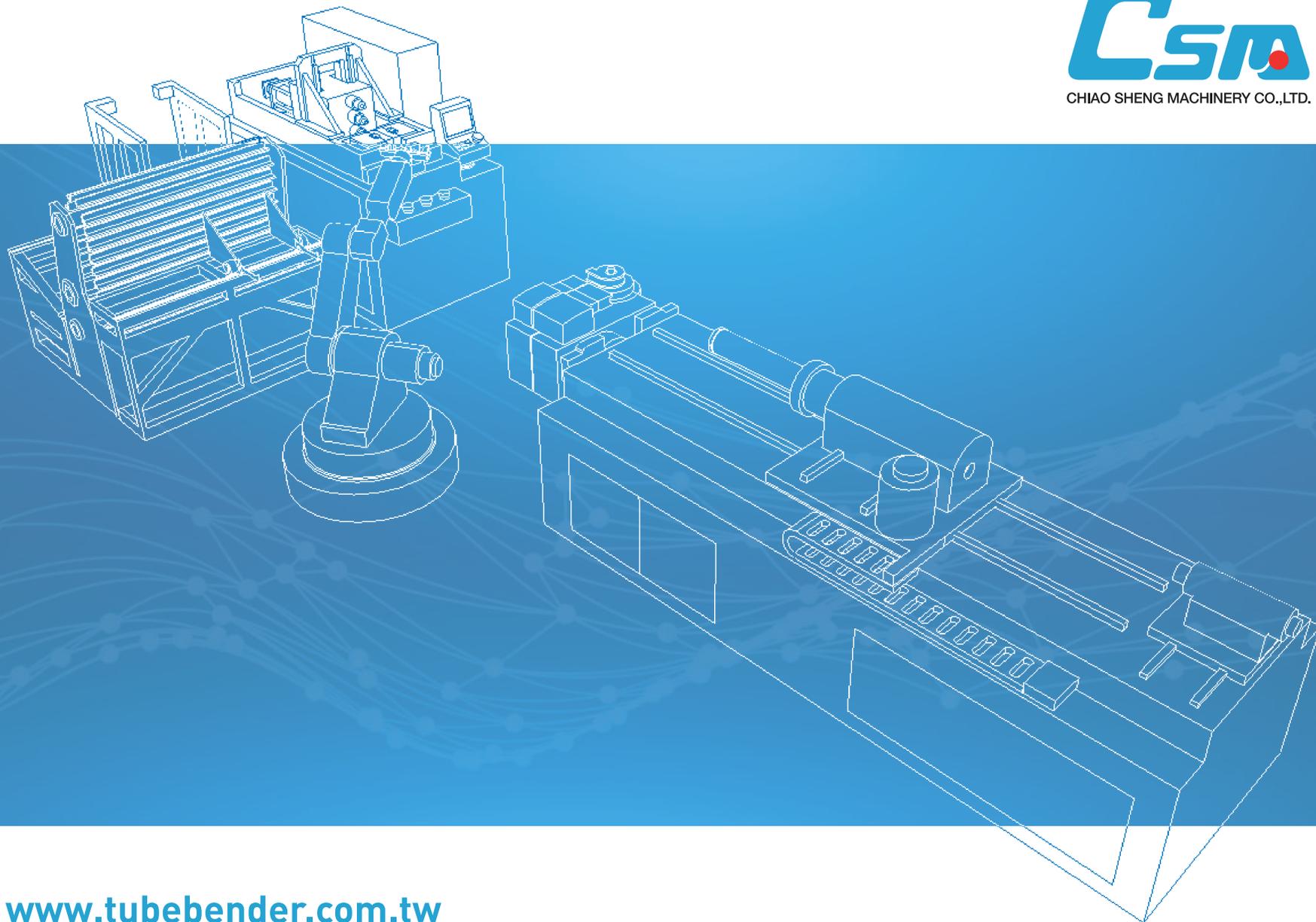




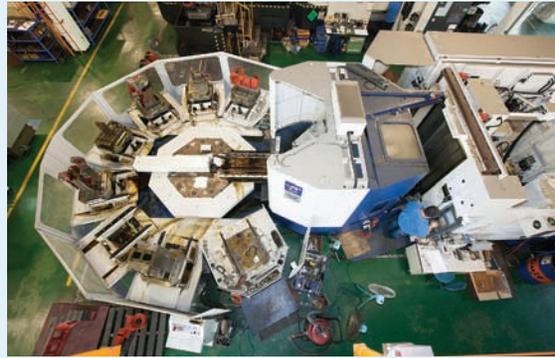
CHIAO SHENG MACHINERY CO.,LTD.



[www.tubebender.com.tw](http://www.tubebender.com.tw)

## Index

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CSM, supplies the most innovative CNC bending machines in the world, with machine capacity from OD 6 to OD 254 mm. Our machines are implemented in diverse industries including aviation, automotive, ship building, furniture, health care, gym utilities, HVAC, construction, boiler making, power generation, petrochemical ... etc. Attributed to our exclusive designs, CSM machines are significantly more compact and consolidated than other manufacturers. In addition to optimum performance, we assure you power efficient, energy economic and environment friendly.

