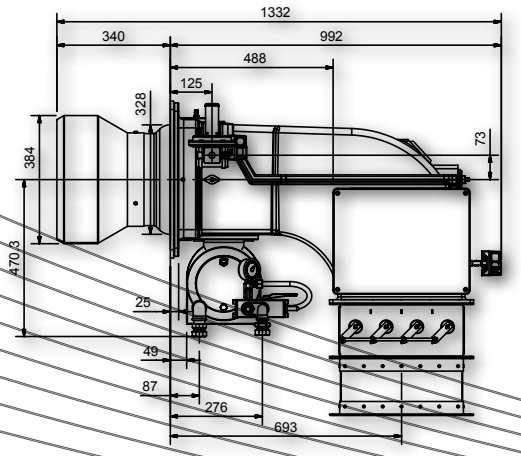
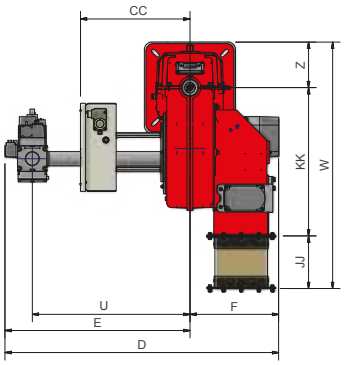
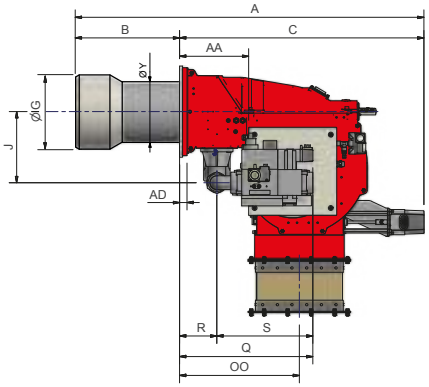
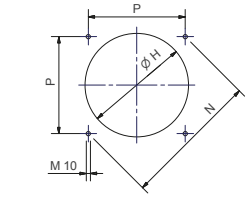

1332
340
992
488
125
328
384
73
470.3
25
49
87
276
693

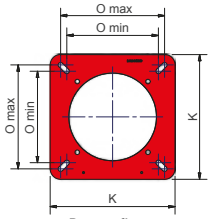
OVERALL DIMENSIONS



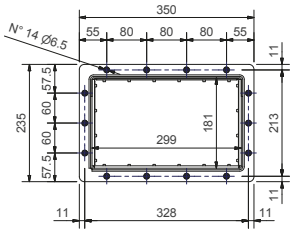




Boiler recommended drilling template

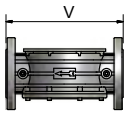


Burner flange



Air inlet flange

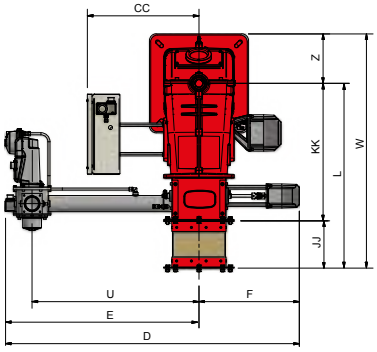
DN65 - DN80

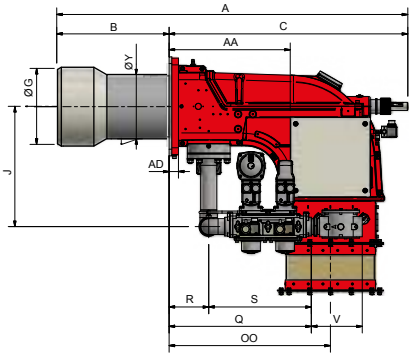


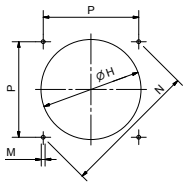
Type	DN	Overall dimensions (mm)																														
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	Q	R	S	U	V	W	Y	Z
TP120A	40	1253	1363	87	28	380	490	873	342	978	634	344	234	264	238	173	300	505	357	M10	330	216	250	401	233	456	131	327	540	-	502	198	155
TP120A	50	1253	1363	87	28	380	490	873	342	978	634	344	234	264	238	173	300	505	357	M10	330	216	250	401	233	469	131	342	526	-	502	198	155
TP120A	65	1253	1363	87	28	380	490	873	342	1062	718	344	234	264	284	173	300	505	357	M10	330	216	250	401	233	539	131	432	593	292	502	198	155
TP120A	80	1253	1363	87	28	380	490	873	342	1082	738	344	234	264	284	173	300	505	357	M10	330	216	250	401	233	559	131	538	565	310	502	198	155
TP165A	40	1318	1428	69	28	390	500	928	352	679	679	333	234	264	229	173	300	505	420	M10	330	220	250	408	233	465	130	335	569	-	575	210	155
TP165A	50	1318	1428	69	28	390	500	928	352	969	969	333	234	264	229	173	300	505	420	M10	330	220	250	408	233	465	130	335	529	-	575	210	155
TP165A	65	1318	1428	69	28	390	500	928	352	1002	1002	333	234	264	296	173	300	505	420	M10	330	220	250	408	233	533	130	403	565	292	575	210	155
TP165A	80	1318	1428	69	28	390	500	928	352	1082	1082	333	234	264	296	173	300	505	428	M10	330	220	250	408	233	574	130	538	565	310	575	210	155
TP205A	40	1431	-	69	28	503	-	928	352	679	679	333	254	270	233	173	300	505	453	M10	330	220	250	408	233	472	130	342	569	-	575	210	155
TP205A	50	1431	-	69	28	503	-	928	352	969	969	333	254	270	233	173	300	505	453	M10	330	220	250	408	233	472	130	342	529	-	575	210	155
TP205A	65	1431	-	69	28	503	-	928	352	1002	1002	333	254	270	233	173	300	505	453	M10	330	220	250	408	233	562	130	432	565	292	575	210	155
TP205A	80	1431	-	69	28	503	-	928	352	1082	1082	333	254	270	287	173	300	505	453	M10	330	220	250	408	233	558	130	538	565	310	575	210	155

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

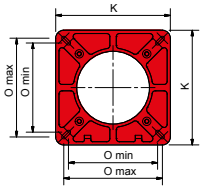
OVERALL DIMENSIONS



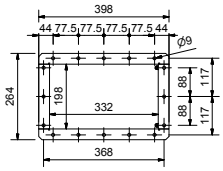




Boiler recommended drilling template



Burner flange

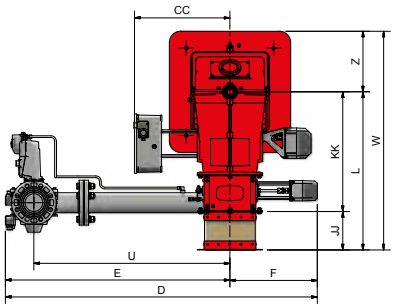


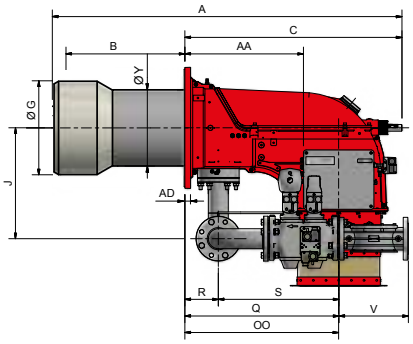
Air inlet flange

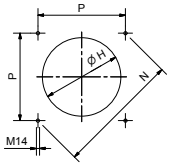
Type	DN	Overall dimensions (mm)																													
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O		OO	P	Q	R	S	U	V	W	Y	Z
																				min.	max.										
TP90A	50	1356	454	28	490	866	305	1349	859	490	234	264	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	198	185
TP90A	65	1356	454	28	490	866	305	1543	1053	490	234	264	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	198	185
TP90A	80	1356	454	28	490	866	305	1574	1084	490	234	264	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	198	185
TP90A	100	1356	454	28	490	866	305	1657	1167	490	234	264	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	198	185
TP91A	50	1396	454	28	490	866	305	1349	859	490	265	295	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
TP91A	65	1396	454	28	490	866	305	1543	1053	490	265	295	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
TP91A	80	1396	454	28	490	866	305	1574	1084	490	265	295	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
TP91A	100	1396	454	28	490	866	305	1657	1167	490	265	295	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
TP92A	50	1396	454	28	490	866	305	1349	859	490	269	299	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
TP92A	65	1396	454	28	490	866	305	1543	1053	490	269	299	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
TP92A	80	1396	454	28	490	866	305	1574	1084	490	269	299	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
TP92A	100	1396	454	28	490	866	305	1657	1167	490	269	299	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
TP93A	50	1396	454	28	495	866	305	1349	859	490	304	344	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
TP93A	65	1396	454	28	495	866	305	1543	1053	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
TP93A	80	1396	454	28	495	866	305	1574	1084	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
TP93A	100	1396	454	28	495	866	305	1657	1167	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

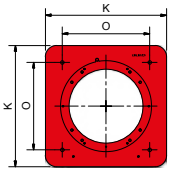
OVERALL DIMENSIONS



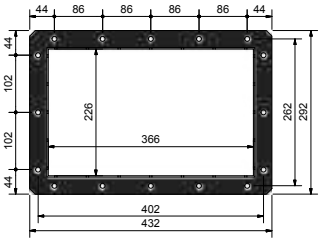




Boiler recommended drilling template



Burner flange

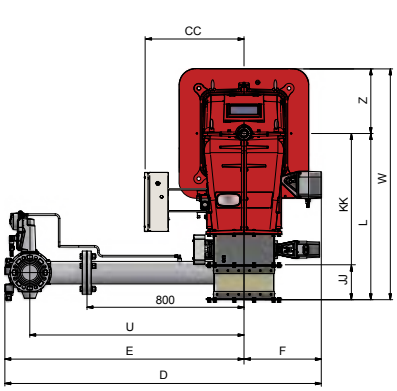


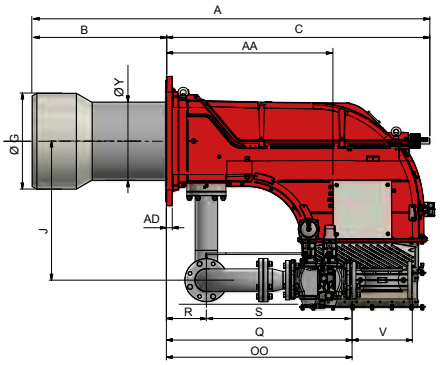
Air inlet flange

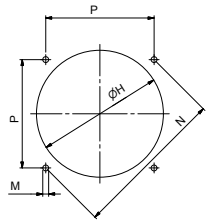
Type	DN	Overall dimensions (mm)																												
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
TP512A	50	1485	536	25	530	955	314	1308	946	362	340	380	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	328	270
TP512A	65	1485	536	25	530	955	314	1331	969	362	340	380	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	328	270
TP512A	80	1485	536	25	530	955	314	1364	1002	362	340	380	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	328	270
TP512A	100	1485	536	25	530	955	314	1444	1082	362	340	380	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	328	270
TP515A	50	1485	536	25	530	955	314	1308	946	362	380	420	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	356	270
TP515A	65	1485	536	25	530	955	314	1331	969	362	380	420	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	356	270
TP515A	80	1485	536	25	530	955	314	1364	1002	362	380	420	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	356	270
TP515A	100	1485	536	25	530	955	314	1444	1082	362	380	420	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	356	270
TP520A	50	1485	536	25	530	955	314	1308	946	362	400	440	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	385	270
TP520A	65	1485	536	25	530	955	314	1331	969	362	400	440	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	385	270
TP520A	80	1485	536	25	530	955	314	1364	1002	362	400	440	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	385	270
TP520A	100	1485	536	25	530	955	314	1444	1082	362	400	440	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	385	270
TP525A	65	1485	536	25	530	955	314	1331	969	362	434	484	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	419	270
TP525A	80	1485	536	25	530	955	314	1364	1002	362	434	484	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	419	270
TP525A	100	1485	536	25	530	955	314	1444	1082	362	434	484	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	419	270

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

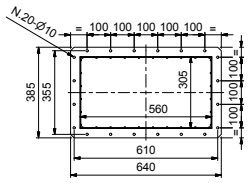
OVERALL DIMENSIONS



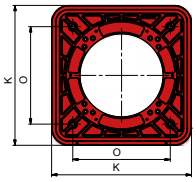




Boiler recommended drilling template



Air inlet flange

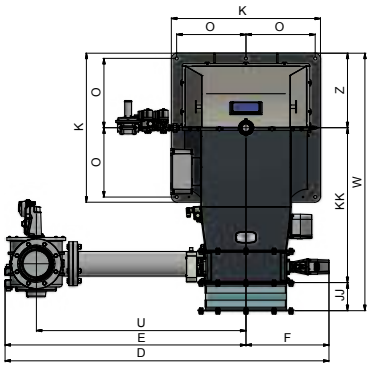


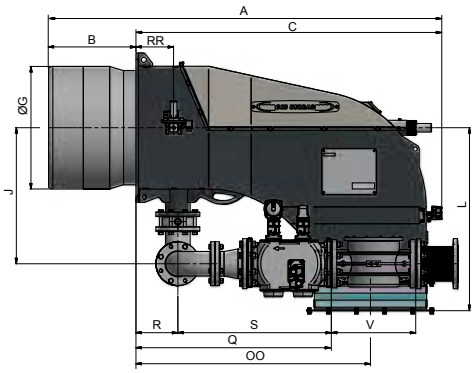
Burner flange

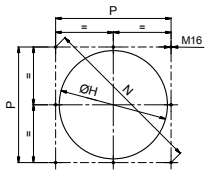
Type	DN	Overall dimensions (mm)																											
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
TP1030	80	1864	848	30	544	1341	540	1816	1219	520	464	504	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	372	329
TP1030	100	1864	848	30	544	1341	540	1816	1219	520	464	504	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	372	329
TP1050	80	1864	848	30	544	1341	540	1816	1219	520	489	539	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	408	329
TP1050	100	1864	848	30	544	1341	540	1816	1219	520	489	539	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	408	329
TP1080	100	1864	848	30	544	1341	540	1816	1219	520	514	564	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	408	329
TP1080	125	1864	848	30	544	1341	540	1816	1219	520	514	564	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	408	329

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

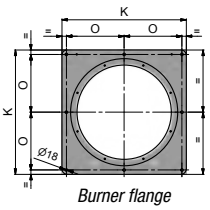
OVERALL DIMENSIONS



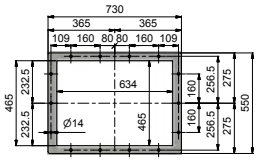




Boiler recommended drilling template



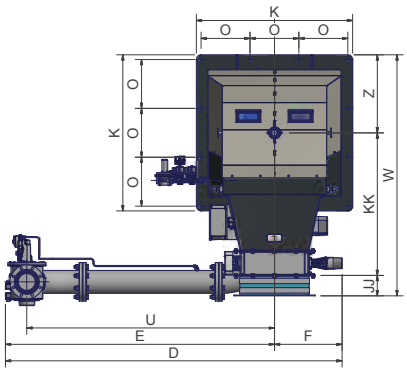
Burner flange

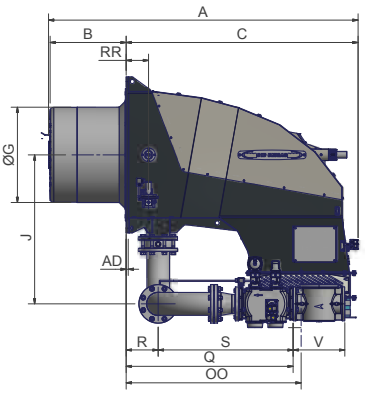


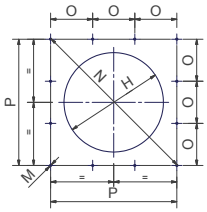
Air inlet flange

Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
TP2000	100	2415	650	1675	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	635	425
TP2000	125	2415	650	1675	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	635	425
TP2500	125	2406	650	1675	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	698	425
TP2500	150	2406	650	1675	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	1114	239	215	875	1195	481	1468	698	425

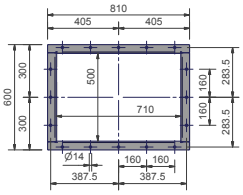
OVERALL DIMENSIONS







Boiler recommended drilling template

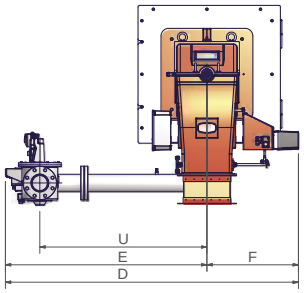


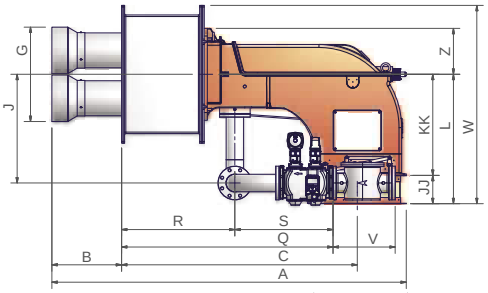
Air inlet flange

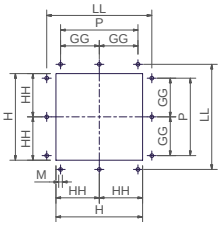
Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
TP3000	150	2513	750	1751	1847	1374	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	1113	239	215	874	1196	481	1468	651	425
TP3000	200	2513	750	1751	-	-	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	-	239	215	-	-	-	1468	651	425

