

Radial forming technology



*Radial forming technology
for all your fastening and
forming requirements*

- *Bench top units*
- *Modular forming heads*
- *Opposed head units*
- *CNC x-y riveting workcells*
- *Process Controllers STF-1,
STF-2, STF-3*
- *Turnkey workcells*

BalTec
The Assembly Experts

A company at your service worldwide

Emerging from the Bracker tradition, Baltec Maschinenbau AG in Pfaffikon, Switzerland is devoted to the production of Riveting and Press Systems for the fastening industry.



BalTec USA Headquarters,
Southpointe Industrial Park,
Canonsburg, PA

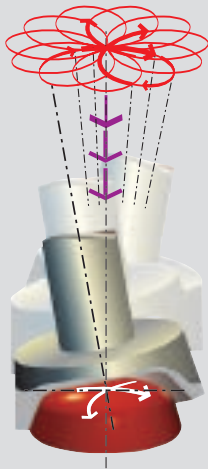
BalTec has sales, engineering and support facilities in Switzerland, Germany, England, France and the USA. Additionally, there is a complete worldwide network responsible for sales and service.

A member of the  FEINTOOL Group

Radial forming technology for the most exacting requirements

The rosette pattern

Radial forming displaces material in a uniform way, at a constant speed, and in three directions—radially outward, radially inward and tangentially overlapping. The tool moves in a pattern of overlapping radial motions, causing the gentle displacement of material. With relatively little axial force, the yielding point of the rivet material is reached over the small contact area between the form tool and the rivet. This action leaves the material's grain structure intact, and creates the unique 11-sided rosette pattern. The result is higher joint strength with superior surface finish.



The closed head in radial forming is partially formed in accordance with the tool motion. Compared with other forming methods, radial forming requires significantly less riveting force to produce a very high deformation rate. In many applications, low specific loading and low friction prolong tool life.

Superior surface structure

Unlike other forming methods, in radial riveting, the tool does not rotate. So the friction between the tool and the workpiece is minimal. The result is a far better surface structure.

Low workplace loading

Because of the low loading of radial forming and the capability to set radial forming machines to precise pressures, even bakelite and ceramic parts can be riveted. Lateral forces are negligible, and clamping is usually unnecessary, so supporting fixtures can be simpler and less expensive.

Perfect closing head formation

Radial forming provides perfect closing head formation with materials that previously could not be riveted. This is primarily because the superimposed radial flow direction of the material—the radial rosette pattern—prevents torsional stress. The result is superior surface quality and very high fatigue strength.

Wide variety of materials

Highly versatile, radial forming can form ferrous and nonferrous metals, die cast materials and case-hardened fasteners. It can also be used with assemblies containing bakelite, ceramics, glass and other brittle materials, because the radial forming machines can be set to precise pressures.

Added safety

Workstations with radial riveting machines are often safer for the operator because radial forming tools do not spin.

Test laboratory

Application tests ensure maximum benefits

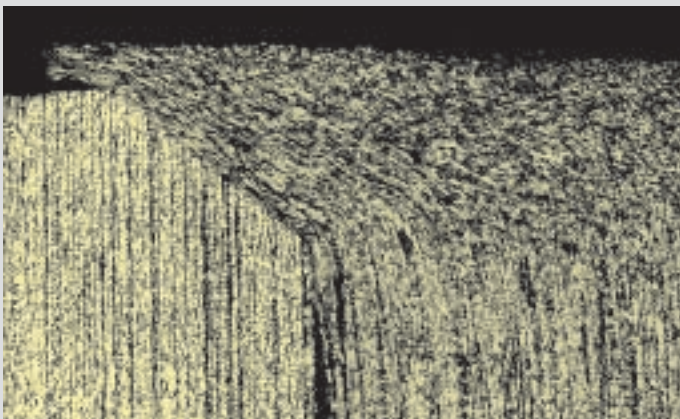


BalTec offers the optimum solution for joining materials by manual and pneumatic means of either riveting or pressing

technology (radial riveting, hydropneumatic and eletromechanical press systems).