- premises : 1st plant @13770 m<sup>2</sup>, 2nd plant @ 18470 m<sup>2</sup>
- employment : 168

- founded in 1982
- release the first CNC bending machine in 1989
- relocated to Taiwan Southern Science Park in 2005
- established 2nd plant in 2010
- certified with ISO-9002 from 1998 and ISO-9001 from 2002
- all machines are approved with CE certification
- 24 international design patents
- winner of Taiwan excellence award in 2003 and 2010
- 2 times national innovation awards in 2002 and 2006
- winner of national CITD + SBIR grant in 2007



# Industrial application

shipyard



oil rig



rail transport



bus & truck



water supply



automotive



aviation



furniture & health care



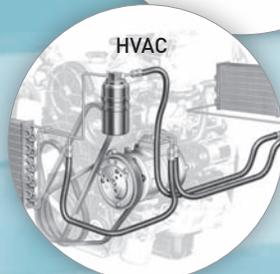
petrochemical



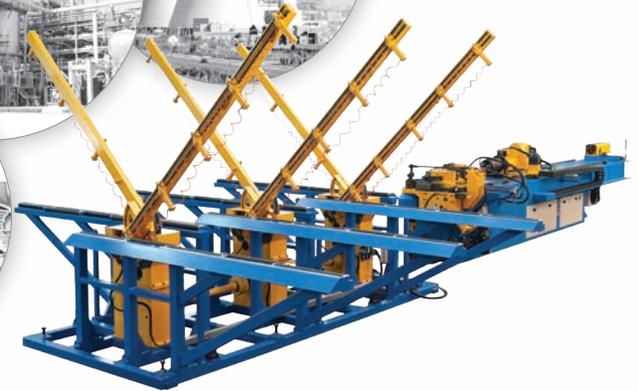
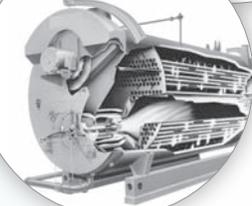
power plant



HVAC



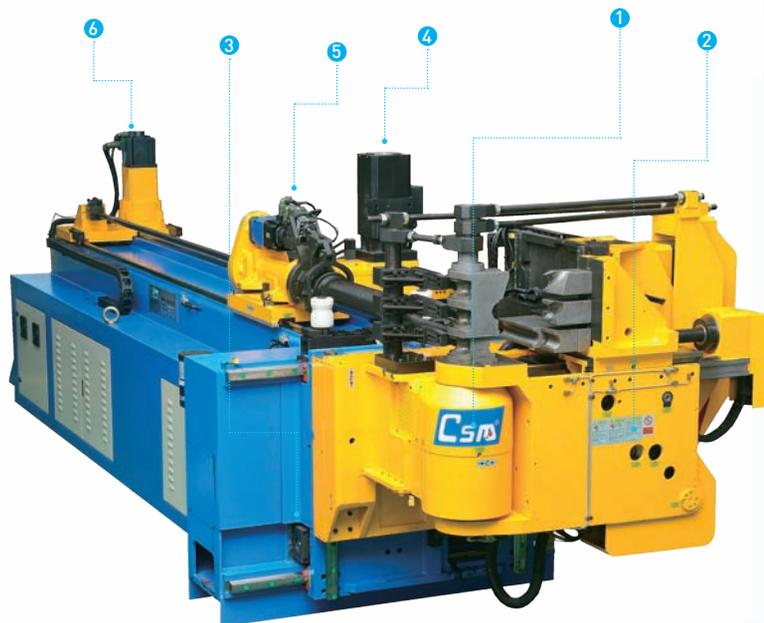
boiler making



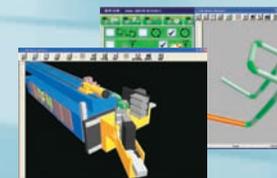
round tube			mandrel length	tooling capacity	push bending	rear booster	CSM Part no.
OD	WT	CLR					
15	1.5	10-55	1000	3+3			15 EMB
20	1.5	10-80	1500	3+3			20 EMB
30	2	15-90	2800	3+3	yes		30 EMR
45	1.6	30-150	3000	3+3	yes		45 EMR
76.2	2	40-230	3000	3+3	yes	servo	75 EMR

round tube			mandrel length	tooling capacity	push bending	rear booster	CSM Part no.
OD	WT	CLR					
50.8	1.8	30-150	2500	3	yes	servo	50 MRE2-RBE
80	2.5	40-230	3000	3	yes	servo	80 MRE2-RBE
100	3.6	30-300	3000	3	yes	servo	100 MRE2-RBE

- 4 • carriage (Y-axis) by servo motor with programmable speed
- 5 • collet ( B-axis) grip by pneumatic rotation by servo motor
- 6 • mandrel by servo motor with automatic lubrication & anticipated retraction
- 7 • work-head rotation (EMB / EMR) by servo motor, capable of converting between left- and right-hand bending
- 1 • bend-arm (C-axis) by servo motor with exclusive transmission gears
- 2 • clamp die by servo motor, EMB/EMR by pneumatic
  - pressure die by servo motor
  - side booster by servo motor
- 3 • tools/radii shifting: motion up-down by servo motor motion left-right by servo motor



- Industrial PC assorted with touch-screen display, capable of bending simulation, 3D preview and interference detection
- programmable speed for servo axes
- with USB port, easy for data transfer
- convertible between manual / automatic mode
- convertible between inch / metric setting
- convertible between XYZ / YBC axes
- capable of reading igs/stp file



