FIN-FAN

Maintenance tools

KRAIS
Tube & Pipe Tools

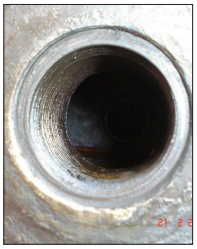
MINIDRILL GFF

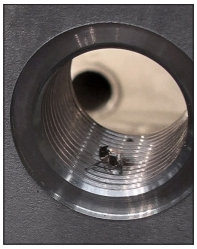
FinFan cooler machining platform

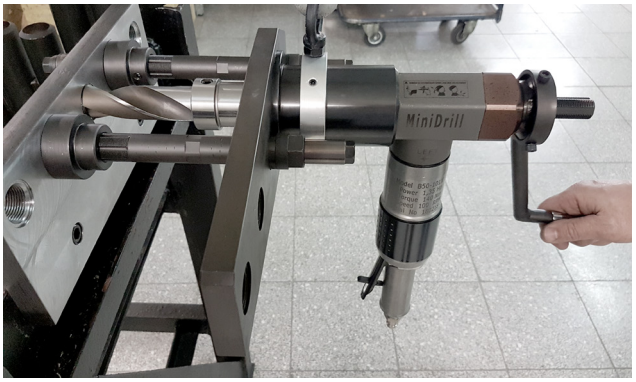
MiniDrill GFF is a unique machining platform designed to safely perform the repair or increase the FinFan Cooler plug thread and other operations on heat exchangers, boilers and similar thermal exchange equipment. This system can drill, ream, bore and even re-machine serrations in steam drums. With a 80 mm (3.150”) travel, tool is suited for the majority of plant equipment. The system is fully torque reacted with 2 clamping arms that are independent of one another and can accommodate most pitch configurations. Once locked into the tubes, the MiniDrill is extremely stable.

WORKING RANGE	LOCKING RANGE	FREE SPEED	POWER	TORQUE
12,5– 51,0 mm	According to the drawing	100 Rpm	1,3 Hp	140 Nm
0,492 – 2,000”				105 Ft.Lbs

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m3/min	2,32”	59 mm	13,1”	335 mm	17,5 Lbs	8 kg



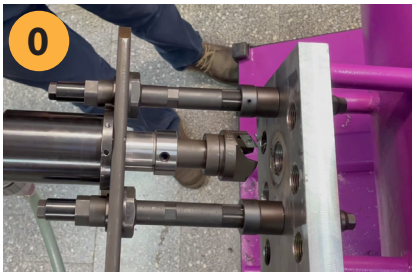




RIGID LOCKING
On standard FinFan gas coolers machine locks onto two shafts on the adjacent holes. The locking plate is manufactured according to the tube hole pitch to ensure precise tool alignment.

UNIVERSAL REACTION PLATE
MiniDrill FinFan is delivered with locking plate and 2 reaction shafts. Construction of the plate allows for locking machine with both shafts on one side to allow to machine the last holes in the row. Plate can be etc.

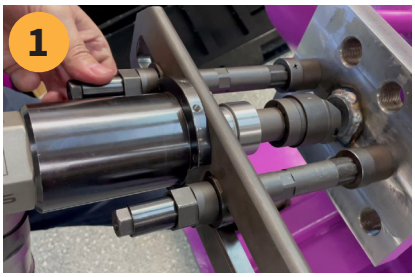
FINFAN THREAD REPAIR PROCESS



PROPER MACHINE LOCKING FOR ALL STEPS

Choose the correct locking jaws to suit the exisiting plug holes

PLUG SIZE			JAW SET (2 REQUIRED)
1-1/8"	28,58 mm	12 TPI	701MM #36-1-1/8-GFF
1-1/4"	31,75 mm	12 TPI	703MM #36-1-1/4-GFF
1-3/8"	34,93 mm	12 TPI	705MM #36-1-3/8-GFF
1-1/2"	38,10 mm	12 TPI	707MM #36-1-1/2-GFF
1-5/8"	41,28 mm	12 TPI	709MM #36-1-5/8-GFF
1-3/4"	44,45 mm	12 TPI	711MM #36-1-3/4-GFF
1-7/8"	47,63 mm	12 TPI	713MM #36-1-7/8-GFF