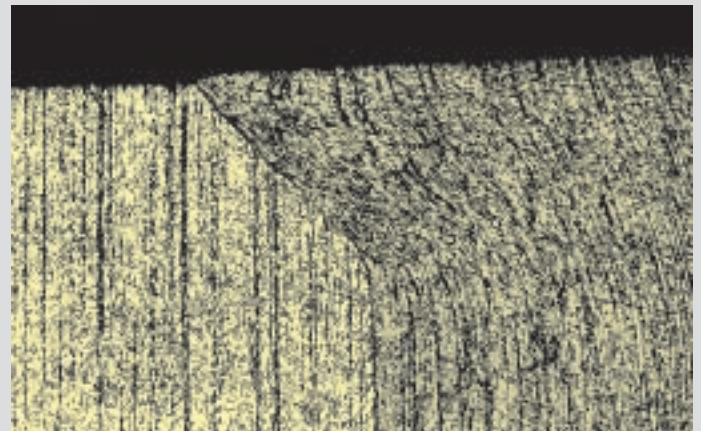
Micrographs of a closing head

Although every forming process displaces material, the degree of displacement is critical and should not affect the material strength. Impact forming tends to explode the material in uncontrolled directions, greatly altering grain structure. Orbital forming works the material unevenly, which also weakens grain structure. Impact riveting, shown below, also severely works the material and disrupts grain structure. Radial forming on the other hand, displaces material uniformly, leaving the grain structure intact.



Hammering Micrograph

Impact riveting severely alters grain structure. Strength is compromised.

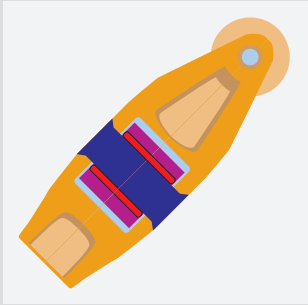


Radial Riveting Micrograph

Radial riveting displaces material evenly, preserving grain structure and increasing joint strength.

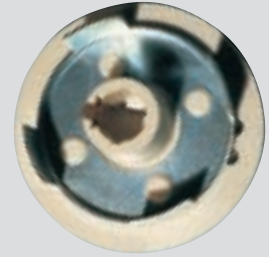
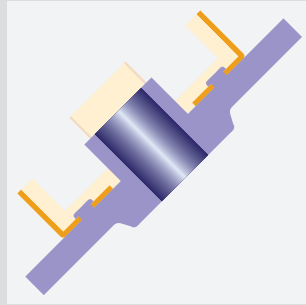
The right solutions for every application

Cam roller assembly



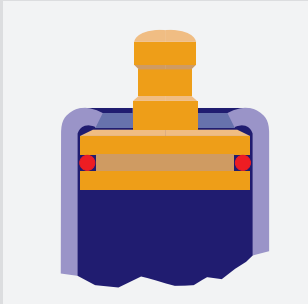
The assembly is a cam roller with needle bearings, double riveted from both sides. The hardened needle bearing axle is fixed in a precision-case lever body; the fit is positive with no deformation of the lever body.

Plastic ignition distributor



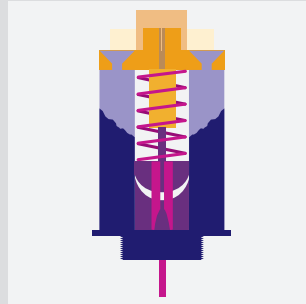
The metal transmitter plate is riveted to the rotor by reshaping the four plastic studs made of ABS plastic.

Airbag igniter assembly



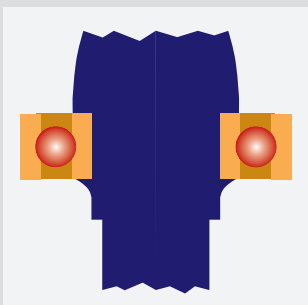
The sealing piston in this assembly is riveted without flattening, despite the large tube cross section and the wall strength. The tube remains perfectly cylindrical.

Zinc die casting



The rivet joints made through the sprues on the ribs. The joints are riveted simultaneously with a multiple riveting head.

Automobile steering pinion



In this assembly, the bearings were previously held in place with circlips. Radial riveting eliminated the groove, circlip and the costly assembly.

Automobile driveshaft



Previously, the square section shaft was welded in place. But with radial riveting, because the radial form does not turn, the square shaft can be riveted, even in this high torque assembly. There is no exposure to heat and no spatter as with welding.

BalTec RNE radial riveting units in a modular system

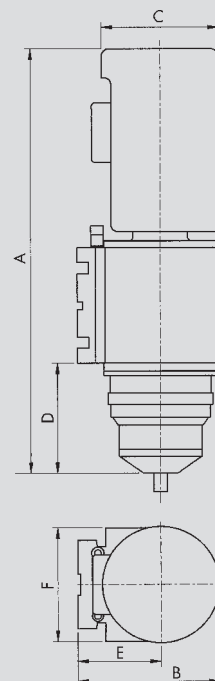
Compact and space-saving, BalTec modular power heads are designed to mount in any position, including in special machines, rotary indexing tables or transfer installations. Depending on model, the riveting force is generated pneumatically or hydraulically. The power heads are available with a variety of options to fit virtually any application, such as sensors, to detect full retraction of the spindle. The radial forming units can also be automatically lubricated to eliminate periodic maintenance.