# CNC electric hybrid

round tube			mandrel length	tooling capacity	push bending	rear booster	CSM Part no.
OD	WT	CLR					
18	1.6	10-80	1200	3			18 MBE
25.4	1.5	15-120	1500	3			25 MBE
30	2	15-120	2000	3			30 MBE
38.1	1.8	25-150	2200	3			38 MBE
50.8	2	30-220	2500	3			50 MBE
65	2.5	35-250	2500	3			65 MBE
80	2.5	40-280	3500	3			80 MBE
100	3	30-300	3500	3			100 MBE
65	2.5	35-250	3000	3		servo	65 MBE-RBE
80	2.8	40-280	3500	3		servo	80 MBE-RBE
100	3.6	30-300	3500	3		servo	100 MBE-RBE
127	3.8	80-400	4000	3		servo	130 MBE-RBE
18	1.6	10-80	1200	3	yes		18 MRE
25.4	1.5	15-120	1500	3	yes		25 MRE
30	2	15-120	2200	3	yes		30 MRE
32	1.8	25-128	3500	3+3	yes		32 MBRE
38.1	1.8	25-150	2200	3	yes		38 MRE
50.8	2	30-220	2500	3	yes		50 MRE
65	2.5	35-250	3000	3	yes		65 MRE
80	2.5	40-280	3500	3	yes		80 MRE
65	2.5	35-250	3000	3	yes	servo	65 MRE-RBE
80	2.8	40-280	3500	3	yes	servo	80 MRE-RBE
100	3.6	30-300	3500	3	yes	servo	100 MRE-RBE
127	3.8	80-400	4000	3	yes	servo	130 MRE-RBE
152.4	3	90-400	4000	3	yes	servo	150 MRE-RBE

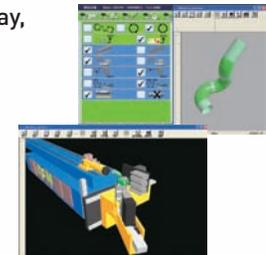
- 4 • carriage (Y-axis) by servo motor with programmable speed
- 5 • collet ( B-axis) grip by hydraulic, rotation by servo motor
- 6 • mandrel by hydraulic with automatic lubrication & anticipated retraction
- 1 • bend-arm (C-axis) by servo motor with exclusive transmission gears. Tolerance within  $\pm 0.01^\circ$
- 2 • clamp die by hydraulic  
• pressure die by hydraulic  
• side booster by hydraulic
- 3 • tools/radii shifting: motion up-down by servo motor motion left-right by servo motor



## 32MBRE

work-head capable of linear motion, serves clockwise and counterclockwise bending

- Industrial PC assorted with touch-screen display, capable of bending simulation, 3D preview and interference detection
- programmable speed for servo axes
- with USB port, easy for data transfer
- convertible between manual / automatic mode
- convertible between inch / metric setting
- convertible between XYZ / YBC axes
- capable of reading igs/stp file



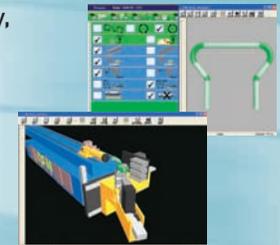
round tube			mandrel length	tooling capacity	push bending	rear booster	CSM Part no.
OD	WT	CLR					
25.4	1.5	15-120	1500	2	yes		25 TBRE
30	2	15-120	2200	2	yes		30 TBRE
38.1	1.8	25-150	2200	2	yes		38 TBRE
50.8	2	30-220	2500	2	yes		50 TBRE
65	2	35-250	2500	2	yes		65 TBRE
80	2.5	40-280	3500	2	yes		80 TBRE
100	3	30-300	3500	2	yes		100 TBRE
65	2.5	35-250	2500	2	yes	servo	65 TBRE-RBE
80	2.8	40-280	3500	2	yes	servo	80 TBRE-RBE
100	3.6	30-300	3500	2	yes	servo	100 TBRE-RBE
127	3.8	80-400	4000	2	yes	servo	130 TBRE-RBE
25.4	1.5	15-120	1500	3	yes		25 TMRE
30	2	15-120	2200	3	yes		30 TMRE
38.1	1.8	25-150	2200	3	yes		38 TMRE
50.8	2	30-220	2500	3	yes		50 TMRE
65	2	35-250	2500	3	yes		65 TMRE
80	2.5	40-280	3500	3	yes		80 TMRE
100	3	30-300	3500	3	yes		100 TMRE
65	2.5	35-250	2500	3	yes	servo	65 TMRE-RBE
80	2.8	40-280	3500	3	yes	servo	80 TMRE-RBE
100	3.6	30-300	3500	3	yes	servo	100 TMRE-RBE

round tube			mandrel length	tooling capacity	push bending	rear booster	CSM Part no.
OD	WT	CLR					
12	1	12-55	1000	2			12TDRE
18	1.6	10-80	1200	2			18TDRE
25.4	1.5	15-120	1500	2			25TDRE
30	2	15-120	2200	2			30TDRE
38.1	1.8	25-150	2200	2			38TDRE
50.8	2	30-220	2500	2			50TDRE
65	2	35-250	2500	2			65TDRE
80	2.5	40-280	3500	2			80TDRE
100	3	30-300	3500	2			100TDRE
65	2.5	35-250	2500	2		servo	65TDRE-RBE
80	2.8	40-280	3500	2		servo	80TDRE-RBE
100	3.6	30-300	3500	2		servo	100TDRE-RBE

- 4 • carriage (Y-axis) by servo motor with programmable speed
- 5 • collet ( B-axis) grip by hydraulic, rotation by servo motor
- 6 • mandrel by hydraulic with automatic lubrication & anticipated retraction
- 1 • bend-arm (C-axis) by servo motor with exclusive transmission gears. Tolerance within  $\pm 0.01^\circ$
- 2 • clamp die by hydraulic
  - pressure die by hydraulic
  - side booster by hydraulic
- 3 • tools/radii shifting: motion up-down by hydraulic motion left-right by servo motor



