TEHREMEX®

60 YEARS

EQUIPMENT AND TOOLS
FOR MANUFACTURE AND REPAIR OF HEAT EXCHANGERS



TEHREMEX

ABOUT COMPANY

TEHREMEX since 1966 is the leader in Russia and CIS-countries in electrical tube expanding machines in tube sheets of heat exchangers and machins for facing of tubes.

MER-11M, MER-16M, MET-2 machines are withstand operation in 3 shift mode for minimum 10 years.

Tube expanding machine MER-11M and tube facing and drilling machine MET-2 are a unique development of TEHREMEX , they are have no analogues in the world.

The team of TEHREMEX has developed regulations for the tube expanding: GOST R (STATE ALL-RUSSIAN STANDARD) 55601-2013.

The company TEHREMEX – today

Today in Russia and the CIS, **almost all the enterprises** of chemical and petrochemical engineering, a refining, petrochemical, nitrogen plants, the chemical and nuclear industries, thermal power plants, enterprises of **GAZPROM, ROSNEFT, LUKOIL** and also their repair Department in Russia and CIS have successfully used tools and equipment, TEHREMEX . So, for example, delivered more than 280 of the electrical tube expanding machines in series, the MER and more than 30 electrical tube expanding and drilling machines series MET. TEHREMEX is the leader in Russia and CIS countries on this equipment.

Regular customers of equipment and tools, TEHREMEX appreciate its high quality, reliability, dependability, convenience in work; for the quality produced with it works that is the result of our 50 years of experience in research, technical developments and their introduction into production.

The company has a **quality management certificate ISO 9001:2015**. Also tube expanding machines series of "MER" and tube facing and drilling machines series of "MET" are certified in accordance with the EAC (EurAsian Conformity).



TUBE EXPANDERS

Tube expanding tool TEHREMEX produced by OST (the standard of the organization) 26-17-02-83** (republication from 2008) – STO (the standard of the organization) 00220368-015-2009***

All the details of tube expanding tools have high strength and durability due to the use of special steels and heat treatment.

The design of the TEHREMEX expander allows the use of an increased set of spare parts. So, for example, expander type 'BR-21-40-80' allows you to use one expander with a replacement kit consisting of 2 cases, 20 mandrels and 60 rollers.

Type A – cooled (With fixed reach)

The air-oil emulsion is supply into the nozzle and exits the through body the grooves to the rollers.



Manufacture other sizes of expanders – on request.

Example of the designation when ordering:

A-20-32-29,

where:

20 – the I.D of the tube

32 – Operative roll length*

29 – the maximum depth of the expanding

*Here and further – the length of the conical part of the roller.

Manufacture other sizes of expanders – on request.

Type	Used for tubes (approximate O.D. and wall thicknesss)	Expanding range (min.-max.), mm	Reach, mm	Size square on mandrel, mm
A-15-24-21	18x1,5; 19x2; 20x2,5	14,2 – 16,8	21	10
A-16-24-21	19x1,5; 20x2; 22x3	15,2 - 17,8		
A-19-32-29	22x1,5; 25x3	18,2 - 20,8	29	
A-20-32-29	24x2; 25x2,5	19,2 - 21,8		
A-21-32-29	24x1,5; 25x2	20,2 - 22,8		

Type B – uncooled (adjustable reach)



Example of the designation when ordering:

B-20-32-40,

where:

20 – the I.D of the tube

32 – Operative roll length

40 – the maximum depth of the expanding

Manufacture other sizes of expanders – on request.

TEHREMEX

Type	Used for tubes (approximate O.D. and wall thickness)	Expanding range (min.-max.), mm	Operative roll length, L mm	Reach, mm	Size square on mandrel, mm
B-15-24-36	17x1; 18x1,5; 19x2; 20x2,5	14,3 - 16,9	24	15 - 36	10
B-16-24-36	20x2; 22x3	15,3 - 17,9			
B-17-32-38	21x2; 22x2,5	16,3 - 18,7	32	15 - 38	
B-17T-32-38	19x1; 20x1,5	16,3 - 18,2			
B-18-32-38	22x2; 25x3,5	17,3 - 19,7			
B-18T-32-38	20x1	17,3 – 19,2			
B-19-32-40	22x1,5; 25x3	18,2 - 21,0		20 - 40	
B-19T-32-40	21x1	18,2 - 20,2			
B-20-32-40	24x2; 25x2,5	19,2 – 22,0			
B-20T-32-40	22x1	19,2 – 21,2			
B-21-32-40	24x1.5; 25x2; 27x3	20,2 – 23,0			
B-21T-32-40	23x1	20,2 – 22,2			
B-22-32-40	24x1; 25x1,5; 26x2; 28x3	21,2 – 24,0			
B-23-32-40	26x1,5; 27x2; 28x2,5	22,2 - 25,0			
B-23T-32-40	25x1	22,2-24,2			
B-24-32-45	26x1; 27x1.5; 28x2; 29x2,5; 30x3; 32x4	23,2 – 26,0		20 - 45	14
B-25-32-45	28x1,5; 29x2	24,2 - 27,0			
B-26-36-45	29x1,5; 32x3	25,0 – 28,2	36		
B-26T-36-45	28x1	25,0 – 27,2			
B-27-36-45	30x1,5; 32x2,5	26,0 – 29,2			
B-28-36-45	32x2	27,0 – 30,2			
B-28T-36-45	30x1	27,0 – 29,3			
B-29-36-45	32x1,5	28,0 – 31,4			
B-30-36-45	33x1,5; 38x4	29,0 – 32,4			
B-(31-32)-40-50	35x1,5; 38x3,5; 38x3	30,0 - 34,8	40	25 - 50	
B-(33-34)-40-50	38x2; 38x2,5	32,0 - 36,8			
B-(35-36)-40-50	38x1; 38x1,5; 40x2	34,0 – 37,6			
B-(37-38)-40-50	42x2; 42x2,5	36,0 – 41,0			
B-(39-40)-40-40	45x2,5-3	38,0 – 43,0			19
B-(41-42)-40-40	45x1,5; 45x2; 51x4–4,5	40,0 – 45,4			
B-(43-44)-40-40	50x3:50x3,5; 51x3,5-4	41,8 – 47,4			
B-(45-47)-40-40	51x2-2,5-3	44,0 – 50,0			
B-(48-51)-50-50	57x4-3,5-4-4,5	47,0 – 54,3	50	35 - 50	
B-(52-54)-50-50	60x3-3,5-4	50,0 – 57,5			
B-(55-57)-50-50	63x3-3,5-4	53,0 – 60,6		40 - 50	
B-(61-64)-52-52	70x3,5-4.5	60,0 – 67,4	52	42 - 52	
B-(65-67)-52-52	76x4,5-5-5,5	64,0 - 71,4			
B-(68-70)-52-52	76x3-3.5-4	66,0 – 74,4			27
B-(71-74)-52-52	83x4,5-5	69,2 – 78			
B-(75-78)-52-52	83x3-3,5	73,0 – 81,6			
B-(79-82)-52-52	89x4,5-5	77,0 – 85,5			