Dimensions and weights

Model	A	B	C	D	E	F	lbs.
RNE 081	416–441 min	132	115	46–71	75	115	45
RNE 181	532–562 min	173	154	126–156	110	126	70
RNE 231	581–621 min	185	154	146–186	110	150	100
RNE 281	642–682 min	211	180	166–206	125	172	130
RNE 331	750–800 min	275	199	208–258	160	230	240
RNE 381	741–791 min	200	200	198–248	120	160	175
RNE 481	899–989 min	271	225	296–386	160	222	400

Changes in size and weight reserved.



Joining is our business!



Performance of each model

Model	081	181	231	281	331	381	481
Rivet shank *) max. Ø in mm/In	4/.15"	6/.25"	8,5/.34"	12/.50"	16/.625"	20/.80"	30/1.2"
Air pressure in bar/PSI	2-6/30-88	2-6/30-88	2-6/30-88	2-6/30-88	2-6/30-88	–	–
Hydraulic pressure in bar/PSI	–	–	–	–	–	10-65/145-950	145/145-2100
*Riveting force in KN/lbs.	2, 3/520	6/1400	12/2700	17/3800	33/7400	40/9000	100/22500
Working stroke in mm	2-25	5-30	5-40	5-40	5-50	5-50	5-90
Riveting time in seconds	0,2-5,9	0,2-5,9	0,2-5,9	0,2-5,9	0,2-5,9	0,2-5,9	0,2-5,9
*) 1010 steel							
* max. riveting force in kN							

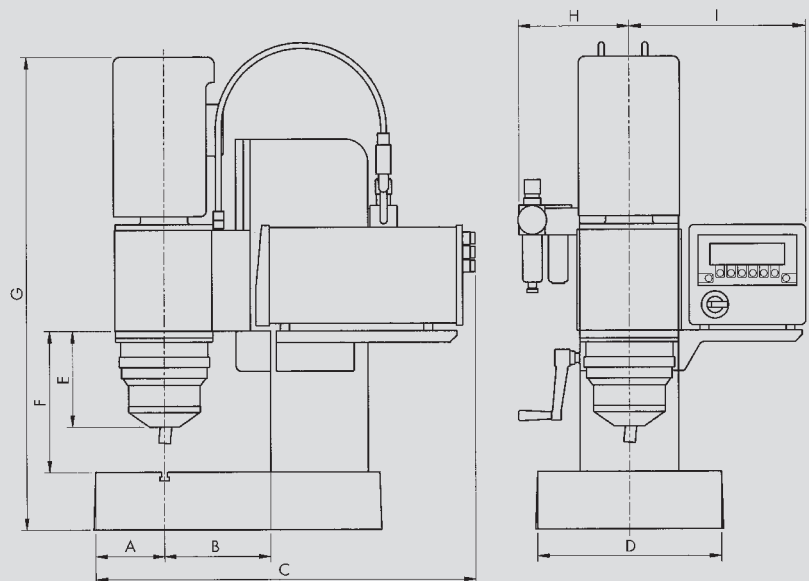
BalTec RN radial riveting machines

A complete workstation

The BalTec RN series is completely modular and designed for table-top use. The flexible design means that components can be added to suit virtually any application. Each table-top unit is complete with pneumatic valving or hydraulic power. Light-touch dual-palm buttons in an ergonomic housing minimize operator fatigue.

The complete workstation consists of:

- Riveting unit with drive motor.
- Cast column and base.
- Vertical adjustment and clamping.
- Complete machine controller.
- Pneumatic valving or hydraulic unit.
- Complete compressed air maintenance unit (for pneumatic models).
- Machine lamp (optional).
- Two-hand operation.



Joining is our business!



Dimensions and weights

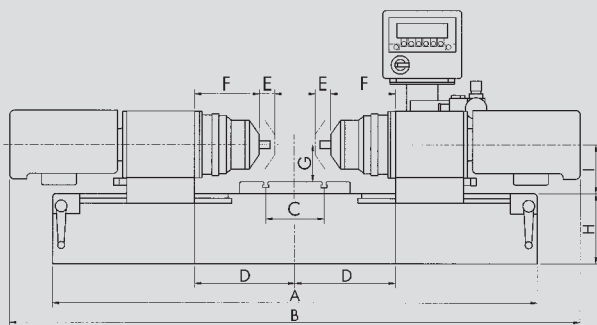
<i>Model</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>	<i>lbs.</i>
RN 081	75	75	–	150	58–83	89–186	531–628	162	–	100
RN 181	75	130	594	260	126–156	200–350	698–848	171	287	165
RN 231	75	130	594	260	146–186	185–340	711–866	171	287	200
RN 281	120	185	662	320	167–207	245–395	821–971	192	308	375
RN 331	125	220	707	350	208–258	285–480	938–1123	210	322	575
RN 381	125	180	667	350	198–248	285–480	938–1138	–	322	490
RN 481	Only available as RNE and RNS									

Changes in size and weight reserved.