TP... VS TYPE TP90 TP91 TP92 TP93

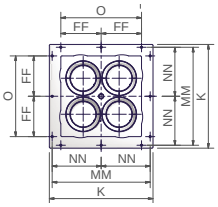
OVERALL DIMENSIONS



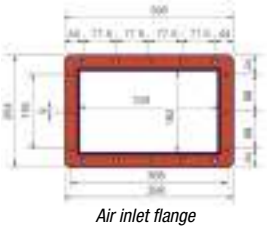




Boiler recommended drilling template



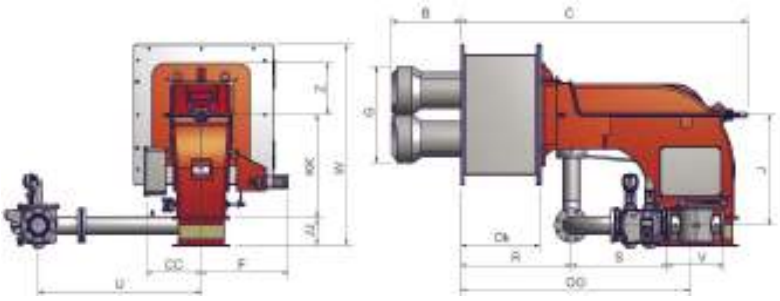
Burner flange

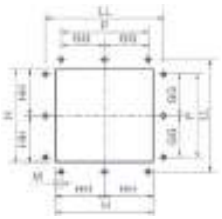


Air inlet flange

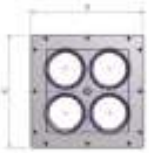
Type	DN	Overall dimensions (mm)																												
		A	B	C	D	E	F	FF	G	GG	H	HH	J	JJ	K	KK	L	LL	M	MM	NN	O	P	Q	R	S	U	V	W	Z
TP90	50	-	-	1122	1342	852	490	255	-	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
TP90	65	-	-	1122	1447	957	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
TP90	80	-	-	1122	1449	959	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
TP90	100	-	-	1122	1539	1049	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180
TP91	50	-	-	1122	1342	852	490	255	-	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
TP91	65	-	-	1122	1447	957	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
TP91	80	-	-	1122	1449	959	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
TP91	100	-	-	1122	1539	1049	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180
TP92	50	-	-	1122	1342	852	490	255	-	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
TP92	65	-	-	1122	1447	957	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
TP92	80	-	-	1122	1449	959	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
TP92	100	-	-	1122	1539	1049	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180
TP93	50	-	-	1122	1342	852	490	255	386	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
TP93	65	-	-	1122	1447	957	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
TP93	80	-	-	1122	1449	959	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
TP93	100	-	-	1122	1539	1049	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180

OVERALL DIMENSIONS

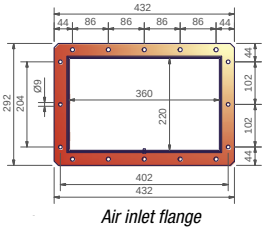




Boiler recommended drilling template



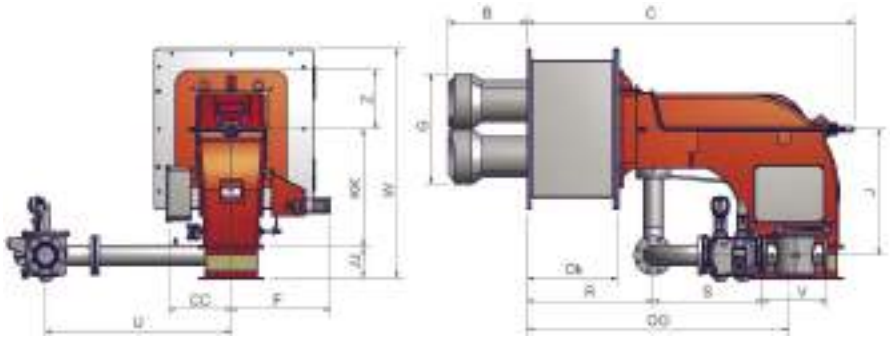
Burner flange

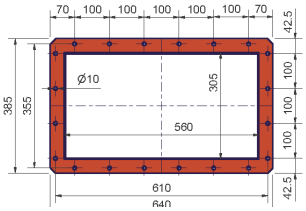


Air inlet flange

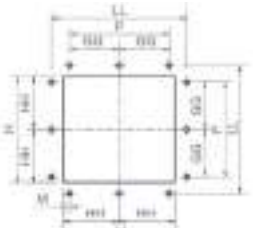
Type	DN	Overall dimensions (mm)																								
		B	C	CC	D	Dk	E	F	GG	H	HH	J	JJ	K	KK	L	LL	M	OO	P	R	S	U	V	W	Z
TP515	50	344	1287	-	1613	310	1071	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	605	843	216	970	235
TP515	65	344	1287	-	1591	310	1049	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	484	843	292	970	235
TP515	80	344	1287	-	1626	310	1084	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	535	875	313	970	235
TP515	100	344	1287	-	1709	310	1167	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	642	942	353	970	235
TP525	65	478	1287	-	1591	310	1049	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	484	843	292	970	235
TP525	80	478	1287	-	1626	310	1084	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	535	875	313	970	235
TP525	100	478	1287	-	1709	310	1167	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	642	942	353	970	235

OVERALL DIMENSIONS

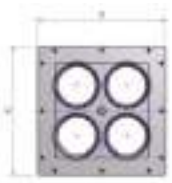




Air inlet flange



Boiler recommended drilling template

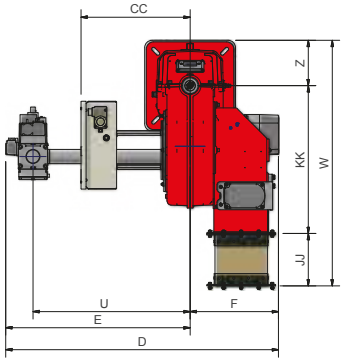


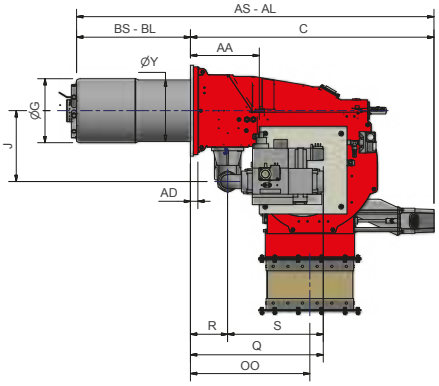
Burner flange

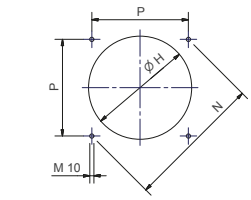
Type	DN	Overall dimensions (mm)																						
		B	C		CC	Dk	F	G	GG	H	HH	J	JJ	K	KK	LL	M	OO	P	R	S	U	V	W	Z
			min.	max.																					
TP1030	80	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	736	1092	322	1170	330
TP1030	100	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	642	1092	382	1170	330
TP1030	125	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	754	1192	480	1170	330
TP1080	100	422	1860	2161	348÷383	540	450÷670	700	350	750	375	710	175	900	665	850	16	1000	700	200	642	1092	382	1170	330
TP1080	125	422	1860	2161	348÷383	540	450÷670	700	350	750	375	710	175	900	665	850	16	1000	700	200	754	1192	480	1170	330

TLX83 TLX115 TLX225 TLX TLX...FGR TYPE

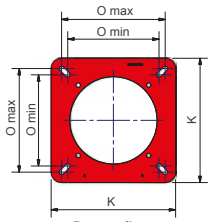
OVERALL DIMENSIONS (TLX... - TLX...FGR)



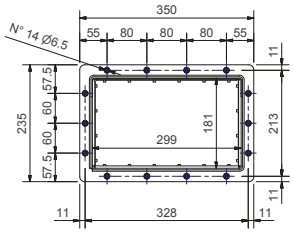




Boiler recommended drilling template

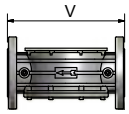


Burner flange



Air inlet flange

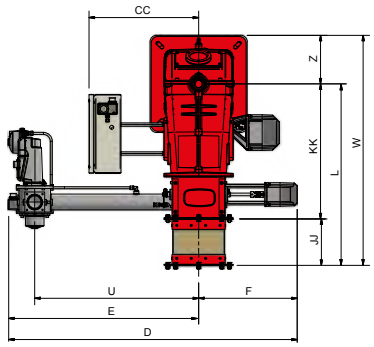
DN65 - DN80 - DN 100

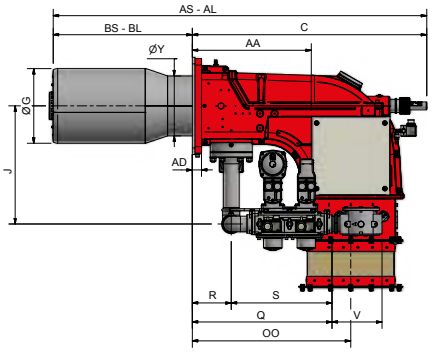


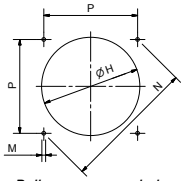
Type	DN	Overall dimensions (mm)																														
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	Q	R	S	U	V	W	Y	Z
TLX83	32	1039	1189	87	28	300	450	705	342	978	634	344	219	249	238	173	300	505	347	M10	330	216	250	401	233	387	131	256	540	-	502	198	155
TLX83	40	1039	1189	87	28	300	450	705	342	978	634	344	219	249	238	173	300	505	347	M10	330	216	250	401	233	458	131	327	540	-	502	198	155
TLX83	50	1039	1189	87	28	300	450	705	342	978	634	344	219	249	238	173	300	505	347	M10	330	216	250	401	233	473	131	342	526	-	502	198	155
TLX83	65	1039	1189	87	28	300	450	705	342	1062	718	344	219	249	118	173	300	505	347	M10	330	216	250	401	233	563	131	432	593	292	502	198	155
TLX115	40	1169	1253	69	28	305	390	830	352	679	679	333	219	249	235	173	300	505	420	M10	330	220	250	408	233	472	127	325	569	-	575	210	155
TLX115	50	1169	1253	69	28	305	390	830	352	969	969	333	219	249	235	173	300	505	420	M10	330	220	250	408	233	472	127	338	529	-	575	210	155
TLX115	65	1169	1253	69	28	305	390	830	352	1002	1002	333	219	249	287	173	300	505	420	M10	330	220	250	408	233	275	127	406	565	292	575	210	155
TLX115	80	1169	1253	69	28	305	390	830	352	1082	1082	333	219	249	287	173	300	505	420	M10	330	220	250	408	233	284	127	538	565	310	575	210	155
TLX225	50	1264	1364	69	28	400	500	830	352	969	969	333	259	289	235	173	300	505	420	M10	330	220	250	408	233	472	127	338	529	-	575	210	155
TLX225	65	1264	1364	69	28	400	500	830	352	1002	1002	333	259	289	287	173	300	505	420	M10	330	220	250	408	233	275	127	406	565	292	575	210	155
TLX225	80	1264	1364	69	28	400	500	830	352	1082	1082	333	259	289	287	173	300	505	420	M10	330	220	250	408	233	284	127	538	565	310	575	210	155
TLX225	100	1264	1364	69	28	400	500	830	352	1082	1082	333	259	289	287	173	300	505	420	M10	330	220	250	408	233	284	127	642	565	353	575	210	155

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

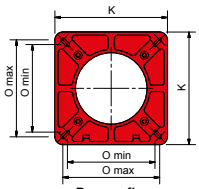
OVERALL DIMENSIONS (TLX... - TLX...FGR)



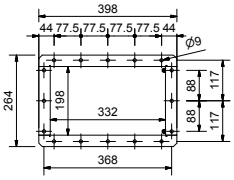




Boiler recommended drilling template



Burner flange



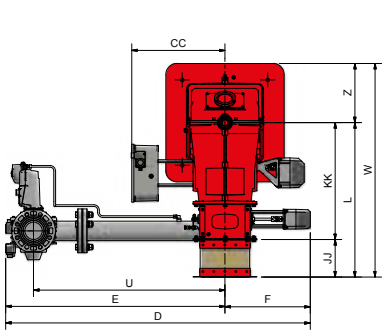
Air inlet flange

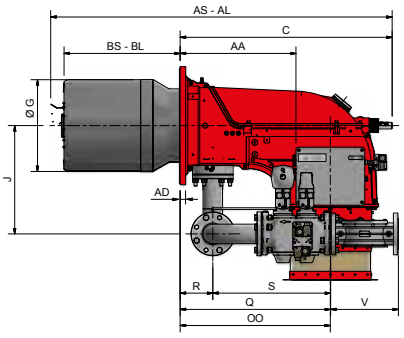
Type	DN	Overall dimensions (mm)																														
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	Q	R	S	U	V	W	Y	Z
TLX92R	50	1256	1356	454	28	390	490	866	305	1349	859	490	259	289	449	175	360	510	685	M12	424	300	300	610	300	522	148	374	624	216	870	228	185
TLX92R	65	1256	1356	454	28	390	490	866	305	1543	1053	490	259	289	447	175	360	510	685	M12	424	300	300	610	300	632	148	484	846	292	870	228	185
TLX92R	80	1256	1356	454	28	390	490	866	305	1574	1084	490	259	289	447	175	360	510	685	M12	424	300	300	610	300	683	148	535	875	313	870	228	185
TLX92R	100	1256	1356	454	28	390	490	866	305	1657	1167	490	259	289	447	175	360	510	685	M12	424	300	300	610	300	790	148	642	942	353	870	228	185
TLX92.1	50	1286	1396	454	28	420	530	866	305	1349	859	490	284	316	449	175	360	510	685	M12	424	300	300	610	300	522	148	374	624	216	870	228	185
TLX92.1	65	1286	1396	454	28	420	530	866	305	1543	1053	490	284	316	447	175	360	510	685	M12	424	300	300	610	300	632	148	484	846	292	870	228	185
TLX92.1	80	1286	1396	454	28	420	530	866	305	1574	1084	490	284	316	447	175	360	510	685	M12	424	300	300	610	300	683	148	535	875	313	870	228	185
TLX92.1	100	1286	1396	454	28	420	530	866	305	1657	1167	490	284	316	447	175	360	510	685	M12	424	300	300	610	300	790	148	642	942	353	870	228	185

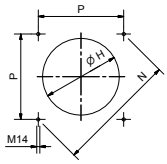
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

TLX512R TLX512.1 TLX515.1 TLX520.1 TLX525.1

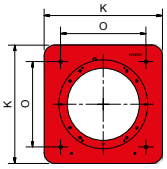
OVERALL DIMENSIONS (TLX... - TLX...FGR)



