



KRAIS
Tube Expanders

TES Mini 2

Compact Digital Tube Expansion System



TES Mini 2 Highlights

Our TES Mini 2 is a semi automatic torque controller for the precise expansion of ferrous, non-ferrous and alloy tubing. It is ideal for Condenser/Chillers, Heat Exchangers and Boilers. It's one of our most popular tools because of its accuracy, speed and ease of use.

The second generation TES Mini has been designed with direct input from our customers and utilizes the latest electronic components. As a direct result of these new technologies, gains in precision and energy efficiency have been realized from an already accurate system ($\pm 1\%$). The redesigned control panel is simpler to navigate and incorporates a built in card reader for detailed work reports.

Main TES Mini 2 features:

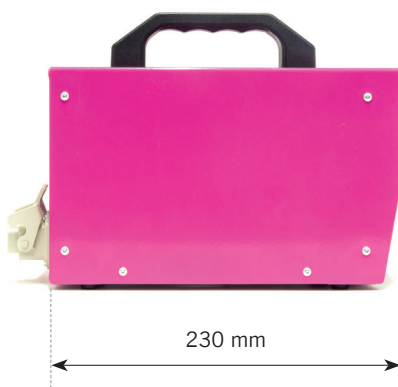
- ▶ microprocessor controlled tube expansion;
- ▶ consistent torque control over 1 or 10,000 expansions;
- ▶ controls torque during long series of tube expanding;
- ▶ programmable torque shut-off value and high/low torque limits;
- ▶ reverse button for retracting expanders from the tubes;
- ▶ programmable timers for; cycle start, reverse pause, end of cycle, and a suppression timer for low torque value settings;
- ▶ CE Certified design.

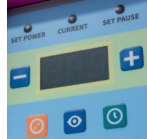
Usage of our TES Mini 2 Controller, which is durable and easy to maintain, ensures that all tubes are expanded to the same torque. With the proper, easy to use set up, you can avoid over rolling which damages joint integrity and the distortion of tube sheet ligaments.



TES Mini 2 functions:

- ▶ speed adjustment or limit (depends on motor type)
- ▶ torque adjustment
- ▶ suppression time adjustments
- ▶ pause time adjustment
- ▶ softstart delay
- ▶ report generation (up to 3000 cycles)
- ▶ works with 110 V and 230 V





TES Mini 2 Motors

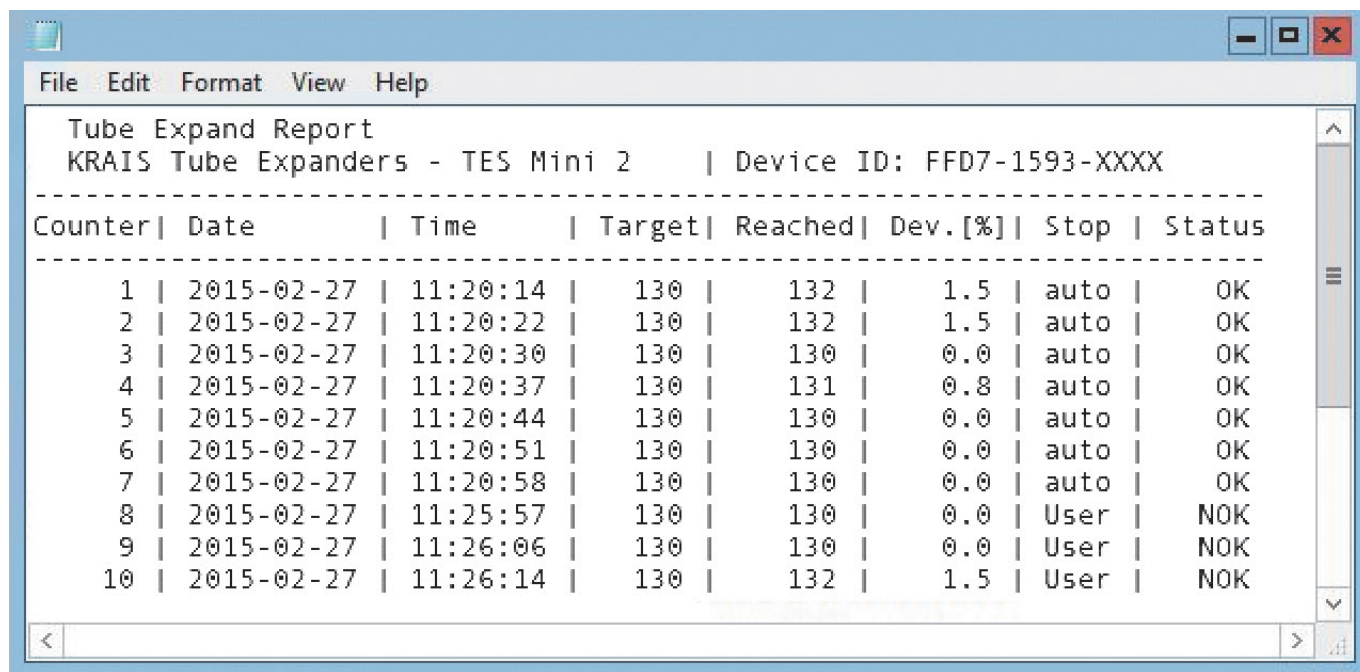
TES Mini in conjunction with one of our tube rolling motors will improve productivity and safety, while delivering unmatched performance and durability.