- Industrial PC assorted with touch-screen display, capable of bending simulation, 3D preview and interference detection
- programmable speed for servo axes
- with USB port, easy for data transfer
- convertible between manual / automatic mode
- convertible between inch / metric setting
- convertible between XYZ / YBC axes
- capable of reading igs/stp file

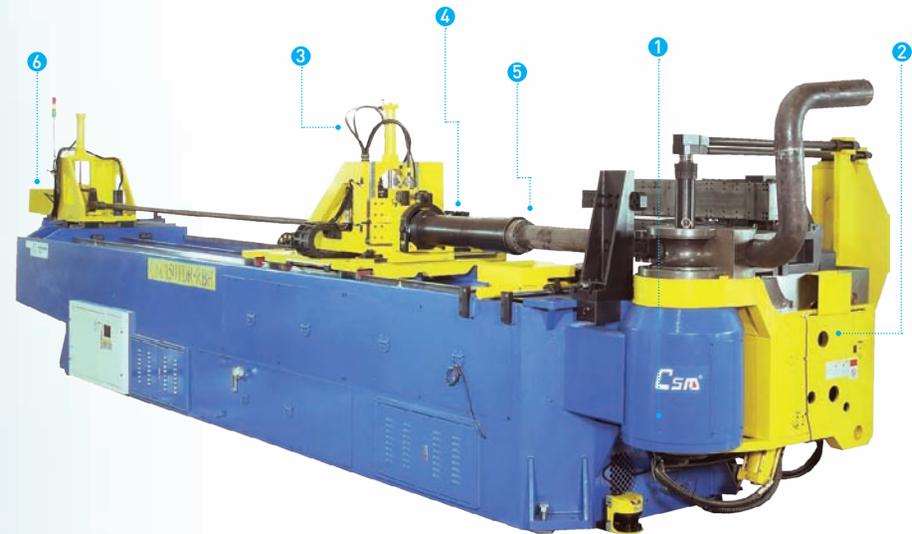


# CNC hydraulic

round tube			mandrel length	tooling capacity	rear booster	CSM Part no.
OD	WT	CLR				
38.1	3	25-150	2200	1		38 TSR
50.8	3	30-220	2200	1		50 TSR
65	3	35-250	2500	1		65 TSR
80	4.5	40-280	3000	1		80 TSR
101.6	5.5	60-400	3600	1		100 TSR
120	5.5	80-450	5000	1		120 TSR
152.4	7	90-500	6000	1		150 TSR
180	9	100-600	6000	1		180 TSR
220	15	100-800	6000	1		220 TSR
80	5.5	32-345	3000	1	hydraulic	80 TSR-RBF
101.6	5.5	30-400	3600	1	hydraulic	100 TSR-RBF
120	5.5	80-450	5000	1	hydraulic	120 TSR-RBF
50.8	3	30-220	2200	1	hydraulic	50 TSR-RBH
65	3	35-250	2500	1	hydraulic	65 TSR-RBH
80	4.5	40-250	3000	1	hydraulic	80 TSR-RBH
101.6	5.5	60-400	3600	1	hydraulic	100 TSR-RBH
120	5.5	80-450	5000	1	hydraulic	120 TSR-RBH
152.4	7	90-500	6000	1	hydraulic	150 TSR-RBH
180	9	100-600	6000	1	hydraulic	180 TSR-RBH
38.1	3	25-150	2200	2		38 TDR
50.8	3	30-220	2200	2		50 TDR
65	3	35-250	2500	2		65 TDR
80	4.5	40-280	3000	2		80 TDR
101.6	5.5	60-400	3600	2		100 TDR
120	5.5	80-400	5000	2		120 TDR
152.4	7	90-500	6000	2		150 TDR
101.6	5.5	60-400	3600	2	hydraulic	100 TDR-RBH
152.4	7	90-500	6000	2	hydraulic	150 TDR-RBH

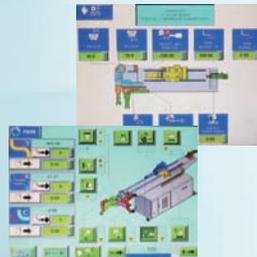
- 4 • carriage (Y-axis) by servo motor with programmable speed
- 5 • collet ( B-axis) grip by hydraulic, rotation by servo motor
- 6 • mandrel by hydraulic with automatic lubrication & anticipated retraction

- 1 • bend-arm (C-axis) by hydraulic
- 2 • clamp die by hydraulic
  - pressure die by hydraulic
  - side booster by hydraulic
- 3 • tools/radii shifting (TDR) : motion up-down by hydraulic motion left-right by hydraulic



## PLC based controller

- PLC controller with touch screen display
- programmable speed for servo axes
- with USB port, easy for data transfer
- convertible between manual / automatic mode
- convertible between XYZ / YBC axes (optional)



## IPC based controller

- Industrial PC assorted with touch-screen display, capable of bending simulation, 3D preview and interference detection
- programmable speed for servo axes
- with USB port, easy for data transfer
- convertible between manual / automatic mode
- convertible between inch / metric setting
- convertible between XYZ / YBC axes
- capable of reading igs/stp file