STEP 1

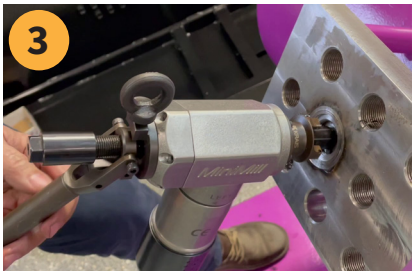
Heads for weld removal over the welded plugs (in case are welded)

PLUGS SIZE			HEAD	INSERT	SCREW
1-1/8"	28,58 mm	12 TPI	TFWR-GFF-350	CS-5D	MHS-4
1-1/4"	31,75 mm	12 TPI	TFWR-GFF-380	CS-5D	MHS-4
1-3/8"	34,93 mm	12 TPI	TFWR-GFF-410	CS-5D	MHS-4
1-1/2"	38,10 mm	12 TPI	TFWR-GFF-440	CS-5D	MHS-4
1-5/8"	41,28 mm	12 TPI	TFWR-GFF-470	CS-5D	MHS-4
1-3/4"	44,45 mm	12 TPI	TFWR-GFF-500	CS-5D	MHS-4
1-7/8"	47,63 mm	12 TPI	TFWR-GFF-540	CS-5D	MHS-4

STEP 2

Select the appropriate size drill head to match the desired new thread size

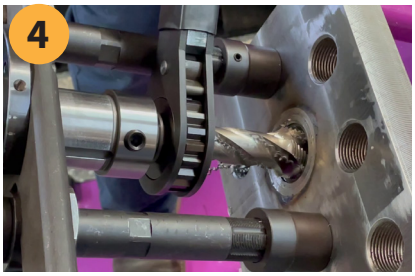
DRILL HEAD SIZE		DRILL HEAD	INSERT	SCREW
1-1/8 to 1-1/4"	28,58 to 31,75 mm	MD-29,6-DRILL-L-130	CS-0.4	MHS-4
1-1/4 to 1-3/8"	31,74 to 34,93 mm	MD-32,9-DRILL-L-130	CS-0.4	MHS-4
1-3/8 to 1-1/2"	34,93 to 38,10 mm	MD-36,1-DRILL-L-130	CS-0.4	MHS-4
1-1/2 to 1-5/8"	38,10 to 41,28 mm	MD-39,3-DRILL-L-130	CS-0.4	MHS-4
1-5/8 to 1-3/4"	41,28 to 44,45 mm	MD-42,5-DRILL-L-130	CS-0.4	MHS-4
1-3/4 to 1-7/8"	44,45 to 47,63 mm	MD-45,5-DRILL-L-130	CS-0.4	MHS-4



STEP 3

Select the chamfering head to chamfer the hole before tapping (heads need a Weldon flange: MD-FLANGE-STWRMH)

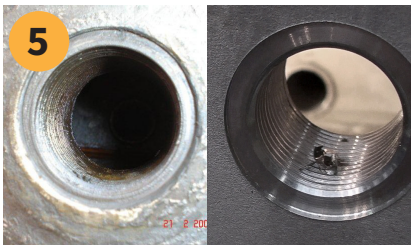
RANGE		HEAD	INSERT	SCREW
0,787 to 1,653"	20,00 to 42,00 mm	STWRMH-317	WRI	MHS-4
1,417 to 2,244"	36,00 to 57,00 mm	STWRMH-444	CDI	MHS-4



STEP 4

Select tapping head to suit the required thred size

PLUGS THREAD SIZE			TAP HEAD	RATCHED FEED ARM
1-1/8"	28,58 mm	12 TPI	MDFFPT-1-1/8_12	MD-RS-H28
1-1/4"	31,75 mm	12 TPI	MDFFPT-1-1/4_12	MD-RS-H28
1-3/8"	34,93 mm	12 TPI	MDFFPT-1-3/8_12	MD-RS-H28
1-1/2"	38,10 mm	12 TPI	MDFFPT-1-1/2_12	MD-RS-H28
1-5/8"	41,28 mm	12 TPI	MDFFPT-1-5/8_12	MD-RS-H28
1-3/4"	44,45 mm	12 TPI	MDFFPT-1-3/4_12	MD-RS-H28
1-7/8"	47,63 mm	12 TPI	MDFFPT-1-7/8_12	MD-RS-H28



STEP 5

Produce new gasket seat using MiniMill-300GFF. Chose heads and jaws on page 6.