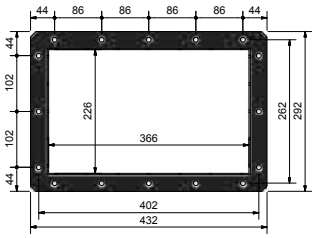




Boiler recommended drilling template



Burner flange

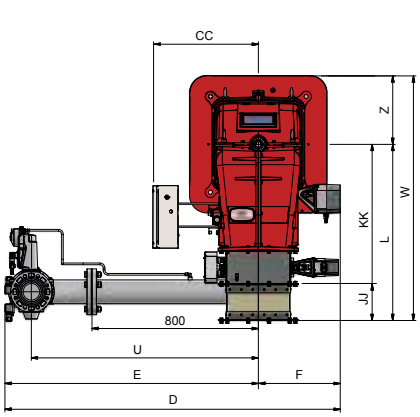


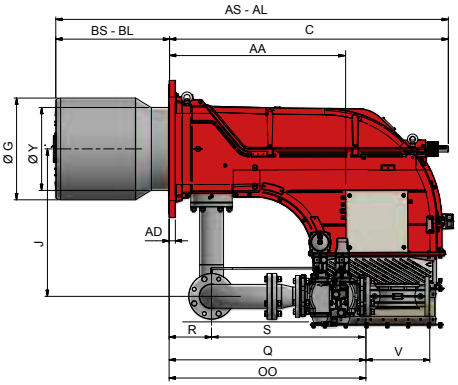
Air inlet flange

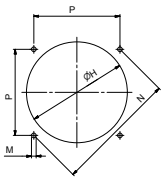
Type	DN	Overall dimensions (mm)																														
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
TLX512R	50	1385	1485	536	25	430	530	955	314	1308	946	362	309	349	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	311	270
TLX512R	65	1385	1485	536	25	430	530	955	314	1331	969	362	309	349	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	311	270
TLX512R	80	1385	1485	536	25	430	530	955	314	1364	1002	362	309	349	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	311	270
TLX512R	100	1385	1485	536	25	430	530	955	314	1444	1082	362	309	349	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	311	270
TLX512.1	50	1385	1485	536	25	430	530	955	314	1308	946	362	328	370	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	330	270
TLX512.1	65	1385	1485	536	25	430	530	955	314	1331	969	362	328	370	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	330	270
TLX512.1	80	1385	1485	536	25	430	530	955	314	1364	1002	362	328	370	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	330	270
TLX512.1	100	1385	1485	536	25	430	530	955	314	1444	1082	362	328	370	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	330	270
TLX515.1	50	1385	1485	536	25	430	530	955	314	1308	946	362	360	400	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	356	270
TLX515.1	65	1385	1485	536	25	430	530	955	314	1331	969	362	360	400	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	356	270
TLX515.1	80	1385	1485	536	25	430	530	955	314	1364	1002	362	360	400	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	356	270
TLX515.1	100	1385	1485	536	25	430	530	955	314	1444	1082	362	360	400	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	356	270
TLX520.1	50	1385	1485	536	25	430	530	955	314	1308	946	362	385	425	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	356	270
TLX520.1	65	1385	1485	536	25	430	530	955	314	1331	969	362	385	425	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	356	270
TLX520.1	80	1385	1485	536	25	430	530	955	314	1364	1002	362	385	425	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	356	270
TLX520.1	100	1385	1485	536	25	430	530	955	314	1444	1082	362	385	425	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	356	270
TLX525.1	65	1385	1485	536	25	430	530	955	314	1331	969	362	419	469	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	356	270
TLX525.1	80	1385	1485	536	25	430	530	955	314	1364	1002	362	419	469	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	356	270
TLX525.1	100	1385	1485	536	25	430	530	955	314	1444	1082	362	419	469	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	356	270

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

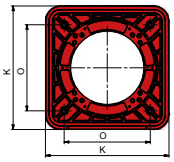
OVERALL DIMENSIONS (TLX... - TLX...FGR)



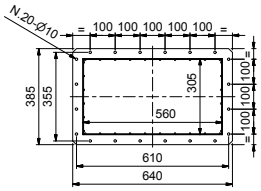




Boiler recommended drilling template



Burner flange



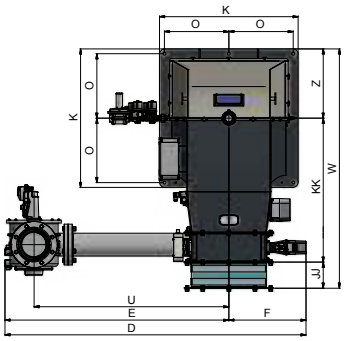
Air inlet flange

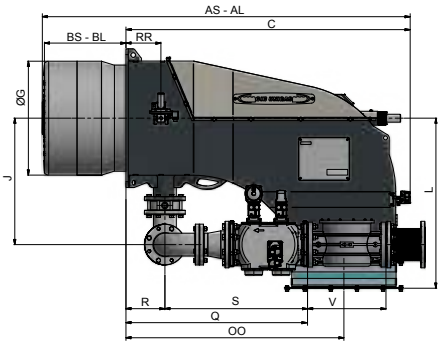
Type	DN	Overall dimensions (mm)																													
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
TLX1030R	80	1786	1886	848	30	445	545	1341	540	1816	1219	520	446	500	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	448	329
TLX1030R	100	1786	1886	848	30	445	545	1341	540	1816	1219	520	446	500	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	448	329
TLX1030R	125	1786	1886	848	30	445	545	1341	540	1816	1219	520	446	500	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	448	329
TLX1030.1	80	1786	1886	848	30	445	545	1341	540	1816	1219	520	489	541	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	491	399
TLX1030.1	100	1786	1886	848	30	445	545	1341	540	1816	1219	520	489	541	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	491	399
TLX1030.1	125	1786	1886	848	30	445	545	1341	540	1816	1219	520	489	541	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	491	399

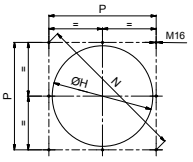
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

TLX2020 TLX2030 TLX2040 TLX TLX...FGR TYPE

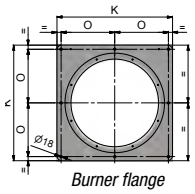
OVERALL DIMENSIONS (TLX... - TLX...FGR)



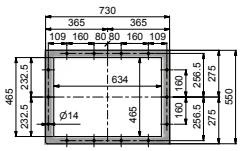




Boiler recommended drilling template



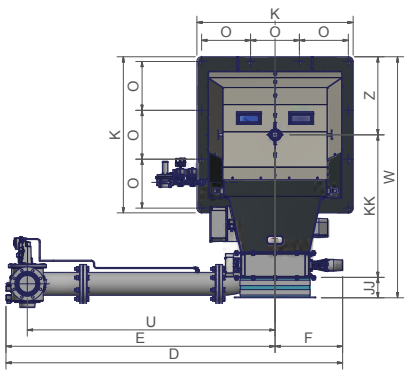
Burner flange

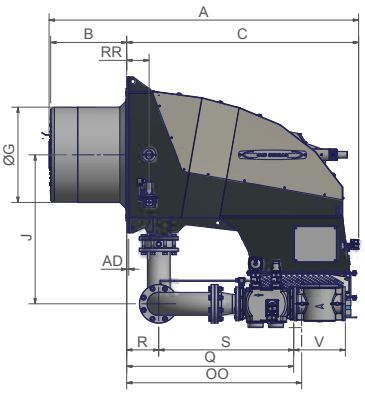


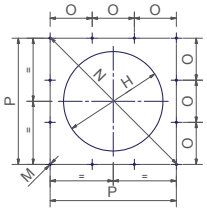
Air inlet flange

Type	DN	Overall dimensions (mm)																												
		AS	AL	BS	BL	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
TLX2020	100	2265	2415	500	650	1675	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	635	425
TLX2020	125	2265	2415	500	650	1675	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	635	425
TLX2030	100	2256	2406	500	650	1675	1847	1339	507	659	717	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	-	425
TLX2030	125	2256	2406	500	650	1675	1847	1339	507	659	717	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	-	425
TLX2040	125	2256	2406	500	650	1675	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	698	425
TLX2040	150	2256	2406	500	650	1675	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	1114	239	215	875	1195	-	1468	698	425

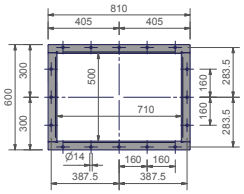
OVERALL DIMENSIONS (TLX... - TLX...FGR)







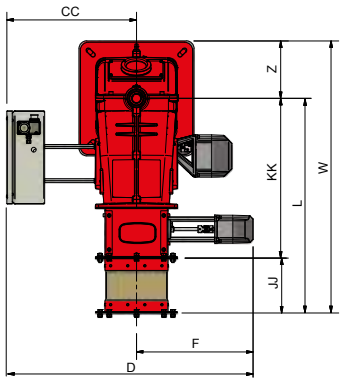
Boiler recommended drilling template

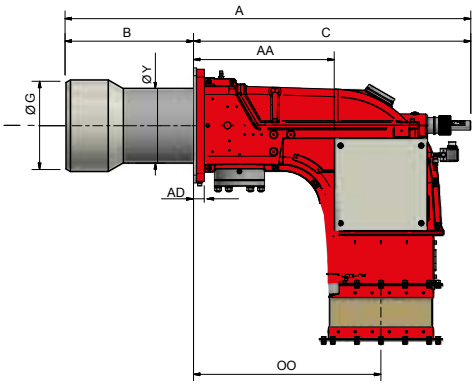


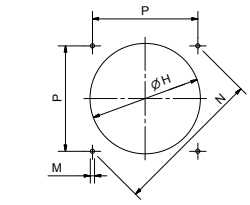
Air inlet flange

Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
TLX3050	150	2513	750	1751	1847	1374	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	1113	239	215	874	1196	481	1468	651	425
TLX3050	200	2513	750	1751	-	-	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	-	239	215	-	-	-	1468	651	425

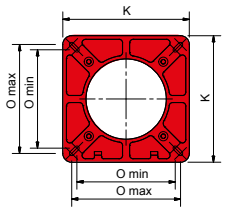
OVERALL DIMENSIONS



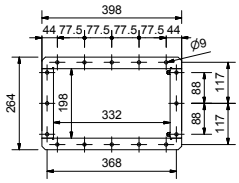




Boiler recommended drilling template



Burner flange

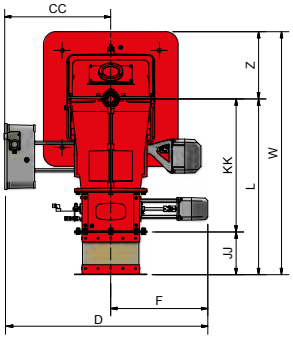


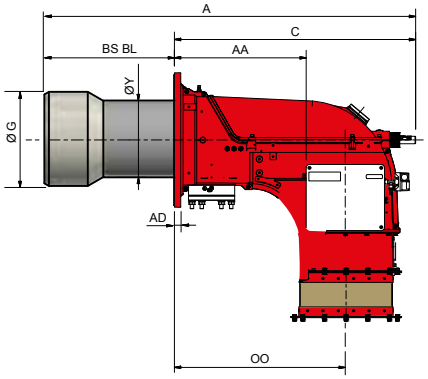
Air inlet flange

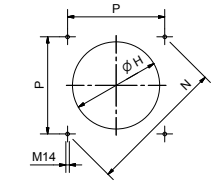
Type	Overall dimensions (mm)																									
	AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	W	Y	Z
TG90	1406	1556	454	28	340	490	1066	305	1349	859	490	234	264	449	175	360	510	685	M12	424	280	310	610	300	870	198	185
TG91	1366	1539	454	28	300	473	1066	305	1349	859	490	238	268	449	175	360	510	685	M12	424	280	310	610	300	870	228	185
TG92	1360	1533	454	28	294	467	1066	305	1349	859	490	266	296	449	175	360	510	685	M12	424	280	310	610	300	870	228	185

Dimensions CC - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

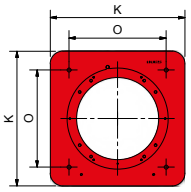
OVERALL DIMENSIONS



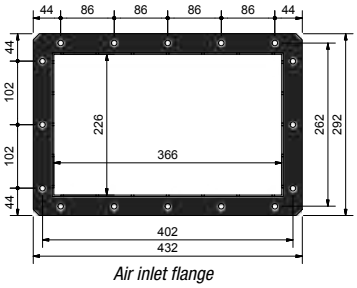




Boiler recommended drilling template



Burner flange

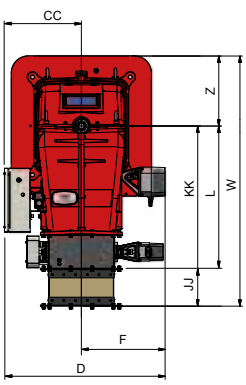


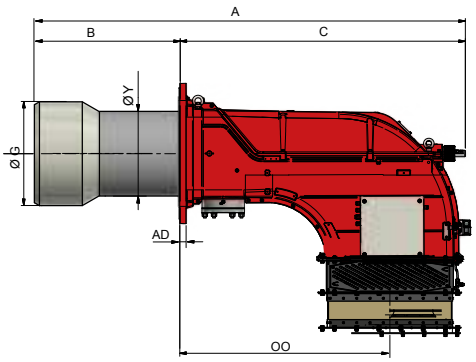
Air inlet flange

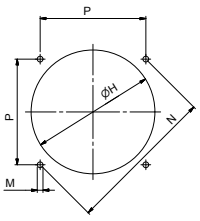
Type	Overall dimensions (mm)																								
	AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	W	Y	Z
TG510	1755	1675	536	25	300	520	1155	314	1308	946	362	329	369	494	175	460	532	707	M14	552	390	686	390	970	328	270
TG515	1755	1675	536	25	300	520	1155	314	1308	946	362	350	390	494	175	460	532	707	M14	552	390	686	390	970	328	270
TG520	1755	1675	536	25	300	520	1155	314	1308	946	362	370	410	494	175	460	532	707	M14	552	390	686	390	970	328	270
TG525	1755	1675	536	25	340	520	1155	314	1308	946	362	434	484	494	175	460	532	707	M14	552	390	686	390	970	328	270

Dimensions CC - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

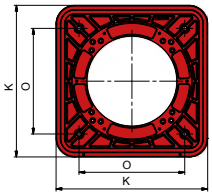
OVERALL DIMENSIONS



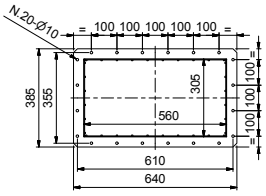




Boiler recommended drilling template



Burner flange

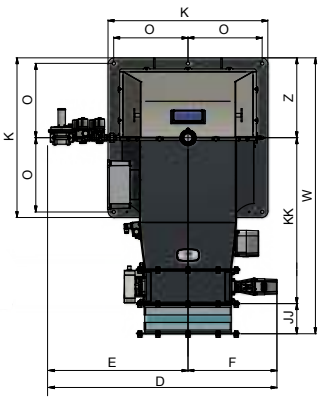


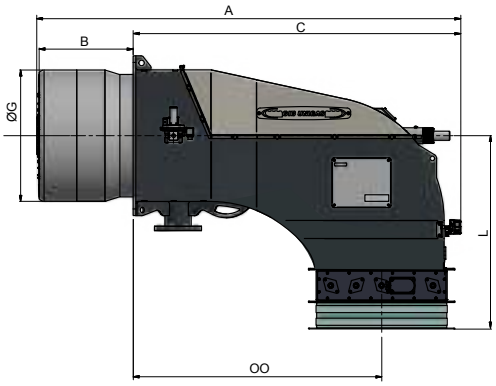
Air inlet flange

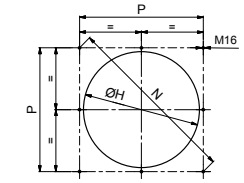
Type	Overall dimensions (mm)																								
	AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	W	Y	Z
TG1030	2114	2308	848	30	350	544	1541	540	1816	1219	520	489	539	709	175	660	672	845	M16	651	460	1000	460	1175	372	329
TG1050	-	-	848	30	-	-	1541	540	1816	1219	520	-	-	709	175	660	672	845	M16	651	460	1000	460	1175	-	329
TG1080	2159	-	848	30	384	-	1541	540	1816	1219	520	671	731	709	175	660	672	845	M16	651	460	1000	460	1175	408	329

Dimensions CC - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

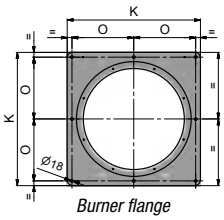
OVERALL DIMENSIONS



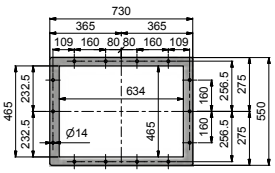




Boiler recommended drilling template



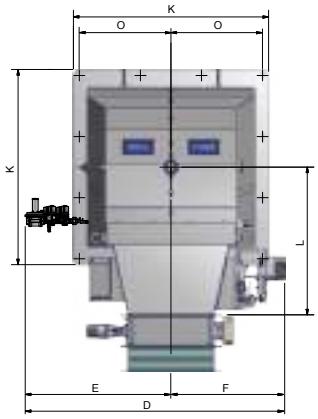
Burner flange

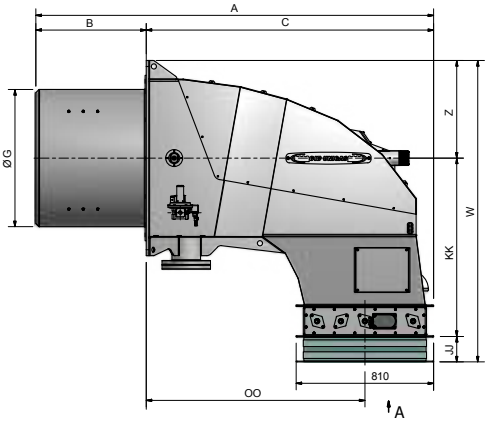


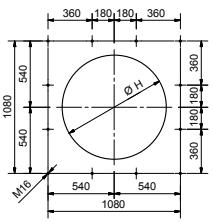
Air inlet flange

Type	Overall dimensions (mm)																			
	A	B	C	D	E	F	G	H	JJ	K	KK	L	M	N	O	OO	P	W	Y	Z
TG2000	2615	650	1875	1203	730	473	545	700	160	850	882	1043	M16	1117	395	1337	790	1468	545	425
TG2500	2615	650	1875	1203	730	473	698	760	160	850	882	1043	M16	1117	395	1337	790	1468	698	425