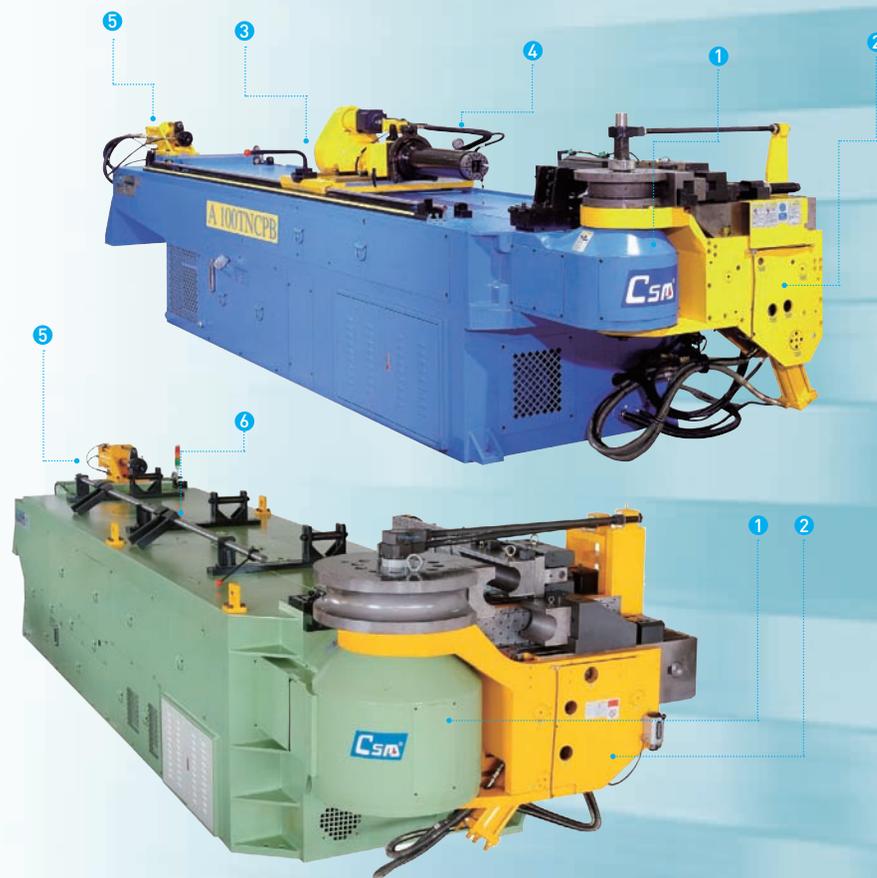


round tube			mandrel length	tooling capacity	rear booster	CSM Part no.
OD	WT	CLR				
50.8	3	30-220	2100	1		50 TNCPB
76.2	3	40-250	2400	1		75 TNCPB
88.9	2.5	50-300	2600	1		89 TNCPB
101.6	5.5	60-400	3600	1		100 TNCPB
round tube			mandrel length	tooling capacity	rear booster	CSM Part no.
OD	WT	CLR				
38.1	3	25-170	1900	1		38 TNCB
50.8	3	30-250	2200	1		50 TNCB
76.2	3	40-300	2600	1		75 TNCB
88.9	2.5	40-350	2600	1		89 TNCB
127	3.5	80-450	5200	1		120 TNCB
152.4	7	90-500	6000	1		150 TNCB
180	9	100-600	6000	1		180 TNCB
220	8	100-700	6000	1		220 TNCB
76.2	3	40-300	2600	1	hydraulic	75 TNCB-CBF
127	5.5	80-400	5200	1	hydraulic	120 TNCB-CBF
127	5.5	60-450	5200	1	hydraulic	120 TNCB-RBF
220	7	100-1000	6000	1	hydraulic	220 TNCB-RBF

- PLC controller with touch screen display
- programmable speed for servo axes
- with USB port, easy for data transfer
- convertible between manual / automatic mode
- convertible between inch / metric setting



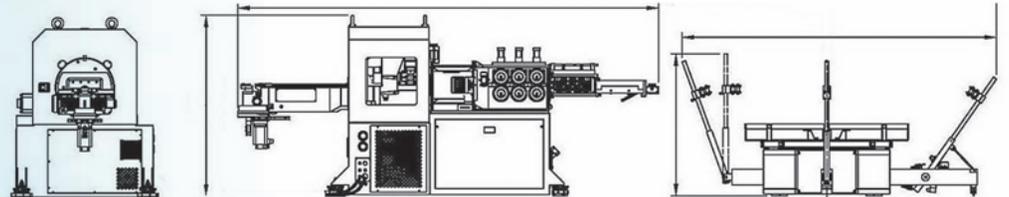
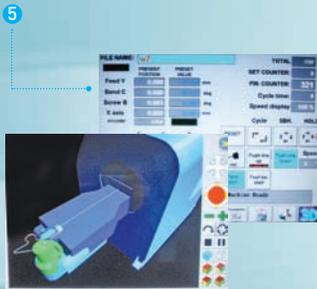
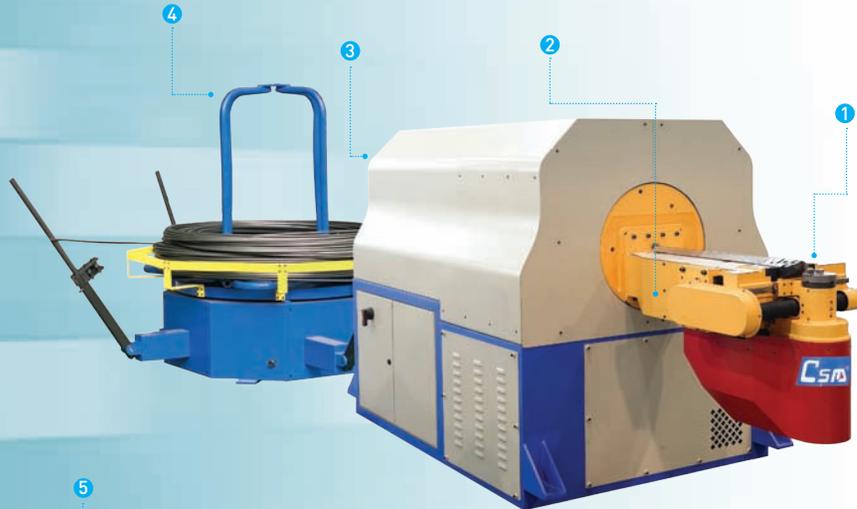
- 4 • collet ( B-axis) grip by hydraulic, rotation by servo motor
- 5 • mandrel by hydraulic with automatic lubrication & anticipated retraction
- 6 • mechanical stopper (TNCB)
- 1 • bend-arm (C-axis) by hydraulic
- 2 • clamp die by hydraulic
  - pressure die by hydraulic
  - side booster by hydraulic
- 3 • carriage (Y-axis) by manual