BR Type – uncooled long, with adjustable reach



Example of the designation when ordering:

BR-20-40-80,

where:

20 – the I.D of the tube

40 – Operative roll length

– the maximum depth of the expanding

Manufacture other sizes of expanders – on request.

TEHREMEX

Type	Used for tubes (approximate O.D. and wall thickness)	Expanding range (min.-max.), mm	Operative roll length, L mm	Reach, mm	Size square on mandrel, mm
BR-12-30-50	14x1; 15x1,5; 16x2	11,4 - 13,0	30	15 - 50	6,35
BR-13-30-50	14,5x0,75; 15x1; 16x1,5; 18x2,5	12,4 - 14,2			
BR-14-30-50	16x1; 18x2; 20x3	13,4 - 15,4			
BR-15-40-80	17x1; 18x1,5; 19x2; 20x2,5	14,2 – 16,6	40	25 - 80	10
BR-16-40-80	20x2; 22x3	15,3 – 17,6			
BR-16T-40-80	18x1; 19x1,5, 19x1,25	15,3 - 17,2			
BR-17-40-80	21x2; 22x2,5	16,3 – 18,6			
BR-17T-40-80	19x1; 20x1,5	16,3 - 18,2			
BR-18-40-80	22x2; 25x3,5	17,3 – 19,6			
BR-18T-40-80	20x1	17,3 – 19,2			
BR-19-40-80	25x3	18,2 – 20,8			
BR-19T-40-80	21x1; 22x1,5	18,2 - 20,2			
BR-20-40-80	24x2; 25x2,5	19,2 – 21,8			
BR-20T-40-80	22x1	19,2 - 21,2			
BR-21-40-80	23x1; 24x1,5; 25x2; 27x3	20,2 - 22,8			
BR-22-45-70	24x1; 25x1,5; 26x2; 28x3	21,2 - 23,8	45	20 - 70	
BR-23-45-45	27x2; 28x2,5	22,2 – 24,8		20 - 45	
BR-23T-45-45	25x1; 25x1,25; 26x1,5	22.2 - 24,2			
BR-24-50-50	26x1; 27x1,5; 28x2; 29x2,5; 30x3; 32x4	23,2 – 25,8	50	25 - 50	14
BR-25-50-50	28x1,25; 28x1,5; 29x2; 32x3,5	24,2 – 26,8			
BR-26-50-50	30x2; 32x3	25,0 – 28,2			
BR-26T-50-50	28x1	25,2 – 27.2			
BR-27-50-50	30x1,5; 32x2,5	26,0 – 29,2			
BR-28-50-50	32x2; 33x2,5	27,0 – 30,2			
BR-28T-50-50	30x1	27 - 29,3			
BR-29-55-55	32x1,5	28,0 – 31,2	55	35 - 55	
BR-30-55-55	33x1,5	29,0 – 32,4			
BR-(31-32)-55-100	35x1,5; 38x3,5; 38x3	30,0 - 34,8		35 - 100	
BR-(32-34)-55-100	38x2; 38x2,5; 38x3	31,4 – 36,5			
BR-(33-34)-55-100	38x2; 38x2,5	32,0 - 36,8			
BR-(35-36)-55-100	38x1,5; 40x2; 42,4x3,2	34,2 – 37,8			
BR-(37-38)-55-100	42x2; 42x2,5; 45x3,5	36,0 - 40,8			
BR-(39-40)-55-100	42x1,5; 45x2,5; 45x3	38,0 - 42,8			19
BR-(41-42)-50-100	45x1,5; 45x2; 51x4,5; 51x5	40,0 - 45,0	50		
BR-(43-44)-50-100	51x3,5; 51x4	42,0 – 47,00			
BR-(45-46)-50-100	51x2,5; 51x3	44,0 – 49,00			

Type BU - uncooled long (with extended reach)



Example of the designation when ordering:

BU-20-40-130,

where:

20 – the I.D of the tube

40 – Operative roll length

130 – the maximum depth of the expanding

Manufacture other sizes of expanders – on request.

Type	Used for tubes (approximate O.D and wall thickness)	Expanding range (min.-max.), mm	Operative roll length, L mm	Min reach, mm	Max reach, mm	Size square on mandrel, mm
BU-12-30-160	14x1; 15x1,5; 16x2	11,4 - 13,4	30	30	160	10
BU-13-40-180	14,5x0,75; 15x1; 16x1,5; 18x2,5	12,4 - 14,8	40	40	180	
BU-13-40-250					250	
BU-14-40-180	16x1; 18x2; 20x3	13,4 - 15,8			180	
BU-14-40-250					250	
BU-15-40-130	17x1; 18x1,5; 19x2; 20x2,5	14,3 – 16,6			130	
BU-15-40-180					180	
BU-15-40-250					250	
BU-16-40-130	18x1; 19x1,5; 20x2; 22x3	15,3 – 17,6			130	
BU-16-40-180					180	
BU-16-40-250					250	
BU-17-40-130	19x1; 20x1,5; 21x2; 22x2,5	16,3 – 18,6			130	
BU-17-40-180					180	
BU-17-40-250					250	
BU-18-40-130	20x1; 22x2; 25x3,5	17,3 – 19,6			130	
BU-18-40-180					180	
BU-18-40-250					250	
BU-19-40-130	21x1; 22x1,5; 25x3	18,2 - 20,8			130	
BU-19-40-180					180	
BU-19-40-250					250	
BU-19-40-300					300	
BU-20-40-130	22x1; 24x2; 25x2,5	19,2 - 21,8			130	
BU-20-40-180					180	
BU-20-40-250					250	
BU-20-40-300					300	
BU-21-40-130	23x1; 24x1,5; 25x2; 27x3	20,2 - 22,8			130	
BU-21-40-180					180	
BU-21-40-250					250	
BU-21-40-300					300	
BU-22-45-180	24x1; 25x1,5; 26x2; 28x3	21,4 - 23,8	45	45	180	
BU-22-45-250					250	
BU-23-45-160	25x1; 26x1,5; 27x2; 28x2,5	22,2 – 24,8			160	
BU-23-45-240					240	
BU-24-50-160	26x1; 27x1,5; 28x2; 29x2,5; 30x3; 32x4	23,2 - 25,8	50	50	160	
BU-24-50-240					240	
BU-25-50-220	28x1,5	24,0 - 28,3			220	14
BU-25-50-270					270	
BU-26-50-220	28x1; 29x1,5; 32x3	25,2 – 28,0			220	
BU-26-50-270					270	
BU-27-50-220	30x1,5; 32x2.5	26,2 – 28,8			220	
BU-27-50-270					270	
BU-28-50-220	32x2; 35x3,5	27,2 – 29,8	50	50	220	
BU-28-50-270					270	
BU-(32-34)-50-180	38x2; 38x2,5	31,9 - 37,2			180	
BU-(43-44)-50-180	51x3,5; 51x4	41,6 - 47,9			180	
BU-(43-44)-50-270					270	