BalTec RND radial double-riveting machines for simultaneous riveting from both sides



RND 281



RND series units are designed for applications where the riveting heads must be mounted opposite each other, such as for a double-ended shaft that requires a lever on both ends. The riveting units on both sides may be moved and fixed on the supporting table. Each power head is mounted on an adjustable slide and has its own flow

control to adjust approach speed. An RC20 controller operates both power heads. Smaller units use a single valve, while the larger units feature separate pneumatic valves. With models RND 281, 331, and 381, the power head comes mounted on a stable working table. For smaller models, a working table is available as an option.

Dimensions and weights

Model	A	B	C	D	E	F	G	H	I	lbs.
RND 081	770	888-1188	90	74-224	2-25	46	75	100	75	200
RND 181	1020	1128-1466	90	156-325	5-30	126	80	150	110	290
RND 231	1020	1212-1482	90	170-305	5-40	146	80	170	110	310
RND 281	1248	1346-1710	150	197-379	5-40	166	95	180	125	750
RND 331	1348	1560-1900	150	238-410	5-50	208	130	200	160	1000
RND 381	1348	1540-1920	150	228-419	5-50	198	90	200	120	1300

Models RND 281, 331 and 381 are mounted on stable working table.

Changes in size and weight reserved.

BalTec RNL radial riveting machines with Long-stroke



RNL 281

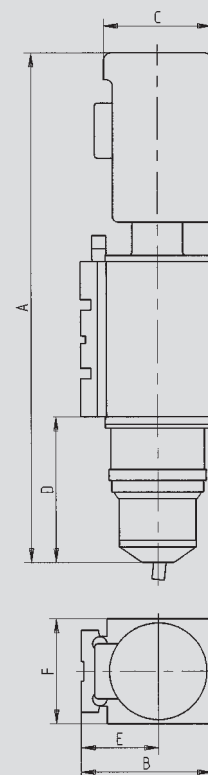
Long-stroke version for special applications:

RNL/RNEL 231:
Stroke adjustment from 50-90 mm
(reduced riveting force)

RNL/RNEL 281:
Stroke adjustment from 15-80 mm
Alternative:
Stroke adjustment from 72-112 mm
(reduced riveting force)

RNL/RNEL 331:
Stroke adjustment from 15-80 mm

RNL/RNEL 381:
Stroke adjustment from 40-90 mm



Dimensions

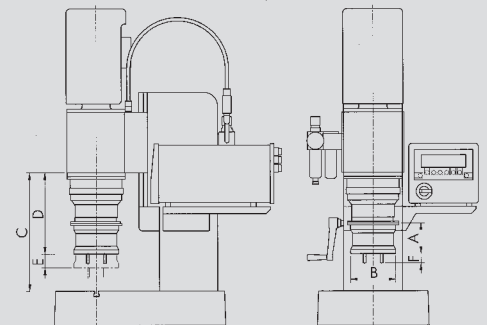
Model	A	B	C	D	E	F
RNL 231/90	662-752	185	140	190-280	110	150
RNL 281/80	883-963	211	176	238-318	125	172
RNL 281/112	797-909	211	176	249-361	125	172
RNL 331/80	865-945	275	199	241-321	160	230
RNL 381/90	836-926	200	200	223-313	120	160

Changes in size and weight reserved.

BalTec MRX radial riveting machines with multiple-riveting-head



The MRX multiple-riveting-head performs several riveting operations simultaneously within a specific area and even at different elevations. The tool operates with the same rosette pattern of the single-head BalTec machines. The number and configuration of riveting positions can be adjusted by interchanging two components—the bearing and guide plates. The MRX can also be equipped with custom pressure-pad devices to secure part assemblies before radial forming.



Dimensions and weights

Model	A	B	C	D	E	F*	lbs.
RN 081 + MRX-1	83	116	89–186	120–145	2–25	18,5	135
RN 181 + MRX-1	83	116	200–350	200–230	5–30	18,5	216
RN 231 + MRX-1	83	116	180–330	220–260	5–40	18,5	257
RN 281 + MRX-2	89	132	274–395	237–277	5–40	27,5	473
RN 281 + MRX-3	97	168	274–395	245–285	5–40	27,5	473
RN 331 + MRX-2	89	132	315–480	278–328	5–50	27,5	716
RN 331 + MRX-3	97	168	315–480	286–336	5–50	27,5	716
RN 381 + MRX-2	89	132	305–485	268–318	5–50	27,5	608
RN 381 + MRX-3	97	168	305–485	276–326	5–50	27,5	608

* Other lengths available

Changes in size and weight reserved.