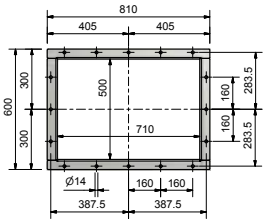
OVERALL DIMENSIONS







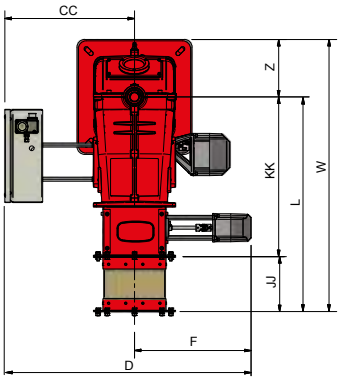
Boiler recommended drilling template

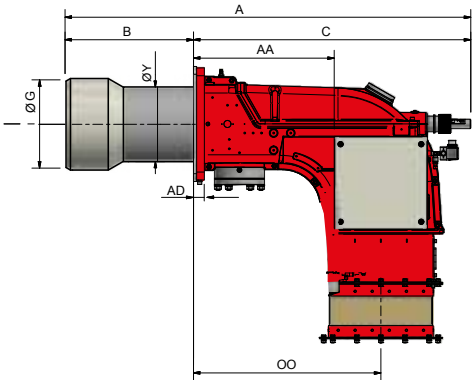


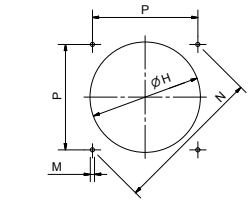
Air inlet flange

Type	Overall dimensions (mm)																									
	A	B	C	D	E	F	G	H	JJ	K	KK	L	M	O	OO	W	Y	Z	M	N	O	OO	P	W	Y	Z
TG3000	2344	650	1694	1554	880	674	808	980	150	1150	1051	871	M16	575	1289	1776	808	575	M16	651	460	1000	460	1175	372	329

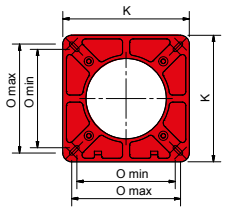
OVERALL DIMENSIONS



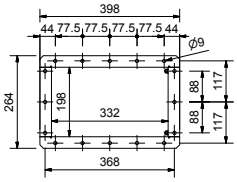




Boiler recommended drilling template



Burner flange

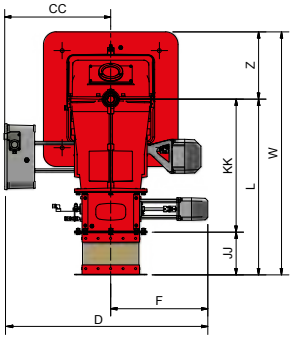


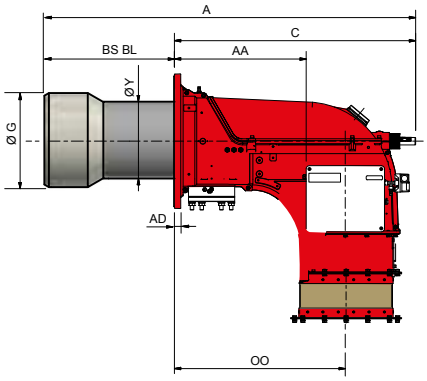
Air inlet flange

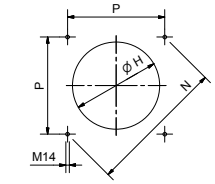
Type	Overall dimensions (mm)																									
	AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O		OO	P	W	Y	Z
																					min.	max.					
TN90	1406	1556	454	28	340	490	1066	305	1349	859	490	262	292	449	175	360	510	685	M12	424	280	310	610	300	870	198	185
TN91	1364	1554	454	28	298	488	1066	305	1349	859	490	292	322	449	175	360	510	685	M12	424	280	310	610	300	870	228	185
TN92	1367	1557	454	28	301	491	1066	305	1349	859	490	292	322	449	175	360	510	685	M12	424	280	310	610	300	870	228	185

Dimensions CC - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

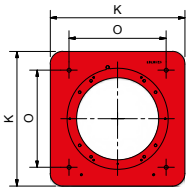
OVERALL DIMENSIONS



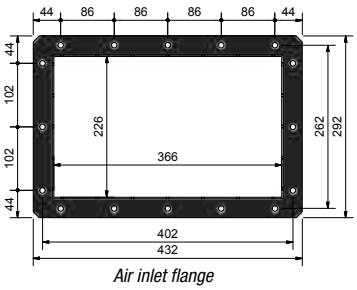




Boiler recommended drilling template



Burner flange

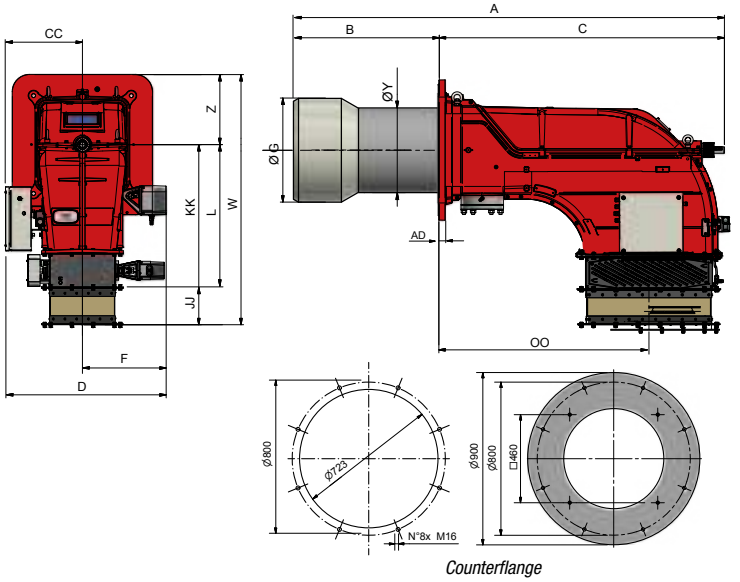


Air inlet flange

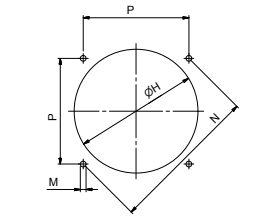
Type	Overall dimensions (mm)																								
	AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	W	Y	Z
TN510	1495	1675	536	25	340	520	1155	314	1308	946	362	345	440	494	175	460	532	707	M14	552	390	686	390	977	328	270
TN515	1495	1675	536	25	340	520	1155	314	1308	946	362	384	440	494	175	460	532	707	M14	552	390	686	390	977	356	270
TN520	1495	1675	536	25	340	520	1155	314	1308	946	362	422	440	494	175	460	532	707	M14	552	390	686	390	977	385	270
TN525	1495	1675	536	25	340	520	1155	314	1308	946	362	434	440	494	175	460	532	707	M14	552	390	686	390	977	419	270

Dimensions CC - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

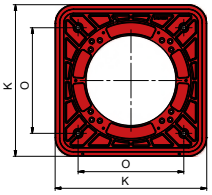
OVERALL DIMENSIONS



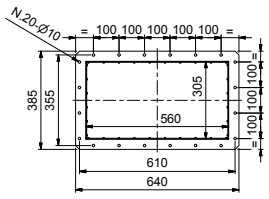
Counterflange



Boiler recommended drilling template



Burner flange

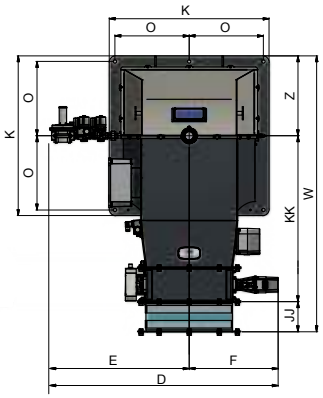


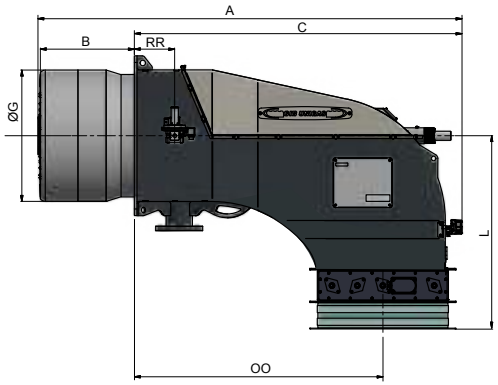
Air inlet flange

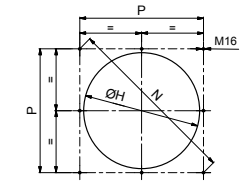
Type	Overall dimensions (mm)																								
	AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	W	Y	Z
TN1030	2114	2308	848	30	350	544	1541	540	1816	1219	520	422	472	709	175	660	672	845	M16	651	460	1000	460	1175	372	329
TN1050	2114	2308	848	30	350	544	1541	540	1816	1219	520	422	-	709	175	660	672	845	M16	-	460	1000	-	1175	-	329
TN1080	2159	-	848	30	384	-	1541	540	1816	1219	520	671	-	709	175	660	672	845	M16	-	460	1000	-	1175	408	329

Dimensions CC - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

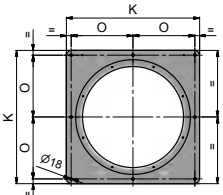
OVERALL DIMENSIONS



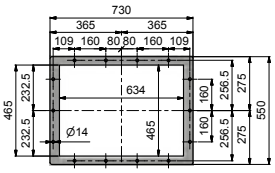




Boiler recommended drilling template



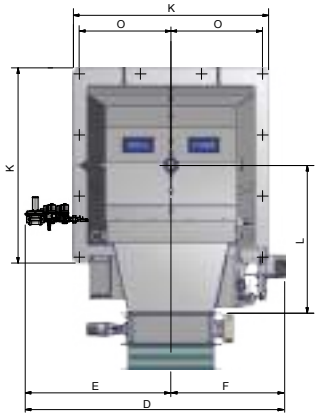
Burner flange

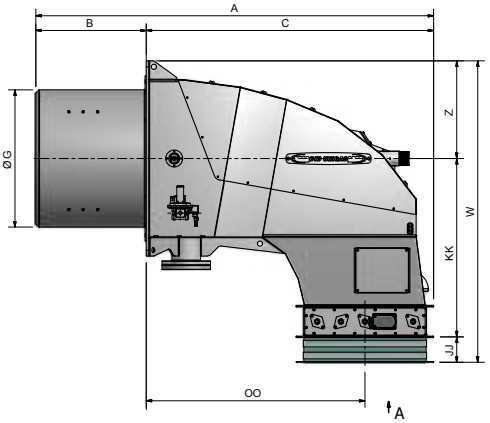


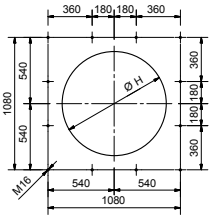
Air inlet flange

Type	Overall dimensions (mm)																				
	A	B	C	D	E	F	G	H	JJ	K	KK	L	M	N	O	OO	P	RR	W	Y	Z
TN2000	2615	650	1875	1203	730	473	545	700	160	850	882	1043	M16	1117	395	1337	790	215	1468	545	425
TN2500	2615	650	1875	1203	730	473	698	760	160	850	882	1043	M16	1117	395	1337	790	215	1468	698	425

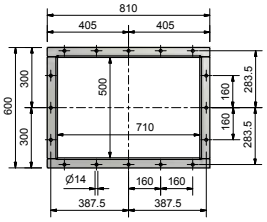
OVERALL DIMENSIONS







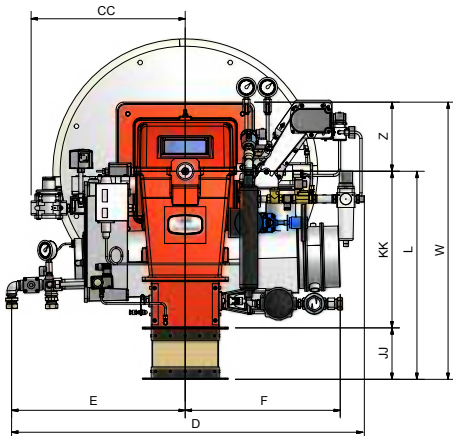
Burner flange

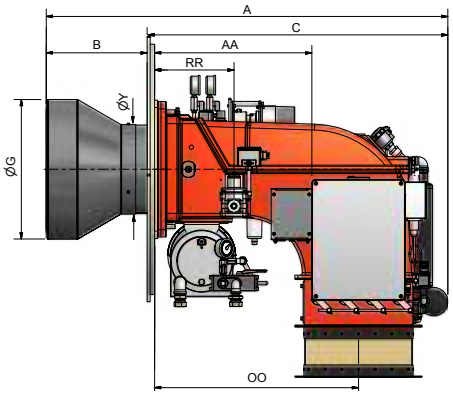


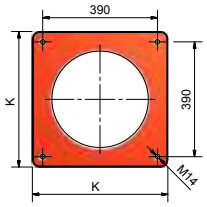
Air inlet flange

Type	Overall dimensions (mm)																	
	A	B	C	D	E	F	G	H	JJ	K	KK	L	M	O	OO	W	Y	Z
TN3000	2344	650	1694	1694	880	674	808	980	150	1150	1051	871	M16	575	1289	1776	808	575

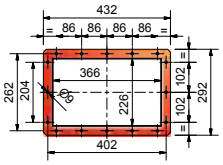
OVERALL DIMENSIONS



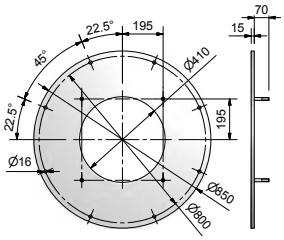




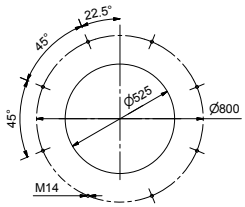
Burner flange



Air inlet flange



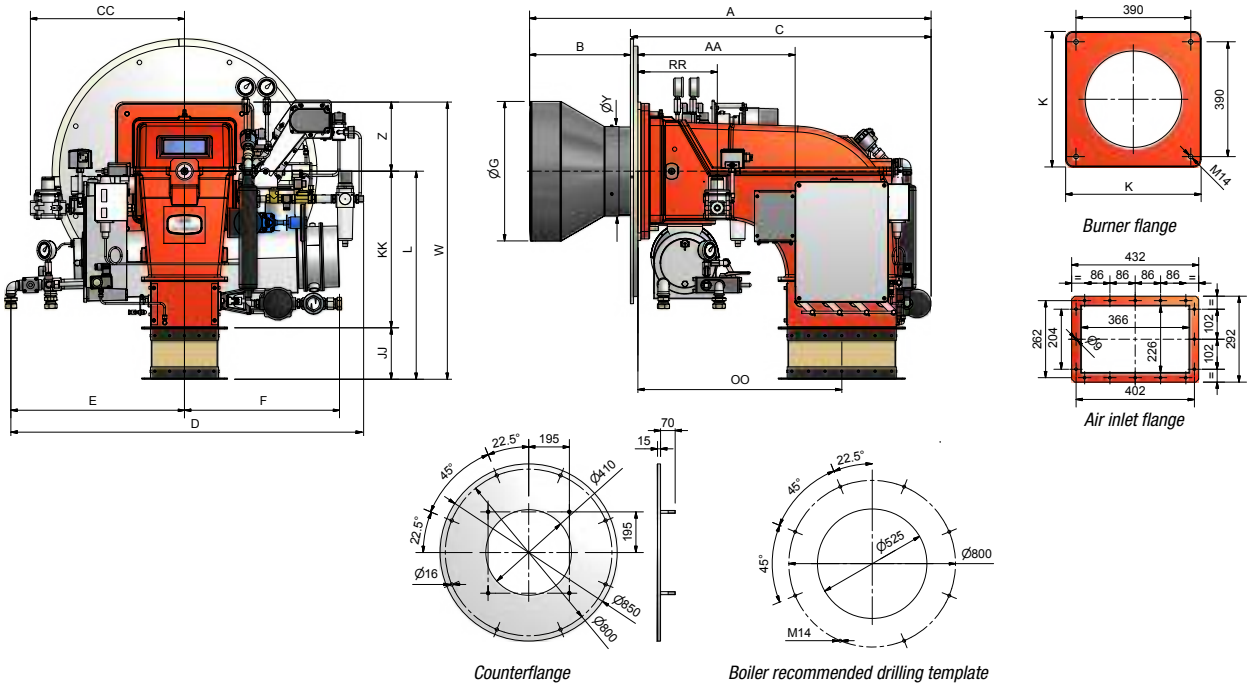
Counterflange



Boiler recommended drilling template

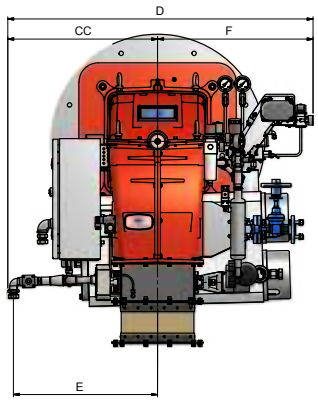
Type	Overall dimensions (mm)																			
	A	AA	B	C	CC	D	E	F	G	H	JJ	K	KK	L	M	OO	RR	W	Y	Z
TPBY90	1315	535	318	997	524	1250	590	527	306	346	175	460	532	707	M14	610	270	942	308	235
TPBY91	1318	535	321	997	524	1250	590	527	324	364	175	460	532	707	M14	610	270	942	308	235
TPBY92	1324	535	327	997	524	1250	590	527	365	405	175	460	532	707	M14	610	270	942	308	235
TPBY93	-	535	-	997	524	1250	590	527	-	-	175	460	532	707	M14	610	270	942	308	235