Type 5B - Five-roll expanders with adjustable reach for expanding thin wall tubes of stainless steel and titanium alloys.



Example of the designation when ordering:

5B-27-31-40,

where:

27 – the I.D of the tube

31 – Operative roll length

40 – the maximum depth of the expanding

Manufacture other sizes of expanders – on request.

Type	Used for tubes (approximate O.D. and wall thickness)	Expanding range (min.-max.), mm	Operative roll length, L mm	Reach, mm	Size square on mandrel, mm
5B-26-31-40	28x1; 29x1,5	25,0 – 27,7	31	22 - 40	14
5B-27-31-40	30x1,5	26 - 29,2			
5B-28-31-40	30x1	27 – 30,2			
5B-29-31-40	32x1,5	28,0 - 31,2			
5B-30-31-40	33x1,5	29,0 – 32,4			
5B-32-31-40	35x1,5	30,0 - 34,8			
5B-33-31-40	38x2,5	32,0 - 36,8			
5B-34-31-40	38x2				
5B-35-50-60	38x1,5	34,0 - 37,6	50	22 - 60	
5B-38-31-40	42x2	36,0 - 40,8	31	22 - 40	19
5B-39-31-40	42x1,5	37,8 - 43,6			
5B-41-47-57	45x2	40,0 - 45,0	47	40 - 57	
5B-42-47-57	45x1,5				
5B-48-47-57	51x1,5	46,0 – 51,0			

Type KV - For centering tubes and conical expanding prior to orbital seal welding.



Example of the designation when ordering:

KV-20,

where:

20 – the I.D of the tube

Manufacture other sizes of expanders – on request.

Type	Used for tubes (approximate O.D. and wall thickness)	Expanding range (min.-max.), mm	Size square on mandrel, mm
KV-12	14x1; 15x1,5; 16x2	11,4 - 13,4	6,35
KV-13	14,5x0,75; 15x1; 16x1,5; 18x2,5	12,4 - 14,4	
KV-14	16x1; 18x2; 20x3	13,4 - 15,4	
KV-15	17x1; 18x1,5; 19x2; 20x2,5	14,4 - 16,4	10
KV-16	18x1; 19x1,5; 20x2; 22x3	15,4 - 17,4	
KV-17	19x1; 20x1,5; 21x2; 22x2,5	16,4 - 18,4	
KV-18	20x1; 22x2; 25x3,5	17,4 - 19,4	
KV-19	21x1; 22x1,5; 25x3	18,4 - 20,4	
KV-20	22x1; 24x2; 25x2,5	19,4 - 21,4	
KV-21	23x1; 24x1,5; 25x2; 27x3	20,4 - 22,4	
KV-22	24x1; 25x1,5; 26x2; 28x3,32x5,0	21,4 - 23,4	
KV-30	34x2; 33x1,5	29,0 - 32,2	14
KV-(31-32)	35x1,5; 38x3,5; 38x3	30,0 - 34,2	
KV-(33-34)	38x2; 38x2,5	32,0 - 36,2	

Type B-AVO - With adjustable reach. Are used for expanding tubes inside welded chambers of air cooled heat exchangers.



For ordering “B-AVO” series tube expander the following information is needed:

T - depth of the camera
(distance from the outer surface the camera
to the front surface of the tube grid)

H - thickness of the tubesheet

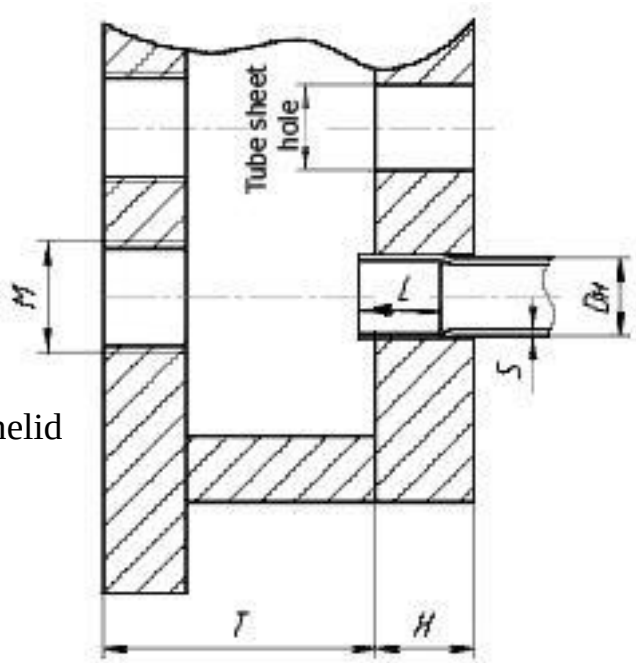
Tube sheet hole - nominal bore diameter

Dн - is the nominal tube outer diameter

S - wall thickness of tube

M – diameter and thread pitch of the holes in thelid

L - the depth of tube expanding



Example of the designation when ordering:

B-AVO-24-50.200,

where:

24 – the I.D of the tube;

50 – Operative roll length;

200 – maximum depth of the camera (T)

Manufacture other sizes of expanders – on request.