The following multiple riveting heads can be supplied:

MRX 1

For models 081, 181 and 231.

Distance between tools: min. 8mm, max. 70mm.

MRX 2

For models 281, 331 and 381.

Distance between tools: min. 15.5mm, max. 85mm.

MRX 3

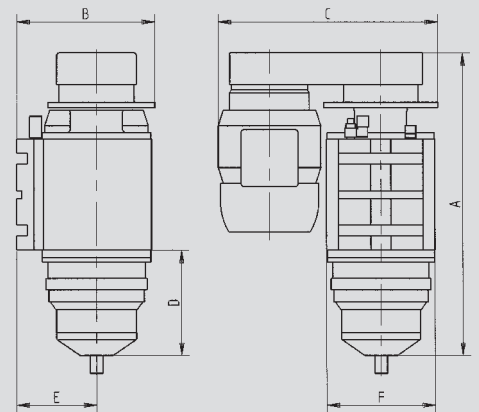
For models 281, 331 and 381.

Distance between tools: min. 15.5mm, max. 120mm.

BalTec RNE radial riveting machines with motor fitted at side



For situations where space is limited, the motor can be fitted on the left, the right or at the front.



Dimensions

Model	A	B	C	D	E	F
RNO 181	390–420	185	288	126–156	110	126
RNO 231	410–450	185	305	146–186	110	150
RNO 281	478–518	211	341	166–206	125	172
RNO 331	570–622	275	427	208–258	160	230
RNO 381	555–605 427–477	213 433	380 186	198–248 198–248	120 120	160 160

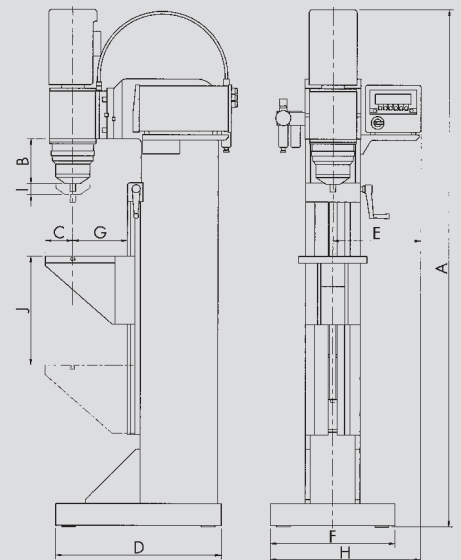
Changes in size and weight reserved.

BalTec RNS stand model radial riveting machines with adjustable table



RNS 281

The RNS machines are especially well suited for riveting long parts. The fixture-mounting table adjusts vertically with a built-in lead screw and is locked in place with a crank handle.



Dimensions and weights

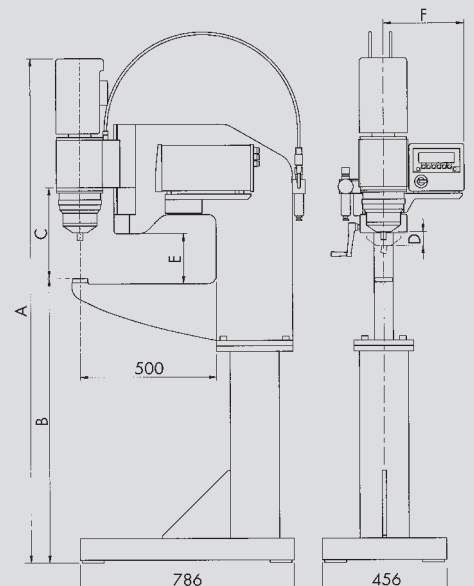
Model	A	B	C	D	E	F	G	H	I	J	lbs.
RNS 181	1800	126	100	606	322	456	200	550	5-30	600	1080
RNS 231	1835	146	100	606	322	456	200	550	5-40	600	1107
RNS 281	1900	166,5	100	606	322	456	200	550	5-40	600	1188
RNS 331	1967	207,5	115	606	322	456	240	550	5-50	600	1269
RNS 381	1970	198	100	606	322	456	200	550	5-50	600	1350
RNS 481	2250	296	100	896	372	556	300	650	5-90	600	2808

Changes in size and weight reserved.

BalTec RNFS stand model radial riveting machines with large overhang



Designed specifically for large-diameter parts, the RNFS series features a deep frame and compact arm design. The riveting area is vertically adjustable to accommodate the fixtures for awkward applications. The RNFS units are available without a floor stand (RNF series) or without an arm (RNY series).