MINIMILL 300GFF

Gasket seat machining tool

Ideal for gasket seat machining of any size of fin fan cooler. A standard machine is equipped with a cutter head and a special locking system to fit your application. The machine locks directly into the plug thread.

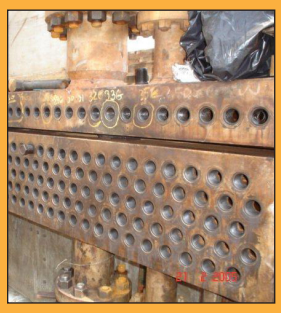
GASKET FINFAN SET
Supplied with 20 mm shaft, one set of jaws to suit plug thread diameter, pilot and gasket seat milling head. Plug size details must be provide by customer with order.

Custom machined jaws. Showing locked and unlocked position.

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED	POWER	TORQUE
APPLICATION RANGE (ID-OD)	LOCKING RANGE (ID)				
12 TPI	Suit to thread of the plug	20 mm	300 Rpm	1,3 Hp	43 Nm
1,125 - 2,125"		0,787"			32 Ft.Lbs

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	2,32"	59 mm	13,1"	335 mm	13,2Lbs	6 kg

WORK EXAMPLES



FinFan cooler before a maintenance

Plug hole before re machining the gasket seat

Safely re-machine gasket surfaces in seconds.

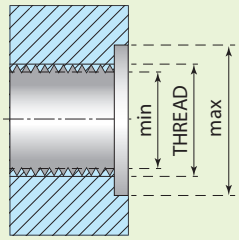
All types of water box materials can be machined with the carbide inserts

GASKET SEAT FACING HEADS AND JAWS NUMBERS

HEAD TYPE	PLUG SIZE			SEAL NEST DIAMETER				INSERT	NO. OF INSERTS	JAWS SET NUMBER	PLUG SIZE		TPI	PILOT
	[INCH]	[MM]	TPI	MIN [INCH]	MAX [INCH]	MIN [MM]	MAX [MM]				[INCH]	[MM]		
FFGSMH-1125	1,125	28,58	12	0,940	1,496	24,00	38,00	CI 5x5	4	701MM #36-1-1/8-GFF	1,125	28,575	12	PGFF-1125
FFGSMH-1250	1,250	31,75	12	1,063	1,614	27,00	41,00	CI 5x5	4	703MM #36-1-1/4-GFF	1,250	31,750	12	PGFF-1250
FFGSMH-1350	1,375	34,93	12	1,220	1,772	31,00	45,00	CI 5x5	4	705MM #36-1-3/8-GFF	1,375	34,925	12	PGFF-1350
FFGSMH-1500	1,500	38,10	12	1,339	1,890	34,00	48,00	CI 5x5	4	707MM #36-1-1/2-GFF	1,500	38,100	12	PGFF-1500
FFGSMH-1625	1,625	41,27	12	1,457	2,008	37,00	51,00	CI 5x5	4	709MM #36-1-5/8-GFF	1,625	41,275	12	PGFF-1625
FFGSMH-1750	1,750	44,45	12	1,590	2,140	40,40	54,40	CI 5x5	4	711MM #36-1-3/4-GFF	1,750	44,450	12	PGFF-1750
FFGSMH-1875	1,875	47,62	12	1,720	2,270	43,60	57,60	CI 5x5	4	713MM #36-1-7/8-GFF	1,875	47,625	12	PGFF-1875

Other sizes on request. If plug holes are damaged beyond repair, our MiniDrill 55 can be used to upsize them to the next size. Example: 1-1/8” to 1-3/8”.

Seal nest diameter diagram

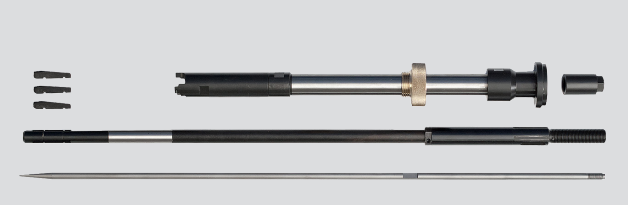


AVAILABLE ACCESSORIES

FAST CLAMPING SYSTEM
System offers rapid tube to tube cycle time, increased productivity (up to 4x) with little operator fatigue. Ideal for large amount of end preps.

