gear built-in is mounted on the 6-axis robot of 15kg loading capacity.
- Two choices available for clamp-/pressure-die power source, pneumatic and electric.
- Booster is spring-driven.
- 4-stack of bending dies is accommodated.
- Applicable type of chuck depends on the requirement for the type of work.
- Max 5-storeid of loading stocker accepted. The width of the stocker is of custom-designed according to the size of machining work piece.
- The mode of DBB feed is JAB-feed regardless of work length.

③ Type 10

- Small bending head with acceleration gear built-in is mounted on the 6-axis robot of 20kg loading capacity.
- Two choices available for clamp-/pressure-die power source, pneumatic and electric.
- Booster is spring-driven.
- 4-stack of bending dies is accommodated.
- Applicable type of chuck depends on the requirement for the type of work.
- Max 5-storeid of loading stocker accepted. The width of the stocker is of custom-designed according to the size of machining work piece.
- The mode of DBB feed is JAB-feed regardless of work length.

④ Type 20

- Small bending head with acceleration gear built-in is mounted on the 6-axis robot of 45kg loading capacity.
- Two choices available for clamp-/pressure-die power source, pneumatic and electric.
- Booster to be driven by spring, pneumatic or electric power.
- 4-stack of bending dies is accommodated.
- Applicable type of chuck depends on the requirement for the type of work.
- Max 5-storeid of loading stocker accepted. The width of the stocker is of custom-designed according to the size of machining work piece.
- The mode of DBB feed is JAB-feed regardless of work length.

⑤ Type 25

- Small bending head with acceleration gear built-in is mounted on the 6-axis robot of 100kg loading capacity.
- Two choices available for clamp-/pressure-die power source, pneumatic and electric.
- Booster to be driven by Numerically-controlled DDV Hydraulic device.
- 4-stack of bending dies is accommodated.
- Applicable type of chuck depends on the requirement for the type of work.
- Max 5-storeid of loading stocker accepted. The width of the stocker is of custom-designed according to the size of machining work piece.
- The mode of DBB feed is JAB-feed regardless of work length.

【 3 】 Tact time

- ① One good case shows 25 second in time for aluminum air-conditioner tube in comparison of 1 minute by a conventional bender.
- ② One example of bending a work piece with brazed branch pipe shows labor power and production time reduced in half.
- ③ The bending time may be sometimes hard to predict for an work piece with pre-mounted parts. Opton is pleased to prepare a realistic proposal upon feasibility study based on a work drawing given by a client.

【 4 】 Operability

Bending data entry is executed same as in other Opton benders.

- ① Loading/unloading is controlled through the teaching pendant controller that is of standard to robot benders.

- ② Standard three-days operator training will be programmed when the client introduces the first robot bender.
- ③ For an assembled work piece with complicated specification will be checked for the data creation by Opton engineer. With these data will be followed by testing trial for client's approval. With these data being submitted to a client operator, skilled production can be easily started by a unskilled operator.

【 5 】 Bending dies and pre-setting of the tool

- ① Standard is 4-stack tooling capacity. If its larger capacity is need for higher productivity, the robot loading capacity needs be increased to the level of one upper class machine.

【 6 】 Customized, Intermediate Chuck

- ① Standard chuck (to hold the end of a work piece)

No rotation is devised with this standard chuck. The robot bending head starts bending at the other end of a work piece, and proceeds towards the chucking end.
- ② Intermediate chucking

The intermediate chuck is mounted to hold a long-sized work piece at its center or custom-designed chuck is used to hold its pre-loaded part of an assembled work piece all for higher machining productivity.
- ③ Travelling chuck

This type of chuck travels to repositioning on a super long-sized work piece in case when the intermediate chuck works not sufficient enough to complete bending for half length of the work.

【 7 】 Mandrel device

- ① For 1D bending, N/C mandrel feeder needs be mounted in the rear side of the chuck.
- ② No mandrel is used when an intermediate chucking is installed.
- ③ When an FA system is built with loading stocker for varieties of work diameters, chucking device and NC mandrel unit need be devised for each different work diameter for set-up free continuous production.

【8】 FA system with Opton Robot Benders

- ① Versatile FA production system will be proposed upon the information presented by client to meet total work specifications and production volume
- ② Opton has many successful and proposed cases that can be of good reference for higher production achievements. Upon request by clients, Opton is pleased to show movies and cases.

【9】 Maintenance

- ① Opton HP contains the site for trouble-shooting. With this, Opton user can have self-maintenance on the machines except the robots.
- ② Or, user contact to Opton Maintenance desk either by telephone, e-mail or fax will be followed by our maintenance staff.
- ③ The robot maintenance will be followed by regional staff of the robot supplier.

In starting feasibility study

For starting a study on T-WIN Robot Bender series, followings are offered:

Please pick up any one below that most suites your initial interest.

1. We are pleased to offer presentation with more detailed series table of T-WIN Root Benders.
2. Opton factory visit by an inquirer is most welcome where T-WIN Robot Benders are exhibited for demonstration.
3. Opton staff is pleased to make a visit to an inquirer for the best proposal upon Opton's receipt of inquirer's product information covering the title, OD, thickness, material, Q'ty of production, repetitiveness of production etc.。

Opton stays always ready to meet anyone above