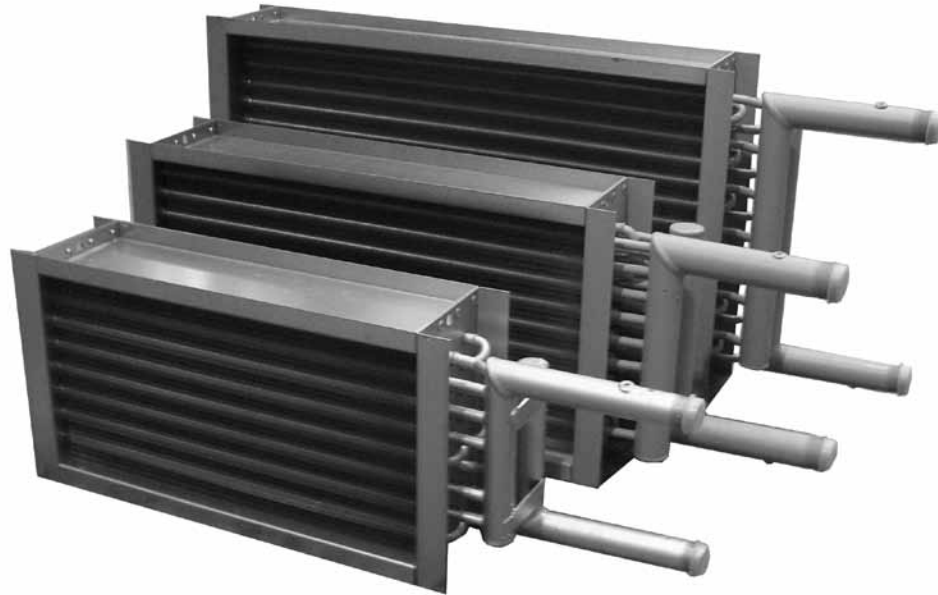


HEAT EXCHANGERS „WATER - AIR“

COT – HEATING WATER COIL

COX – COOLING WATER COIL



Description

- Designed for air heating/ cooling in ventilation and air-conditioning installations using working fluid: water or low temperature liquid.
- Heating/ cooling water coils work with clean air, without any aggressive mixtures.
- Units are provided with 2 plugs 1/8" for draining and installation of deaerators.

Construction

- Corpus of galvanized metal sheets with incorporated heat exchanger "water-air" – constructed of copper pipes with aluminum lamellas.
- Good contact between pipes and lamellas is achieved with mechanical distension.
- All water coils are tested in density at 30 bar.
- Maximal working pressure – 10 bar.

Water coils types

- **Two-rows (2R) – mainly used in heating mode.**
- **Four-rows (4R) – mainly used in cooling mode.**
- By customer request could be produced: six-rows (6R) and eight-rows (8R).