# Wire bending

- 3 • straightening by hydraulic
  - feeding by servo motor
- 4 • uncoiling driven by AC motor
- 5 Controller
  - IPC base
  - 15" inches touch screen display
  - facilitated with 3D simulation

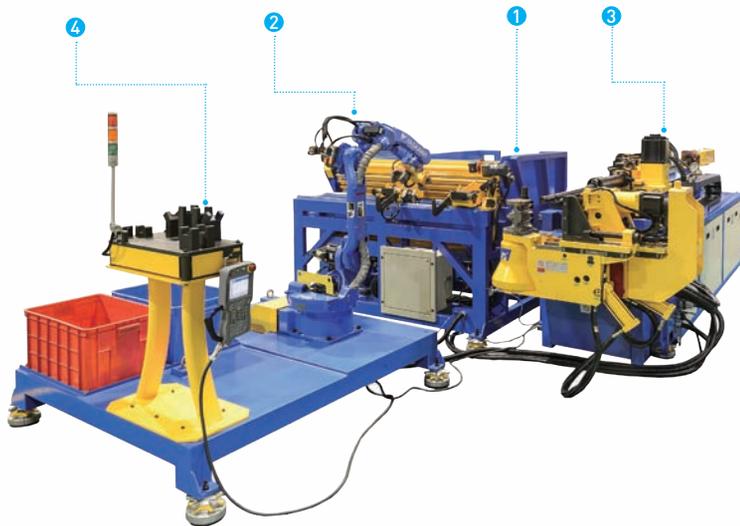
- 1 • bending by servo motor
  - cutting by hydraulic
  - tooling shift by servo motor
  - concentric tooling design, enhance bending versatility
- 2 • customized work-head, eliminates possibility of interference
  - work-head rotation by servo motor



wire bender WB 10-A	unit	Spec
Bending capacity / O.D.	mm	4~10
Bending speed	deg/sec	1000
Bending repeatability	degree	±0.01
Feeding speed	m/min	50
Feeding repeatability	mm	±0.1
Work-head rotation speed	deg/sec	440
Work-head rotation repeatability	degree	±0.01
Max pressure	kgf/cm <sup>2</sup>	140
Total power	kw	13.4
Width	mm	1300
Height	mm	1715
Length	mm	3450
Weight	kg	2400
wire bender WB 14-A	unit	Spec
Bending capacity / O.D.	mm	6~14
Bending speed	deg/sec	600
Bending repeatability	degree	±0.01
Feeding speed	m/min	50
Feeding repeatability	mm	±0.1
Work-head rotation speed	deg/sec	440
Work-head rotation repeatability	degree	±0.01
Max pressure	kgf/cm <sup>2</sup>	140
Total power	kw	14.9
Width	mm	1300
Height	mm	1715
Length	mm	3450
Weight	kg	2400

## Automation with robotic loading, unloading, bending and tolerance inspection

- 1 hopper loader driven by servo motor with weld seam detector
- 2 robotic arm facilitates tube loading, transferring and unloading
- 3 50MRE-RBE bending machine
  - feeding (Y-axis), rotation (B-axis) & bending (C-axis) by servo motor
  - tools / radii shifting by servo motor
  - side booster & rear booster by servo motor
  - clamp die, pressure and mandrel working by hydraulic
- 4 checking fixture serves for instant tolerance control



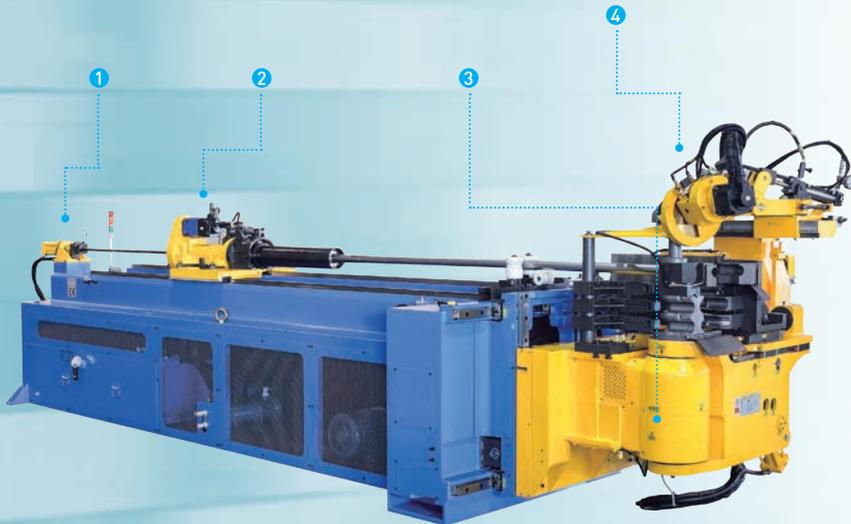
## Automation with decoiling, straightening, bending, cutting, end-finishing and robotic loading/unloading