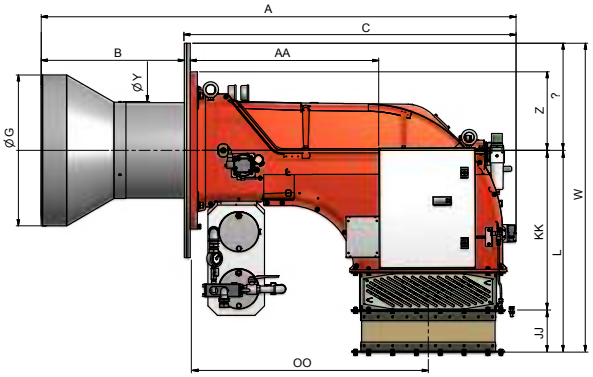
OVERALL DIMENSIONS

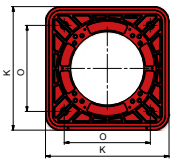


Type	Overall dimensions (mm)																			
	A	AA	B	C	CC	D	E	F	G	H	JJ	K	KK	L	M	OO	RR	W	Y	Z
TPBY510	1361	535	364	997	524	1250	590	527	387	427	175	460	532	707	M14	686	270	942	308	235
TPBY515	1365	535	368	997	524	1250	590	527	474	524	175	460	532	707	M14	686	270	942	308	235
TPBY520	1365	535	368	997	524	1250	590	527	474	524	175	460	532	707	M14	686	270	942	308	235
TPBY525	1365	535	368	997	524	1250	590	527	474	524	175	460	532	707	M14	686	270	942	308	235

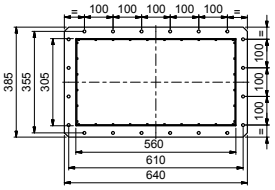
OVERALL DIMENSIONS



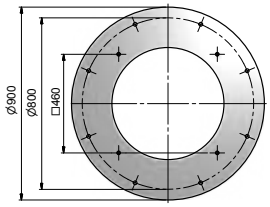




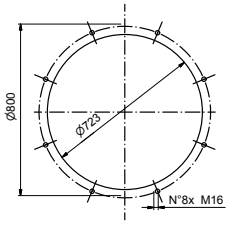
Burner flange



Air inlet flange



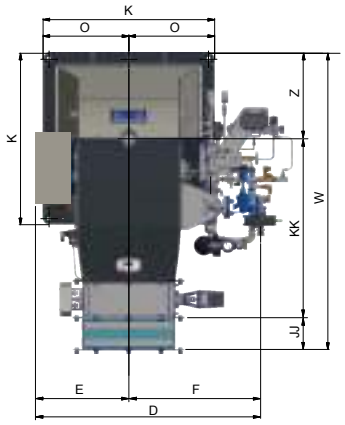
Counterflange

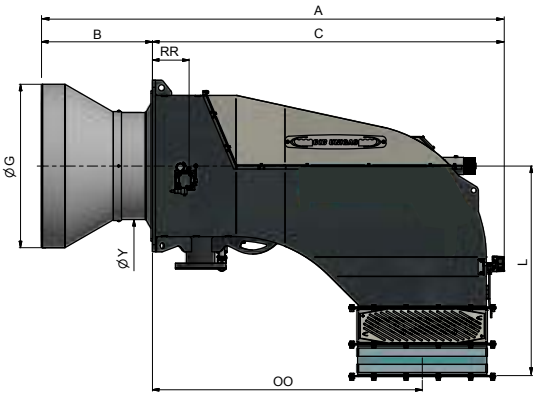


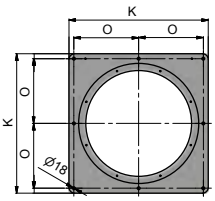
Boiler recommended drilling template

Type	Overall dimensions (mm)																					
	AS	AL	AA	BS	BL	C	CC	D	E	F	G	H	JJ	K	KK	L	M	O	OO	W	Y	Z
TPBY1030	1721	-	800	353	-	1368	524	1250	590	645	633	693	175	660	670	845	M16	460	1000	1295	400	330
TPBY1050	1729	1939	800	361	571	1368	524	1250	590	645	671	731	175	660	670	845	M16	460	1000	1295	400	330
TPBY1080	1729	1939	800	361	571	1368	524	1250	590	645	671	-	175	660	670	845	M16	460	1000	1295	421	330

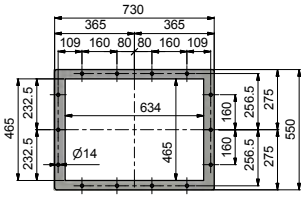
OVERALL DIMENSIONS



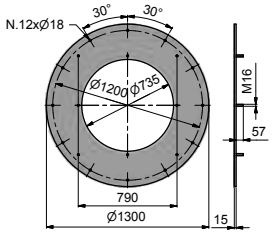




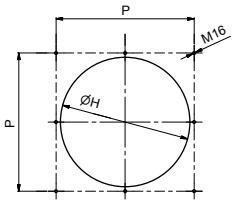
Burner flange



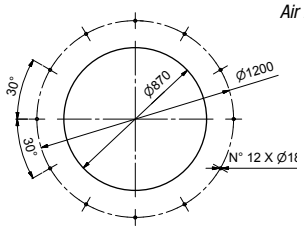
Air inlet flange



Counterflange



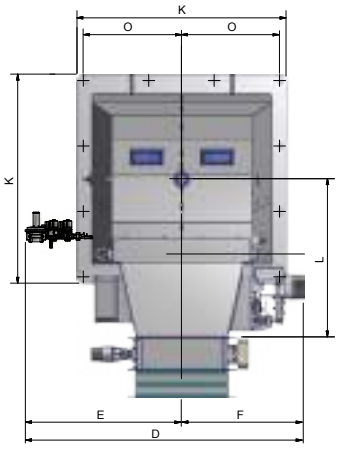
Boiler recommended drilling template - TPBY2000

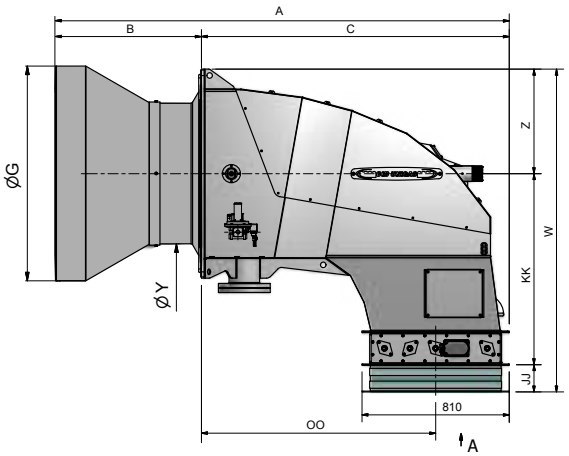


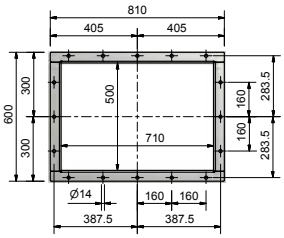
Boiler recommended drilling template - TPBY2500

Type	Overall dimensions (mm)																		
	A	B	C	D	E	F	G	H	JJ	K	KK	L	M	O	OO	RR	W	Y	Z
TPBY2000	2293	550	1743	1480	730	750	700	760	160	850	883	1043	M16	395	1337	215	1468	530	425
TPBY2500	2293	550	1743	1480	730	750	810	870	160	850	883	1043	M16	395	1337	215	1468	530	425

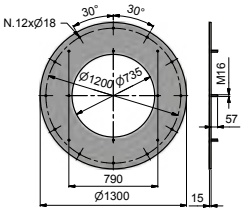
OVERALL DIMENSIONS



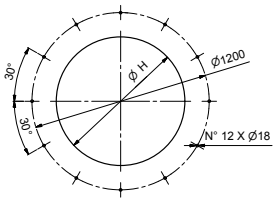




Air inlet flange



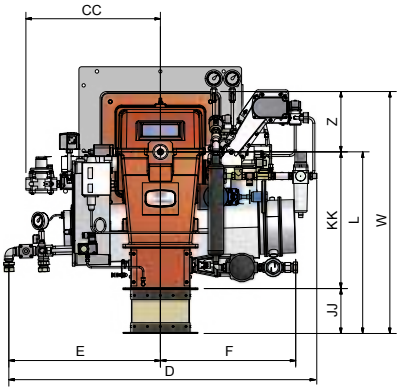
Counterflange

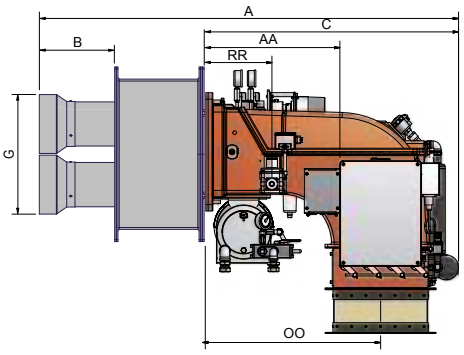


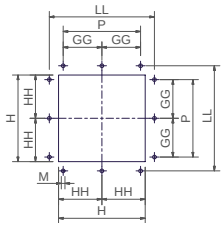
Boiler recommended drilling template

Type	Overall dimensions (mm)																	
	A	B	C	D	E	F	G	H	JJ	K	KK	L	M	O	OO	W	Y	Z
TPBY3000	2344	650	1694	1554	880	674	808	980	150	1150	1051	871	M16	575	1289	1776	808	575

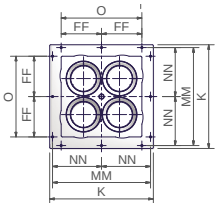
OVERALL DIMENSIONS



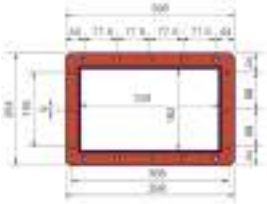




Boiler recommended drilling template



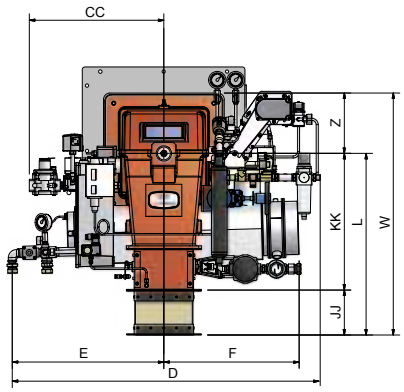
Burner flange

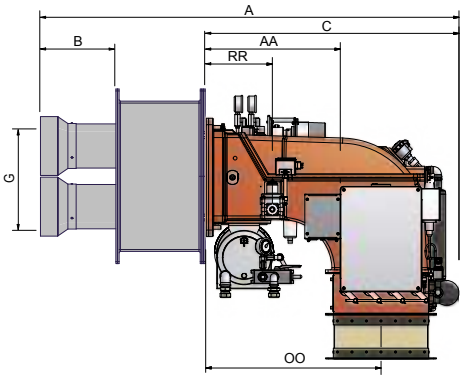


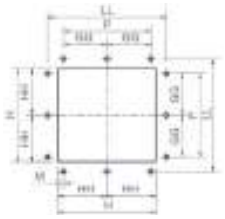
Air inlet flange

Type	Overall dimensions (mm)																								
	A	AA	B	C	CC	D	E	F	FF	G	GG	H	HH	JJ	K	KK	L	LL	M	O	OO	P	RR	W	Z
TPBY93	1361	535	304	997	524	1250	590	527	255	386	255	442	221	185	550	460	707	510	M12	510	610	510	270	942	235

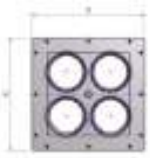
OVERALL DIMENSIONS



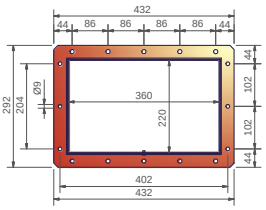




Boiler recommended drilling template



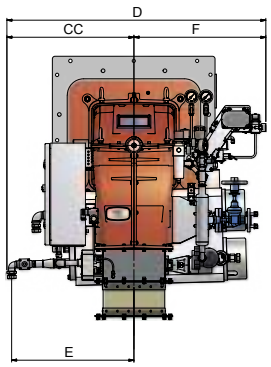
Burner flange

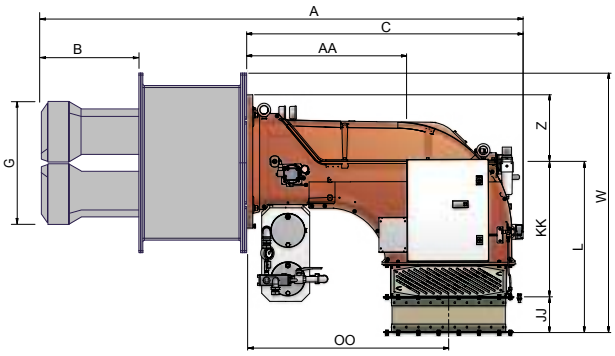


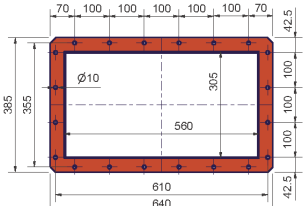
Air inlet flange

Type	Overall dimensions (mm)																					
	A	AA	B	C	CC	D	E	F	G	GG	H	HH	JJ	K	KK	L	LL	M	OO	RR	W	Z
TPBY515	-	535	-	-	524	1250	590	527	-	275	524	300	175	460	532	707	700	M16	686	270	942	235
TPBY525	1765	535	478	1287	524	1250	590	527	-	275	524	300	175	460	532	707	700	M16	686	270	942	235

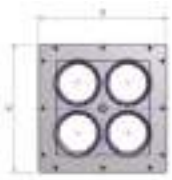
OVERALL DIMENSIONS



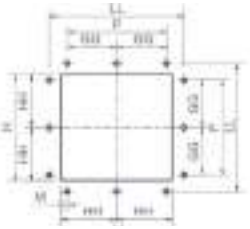




Air inlet flange



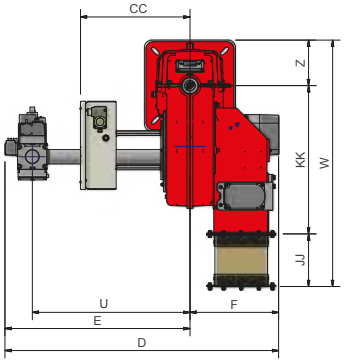
Burner flange

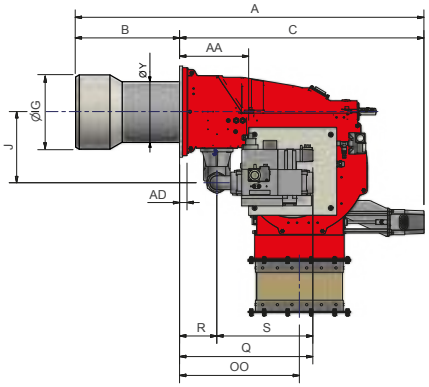


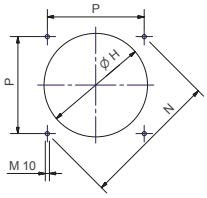
Boiler recommended drilling template

Type	Overall dimensions (mm)																				
	A	AA	B	C	CC	D	E	F	G	GG	H	HH	JJ	K	KK	L	LL	M	OO	W	Z
TPBY1030	-	535	-	997	524	1250	590	527	-	275	693	300	175	460	532	707	700	M16	1000	1170	235
TPBY1080	-	535	-	997	524	1250	590	527	-	275	-	300	175	460	532	707	850	M16	1000	1170	235