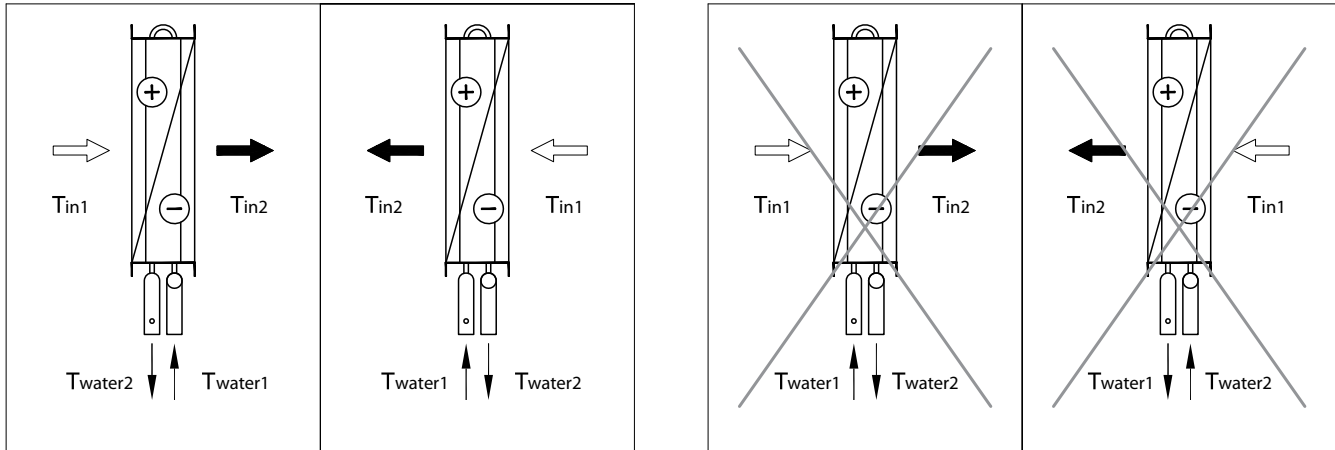
Installation

- Units are designed for direct installation on the air ducts (in-line systems) and also for incorporation in ventilation and air-conditioning equipment (air handling units).

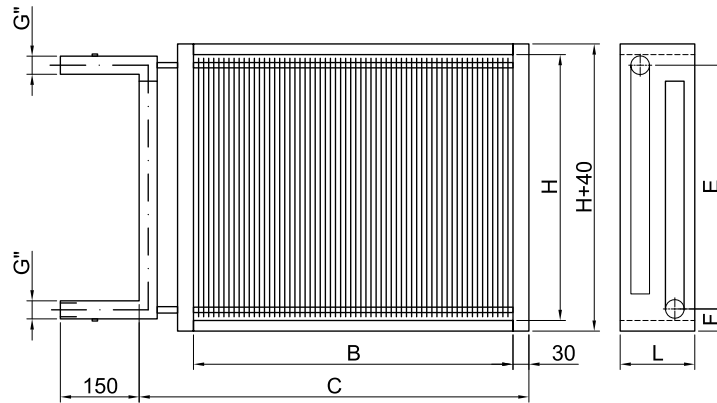
Options – only by request in the offices of "Tangra-AV" Ltd.

- Drop separator with condensation tray – suitable for installation after cooling water coils with air speed in the inlet section > 2 m/s.
- Flexible connectors – Hollander type for dimensions up to 2", flange type for dimensions over 2".
- Frost protection – recommended to be installed on each water coils after heat exchanger.
- 3-way valve with electric motor (actuator) – temperature regulation after heat exchanger with air flow regulation or temperature of the working fluid.
- Circulation pump.
- Power board, controllers and automation equipment.

Scheme of heat / cool supply



Overall and joined dimensions



Model	B [mm]	H [mm]	C [mm]	L [mm]	Two rows sections (2R)				Four rows sections (4R)			
					E [mm]	F [mm]	G"	Weight [kg]	E [mm]	F [mm]	G"	Weight [kg]
400/200 - *R	400	200	510	120	168	36	1/2"	4.4	168	36	3/4"	6.3
500/250 - *R	500	250	620	120	218	36	3/4"	5.8	210	40	1"	8.0
500/300 - *R	500	300	620	120	268	36	3/4"	6.6	260	40	1"	9.4
600/300 - *R	600	300	720	120	260	40	1"	6.9	260	40	1"	10.4
600/350 - *R	600	350	720	120	310	40	1"	8.6	310	40	1"	13.5
700/400 - *R	700	400	830	140	360	40	1"	9.7	352	44	1 1/4"	15.7
800/500 - *R	800	500	940	140	452	44	1 1/4"	13.3	448	46	1 1/2"	18.7
1000/500 - *R	1000	500	1140	140	452	44	1 1/4"	16.5	448	46	1 1/2"	21.6
400/400 - *R	400	400	520	120	368	36	3/4"	6.6	360	40	1"	10.4
500/500 - *R	500	500	630	140	460	40	1"	10.7	452	44	1 1/4"	15.0
600/600 - *R	600	600	740	140	552	44	1 1/4"	14.3	548	46	1 1/2"	19.6
800/600 - *R	800	600	740	160	552	44	1 1/4"	17.2	536	52	2"	26.2
800/800 - *R	800	800	940	160	748	46	1 1/2"	22.2	736	52	2"	32.8
1000/800 - *R	1000	800	1160	160	748	46	1 1/2"	25.0	736	52	2"	37.5
1200/800 - *R	1200	800	1390	200	736	52	2"	32.3	720	60	2 1/2"	44.8
1000/1000 - *R	1000	1000	1190	200	936	52	2"	34.3	920	60	2 1/2"	50.0
1200/1000 - *R	1200	1000	1390	220	936	52	2"	40.2	906	67	3"	60.6
1200/1200 - *R	1200	1200	1390	220	1136	52	2"	48.5	1106	67	3"	69.5
1300/1300 - *R	1300	1300	1510	220	1236	52	2"	49.4	1206	67	3"	73.5
1400/1400 - *R	1400	1400	1610	220	1320	60	2 1/2"	58.6	1306	67	3"	88.5
1600/1200 - *R	1600	1200	1810	220	1120	60	2 1/2"	55.6	1106	67	3"	83.5
1600/1600 - *R	1600	1600	1810	260	1506	67	3"	76.7	1500	70	4"	127.0
2000/1600 - *R	1600	1600	2210	260	1506	67	3"	97.7	1500	70	4"	144.7