- 1 decolier by AC motor
- 2 15EMR bending machine
  - capable of straightening, feeding, bending and orbital cutting
  - feeding + work-head rotation + tooling shift + bending by servo motors
  - orbital cutting by AC motor
  - collet by pneumatic
- 3 tube transfer by robot arm (optional)
- 4 ER30-5 complex tube end-finish machine
  - capable of end-forming, grooving and chamfering
- 5 custom-made trolley platform, allows user to move ER30-5 to and fro with ease



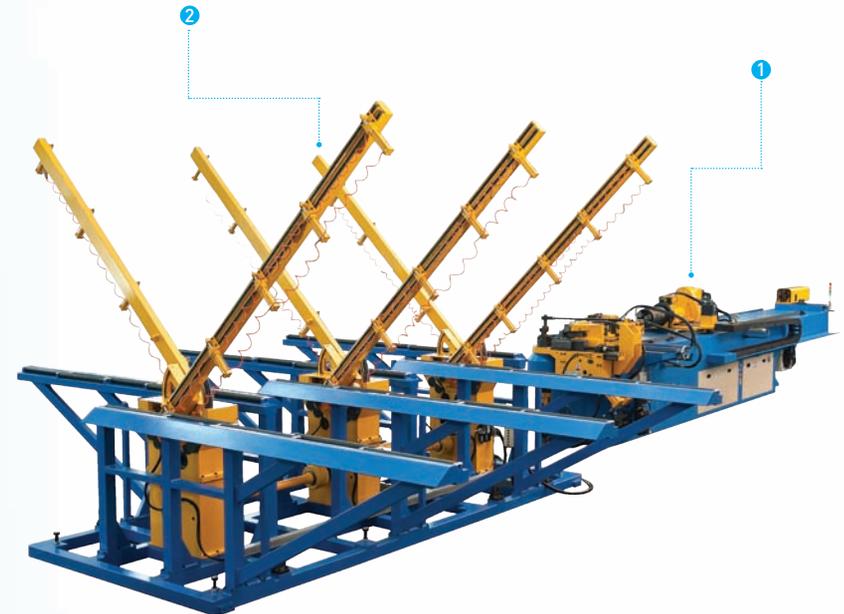
## Automation with bending and circular sawing

- 1 mandrel working by hydraulic
- 2 carriage (Y-axis) by servo motor  
collet by hydraulic  
tube rotation (B-axis) by servo motor
- 3 bending (C-axis) by servo motor  
tools / radii shifting by servo motor  
clamp die + pressure die + side booster by hydraulic
- 4 sawing by servo motor  
cutting head swivel by hydraulic



## Automation with bending and profile flipping

- 1 80/100TSR-RBF
  - bending (C-axis) by hydraulic
  - feeding (Y-axis) by servo motor
  - rotation (B-axis) by servo motor
  - clamp die + pressure die + side booster by hydraulic
  - with RBF power rear booster, optimized for bending extra thick tube with OD/WT  $\leq 10$  and CLR = 0.9-1.5D
- 2 automated tube flipper, facilitates 180 ° successive serpentine bending



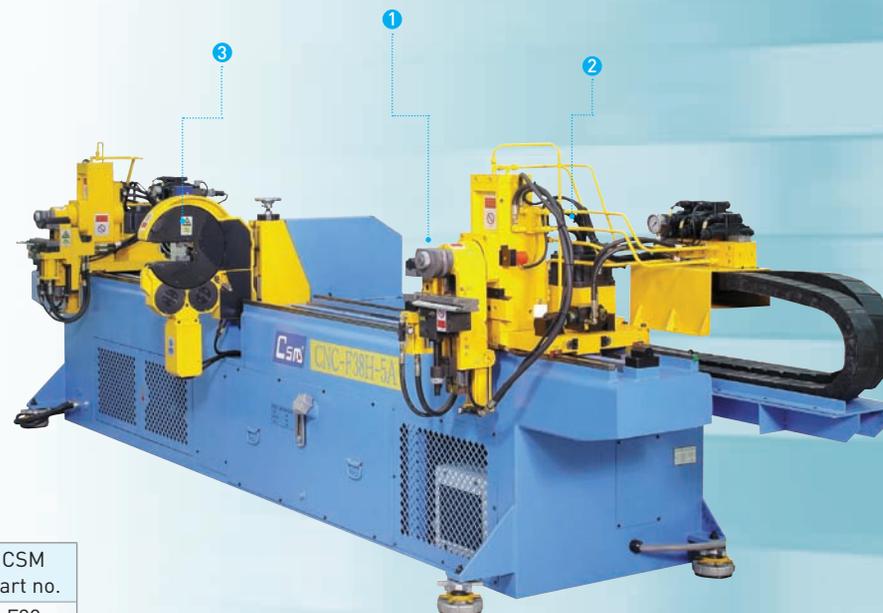
## single axis

- 1 • bending by hydraulic
- clamp die by hydraulic
- pressure die by hydraulic
- 2 • head pusher facilitates fast unloading