TEHREMEX

Type	Used for tubes (approximate O.D. and wall thickness)	Expanding range (min.-max.), mm	Operative roll length, L mm	Min reach, mm	Size square on mandrel, mm
B-AVO -12-30.200	14x1; 16x2	11,4 - 13,0	30	15 - 30	10
B-AVO -12-30.250					
B-AVO -13-30.200	16x1,5; 17x2	12,4 - 14,3			
B-AVO -13-30.250					
B-AVO -14-30.200	16x1; 17x1,5; 18x2; 19x2,5	13,4 - 15,3			
B-AVO-14-30.250					
B-AVO-15-40.200	17x1; 18x1,5; 19x2; 20x2,5	14,3 - 16,6	40	15 - 40	
B-AVO-15-40.250					
B-AVO-16-40.200	19x1; 20x1,5; 21x2; 22x2,5	15,3 - 17,6			
B-AVO-16-40.250					
B-AVO-18-40.200	20x1; 22x1,5;	17,3 - 19,6			
B-AVO-18-40.250					
B-AVO-19-40.200	21x1; 22x1,5; 25x3	18,2 - 20,8			
B-AVO-19-40.250					
B-AVO-19-40.300					
B-AVO-20-40.200	22x1; 24x2; 25x2,5	19,2 - 21,8			
B-AVO-20-40.250					
B-AVO-20-40.300					
B-AVO-21-40.200	23x1; 24x1,5; 25x2; 27x3	20,2 - 22,8			
B-AVO-21-40.250					
B-AVO-21-40.300					
B-AVO-22-45.200	25x1,5; 26x2; 28x3	21,4 - 23,8	45	15 - 45	
B-AVO-22-45.250					
B-AVO-22-45.300					
B-AVO-23-45-200	27x2; 28x2,5	22,2 - 24,8			
B-AVO-23-45.250					
B-AVO-24-50.200	28x2; 29x2,5; 30x3	23,4 - 25,8	50	20 - 50	
B-AVO-24-50.250					
B-AVO-25-50.240	29x2; 30x2.5	24,0 - 26,8			14
B-AVO-26-50.250	29x1,5; 30x2; 32x3	25,2 - 28,0			
B-AVO-27-50.200	30x1,5; 32x2,5	26,2 - 28,8			
B-AVO-27-50.250					
B-AVO-28-50.200	30x1; 32x2	27,2 - 29,8			
B-AVO-28-50.250					

TUBE EXPANDING MACHINE

TEHREMEX since 1966 is the leader in Russia and CIS-countries inelectrical tube expanding machines in tube sheets of heat exchangers.

Specification tube expanding machines

Model	Tube position	Voltage, volts	Tube O.D. mm.	Frame	Telescopic shaft	Torque limitation	Max.weight kg
Machine MER-11M	horizontal	380	16 – 63 2)	x	x	x	400
Auto machine MER-16M	horizontal	380	16 – 38	x	x	x	160

Specification tube expanding machines

Model	Tube position	Voltage, volts	Type of electric motor	Tube O.D.mm	Telescopic shaft	Torque limitation	Max.weight kg
Machine MER-16M-1	any	220	Brushless	8 – 25 2)		x	30 11 1)
Machine MER-16M-2 for small diameter tubes	any	220	collector	8 – 25 2)		x	11 3,8 1)
MER-16M-3-24	any	24	Brushless	8 – 16 2)		x	2,9 1)
MER-16M-3-48		48		16 – 42 2)			8,8 1)

Tube expanding machines and machines TEHREMEX manufactured in accordance with the requirements of GOST R (STATE ALL-RUSSIAN STANDARD) 55601-2013, STO (the standard of the organization) 00220368-014-2009, STO (the standard of the organization) 26-17-01-83 reissue in 2007.

The notices:

1) Weight of geared motor.

2) The models of gear motors that cover the range of expanded tubes are specified in the description of installations and machines for expanding.

TEHREMEX

AUTO TUBE EXPANDING MER-11M

Maximum tube sheet O.D. which can be done without repositioning of the machine at the heat exchanger: 1900 mm

Dimensions: L 2200 mm x W 880 mm x H 2500 mm

Weight: 390 kg



A video about the operation of the machine MER-11M can be downloaded or viewed " online" on the website http://www.tehremex.com

Technical characteristics of the machine

Geared motor no.	Telescopic shaft no.	Torque, H x м		Speed rpm	Approximate O.D. of expanding tubes, mm
		min.	max.		
MR-2200-250	VT-20-2	2	16	604	16 – 20
		17	38	403 - 604	20 – 25
		39	72	328 - 524	25 – 33
		72	110	252 - 403	33 - 38
MR-2200-100	VT-25-2	42	97	160 - 240	25 - 38
		98	198	128 - 208	38 – 51
		199	280	100 - 160	51 - 63

The optimum speed is set automatically depending on the set torque.

The main components of auto tube expanding machine MER-11M

1. Stand.
2. The control unit of geared motor is adapted to a programmable logic controller (PLC) Signetics.
3. The control unit of stand.
4. Geared motor MR.
5. Telescopic shaft VT.
6. Leg three-button remote control.
7. Tube expanding tool type “A” – cooled.

Control unit of gear motor of main drive and cooling unit

The control unit of geared motor of main drive and the cooling unit

Electronic control system with a flare will organize a series of expanding: start the engine, testing to the specified torque, stop, reverse inclusion. In automatic mode, the cycles are repeated. The duration of the pause between cycles is adjustable. Also, the control unit automatically arranges the optimal mode of cooling: automatic on submission of the air-oil emulsion upon reaching the set torque values; off - after the start of the reverse.