MINIMILL 300FF
Tube trimming machine

A standard machine for Fin Fan cooler tube trimming is equipped with custom head and locking system to suit your application (customer to provide drawing of unit). The MiniMill 300FF cutter heads have 3 carbide inserts with 4 Cutting edges each.



FINFAN ATTACHMENT
Special attachment for facing tubes in fin fan gas coolers. A locking shaft with adjustable length and a support bushing are screwed into the plug thread, making this tool the best one available on the market today. The cycle is approx. 1 min from tube to tube. For this application we recommend our 300 Rpm machine

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED	POWER	TORQUE
APPLICATION RANGE (ID-OD)	LOCKING RANGE (ID)				
12,5– 51,0 mm	According to the drawing	20 mm	300 Rpm	1,3 Hp	43 Nm
0,492 – 2,000”		0,787”			32 Ft.Lbs

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
55 cfm	1,3 m^3/min	2,32”	59 mm	13,1”	335 mm	13,2Lbs	6 kg

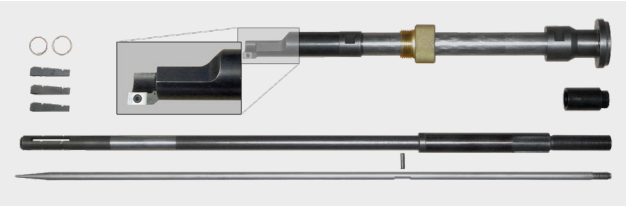
FINFAN ATTACHMENT PART NUMBERS

FINFAN	TUBE CAPACITY (OD)			INSERT	NO. INSERTS	SCREW	JAWS COVER	
	[INCH]	[MM]	BWG				MIN	MAX
601-FinFan-1-12”	1,000	25,40	12-23	CI	3	1-1/8	207MM#36	213MM#36
603-FinFan-1-1/8-12”	1,125	28,58	12-23	CI	3	1-1/4	211MM#36	217MM#36
605-FinFan-1-1/4-12”	1,250	31,75	11-23	CI	3	1-3/8	103MM#36	107MM#36
607-FinFan-1-1/2-12”	1,500	38,10	11-23	CI	3	1-5/8	107MM#36	111MM#36
609-FinFan-1-3/4-12”	1,750	44,45	9-23	CI	3	1-7/8	111MM#36	115MM#36
611-FinFan-2-12”	2,000	50,80	9-23	CI	3	2-1/8	115MM#36	119MM#36

AVAILABLE LENGTHS

MODEL	DŁUGOŚĆ	
	[MM]	[INCH]
601-FinFan-xx-6	152,4	6”
601-FinFan-xx-8	203,2	8”
601-FinFan-xx-10	254,0	10”
601-FinFan-xx-12	305,0	12”
601-FinFan-xx-14	355,6	14”
601-FinFan-xx-16	406,4	16”

AVAILABLE ACCESORIES



FINFAN SEAL WELD REMOVAL ATTACHMENT
Simply the best solution for seal weld removal from air coolers. Adjustable length locking shaft and support bushing that fits into the plug thread, making this tool the best one available on the market today. A cycle time of approximately 1 min from tube to tube can be expected.

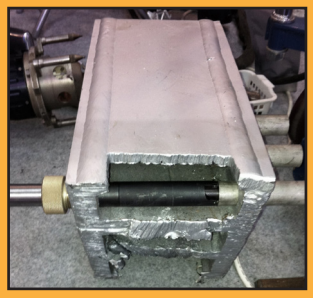
FINFAN CHAMFERING ATACHMENT
FINFAN-CMF-000-00 Chamfering Attachment for tube sheet holes in the FinFan tube sheet before welding. Available for 45-degree chamfer and R4 radius J-Prep.

SPEED REDUCER
Easy to use gearbox for 3x speed reduction. Increases the torque, enabling the machine to generate a thick chip whilst reducing the cutting time.