		WEIGHT		MOTOR POWER	FREE SPEED	MAX RPM UNDER LOAD	TORQUE				TUBE CAPACITY*	
		[KG]	[LBS]				[NM]		[FT-LBS]		MIN	MAX
							MIN	MAX	MIN	MAX		
	HT-0	1,2	2,4	460 W	2300	1700	0,70	10,00	0,50	7,40	1/4	1/2
	ES-0	3,2	7,0	1150 W	680	450	12,00	45,00	8,85	33,00	5/8	1 1/4
	ES-2	3,2	7,0	1150 W	650 1200	430 760	8,00	43,00	6,00	32,00	5/8	1 1/8
	DU-0	2,0	4,4	650 W	628 2100	450 1550	3,00	42,00	2,21	30,50	5/8	1
	DU-1	8,6	17,6	2000 W	150 250 445 720	120 219 380 650	12,00	250,00	8,85	185,00	3/4	2
	K90-E-90	10,0	22,0	1150 W	90	81	70,00	510,00	51,63	376,16	2	5
	K90-E-190	10,0	22,0	1150 W	142	129	50,00	260,00	36,88	191,77	1 1/2	3
	K90-E-280	10,0	22,0	1150 W	274	250	40,00	190,00	29,50	140,14	1 1/4	2 1/2

* Tube Capacity depends on material and technical condition of tube



TES Mini 2 Digital specs



The screenshot shows a software window titled 'Tube Expand Report' for 'KRAIS Tube Expanders - TES Mini 2'. It displays a table of expansion data with columns: Counter, Date, Time, Target, Reached, Dev. [%], Stop, and Status. The data shows 10 expansion attempts, with the last three (9, 10, and 11) marked as 'NOK' (Not OK) because the 'Reached' value did not meet the 'Target' value within the specified deviation.

Counter	Date	Time	Target	Reached	Dev. [%]	Stop	Status
1	2015-02-27	11:20:14	130	132	1.5	auto	OK
2	2015-02-27	11:20:22	130	132	1.5	auto	OK
3	2015-02-27	11:20:30	130	130	0.0	auto	OK
4	2015-02-27	11:20:37	130	131	0.8	auto	OK
5	2015-02-27	11:20:44	130	130	0.0	auto	OK
6	2015-02-27	11:20:51	130	130	0.0	auto	OK
7	2015-02-27	11:20:58	130	130	0.0	auto	OK
8	2015-02-27	11:25:57	130	130	0.0	User	NOK
9	2015-02-27	11:26:06	130	130	0.0	User	NOK
10	2015-02-27	11:26:14	130	132	1.5	User	NOK

Performance, new technology

TES Mini 2 uses 32-bit flash micro-controller based on the ARM Cortex™-M processor. Processor design offers totally new possibilities for all MCU users. 32-bit architecture combines high performance, real-time work capabilities for digital signal processing and low-voltage operation. Second main part is two channel analog to digital converter: 4th order Delta-Sigma. 512 kHz sampling frequency provides wide dynamic range and very good noise immunity. All this results in capability of sense less than 0.5 Watt change in power.

Expansion History Report

One of the new features of the second generation TES Mini, is the automatic saving of tube expansion history. The device writes expansion data onto the inserted SD card. After each expansion it creates the next entry containing date, time and additional expansion parameters. Data can be easily reviewed in excel type software

Report features:

- MMC card and compatible, FAT 16&32
- *.txt file with name: *raport.txt*
- contains Device ID, date and time
- contains all specific data regarding expansion.

Advanced speed regulations

TES Mini 2 is designed to work with drives with built-in special sensor. The solution provides broad possibilities for regulating the operation of the drive. This is particularly useful during works with small diameter and very hard tubes.

PID regulator
range: 50-100% of nominal RPM
automatic activation

For special request "speed limitation" option can be unlocked (compatible with all rolling motors supplied by KRAIS).



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