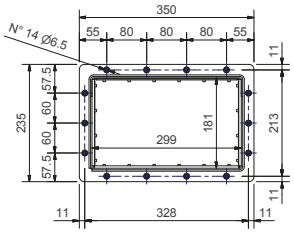
OVERALL DIMENSIONS



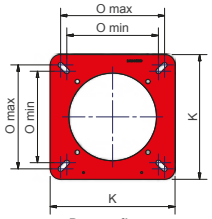




Boiler recommended drilling template

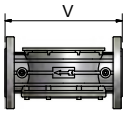


Air inlet flange

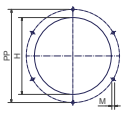


Burner flange

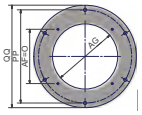
DN65 - DN80



HTP120A



Boiler recommended drilling template



Counterflange

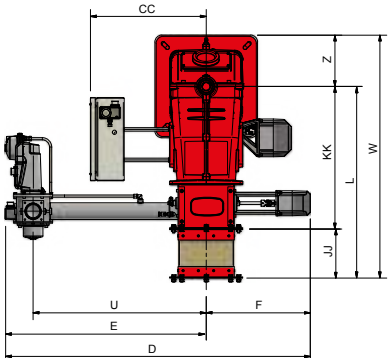
Type	DN	Overall dimensions (mm)																																
		A	AA	AD	AG	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	PP	Q	QQ	R	S	U	V	W	Y	Z
HTP120A	40	1363	87	28	280	500	873	342	978	634	344	300	330	238	173	300	505	357	M10	330	216	250	401	233	400	456	440	131	327	540	-	502	198	155
HTP120A	50	1363	87	28	280	500	873	342	978	634	344	300	330	238	173	300	505	357	M10	330	216	250	401	233	400	469	440	131	342	526	-	502	198	155
HTP120A	65	1363	87	28	280	500	873	342	1062	718	344	300	330	284	173	300	505	357	M10	330	216	250	401	233	400	539	440	131	432	593	292	502	198	155
HTP120A	80	1363	87	28	280	500	873	342	1082	738	344	300	330	284	173	300	505	357	M10	330	216	250	401	233	400	559	440	131	538	565	310	502	198	155
HTP165A	40	1428	69	28	-	500	928	352	679	679	333	234	264	229	173	300	505	420	M10	330	220	250	408	233	-	465	-	130	335	569	-	575	210	155
HTP165A	50	1428	69	28	-	500	928	352	969	969	333	234	264	229	173	300	505	420	M10	330	220	250	408	233	-	465	-	130	335	529	-	575	210	155
HTP165A	65	1428	69	28	-	500	928	352	1002	1002	333	234	264	296	173	300	505	420	M10	330	220	250	408	233	-	533	-	130	403	565	292	575	210	155
HTP165A	80	1428	69	28	-	500	928	352	1082	1082	333	234	264	296	173	300	505	428	M10	330	220	250	408	233	-	574	-	130	538	565	310	575	210	155
HTP205A	40	1431	69	28	-	503	928	352	679	679	333	254	270	233	173	300	505	453	M10	330	220	250	408	233	-	472	-	130	342	569	-	575	210	155
HTP205A	50	1431	69	28	-	503	928	352	969	969	333	254	270	233	173	300	505	453	M10	330	220	250	408	233	-	472	-	130	342	529	-	575	210	155
HTP205A	65	1431	69	28	-	503	928	352	1002	1002	333	254	270	233	173	300	505	453	M10	330	220	250	408	233	-	562	-	130	432	565	292	575	210	155
HTP205A	80	1431	69	28	-	503	928	352	1082	1082	333	254	270	287	173	300	505	453	M10	330	220	250	408	233	-	558	-	130	538	565	310	575	210	155

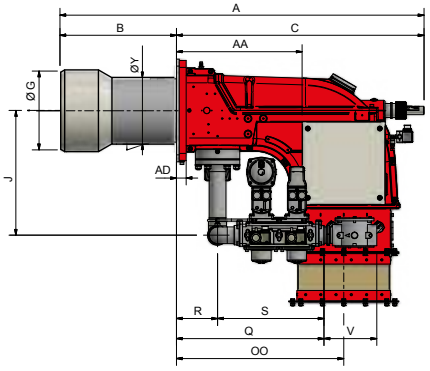
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

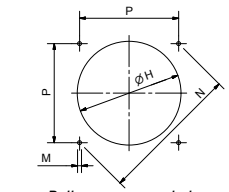
HTP TYPE HTP90A HTP91A HTP92A HTP93A

GAS/LIGHT OIL

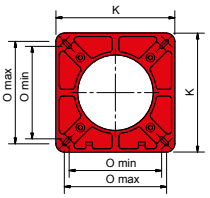
OVERALL DIMENSIONS



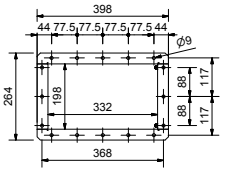




Boiler recommended drilling template



Burner flange



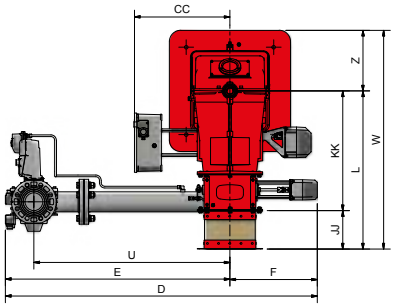
Air inlet flange

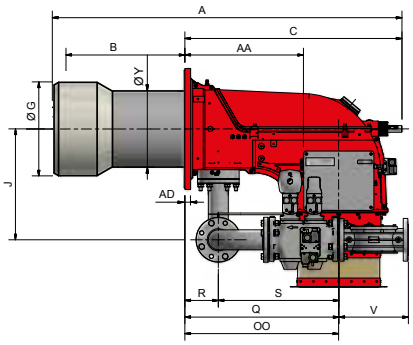
Type	DN	Overall dimensions (mm)																													
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O		OO	P	Q	R	S	U	V	W	Y	Z
																				min.	max.										
HTP90A	50	1556	454	28	490	1066	305	1349	859	490	234	264	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
HTP90A	65	1556	454	28	490	1066	305	1543	1053	490	234	264	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
HTP90A	80	1556	454	28	490	1066	305	1574	1084	490	234	264	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
HTP90A	100	1556	454	28	490	1066	305	1657	1167	490	234	264	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
HTP91A	50	1596	454	28	490	1066	305	1349	859	490	265	295	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
HTP91A	65	1596	454	28	490	1066	305	1543	1053	490	265	295	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
HTP91A	80	1596	454	28	490	1066	305	1574	1084	490	265	295	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
HTP91A	100	1596	454	28	490	1066	305	1657	1167	490	265	295	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
HTP92A	50	1596	454	28	490	1066	305	1349	859	490	269	299	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
HTP92A	65	1596	454	28	490	1066	305	1543	1053	490	269	299	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
HTP92A	80	1596	454	28	490	1066	305	1574	1084	490	269	299	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
HTP92A	100	1596	454	28	490	1066	305	1657	1167	490	269	299	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
HTP93A	50	1596	454	28	495	1066	305	1349	859	490	304	344	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
HTP93A	65	1596	454	28	495	1066	305	1543	1053	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
HTP93A	80	1596	454	28	495	1066	305	1574	1084	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
HTP93A	100	1596	454	28	495	1066	305	1657	1167	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185

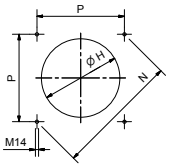
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

HTP512A HTP515A HTP520A HTP525A HTP TYPE

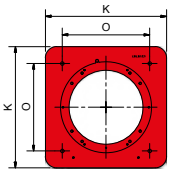
OVERALL DIMENSIONS



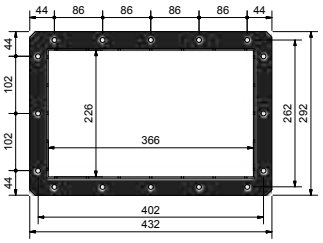




Boiler recommended drilling template



Burner flange

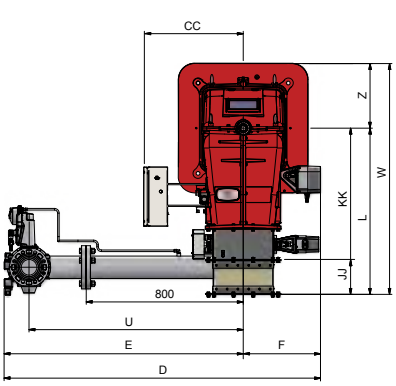


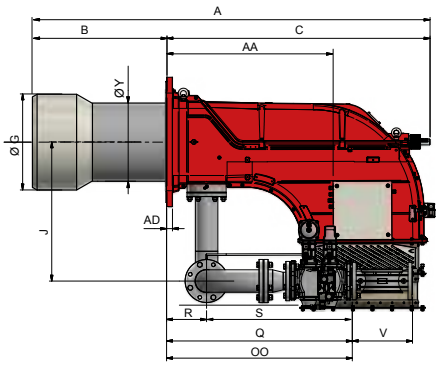
Air inlet flange

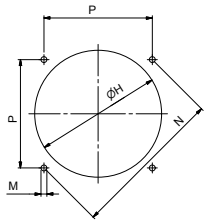
Type	DN	Overall dimensions (mm)																												
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
HTP512A	50	1685	536	25	530	1055	314	1308	946	362	340	380	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	284	270
HTP512A	65	1685	536	25	530	1055	314	1331	969	362	340	380	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	284	270
HTP512A	80	1685	536	25	530	1055	314	1364	1002	362	340	380	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	284	270
HTP512A	100	1685	536	25	530	1055	314	1444	1082	362	340	380	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	284	270
HTP515A	50	1685	536	25	530	1055	314	1308	946	362	380	420	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	328	270
HTP515A	65	1685	536	25	530	1055	314	1331	969	362	380	420	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	328	270
HTP515A	80	1685	536	25	530	1055	314	1364	1002	362	380	420	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	328	270
HTP515A	100	1685	536	25	530	1055	314	1444	1082	362	380	420	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	328	270
HTP520A	50	1685	536	25	530	1055	314	1308	946	362	400	440	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	328	270
HTP520A	65	1685	536	25	530	1055	314	1331	969	362	400	440	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	328	270
HTP520A	80	1685	536	25	530	1055	314	1364	1002	362	400	440	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	328	270
HTP520A	100	1685	536	25	530	1055	314	1444	1082	362	400	440	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	328	270
HTP525A	65	1685	536	25	530	1055	314	1331	969	362	434	484	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	328	270
HTP525A	80	1685	536	25	530	1055	314	1364	1002	362	434	484	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	328	270
HTP525A	100	1685	536	25	530	1055	314	1444	1082	362	434	484	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	328	270

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

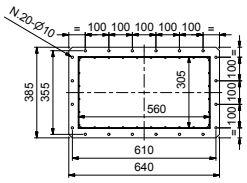
OVERALL DIMENSIONS



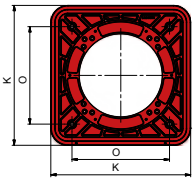




Boiler recommended drilling template



Air inlet flange

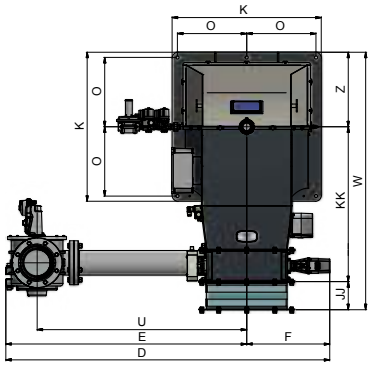


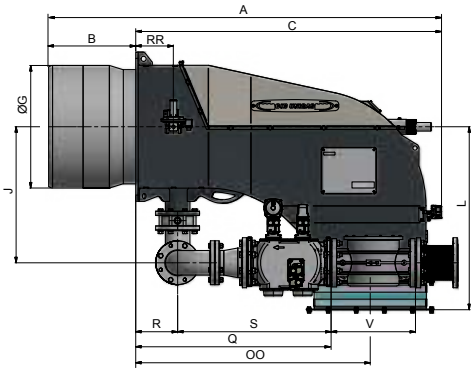
Burner flange

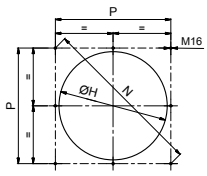
Type	DN	Overall dimensions (mm)																												
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
HTP1030	80	2064	848	30	544	1541	540	1816	1219	520	464	504	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	372	329
HTP1030	100	2064	848	30	544	1541	540	1816	1219	520	464	504	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	372	329
HTP1050	80	2064	848	30	544	1541	540	1816	1219	520	489	539	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	408	329
HTP1050	100	2064	848	30	544	1541	540	1816	1219	520	489	539	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	408	329
HTP1080	100	2064	848	30	544	1541	540	1816	1219	520	514	564	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	408	329
HTP1080	125	2064	848	30	544	1541	540	1816	1219	520	514	564	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	408	329

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

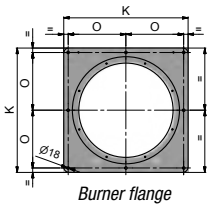
OVERALL DIMENSIONS



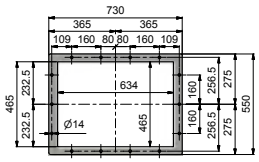




Boiler recommended drilling template



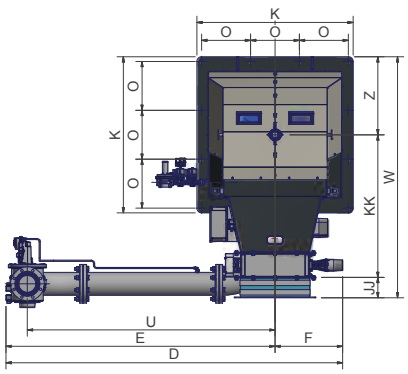
Burner flange

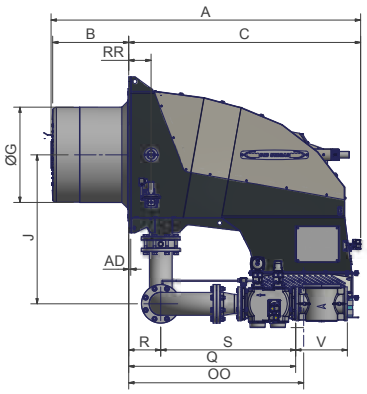


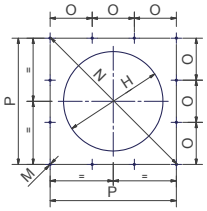
Air inlet flange

Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
HTP2000	100	2615	650	1875	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	635	425
HTP2000	125	2615	650	1875	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	635	425
HTP2500	125	2606	650	1875	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	698	425
HTP2500	150	2606	650	1875	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	1114	239	215	875	1195	481	1468	698	425

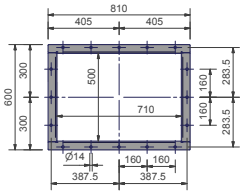
OVERALL DIMENSIONS







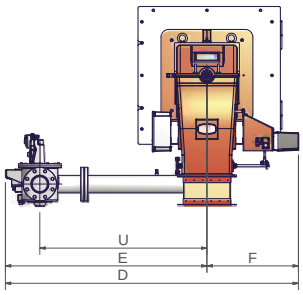
Boiler recommended drilling template

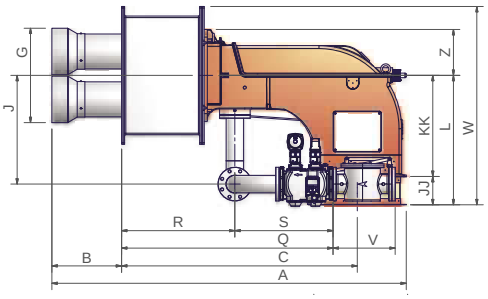


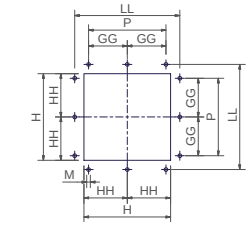
Air inlet flange

Type	DN	Overall dimensions (mm)																											
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
HTP3000	150	2713	750	1951	1847	1374	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	1113	239	215	874	1196	481	1468	651	425
HTP3000	200	2713	750	1951	-	-	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	-	239	215	-	-	-	1468	651	425