Technical characteristics of the control unit of the gear motor and cooling and lubrication unit

- Programmable logic controller (PLC) Signetics.
- 4 waste digital display for displaying modes and parameters of the flaring process, archive read data by expanding each connection.
- Leg three-button remote control 24 V.
- APCS expanding.
- Setpoint torque in N*m
- Time setting reverse from 1 to 60 seconds
- The delay time from 1 to 60 seconds
- A frequency Converter for rotational speed adjustment of main drive
- Archive data display in the beading of each connection (up to 1000 compounds)

APCS expanding process control implemented by the control unit and frequency converter provides:

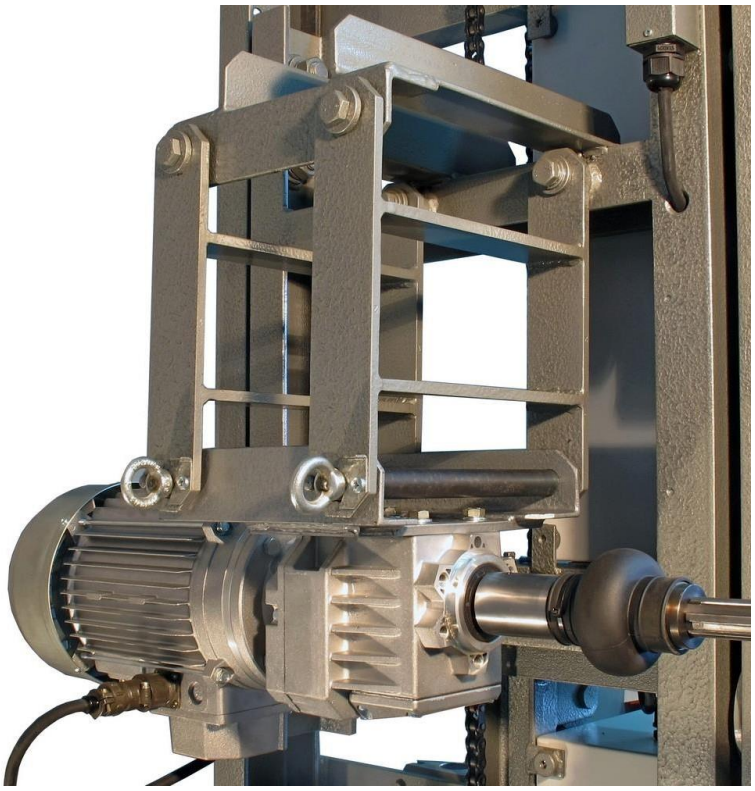
- high productivity due to increased speed when expanding the tubes to the contact with the tube sheet,
- high quality due to automatic transition to a lower speed when expanding after the contact of the tubes with the tube sheet,
- high quality due to the possibility of manual switching mode of expanding at a reduced speed,
- storing up to 1000 values torque expanding with the possibility of viewing them on the screen of the control unit,
- soft start and soft stop.

Geared motor main drive with the MR suspension

Power supply: 380 V, 50 Hz, 3-phase.

Power output: 2200 watts.

High performance is ensured accelerated expanding of the tube to the sample clearance with the tube grid through frequency Converter



Telescopic shaft VT



Provides increased working area without having to reinstall the geared motor.

Additional equipment on request:

- The machine of cooling and lubrication
- USB interface for connection to laptop:

- Data output for program control of the correctness of the chosen moment
- Conclusion of the achieved points for the certification and processing of data
- Program for visualizing the process of expanding with the plotting of a graph in real time with the possibility of archiving the obtained data.

The cooling and lubrication unit

The cooling and lubricant operates from the pipeline prepares the air-oil emulsion that is fed directly into the zone of expanding automatically after reaching the preset torque, which eliminates spraying outside of the pipe and facilitates working conditions. Lubrication, cooling, and blowing the wear debris produced in the process automatically.

The optimum cooling mode implemented by the block cooling and lubrication and cooling expander type ‘A’ contributes to the stabilization of the contact pressure in the connection tube and the tubesheet. This improves the quality of the beading connection and also increases the productivity and enhances the durability of parts by 30 %.

Tube expanding machine MER-11M produced by TEHREMEX -LRT Ltd.since 1992.

All machines and MER-11M (over 80), even released over fifteen years ago work today.

Most of the components for the machine MER-11M made in Germany and Italy. Certified according to EAC (EurAsian Conformity).

MER-11M machine is withstand operation in 3 shift mode for minimum 10 years.

Tube expanding machine MER-11M is a unique development of TEHREMEX , they are have no analogues in the world.

We would like to be useful to your business.

TEHREMEX

AUTO TUBE EXPANDING MER-16M

Maximum tube sheet O.D.
which can be done
without repositioning
of the machine at the heat exchanger : 1500 mm



A video about the operation of the machine MER-11M (the same MER-16M) can be downloaded or viewed " online" on the website http://www.tehremex.com

Technical characteristics of the macihe

Geared motor no.	Telescopic shaft no.	Torque H x м		Speed rpm		Approximate O.D. of expanding tubes, mm
		min.	max.	max.	operating	
MR-2200-250	VT-20-1	2	17	604	604	16 – 20
		18	48	604	400	20 – 25
		49	83	524	328	25 – 33
		84	120	400	252	33 - 38

The optimum speed is set automatically depending on the set torque.

THE CONTROL UNIT, GEAR MOTOR, TELESCOPIC SHAFT*, ADDITIONAL EQUIPMENT ON REQUEST, COOLING AND LUBRICATION UNIT ARE IDENTICAL TO THE MACHINE MER-11M.

The main components of auto tube expanding machine MER-16M

- Mobile stand with a work desk and a wardrobe for snap.
- The control unit is adapted to a programmable logic controller (PLC) Signetics.
- Geared motor MR (Italy) controlled by a control unit with frequency Converter.
- Telescopic shaft VT with one hinge.
- Tool balancer TSW.
- Leg three-button remote control.
- Tube expanding tool type “A” – cooled.

MER-16M machine is withstand operation in 3 shift mode for minimum 10 years.

We would like to be useful to Your business.

TEHREMEX

TUBE EXPANDING MACHINE MER-16M-1

Available for steel tubes from 8 mm to 25 mm O.D. Suspension using a balance beam. Dimensions in disassembled form in the box - 750x500x300 mm

The main components of tube expanding machine MER-16M-1

1. Programmable logic controller (PLC) Signetics. Similar to the MER-11M control unit (see the description of the MER-11M machine)
2. Gear motor MR
3. The spring balancer
4. Foot-mounted three-button control panel



The optimal rotation speed is set automatically during operation.

- Power supply: 220 V, 50 Hz
- Power output: 370 watts
- Weight: 11 kg
- High performance is provided by accelerated tube expanding to the sampling gap with the tube sheet due to the frequency converter

Most components are manufactured in Germany and Italy. Certified according to GOST R (State all-Russian Standard).