Counter-flow and air speed – $w_{B-X} \approx 3 \text{ m/s}$

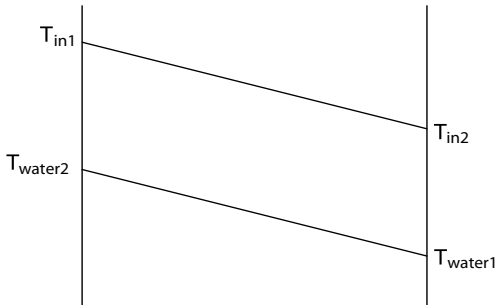
Two rows sections		Heating mode					Cooling mode				
Model	V_{in} [m ³ /h]	$T_{in1} = -12^{\circ}\text{C}$; $T_{water1} = 80^{\circ}\text{C}$; $T_{water2} = 60^{\circ}\text{C}$					$T_{in1} = 33^{\circ}\text{C}$; $\varphi = 40\%$; $T_{water1} = 7^{\circ}\text{C}$; $T_{water2} = 12^{\circ}\text{C}$				
		Q_{heat} [kW]	T_{in2} [°C]	ΔP_{in} [Pa]	V_{water} [m ³ /h]	ΔP_{water} [kPa]	Q_{heat} [kW]	T_{in2} [°C]	ΔP_{in} [Pa]	V_{water} [m ³ /h]	ΔP_{water} [kPa]
400/200 – 2R	900	9.87	20.3	38	0.40	3.00	3.49	24.5	52	0.58	7.11
500/250 – 2R	1400	15.64	21.0	38	0.65	2.99	5.71	24.3	52	0.97	7.51
500/300 – 2R	1700	19.22	21.4	39	0.79	5.05	7.24	24.1	54	1.22	13.39
600/300 – 2R	2100	22.96	20.2	41	0.97	2.72	8.31	24.5	56	1.40	6.73
600/350 – 2R	2350	26.16	20.8	38	1.12	2.67	9.48	24.4	52	1.62	6.62
700/400 – 2R	3000	34.54	22.0	35	1.48	3.84	12.88	24.0	48	2.20	10.02
800/500 – 2R	4200	49.33	22.6	34	2.09	5.38	18.79	23.8	47	3.20	14.56
1000/500 – 2R	5250	60.70	22.1	34	2.59	3.70	22.48	24.0	46	3.85	9.53
400/400 – 2R	1800	20.53	21.6	38	0.64	6.54	7.80	24.0	53	1.33	17.62
500/500 – 2R	2700	29.91	20.7	35	1.26	1.76	10.45	24.5	48	1.76	4.07
600/600 – 2R	4000	44.68	20.9	37	1.91	2.99	16.21	24.3	51	2.77	7.41
800/600 – 2R	5200	60.27	22.2	36	2.55	5.85	22.94	23.9	49	3.92	15.81
800/800 – 2R	7000	80.80	22.0	36	3.46	6.45	30.75	23.9	50	5.29	17.43
1000/800 – 2R	8750	100.61	21.9	36	4.32	6.38	38.01	24.0	50	6.52	16.99
1200/800 – 2R	10500	118.07	21.2	36	5.04	4.78	42.85	24.3	49	7.34	11.85
1000/1000 – 2R	11000	120.91	20.4	37	5.18	2.70	42.24	24.6	49	7.24	6.25
1200/1000 – 2R	13000	146.78	21.3	36	6.30	4.03	53.30	24.2	49	9.14	10.02
1200/1200 – 2R	15500	175.88	21.5	35	7.52	4.94	64.10	24.2	48	11.02	12.31
1300/1300 – 2R	18000	206.37	21.8	35	8.86	6.21	76.07	24.1	47	13.07	15.83
1400/1400 – 2R	21000	241.79	22.0	35	10.37	7.99	90.21	24.0	48	15.52	20.83
1600/1200 – 2R	20750	240.75	22.2	36	10.33	9.21	91.64	23.9	49	15.73	24.89
1600/1600 – 2R	28000	323.23	22.0	36	13.86	8.51	123.01	23.9	50	21.17	22.99
2000/1600 – 2R	34500	407.34	22.8	36	17.50	14.02	159.55	23.6	49	27.43	39.89