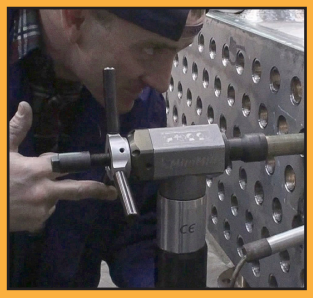
RATCHET FEED
Feed system allowing to work in narrow and tight locations, eg. in water walls.

LEVER FEED
Quick and easy feed system. Used in many basic applications.

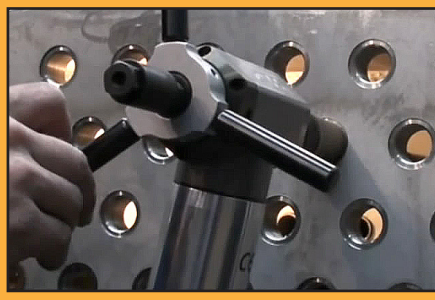
WORK EXAMPLES



Water box demonstration of the simplicity of machine operation.



An operator trimming back tubes prior to seal welding.



Machine locks securely both to the tube and the plug thread of the water box.

FINMILL

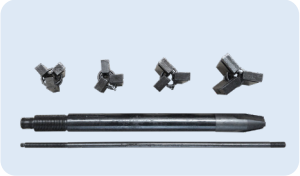
Fin removing machine

KRAIS FinMill is a air powered tool designed for removing fin from the outside diameter of a tube. The tool is based on the same quality drive and housing as our other PrepMill series tools. Thanks to heavy duty locking system The FinMill fin tube removal tool clamps reliably in the tube and offers chatter-free work at any position.

Reversible motor allow to work and remove left and right hand fins.

STANDARD SET UP

DOUBLE SIDE HEAD
Special shaped head, allows to remove left- and right-handed fins.



SHAFT25
Self-align, heavy duty locking system. Shafts and jaws are longer and wider to ensure maximum clamping force.

STANDARD WORKING RANGE		FEED STROKE	FREE SPEED	POWER	TORQUE
APPLICATION RANGE (ID-OD)	LOCKING RANGE (ID)				
31,75 - 63,50 mm	25 - 122 mm	100 mm	100 Rpm	2,2 Hp	370 Nm
1-1/4" – 2-1/2"	0,984 - 4,803”	4”			277 Ft.Lbs

AIR USE		BODY WIDTH		BODY HEIGHT		BODY WEIGHT	
75 cfm	2,2 m^3/min	2,59”	66 mm	14,5”	370 mm	19 Lbs	9 kg

HEAD NUMBERS

RANGE		HEAD
[INCH]	[MM]	
1-1/4	31,75	FMRH-317
1-1/2	38,10	FMRH-381
1-3/4	44,45	FMRH-444
2	50,80	FMRH-501
2-1/4	57,15	FMRH-571
2-1/2	63,50	FMRH-635

LOCKING RANGES WITH SHAFT25

RANGE [MM]		RANGE [INCH]		JAWS	EXT.	SPRING	
MIN	MAX	MIN	MAX			NUMBER	QTY.
25	30	0,984	1,181	NS-1	-	SP-24	1
30	35	1,181	1,378	NS-2	-	SP-24	1
35	40	1,378	1,575	NS-3	-	SP-25	2
40	45	1,575	1,772	NS-4	-	SP-25	2
45	50	1,772	1,969	NS-5	-	SP-25	2
50	55	1,969	2,165	NS-6	-	SP-25	2
55	60	2,165	2,362	NS-7	-	SP-25	2
60	65	2,362	2,559	NS-8	-	SP-25	2

OPTIONAL

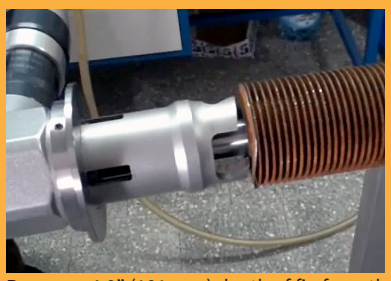
STAR WHEEL
The most precise feed system. Used in many basic and demanding applications.