Gear motor MR

Geared motor no.	Torque, N•m		Speed rpm	The size of the internal square of the lock, mm	Approximate O.D. of expanding tubes, mm	
	min	max			Non-ferrous metals	Steel
MR-370-280	2	16	280 - 670	6,35; 10	8x1 - 19x1,5	8x1 - 16x1,5
MR-370-180	3	25	180 - 430	6,35; 10	10x1 - 25x1,5	10x1 - 20x2
MR-370-100	4	46	102 - 244	6,35; 10	12x1 - 30x1	12x1 - 25x2,5
MR-370-90	4	53	90 - 210	6,35; 10	12x1 - 32x1,5	12x1 - 25x3

TUBE EXPANDING MACHINE MER-16M-2

It is intended for the tube expanding in the sheets of heat exchangers. The center of mass of the drive is located on the suspension axis. The machine is easy to operate thanks to an additional handle with a rubberized handle that compensates for reactive torque

The main components of tube expanding machine MER-16M-2

1. The control unit. Electronic control system of expanding will organize a series of expanding: start the engine, testing to the specified torque, stop, reverse activation. In automatic mode, the cycles are repeating. The duration of the pause between cycles is adjustable.

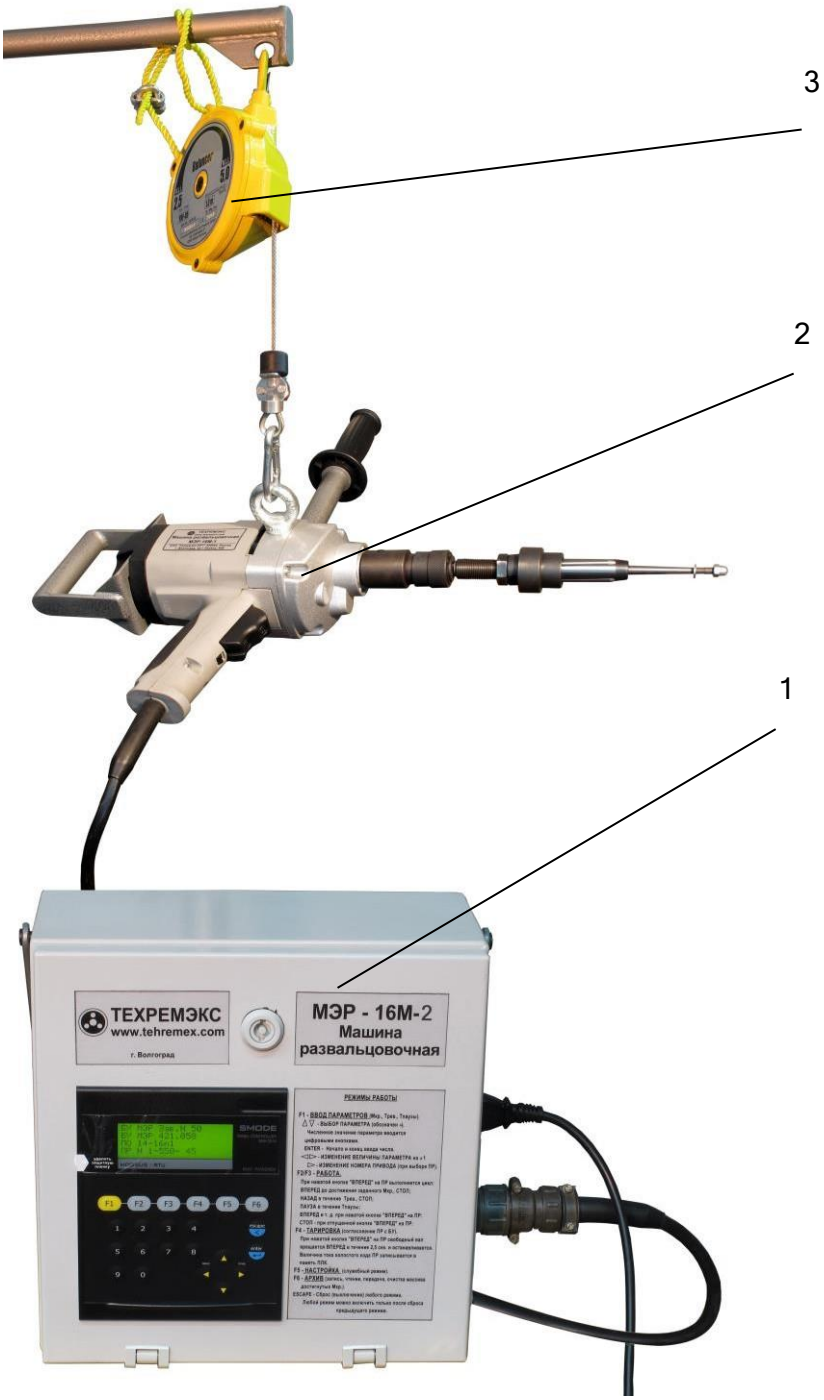
Technical characteristics of the control unit

- Programmable logic controller Segnetics
- 4-line digital display for displaying modes and parameters of the expanding process, archive read data by expanding each connection 4-line digital display for displaying modes and parameters of the expanding process, archive read data by expanding each connection
- The setpoint torque in N•m
- Set the time of the reverse from 1 to 50 seconds
- Set delay time 1 to 50 seconds
- An archive of data with display on the expanding of each connection (up to 1000).

2. Gear motor MR-1050-550

Geared motor no.	Torque, N•m		Speed rpm	Power, watts	The size of the internal square of the lock, mm	Approximate O.D. of expanding tubes, mm	
	min	max				Non-ferrous metals	Steel
MR-1050-550	2	45	550	1,05	10	8x1 - 28x3	8x1 - 25x3

3. The spring balancer. Designed for weight compensation of the gear motor.



Technical characteristics

- Dimensions of the drive without side lever and eyelet, mm, no more	420x91x255
- Dimensions of the gear motor MR-260-800, mm, no more. . .	220x60x210
- Dimensions of control unit, mm, not more	330x310x180
- Dimensions disassembled in box, mm, not more	500x350x350
- Weight of the gear motor MR-1050-550, kg, no more	3,8
- Weight of the gear motor MR-260-800, kg, no more.	1,3
- Weight of control unit, kg, no more	7
- Consumption current, A, not more	5
- Supply voltage, V.	220±22
- Reduced error of the torque limiting	± 1 %

Additional equipment on request:

USB interface for connection to laptop:

- Data output for program control of the correctness of the chosen moment
- Conclusion of the achieved points for the certification and processing of data
- ACSTP of expanding

ACSTP of expanding implemented by the control unit provides:

- Certification and processing of expanding data using a torque archiving program.
- Program for visualizing the process of expanding with the plotting of a graph in real time with the possibility of archiving the obtained data.