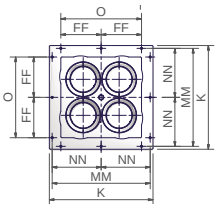
OVERALL DIMENSIONS



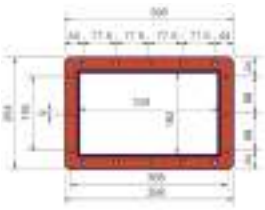




Boiler recommended drilling template



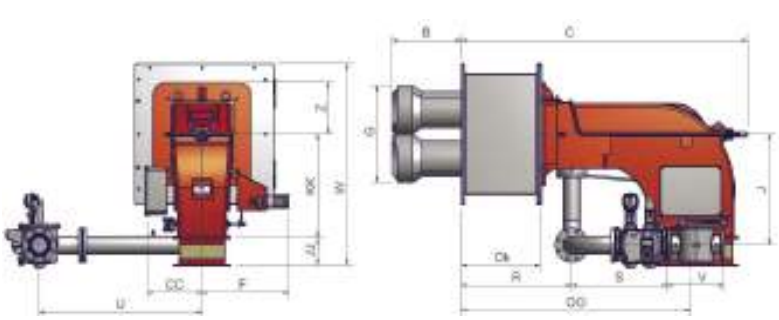
Burner flange

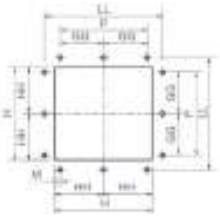


Air inlet flange

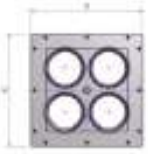
Type	DN	Overall dimensions (mm)																											
		A	B	C	D	E	F	FF	G	GG	H	HH	J	JJ	K	KK	L	LL	M	MM	NN	O	P	Q	R	S	U	V	W	Z
HTP90	50	-	-	1122	1342	852	490	255	-	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
HTP90	65	-	-	1122	1447	957	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
HTP90	80	-	-	1122	1449	959	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
HTP90	100	-	-	1122	1539	1049	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180
HTP91	50	-	-	1122	1342	852	490	255	-	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
HTP91	65	-	-	1122	1447	957	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
HTP91	80	-	-	1122	1449	959	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
HTP91	100	-	-	1122	1539	1049	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180
HTP92	50	-	-	1122	1342	852	490	255	-	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
HTP92	65	-	-	1122	1447	957	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
HTP92	80	-	-	1122	1449	959	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
HTP92	100	-	-	1122	1539	1049	490	255	-	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180
HTP93	50	-	-	1122	1342	852	490	255	386	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
HTP93	65	-	-	1122	1447	957	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
HTP93	80	-	-	1122	1449	959	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
HTP93	100	-	-	1122	1539	1049	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180

OVERALL DIMENSIONS

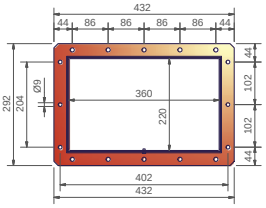




Boiler recommended drilling template



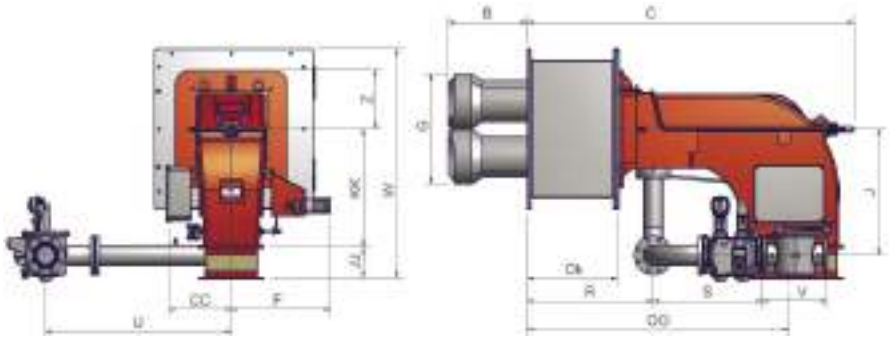
Burner flange

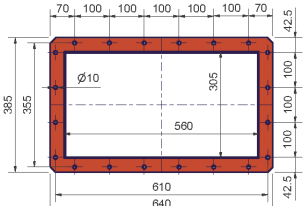


Air inlet flange

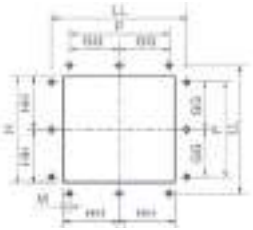
Type	DN	Overall dimensions (mm)																							
		B	C	CC	D	Dk	E	F	GG	H	HH	J	JJ	K	KK	L	LL	M	OO	P	R	S	U	V	W	Z
HTP515	50	-	1287	-	1613	310	1071	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	605	843	216	970	235
HTP515	65	-	1287	-	1591	310	1049	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	484	843	292	970	235
HTP515	80	-	1287	-	1626	310	1084	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	535	875	313	970	235
HTP515	100	-	1287	-	1709	310	1167	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	642	942	353	970	235
HTP525	65	478	1287	-	1591	310	1049	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	484	843	292	970	235
HTP525	80	478	1287	-	1626	310	1084	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	535	875	313	970	235
HTP525	100	478	1287	-	1709	310	1167	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	642	942	353	970	235

OVERALL DIMENSIONS

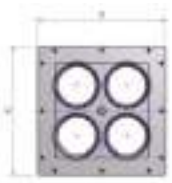




Air inlet flange



Boiler recommended drilling template



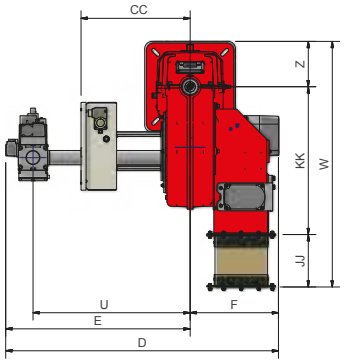
Burner flange

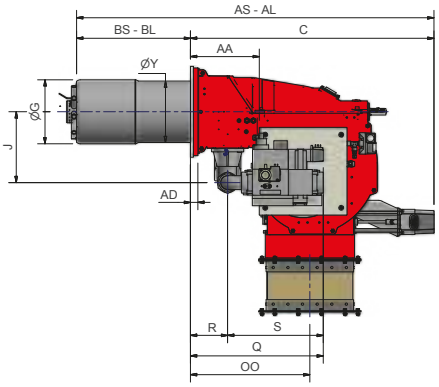
Type	DN	Overall dimensions (mm)																							
		B	C		CC	Dk	F	G	GG	H	HH	J	JJ	K	KK	LL	M	OO	P	R	S	U	V	W	Z
			min.	max.																					
HTP1030	80	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	736	1092	322	1170	330
HTP1030	100	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	642	1092	382	1170	330
HTP1030	125	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	754	1192	480	1170	330
HTP1080	100	422	1860	2161	348÷383	540	450÷670	700	350	750	375	710	175	900	665	850	16	1000	700	200	642	1092	382	1170	330
HTP1080	125	422	1860	2161	348÷383	540	450÷670	700	350	750	375	710	175	900	665	850	16	1000	700	200	754	1192	480	1170	330

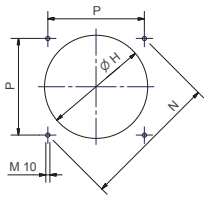
HTLX HTLX...FGR TYPE HTLX83 HTLX115 HTLX225

GAS/LIGHT OIL

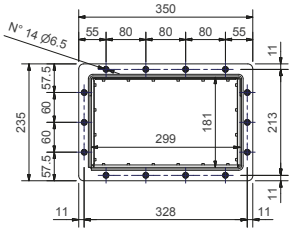
OVERALL DIMENSIONS (HTLX... - HTLX...FGR)



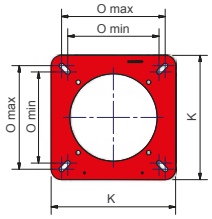




Boiler recommended drilling template

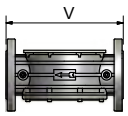


Air inlet flange



Burner flange

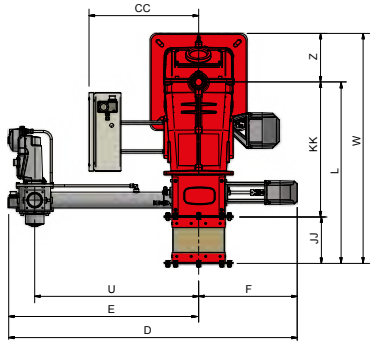
DN65 - DN80 - DN 100

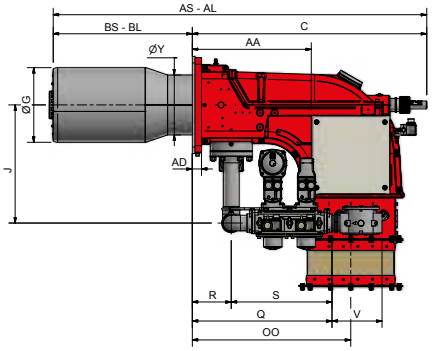


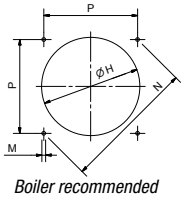
Type	DN	Overall dimensions (mm)																														
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	Q	R	S	U	V	W	Y	Z
HTLX83	32	1039	1189	87	28	300	450	705	342	978	634	344	219	249	238	173	300	505	347	M10	330	216	250	401	233	387	131	256	540	-	502	198	155
HTLX83	40	1039	1189	87	28	300	450	705	342	978	634	344	219	249	238	173	300	505	347	M10	330	216	250	401	233	458	131	327	540	-	502	198	155
HTLX83	50	1039	1189	87	28	300	450	705	342	978	634	344	219	249	238	173	300	505	347	M10	330	216	250	401	233	473	131	342	526	-	502	198	155
HTLX83	65	1039	1189	87	28	300	450	705	342	1062	718	344	219	249	118	173	300	505	347	M10	330	216	250	401	233	563	131	432	593	292	502	198	155
HTLX115	40	1169	1253	69	28	305	390	830	352	679	679	333	219	249	235	173	300	505	420	M10	330	220	250	408	233	-	127	325	569	-	575	210	155
HTLX115	50	1169	1253	69	28	305	390	830	352	969	969	333	219	249	235	173	300	505	420	M10	330	220	250	408	233	-	127	338	529	-	575	210	155
HTLX115	65	1169	1253	69	28	305	390	830	352	1002	1002	333	219	249	287	173	300	505	420	M10	330	220	250	408	233	275	127	406	565	292	575	210	155
HTLX115	80	1169	1253	69	28	305	390	830	352	1082	1082	333	219	249	287	173	300	505	420	M10	330	220	250	408	233	284	127	538	565	310	575	210	155
HTLX225	50	1264	1364	69	28	400	500	830	352	969	969	333	259	280	235	173	300	505	420	M10	330	220	250	408	233	-	127	338	529	-	575	210	155
HTLX225	65	1264	1364	69	28	400	500	830	352	1002	1002	333	259	280	287	173	300	505	420	M10	330	220	250	408	233	275	127	406	565	292	575	210	155
HTLX225	80	1264	1364	69	28	400	500	830	352	1082	1082	333	259	280	287	173	300	505	420	M10	330	220	250	408	233	284	127	538	565	310	575	210	155
HTLX225	100	1264	1364	69	28	400	500	830	352	1082	1082	333	259	280	287	173	300	505	420	M10	330	220	250	408	233	284	127	642	565	353	575	210	155

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

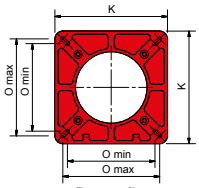
OVERALL DIMENSIONS (HTLX... - HTLX...FGR)



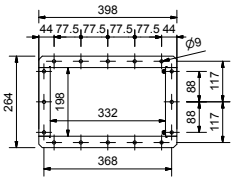




Boiler recommended drilling template



Burner flange



Air inlet flange

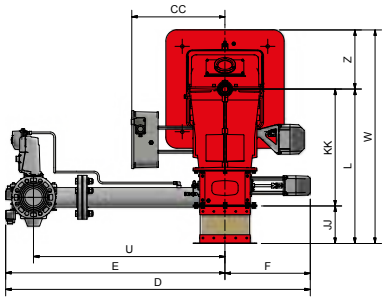
Type	DN	Overall dimensions (mm)																														
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O min.	O max.	OO	P	Q	R	S	U	V	W	Y	Z
HTLX92R	50	1456	1556	454	28	390	490	1066	305	1349	859	490	259	289	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
HTLX92R	65	1456	1556	454	28	390	490	1066	305	1543	1053	490	259	289	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
HTLX92R	80	1456	1556	454	28	390	490	1066	305	1574	1084	490	259	289	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
HTLX92R	100	1456	1556	454	28	390	490	1066	305	1657	1167	490	259	289	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
HTLX92.1	50	1486	1596	454	28	420	530	1066	305	1349	859	490	284	316	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
HTLX92.1	65	1486	1596	454	28	420	530	1066	305	1543	1053	490	284	316	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
HTLX92.1	80	1486	1596	454	28	420	530	1066	305	1574	1084	490	284	316	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
HTLX92.1	100	1486	1596	454	28	420	530	1066	305	1657	1167	490	284	316	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185

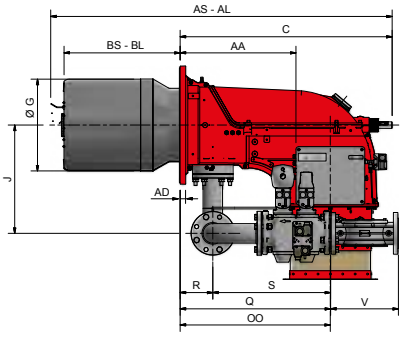
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

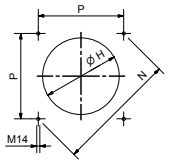
HTLX_HTLX...FGR TYPE HTLX512R HTLX512.1 HTLX515.1 HTLX520.1 HTLX525.1

GAS/LIGHT OIL

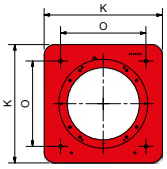
OVERALL DIMENSIONS (HTLX... - HTLX...FGR)



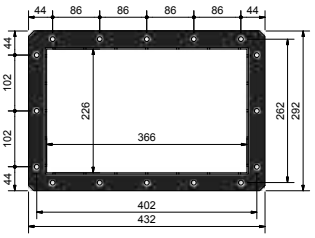




Boiler recommended drilling template



Burner flange



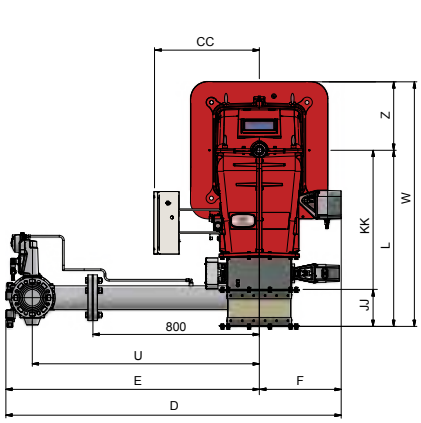
Air inlet flange

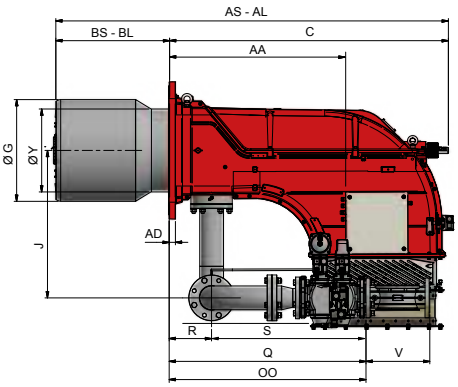
Type	DN	Overall dimensions (mm)																													
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
HTLX512R	50	1585	1685	536	25	430	530	1155	314	1308	946	362	309	349	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	311	270
HTLX512R	65	1585	1685	536	25	430	530	1155	314	1331	969	362	309	349	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	311	270
HTLX512R	80	1585	1685	536	25	430	530	1155	314	1364	1002	362	309	349	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	311	270
HTLX512R	100	1585	1685	536	25	430	530	1155	314	1444	1082	362	309	349	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	311	270
HTLX512.1	50	1585	1685	536	25	430	530	1155	314	1308	946	362	328	370	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	330	270
HTLX512.1	65	1585	1685	536	25	430	530	1155	314	1331	969	362	328	370	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	330	270
HTLX512.1	80	1585	1685	536	25	430	530	1155	314	1364	1002	362	328	370	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	330	270
HTLX512.1	100	1585	1685	536	25	430	530	1155	314	1444	1082	362	328	370	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	330	270
HTLX515.1	50	1585	1685	536	25	430	530	1155	314	1308	946	362	360	400	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	356	270
HTLX515.1	65	1585	1685	536	25	430	530	1155	314	1331	969	362	360	400	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	356	270
HTLX515.1	80	1585	1685	536	25	430	530	1155	314	1364	1002	362	360	400	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	356	270
HTLX515.1	100	1585	1685	536	25	430	530	1155	314	1444	1082	362	360	400	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	356	270
HTLX520.1	50	1585	1685	536	25	430	530	1155	314	1308	946	362	385	425	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	336	270
HTLX520.1	65	1585	1685	536	25	430	530	1155	314	1331	969	362	385	425	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	336	270
HTLX520.1	80	1585	1685	536	25	430	530	1155	314	1364	1002	362	385	425	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	336	270
HTLX520.1	100	1585	1685	536	25	430	530	1155	314	1444	1082	362	385	425	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	336	270
HTLX525.1	65	1585	1685	536	25	430	530	1155	314	1331	969	362	419	469	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	336	270
HTLX525.1	80	1585	1685	536	25	430	530	1155	314	1364	1002	362	419	469	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	336	270
HTLX525.1	100	1585	1685	536	25	430	530	1155	314	1444	1082	362	419	469	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	336	270