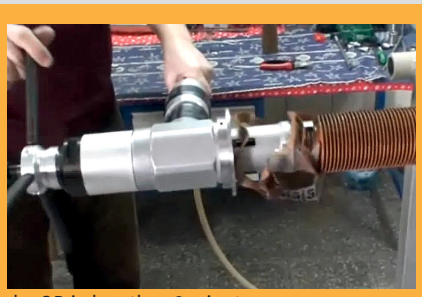
FINMILL E

FinMill E is electric version of FinMill. A standard machine cover the same pipe sizes and comes with the same cutting head. The electric motor made by Makita with 3 stage planetary gear box made by KRAIS has variable speed control and produce enormous torque. Is interchangeable with pneumatic drive and can be purchased separately at any time.
FinMill E works only with right hand fins.

Free Speed ..... 115 RPM
Power..... 750 W
Torque ..... 366 NM (280 Ft.Lbs)
Feed Stroke ..... 20 mm (0,787”)

WORK EXAMPLES





Removes 4.0” (101 mm) depth of fin from the tube OD in less than 2 minutes

TUBE EXPANDERS

For condenser and heat exchangers

900 SERIES TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
3,86 - 8,41 mm	6,35 - 9,50 mm	6,3 - 31,7 mm
0,152” - 0,331”	1/4” - 3/8”	0,25” - 1,25”

1300 SERIES TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
5,87 - 8,41 mm	9,5 MM	19,0 - 88,9 MM
0,231” - 0,331”	3/8”	0,75” - 3,50”

800 SERIES TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
8,48 - 26,9 mm	12,7 - 38,1 MM	12,7 - 57,1 MM
0,334” - 1,027”	1/2” – 1-1/2”	0,50” - 2,25”

800-5 SERIES 5-ROLL TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
12,98 - 36,68 MM	15,8 - 38,1 MM	12,7 - 57,1 MM
0,509” - 1,440”	5/8” – 1-1/2”	1/2” - 2 1/4”

1200 SERIES TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
8,48 - 36,32 MM	12,7 - 38,1 MM	50,8 - 304,8 MM
0,334 - 1,430”	1/2” – 1-1/2”	2” - 12”

1200-5 SERIES 5-ROLL TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
14,83 - 36,32 MM	19,0 - 38,1 MM	50,8 - 304,8 MM
0,584 - 1,430”	1/2 – 1-1/2”	2” - 12”

600 SERIES FLARE TYPE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
13,51 – 22,45 MM	15,88 - 25,40 MM	38,1 - 57,1 MM
0,532 - 0,884”	5/8” - 1”	1 1/2 - 2 1/4”

8012 SERIES TUBE EXPANDERS

TUBE ID	TUBE OD	TUBE SHEET
36,07 - 73,72 mm	44,4 - 76,2 mm	12,7 - 101,6 mm
1,420 - 2,902”	1 3/4 - 3”	1/2 - 2 1/4”

TACK CONICAL EXPANDERS SERIES

TUBE ID	TUBE OD
8,0 - 50,0 mm	9,5 - 50,8 mm
0,315 - 1,969”	0,374 - 2,000”

ROLLING SYSTEMS

Pneumatic motors and digital controllers

HTES-9000

HTES-9000 is the most precise system from the pneumatically driven KRAIS tube rolling machines. The machine has an integrated strain gauge sensor controlled by an electric torque control transducer. Thanks to modern solutions, HTES-9000 is measuring torque directly from the driven spindle with superb precision. For the highest accuracy every machine is calibrated with certified torque tester.
HTES-9000 is the first choice expansion tool for all who need to roll tubes with quality above industry-accepted standards offered by regular pneumatic tube expanding machines.
TES-9000 system is resistant to air pressure and volume fluctuations. The system monitors torque throughout every expansion cycle, constantly provides the most precise wall reductions for every expanded tube. The system rolls to the targeted wall reduction each time, eliminating a lot of wasteful re-rolling.

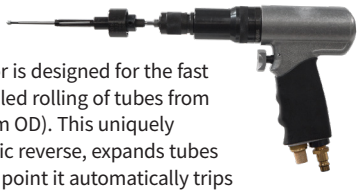
TES-3000

This Digital Tube Expanding System features a range of powerful and efficient servo motors. Variable Speed and Torque repeatability +/- 1% are a few of the advantages of this system. Created for the demanding customer, this system ensures uniform tube expansion over a wide range of tube diameters and materials.