Four rows sections		Heating mode					Cooling mode				
Model	V_{in} [m ³ /h]	$T_{in1} = -12^{\circ}\text{C}$; $T_{water1} = 80^{\circ}\text{C}$; $T_{water2} = 60^{\circ}\text{C}$					$T_{in1} = 33^{\circ}\text{C}$; $\varphi = 40\%$; $T_{water1} = 7^{\circ}\text{C}$; $T_{water2} = 12^{\circ}\text{C}$				
		Q_{heat} [kW]	T_{in2} [°C]	ΔP_{in} [Pa]	V_{water} [m ³ /h]	ΔP_{water} [kPa]	Q_{heat} [kW]	T_{in2} [°C]	ΔP_{in} [Pa]	V_{water} [m ³ /h]	ΔP_{water} [kPa]
400/200 – 4R	900	15.87	40.0	79	0.65	1.46	5.75	19.5	104	0.97	3.60
500/250 – 4R	1400	24.56	39.8	79	1.04	1.23	8.78	19.6	102	1.48	2.97
500/300 – 4R	1700	29.70	39.5	80	1.26	1.33	10.61	19.6	105	1.80	3.22
600/300 – 4R	2100	36.73	39.6	85	1.55	1.78	13.38	19.5	111	2.27	4.45
600/350 – 4R	2350	42.02	40.7	79	1.80	2.16	15.56	19.2	104	2.66	5.55
700/400 – 4R	3000	55.16	42.2	73	2.34	3.06	20.99	18.7	97	3.60	8.27
800/500 – 4R	4200	75.82	41.2	70	3.24	2.25	27.55	19.1	91	4.72	5.60
1000/500 – 4R	5250	96.77	42.4	70	4.14	3.72	36.58	18.7	93	6.26	9.93
400/400 – 4R	1800	30.69	38.3	79	1.30	0.87	10.39	20.2	101	1.76	1.90
500/500 – 4R	2700	47.95	40.4	73	2.05	1.60	17.18	19.4	96	2.95	3.89
600/600 – 4R	4000	70.04	39.6	77	2.99	1.95	24.83	19.6	101	4.25	4.63
800/600 – 4R	5200	92.91	40.7	74	3.96	1.94	33.71	19.3	97	5.80	4.81
800/800 – 4R	7000	124.66	40.5	75	5.33	2.58	45.23	19.3	99	7.78	6.41
1000/800 – 4R	8750	159.15	41.6	75	6.84	4.25	60.05	18.9	100	10.30	11.29
1200/800 – 4R	10500	189.19	41.1	75	8.10	2.96	70.16	19.1	99	12.06	7.64
1000/1000 – 4R	11000	199.67	41.5	76	8.57	3.66	75.35	18.9	101	12.96	9.74
1200/1000 – 4R	13000	234.96	41.3	74	10.08	3.73	87.19	19.0	98	14.98	9.64
1200/1200 – 4R	15500	281.29	41.5	73	12.06	4.72	104.78	19.0	97	18.04	12.28
1300/1300 – 4R	18000	329.54	42.0	72	14.15	5.14	124.02	18.8	95	21.35	13.62
1400/1400 – 4R	21000	386.12	42.2	73	16.60	6.67	146.96	18.7	97	25.27	18.02
1600/1200 – 4R	20750	384.36	42.6	74	16.49	7.47	149.01	18.5	99	25.63	20.87
1600/1600 – 4R	28000	516.67	42.4	76	22.18	10.82	200.18	18.5	101	34.42	30.15
2000/1600 – 4R	34500	649.10	43.5	74	27.86	17.05	258.33	18.1	99	44.42	49.88

For specific cases, with different inlet parameters, please, contact us.