TEHREMEX

TUBE EXPANDING MACHINE MER-16M-3-24

Available for steel tubes from 8 mm to 16 mm O.D.

Safe voltage, low noise, compact size, and the possibility of long continuous operation make this machine necessary for large volumes of work, especially inside chambers.

The control unit CU based on the programmable logic controller (PLC) Segnetics. It is serve to control the MR using a special BLD driver that provides smooth start of the MR and high-precision torque control. CU have connector RS 232 to connect to the computer. CU organizes a series of expanding: start the engine, testing to the specified torque, stop, reverse activation. In automatic mode, the cycles are repeating. The duration of the pause between cycles is adjustable.



- Power supply: 220 V, 50 Hz
- Power output: no more than 300 Watts
- Dimensions: 300x320x170 mm
- Weight: no more than 10 kg

Geared motor MR made on the base of the engine with a safe voltage of 24 V.

- Power output: 120 Watts
- Weigh: no more than 2,9 kg
- Dimensions: 210x70x210 mm

The control key placed directly on the gear motor.

A spring balancer provide for suspension to compensate for the weight of the gear motor.

Main technical characteristics of the CU and additional equipment on request (see the description of the machine MER-16M-2)

Gear motor MR

Geared motor no.	Torque, N•m		Speed rpm	Power, watts	The size of the internal square of the lock, mm	Approximate O.D. of expanding tubes, mm	
	min	max				Non-ferrous metals	Steel
MR-120-400-24	0,5	4,5	400	120	6,35	8 - 12	8 - 12
MR-180-400-24	1,0	7,0		180		8 - 16	8 - 16

TUBE EXPANDING MACHINE MER-16M-3-48

Available for steel tubes from 16 mm to 42 mm O.D. Suspension using a balance beam.

Safe voltage, low noise, compact size, and the possibility of long continuous operation make this machine necessary for large volumes of work, especially inside chambers.

The control unit CU based on the programmable logic controller (PLC) Segnetics. It is serve to control the MR using a special BLD driver that provides smooth start of the MR and high-precision torque control. CU have connector RS 232 to connect to the computer. CU organizes a series of expanding: start the engine, testing to the specified torque, stop, reverse activation. In automatic mode, the cycles are repeating. The duration of the pause between cycles is adjustable.



- Power supply: 220 V, 50 Hz
- Power output: no more than 700 Watts
- Dimensions: 440x350x210 mm
- Weight: no more than 10 kg



Geared motor MR made on the base of the engine with a safe voltage of 48 V.

- Power output: 565 Watts
- Dimensions: 250x400x120 mm

The control key placed directly on the gear motor.

A spring balancer provide for suspension to compensate for the weight of the gear motor.

Main technical characteristics of the CU and additional equipment on request (see the description of the machine MER-16M-2)

Gear motor MR

Geared motor no.	Torque, N•m		Speed rpm	The size of the internal square of the lock, mm	Weigh, kg	Approximate O.D. of expanding tubes, mm	
	min	max				Non-ferrous metals	Steel
MR-565-300-48	5	40	300	10	7,8	16 – 38	16 - 32
MR-565-120-48	10	100	120	14	8,8	32 – 45	28 – 42

TEHREMEX

TUBE FACING AND DRILLING MACHINE MET-2



A video about the operation of the machine MET-2 can be downloaded or viewed " online" on the website http://www.tehremex.com

The MET-2 machine is designed for facing and drilling tubes with an approximate O.D. from 10 to 30 mm, a wall thickness from 1 to 3.5 mm and removing welds in combined (welding with expanding) joints.



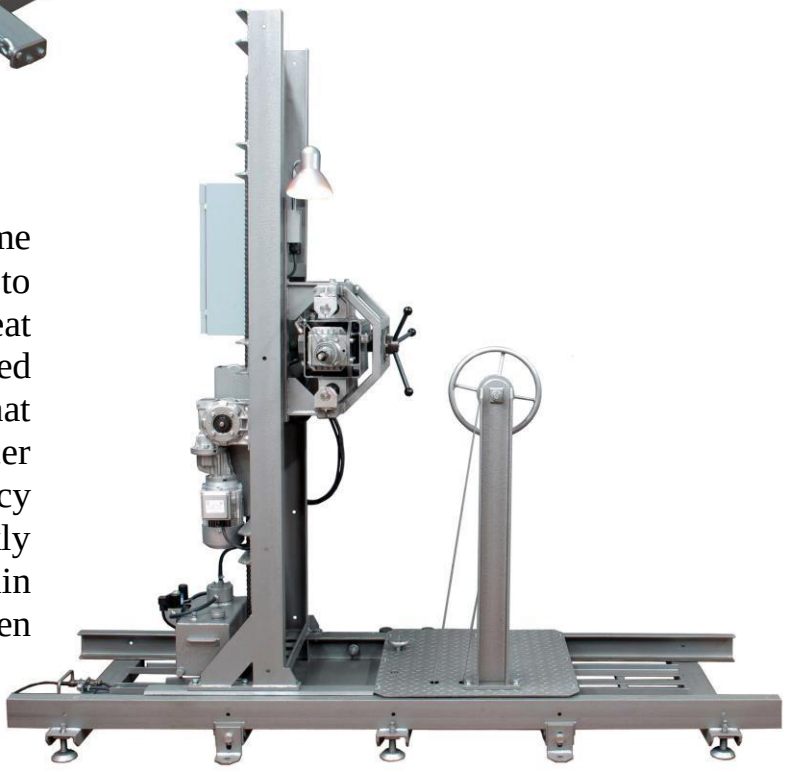
Maximum internal approximate O.D. of heat exchanger treated without moving the machine up to 1400 mm.

Optimal cooling of the tool provides multiple saving. Preparation machine preparing air, oil-air emulsion that is fed directly into the zone of the facing automatically. T. O. lubrication, cooling and blowing the wear debris produced in the process automatically.