TES MINI 2

TES Mini 2 is a second version of semi automatic torque controller for the precise expansion of ferrous, non-ferrous and alloy tubing. Gains in precision and energy efficiency have been realized from an already accurate system (±1%). Control panel is simple to navigate and incorporates a built in card reader for detailed work reports.

K20 SERIES

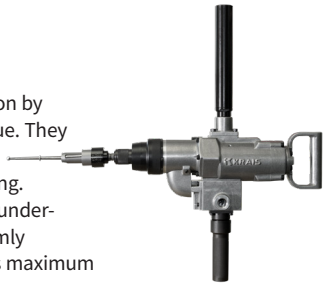


K20 pneumatic rolling motor is designed for the fast and accurate torque controlled rolling of tubes from 1/4” – 1/2” OD (6.3 - 12.7 mm OD). This uniquely designed tool with automatic reverse, expands tubes to a preset torque, at which point it automatically trips over to its reverse rotation, backing itself out of the tube ready for the next expansion.

PUSH&PULL K50 SERIES

K50 series pneumatic motors has been specifically engineered to ensure uniform tube to tube sheet expansions, thereby preventing the under and over rolling of tubes. This pneumatic tool features an aluminum body, weigthing in at only 10.5 lbs (4.76 Kgs) with an ergonomically correct push/pull throttle. Automatically stops tube expansion at defined settings.

K60 SERIES



K60 rolling motors control expansion by the accurate measurement of torque. They automatically stop expanding according to a predetermined setting. Torque control prevents over- and under-expansion of tubes, assures uniformly tightened tube joints, and provides maximum holding strength for individual tubes.

K70 RIGHT ANGLE SERIES

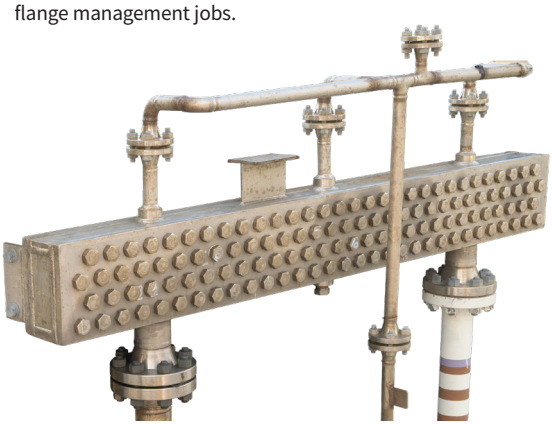
K70 Torque Controlled Rolling Motors have been designed for the Boiler Tube Industry. Tools have a unique head design which features a fully enclosed bearing design for long and trouble free life. All models are equipped with a roll throttle as standard, a lever throttle is optional.

NBFF – Narrow Body Flange Facer

**Patent pending*

NBFF – the flange facing machine with a slim line gantry profile for mounting in tight spaces. An operator can mount NBFF tool on-site within demanding conditions such as flanges close to walls or pipe racks. The unique design of NBFF allows the operator to mount the machine and perform a repair in locations that popular, standard equipment could not fit.
The machine conforms to all the necessary standards and is extremely easy to use. Light and robust to quickly mount and repair damaged faces on flanges. NBFF can maximize production and uptime in all flange management jobs.

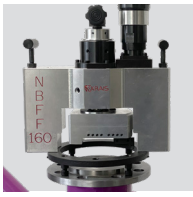
All versions of NBFF deliver the same advantage over standard flange facers: despite working size all are narrow and fit perfectly in tight spaces.

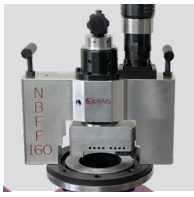


SUPER NARROW BODY

Thanks to unique, a true narrow design NBFF tool is fully usable within demanding conditions such as flanges close to walls or pipe racks.

FLANGE2FLANGE LOCKING OPTION





Optional flange type locking system is made to suit the application more. NBFF machine is still mounted on the flange outside diameter, but the locking system is equipped with additional studs to be mounted in the flange holes to provide easy operation and perfect centring.

KRAIS Tube & Pipe Tools

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