## multiple axes

- 1 • bending by hydraulic
- clamp die by hydraulic
- pressure die by hydraulic
- 2 • feeding by servo motor
- 3 • grip by hydraulic, rotation by servo motor (-5A)



round tube			working distance	tools stack				multi-plane	axes	CSM Part no.
OD	WT	CLR		OD=19	OD=25	OD=32	OD=38			
38.1	2.5	38-180	170-1500	3-4	2-3	1-2	1		1	F38
50	2	40-250	200-2300	4-5	3-4	2-3	1-2		1	F50
38.1	2.5	38-180	170-1500	3-4	2-3	1-2	1	manual	1	F38-90
38	2.5	38-180	250-4200	3-4	2-3	1-2	1		2	F38H-4A
38	2.5	38-180	320-4200	3-4	2-3	1-2	1	automatic	3	F38H-5A

## end-forming EF series - plane type

max capacity OD/mm	forming station	working height / mm	total power / kw	max pressure kgf/cm2	part no.
20	6	1220	5.5	170	EF20
30	6	1220	5.5	170	EF30
50	6	1250	7.5	170	EF50



## end-forming EF series – vertical type

max capacity OD/mm	forming station	working height / mm	total power / kw	max pressure kgf/cm2	part no.
20	6	1220	5.5	140	EF20 VH
30	6	1220	5.5	140	EF30 VH
50	6	1250	7.5	170	EF50 VH



## grooving REF series

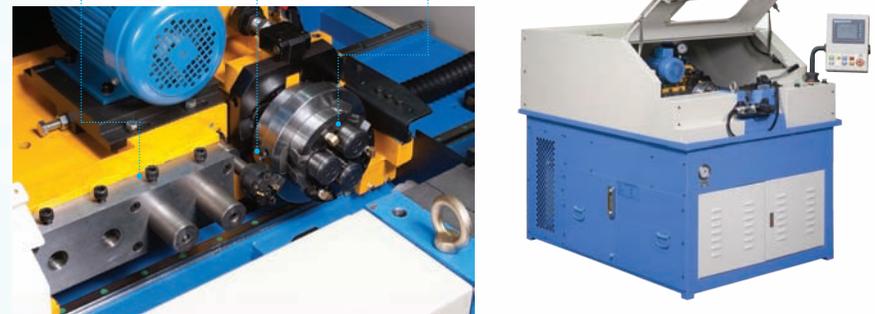
max capacity OD/mm	max forming stroke / mm	working height / mm	total power / kw	max pressure kgf/cm2	part no.
30	6.5	1060	3.7	100	REF30
40	5	1210	4.4	70	REF40



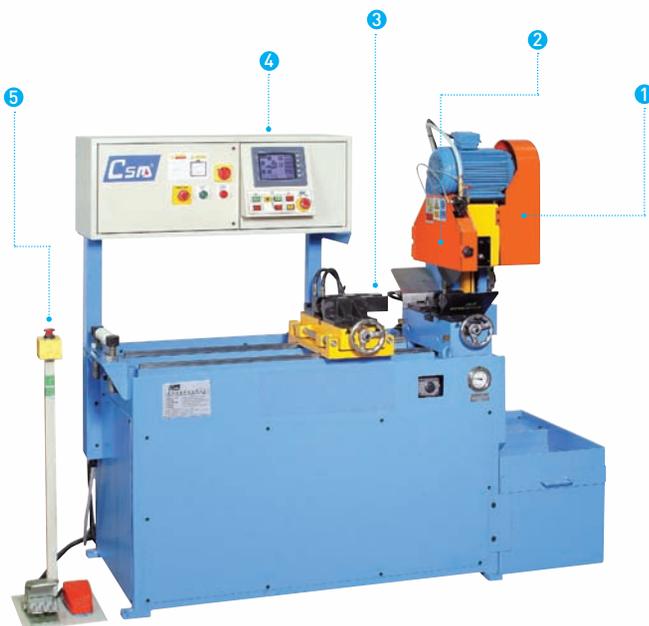
## complex ER series

max capacity OD/mm	max forming stroke/mm	working height / mm	total power / kw	max pressure kgf/cm2	part no.
30	6.5	1000	5.5	170	ER30-5

end-forming    chamfering    grooving



- ① • down feed by hydraulic
- ② • cutting : by aid of planetary transmission gears, assure energy economic. Circular saw blade = OD 250~325mm
- ③ • carriage : clamping by hydraulic, feeding by servo motor
- ④ • PLC controller with touch screen display
- ⑤ • standing pedestal serves emergency stop and remote control



specification	unit	CT325 L-type	CT325 M-type	CT325 H-type
mild Steel (S=40kgf/mm <sup>2</sup> )	mm	standard vises >OD44~101.6 customized vises >OD12~63.5	standard vises >OD44~101.6 customized vises >OD12~63.5	standard vises >OD44~101.6 customized vises >OD12~63.5
total Power	HP	3.8	3.8	3.8
spindle rotation rate	rpm	22~62	47~135	80~220
saw blade	mm	OD 250~325	OD 250~325	OD 250~325
feeding speed	mm/s	1000	1000	1000
feeding accuracy	mm	±0.1	±0.1	±0.1
working height	mm	950	950	950
length	mm	1700	1700	1700
width	mm	760	760	760
height	mm	1600	1600	1600
weight	kg	800	800	800