Motor-reducer controlled by a frequency Converter, allows you to select the optimum speed for cutting carbon steel, stainless steel and tubes of non-ferrous metals. Maximum cutting speed of the tubes 504 rpm.

Outperforms the manual pneumatic machines with fixing tool at the inner approximate O.D. of thetube 30 times.

The horizontal rack frame moves in a vertical frame parallel to the plane of the lattice heat exchanger. The carriage, with a fixed geared motor of the main drive that moves vertically worm motor reducer for vertical movement with frequency Converter. This allows you to quickly move the gear motor of the main drive to the desired area and then perform precise positioning.



Technical data

length . . . 2500

height . . . 2300

width . . . 830

Weight, kg, not more . . . 450

Rated motor power, kW . . . 1,8

Nominal frequency of rotation of the rotor of the motor, rpm . . . 1410

Nominal spindle rotation frequency, Rev/min . . . 293

minimal . . . 176

max . . . 530

Approximate outer approximate O.D. of the treated tube, mm . . .

from 10 to 38Move the tool horizontally, mm . . . 1400

Movement of the tool vertical, mm, not less . . . 1350

Movement of the tool along the axis, mm . . . 150

The depth of bore of tube, mm, not more . . . 60

Mains voltage, . . . 380 (- 38, + 57)

AC frequency, Hz . . . 50

Voltage lighting . . . 24

Machine of MET-2 issued since 2003. Constantly improve. Extremely reliable. All issued machines (more than 30) are working today.

MET-2 machines is withstand operation in 3 shift mode for minimum 10 years.

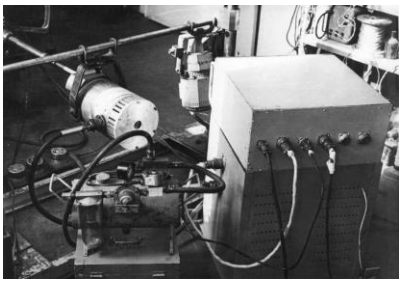
Tube facing and drilling machine MET-2 is a unique development of TEHREMEX , they are have no analogues in the world.

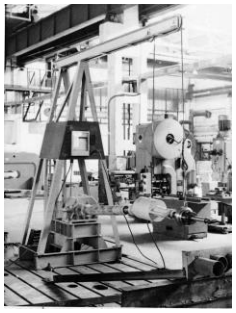
HISTORY OF THE COMPANY

In 1964 founded the Institute of **VNIIPTchemnefteapparatury (All-Russian research and design-Technological Institute of chemical and petroleum apparatus)**, which is the only in Russia specialized scientific research organization in the manufacturing technology of the vessels.

In 1966 the Institute **established the research laboratory of tube expanding**.

Since 1968, the laboratory, based on its own developments, have organized the production of tube expanders and tube expanding machines.






The laboratory has gone from simple devices for expanding to mass production tube expanding machines that meet global standards.




In 1992 at the research laboratory of tube expanding No. 21 PJSC VNIIPTchemnefteapparatury was founded TEHREMEX Ltd.

In 2006, TEHREMEX Ltd. was reorganized. On its base was established TEHREMEX -LRT Ltd. ("TEHREMEX " - technology, repair, exploitation; "LRT" - laboratory of tube expanding).

PRODUCTS AND SERVICES OF THE LABORATORY OF TUBE EXPANDING

Laboratory of tube expanding development in the field of standardization

Team TEHREMEX together with VNIIPTchemnefteapparatury (All-Russian research and design-Technological Institute of chemical and petroleum apparatus), developed and implemented at the enterprises of chemical and petroleum engineering since 1966 14 names GOST (STATE ALL-RUSSIAN STANDARD), OST (the standard of the organization), STO (the standard of the organization), RTM (Release To Manufacturing) on the basic processes of fastening of tubes in tube sheets, tightening of threaded connections, etc.

The team of TEHREMEX is the co-author of a number of regulations for the fastening of tubes in tube sheets of heat exchangers, tightening of threaded connections in heat etc. all these guidelines ensure the use of unified technological solutions in the production process, contribute to improving its technical level. Most of the documents have been approved by Rostekhnadzor (Federal Service for Environmental, Technological and Nuclear Supervision).

- GOST R (State all-Russian Standard) 55601-2013 "heat exchangers and air coolers. General technical requirements for mounting in tube plates".
- OST (the standard of the organization) 26-17-01-83 reissue 2007. "Heat exchangers and air coolers standard. Technical requirements for the tube expanding with torque limitation".
- OST (the standard of the organization) 26-17-02-83 reissue 2008. "The tube expanders with forced cooling and lubrication for tubes approximate O.D. mm 10-57".
- OST (the standard of the organization) 26-02-1015-85 reissue 2007. "Fastening of tubes in tube sheets".
- STO (the standard of the organization) 00220368-014-2009 "Mount tubes in tube sheet of tube heat exchangers and air cooled heat exchangers".
- STO (the standard of the organization) 00220368-015-2009 "Tube expanders for tubes approximate O.D. s 10-57 mm".
- STO (the standard of the organization) 00220368-018-2010 "Certification of technology of tubes expanding in the tube arrays shell and tube heat exchangers".

Laboratory of tube expanding activities in the field of certification

The current rules GOST R (State all-Russian Standard) 55601-2013, GOST (State all-Russian Standard) 31842-2012, TU (established technical requirements) 3612-023-00220302-01, TU (established technical requirements) 3612-024-00220302-02, STO (the standard of the organization) 00220368-014-2009 section 10, STO (the standard of the organization) 00220368-018-2010 require the certification of specialists, technology and equipment.

- Training and certification of specialists in the tube expanding
- Certification of technology of tube expanding
- Certification of equipment for tube expanding

  License to conduct educational activities № 581 from 30.05.2012.


ЛИЦЕНЗИЯ



Laboratory of tube expanding services

- The official letters of permission to derogate from regulations on mounting in tube plates in particular cases
- The letters of recommendations on technology of tube expanding for non-standard cases
- Development and approval of technological instructions for the tube expanding
- Development and approval of the provisions on the engineers responsible for the fastening of tubes in heat exchangers



TEHREMEX-LRT Ltd.
Volzhsky avenue, 4K, 400116, Volgograd, Russia
Phone: +7 (8442) 98-07-07
E-mail: info@tehremex.com
www.tehremex.com