Dimensions and weights

Model	A	B	C	D	E	F	lbs.
RNFS 081	1486–1586	1000	124–224	2–25	135	240	648
RNFS 181	1581–1731	1000	173–323	5–30	182	250	810
RNFS 231	1677–1807	1042	200–330	5–40	212	250	837
RNFS 281	1760–1910	1050	235–385	5–40	165	255	1134

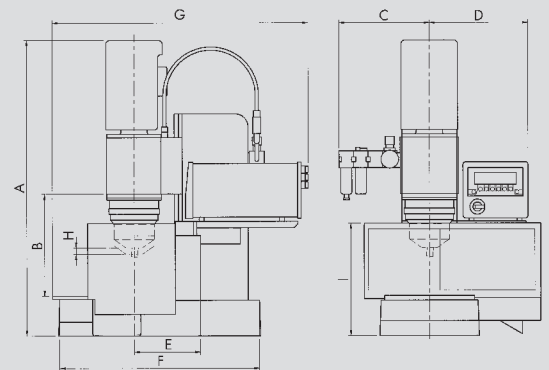
Changes in size and weight reserved.

BalTec RNR radial riveting machines with pneumatic rotary indexing table



RNR 281

The RNR series provides maximum productivity with minimum price. The standard design includes a built-in index table with an air-operated rack and pinion drive. Built for performance, the RNR series indexing unit features hardened and ground nickel-chrome plated wear components. The RC20 controller is standard. A pneumatic rotary indexing table with 6 index positions; 4, 8, 12 or 24 steps is also available as an option. Pneumatic ejection of riveted parts is also available. Lexan safety gates ensure complete guarding for the operator.

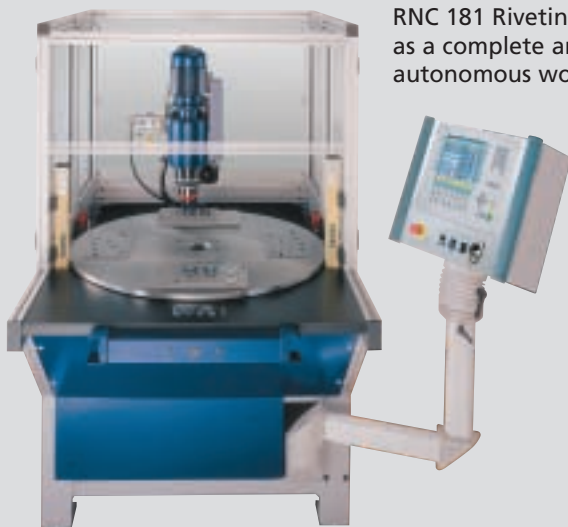


Dimensions and weights

Model	A	B	C	D	E	F	G	H	I	lbs.
RNR 081	571-668	75-172	252	-	75	530	-	2-25	266,5	270
RNR 181	718-868	186-336	261	287	130	530	739	5-30	266,5	338
RNR 231	745-875	186-316	261	287	130	530	739	5-40	266,5	351
RNR 281	831-981	231-381	282	308	185	625	797	5-40	349	540

Changes in size and weight reserved.

CNC coordinate riveting machines modular construction



Module 4:
RNC 181 Riveting Machine
as a complete and
autonomous workstation

The standard solution or the basis for customized riveting applications

Models RNC 181, RNC 231 and RNC 281 differ only in terms of the size of riveting units. The required riveting force determines the selection.

Module 1
Baltec radial riveting unit,
electro-pneumatic, at C-stands



Module 2
Coordinates riveting unit
with X, Y traversing units



Module 3
Basic coordinates riveting
station, machine frame
heavy welded construction,
indexing table and X, Y
traversing units



Technical data of the CNC coordinate riveting machine

Riveting range					
	X axis travel	[mm]	300		
	Y axis travel	[mm]	200		
	X/Y axis speed	[mm/min]	12000		
Indexing table					
	Table-ø	[mm]	850		
	Number of stations, option		2/4		
	Slew time for 90°	[s]	1,5*)		
	Clamping weight max.	[lbs.]	10.8 X 24.3		
Coordinate riveting station					
		RNC 181	RNC 231	RNC 281	
	Riveting unit	RNE 181	RNE 231	RNE 281	
	Diameter handled	[mm]	6	8.5	12
	Motor rating (at 1500 rpm)	[kW]	0.25	0.37	0.55
	Riveting force max. 6 bar	[kN]	6	12	17
	Riveting time	[s]	0.1-10	0.1-10	0.1-10
	Tool stroke	[mm]	10-30	10-40	10-40
	Cylinder volume max. stroke	[cm ³]	350	796	1140
Machine controller					
	Allen Bradley PLC or Siemens PLC				
Operation					
	Key operated switches for setup-modes				
	Cycle start with two-hand safety switch				
Installation data					
	Overall weight	[lbs.]	2268	2295	2430
	Rated power	[kW]	3.4	3.5	3.7
	Line voltage	[V]		400 ± 10%	
	Frequency	[Hz]		50/60 ± 1%	
	Compressed air	[bar]		6	
	Main dimensions see diagram 802967a				