Correction coefficient of capacity

Type \ ΔT_{mid} [°C]	Heating mode									Cooling mode		
	70	65	60	55	50	45	40	35	30	20	15	10
2-row	1.09	1.01	0.93	0.85	0.78	0.70	0.62	0.54	0.47	1.00	0.75	0.50
4-row	1.32	1.22	1.13	1.03	0.94	0.85	0.75	0.66	0.56	1.19	0.89	0.60



$$\Delta T_{mid} = 0.4 \cdot \Delta t_{big} + 0.6 \cdot \Delta t_{small} \text{ [°C]} \rightarrow K$$

$$Q_{heat,1} = K \cdot Q_{heat} \text{ or } Q_{cool,1} = K \cdot Q_{cool,r} \text{ where:}$$

$Q_{heat,1}$ ($Q_{cool,1}$) – corrected heat capacity

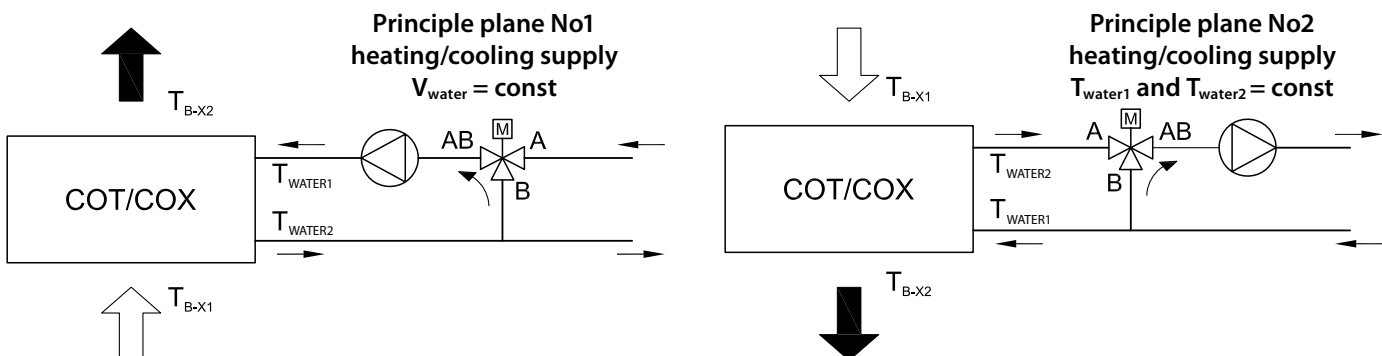
K – coefficient of correction

Q_{heat} ($Q_{cool,r}$) – heat capacity, read from the table for type section

Pressure drop ΔP_{in} [Pa]

W_{B-X} [m/s]		2.0	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	4.0
Heating mode	2-row	17	20	23	27	31.5	36	40	45	50	55	61
	4-row	35	42	49	57	65	74	83	93	104	114	126
Cooling mode	2-row	24	28	32	38	44	50	56	63	70	77	85
	4-row	50	61	71	82	94	104	120	135	151	165	182

Principal planes of connection and management



Management:

- Control of three-way valve according to outlet air temperature T_{in2}
 - Analogue control – 0÷10V; 2÷10V.
 - 3-point control.
 - Digital control – protocol MPBus.
- Procedure in freezing conditions:
 - Fan – OFF
 - Regulation damper (PJR) – OFF
 - Circulation pump – ON
 - Three-way valve – 100% A -> AB

Note:

- Attached schemes are valid for three-way valves, working on mixing.
- For particular cases and detailed calculation of all parameters, please, contact us.

Order designation

COT 500 / 300 - 2R

- Number of rows: 2R – two rows or 4R – four rows
- Height
- Width
- Heat exchanger: COT – heating, COX - cooling