*) With reduced clamping weight on order, also with shorter switching time

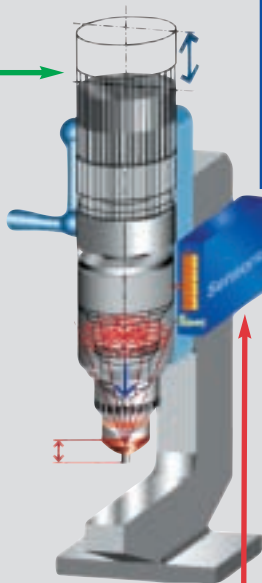
Riveting machine control and process controller for all safety standards



RC 20 Riveting machine control
The RC 20 exceeds all present safety standards.

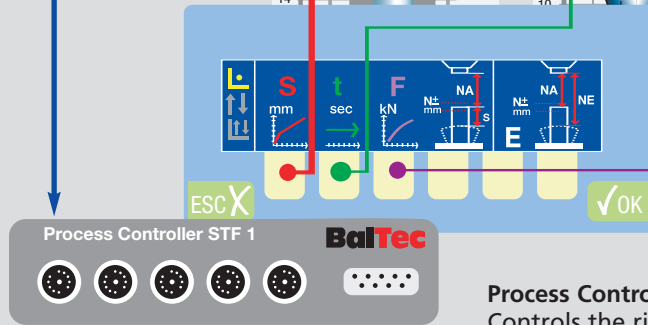
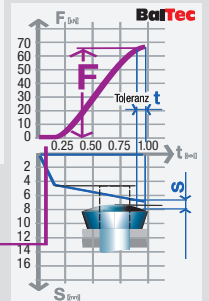
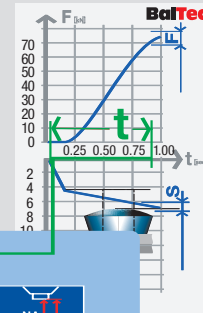
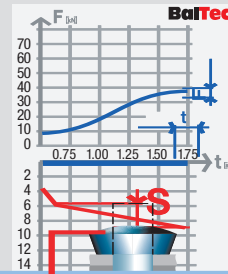
Features

- Display suitable for graphics.
- Menu operation with softkeys.
- Basic software for all machines.
- Input/output capabilities for riveting system components (slide logic, safety light curtains, rotary table).
- Machine and program configuration by means of setup functions.
- Good-piece counter.
- Bad-piece counter.
- Total-stroke counter.
- Operating-hours counter.
- Total-hours counter.
- Operator desktop and communications software for Quantum 2000 STF-1 process controller.
- RS 232 data interface.



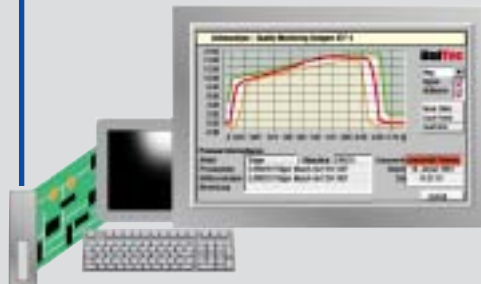
Sensory analysis

Path measurement system and pressure sensors for RC20 control together with Process Controller STF-1 or for, Measurement data Acquisition System QMS-STF-2



Process Controller STF 1 Super Plus
Controls the riveting process according to a reference value, optionally according to path (s), time (t) or force (F). The reference values s, t and F are acquired on setup and stored as such. With each riveting process, the actual s, t and F process values are continuously measured and compared with the reference values.

Cable Splitter



QMS-STF 2 (Quality Monitoring System)
Quality monitoring software for visualizing and saving measuring data (path/time, force/time curves). Installable on standard PC with Windows operating system. Delivered with the necessary process interface.

- Compares the measured values with the preset tolerance values, envelope curve
- Can be active with tolerance overshoot. All data is logged and saved



PDR STF 3 (Process Data Recording)
Process data visualizing and storage of the Process Controller Data of up to 6 riveting stations on an industrial PC with touch screen. Additional possibilities:

- Online statistics of process variables, limit value monitoring, workpiece marking system
- The measured values of each riveting station are centrally saved and can be documented for quality assurance

Forming Tool Guide

Replacement Forming Tools

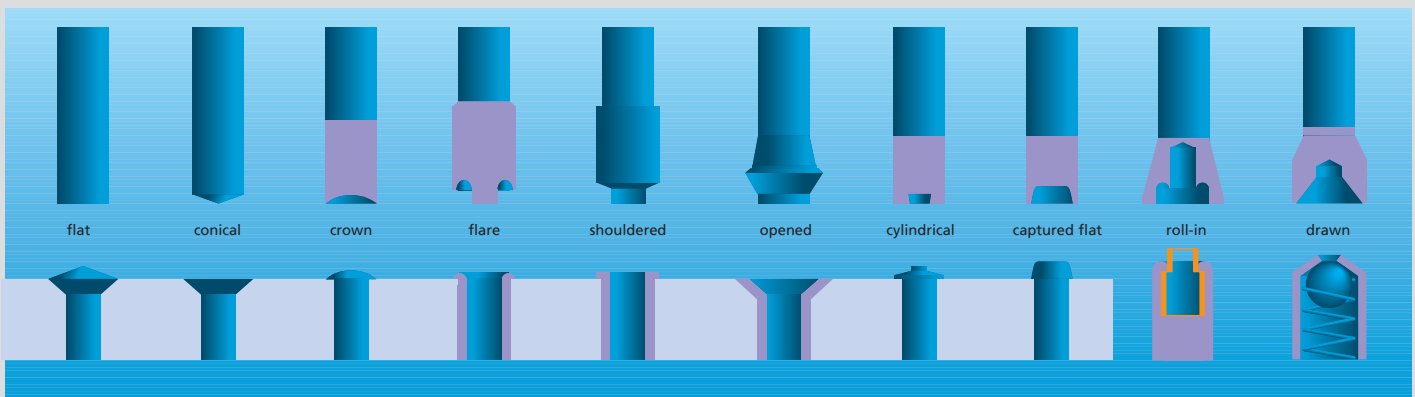
We are your source for replacement forming tools, and we now offer special quick turnaround when emergencies arise. For your convenience, we also promote blanket tool orders so we can ship your custom tools at your request. Our blanket tool order features:

- Immediate shipment of tools
- Guaranteed pricing for blanket order periods
- Quality discounts
- Personal management of your tooling requirements
- Reliable scheduling of your delivery needs
- Storage of your tool to save valuable space

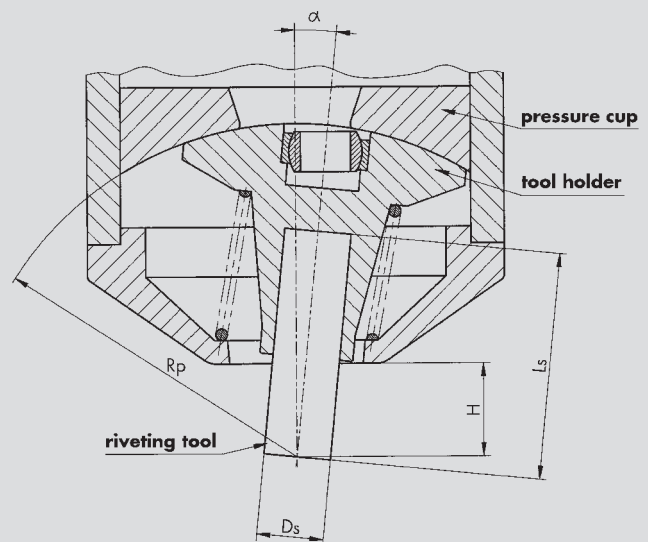
Forming Tools

Each riveter series has a standard forming tool length that is determined by the tool holder and pressure cup set inherent to the riveter. Should an application require a different clearance, the set can be changed easily to arrive at a different tool length.

For more information, please contact our Customer Service Department



Models	Radius	Tool length	Free height	Shank diam.	Angle of Inclination
RN / RNE	R_p	L_s	H	D_s	
081, 181, 231	65	39	18	10	6° 02'*
	80	54	33	10	4° 47'
	100	74	53	10	3° 44'
	120	94	73	10	3° 04'
	132	106	85	10	2° 46'
281, 331, 381	100	68	28	20	5° 37'*
	116	84	44	20	4° 47'
	132	100	60	20	4° 10'
	148	116	76	20	3° 41'
	170	138	98	20	3° 10'
	191	159	119	20	2° 49'
	240	208	168	20	2° 13'
481	148	100	45	30	6° 15'*
	196	148	93	30	4° 38'
	240	192	137	30	3° 45'
	290	242	187	30	3° 04'



The tool length and the radius of the holder result from your desired free height (H).

*All machines are fitted as standard with tool holder and pressure cup.



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