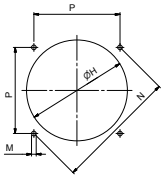
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

HTLX1030R HTLX1030.1 HTLX HTLX...FGR TYPE

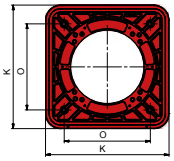
OVERALL DIMENSIONS (HTLX... - HTLX...FGR)



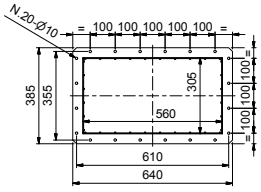




Boiler recommended drilling template



Burner flange



Air inlet flange

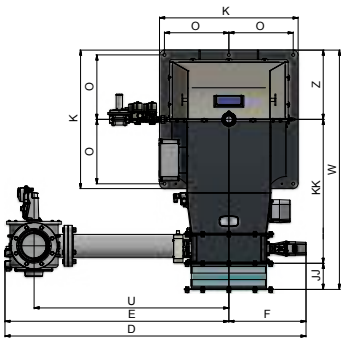
Type	DN	Overall dimensions (mm)																													
		AS	AL	AA	AD	BS	BL	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
HTLX1030R	80	1986	2086	848	30	445	545	1541	540	1816	1219	520	446	500	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	448	329
HTLX1030R	100	1986	2086	848	30	445	545	1541	540	1816	1219	520	446	500	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	448	329
HTLX1030R	125	1986	2086	848	30	445	545	1541	540	1816	1219	520	446	500	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	448	329
HTLX1030.1	80	1986	2086	848	30	445	545	1541	540	1816	1219	520	489	541	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	399	329
HTLX1030.1	100	1986	2086	848	30	445	545	1541	540	1816	1219	520	489	541	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	399	329
HTLX1030.1	125	1986	2086	848	30	445	545	1541	540	1816	1219	520	489	541	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	399	329

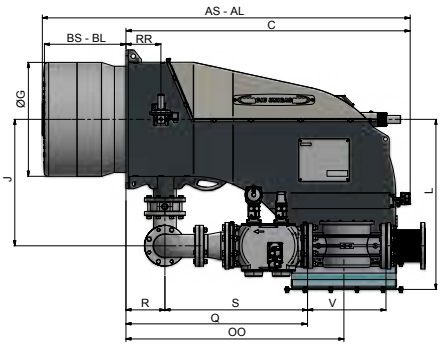
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

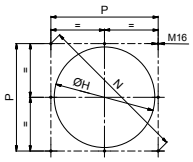
HTLX_HTLX...FGR TYPE HTLX2020 HTLX2030 HTLX2040

GAS/LIGHT OIL

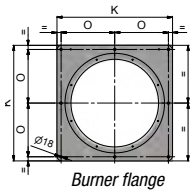
OVERALL DIMENSIONS (HTLX... - HTLX...FGR)



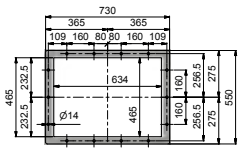




Boiler recommended drilling template



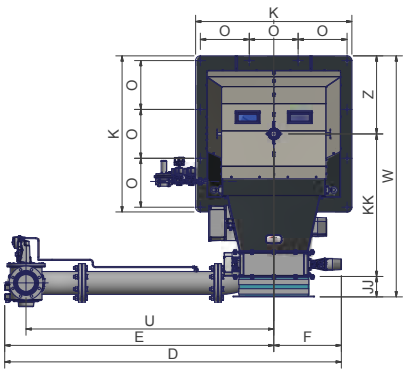
Burner flange

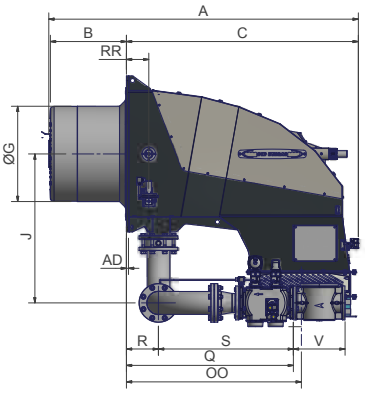


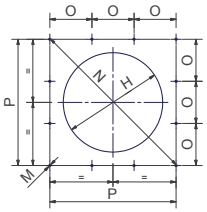
Air inlet flange

Type	DN	Overall dimensions (mm)																												
		AS	AL	BS	BL	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
HTLX2020	100	2465	2615	500	650	1875	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	635	425
HTLX2020	125	2465	2615	500	650	1875	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	635	425
HTLX2030	100	2456	2606	500	650	1875	1847	1339	507	659	717	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	-	425
HTLX2030	125	2456	2606	500	650	1875	1847	1339	507	659	717	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	-	425
HTLX2040	125	2456	2606	500	650	1875	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	651	425
HTLX2040	150	2456	2606	500	650	1875	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	1114	239	215	875	1195	-	1468	651	425

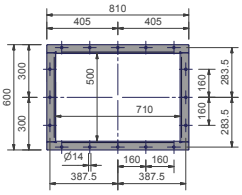
OVERALL DIMENSIONS (HTLX... - HTLX...FGR)







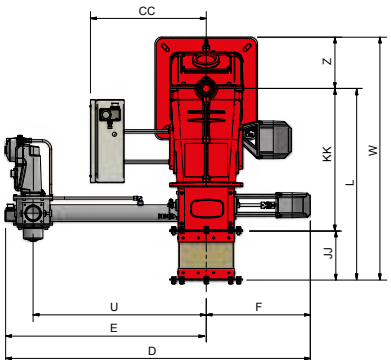
Boiler recommended drilling template

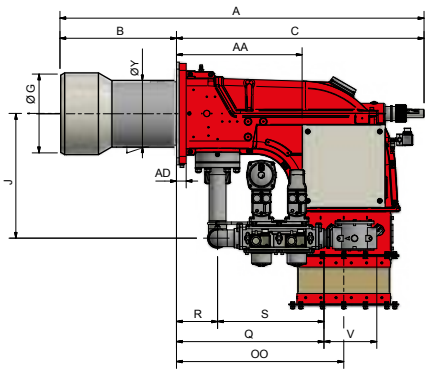


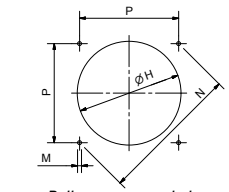
Air inlet flange

Type	DN	Overall dimensions (mm)																											
		A	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
HTLX3050	150	2713	750	1951	-	1847	1374	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	1113	239	-	874	1196	481	1468	651	425
HTLX3050	200	2713	750	1951	-	-	-	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	-	239	-	-	-	-	1468	651	425

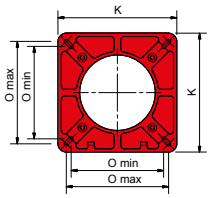
OVERALL DIMENSIONS



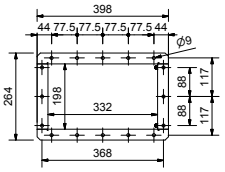




Boiler recommended drilling template



Burner flange



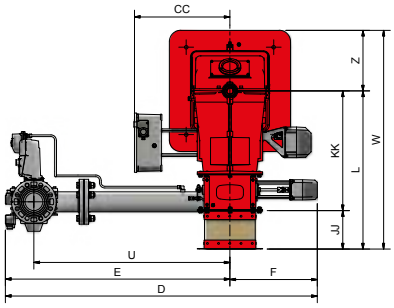
Air inlet flange

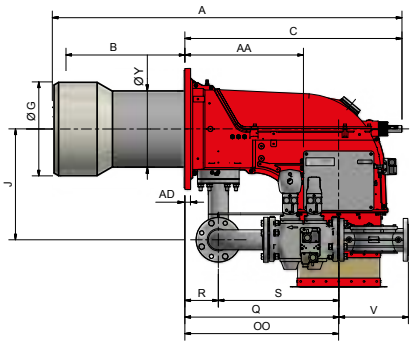
Type	DN	Overall dimensions (mm)																													
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O		OO	P	Q	R	S	U	V	W	Y	Z
																				min.	max.										
KTP90	50	1593	454	28	527	1066	305	1349	859	490	274	304	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	198	185
KTP90	65	1593	454	28	527	1066	305	1543	1053	490	274	304	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	198	185
KTP90	80	1593	454	28	527	1066	305	1574	1084	490	274	304	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	198	185
KTP90	100	1593	454	28	527	1066	305	1657	1167	490	274	304	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	198	185
KTP91	50	1586	454	28	520	1066	305	1349	859	490	304	344	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
KTP91	65	1586	454	28	520	1066	305	1543	1053	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
KTP91	80	1586	454	28	520	1066	305	1574	1084	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
KTP91	100	1586	454	28	520	1066	305	1657	1167	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
KTP92	50	1586	454	28	520	1066	305	1349	859	490	304	344	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
KTP92	65	1586	454	28	520	1066	305	1543	1053	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
KTP92	80	1586	454	28	520	1066	305	1574	1084	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
KTP92	100	1586	454	28	520	1066	305	1657	1167	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185
KTP93	50	1586	454	28	520	1066	305	1349	859	490	304	344	449	175	360	510	685	M12	424	280	310	610	300	522	148	374	624	216	870	228	185
KTP93	65	1586	454	28	520	1066	305	1543	1053	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	632	148	484	846	292	870	228	185
KTP93	80	1586	454	28	520	1066	305	1574	1084	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	683	148	535	875	313	870	228	185
KTP93	100	1586	454	28	520	1066	305	1657	1167	490	304	344	447	175	360	510	685	M12	424	280	310	610	300	790	148	642	942	353	870	228	185

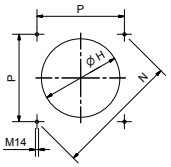
Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

KTP512 KTP515 KTP520 KTP525 KTP TYPE

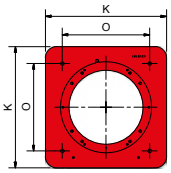
OVERALL DIMENSIONS



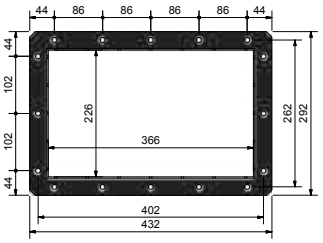




Boiler recommended drilling template



Burner flange

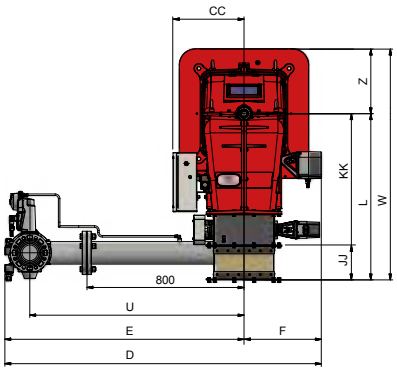


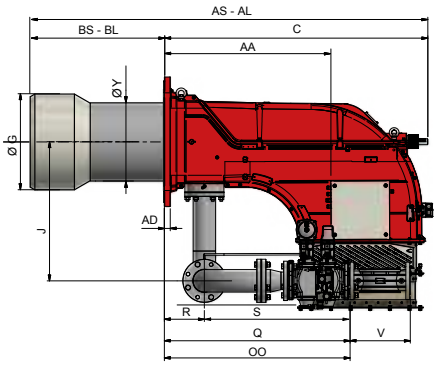
Air inlet flange

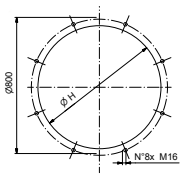
Type	DN	Overall dimensions (mm)																												
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
KTP512	50	1675	536	25	520	1055	314	1308	946	362	340	380	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	328	270
KTP512	65	1675	536	25	520	1055	314	1331	969	362	340	380	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	328	270
KTP512	80	1675	536	25	520	1055	314	1364	1002	362	340	380	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	328	270
KTP512	100	1675	536	25	520	1055	314	1444	1082	362	340	380	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	328	270
KTP515	50	1675	536	25	520	1055	314	1308	946	362	380	420	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	356	270
KTP515	65	1675	536	25	520	1055	314	1331	969	362	380	420	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	356	270
KTP515	80	1675	536	25	520	1055	314	1364	1002	362	380	420	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	356	270
KTP515	100	1675	536	25	520	1055	314	1444	1082	362	380	420	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	356	270
KTP520	50	1675	536	25	520	1055	314	1308	946	362	400	440	494	175	460	532	707	M14	552	390	686	390	765	160	605	843	216	977	385	270
KTP520	65	1675	536	25	520	1055	314	1331	969	362	400	440	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	385	270
KTP520	80	1675	536	25	520	1055	314	1364	1002	362	400	440	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	385	270
KTP520	100	1675	536	25	520	1055	314	1444	1082	362	400	440	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	385	270
KTP525	65	1675	536	25	520	1055	314	1331	969	362	434	484	494	175	460	532	707	M14	552	390	686	390	644	160	484	843	292	977	419	270
KTP525	80	1675	536	25	520	1055	314	1364	1002	362	434	484	494	175	460	532	707	M14	552	390	686	390	695	160	535	875	313	977	419	270
KTP525	100	1675	536	25	520	1055	314	1444	1082	362	434	484	494	175	460	532	707	M14	552	390	686	390	802	160	642	942	353	977	419	270

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

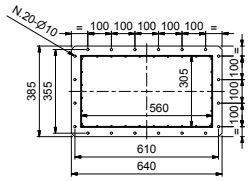
OVERALL DIMENSIONS



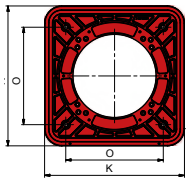




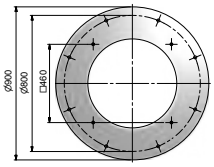
Boiler recommended drilling template



Air inlet flange



Burner flange

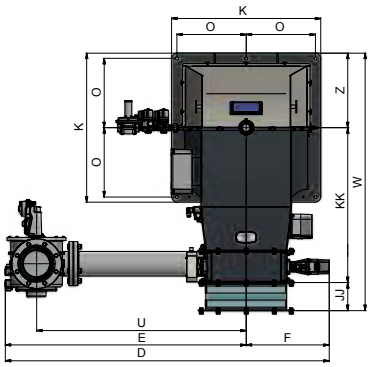


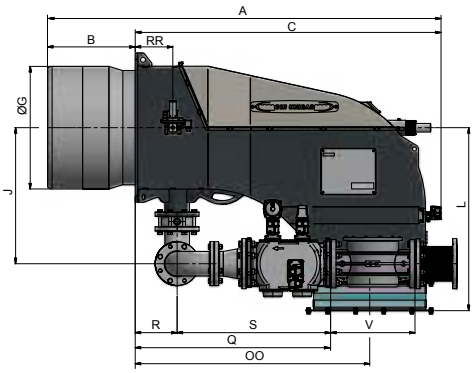
Counterflange

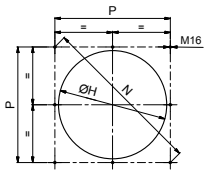
Type	DN	Overall dimensions (mm)																											
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	U	V	W	Y	Z
KTP1030	80	2121	848	30	580	1541	540	1816	1219	520	600	660	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	372	329
KTP1030	100	2121	848	30	580	1541	540	1816	1219	520	600	660	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	372	329
KTP1050	80	2121	848	30	580	1541	540	1816	1219	520	633	693	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	310	1175	408	329
KTP1050	100	2121	848	30	580	1541	540	1816	1219	520	633	693	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	408	329
KTP1080	100	2145	848	30	604	1541	540	1816	1219	520	671	731	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	350	1175	408	329
KTP1080	125	2145	848	30	604	1541	540	1816	1219	520	671	731	709	175	660	672	845	M16	651	460	1000	460	937	204	733	1092	478	1175	408	329

Dimensions CC - U - E - D refer to burners with maximum overall dimensions of hot air and mechanical version models.
In standard and electronic versions these dimensions may be smaller.

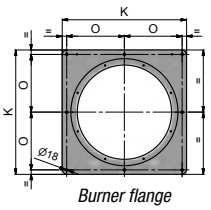
OVERALL DIMENSIONS



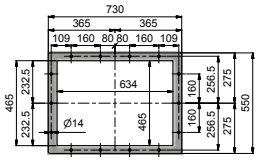




Boiler recommended drilling template



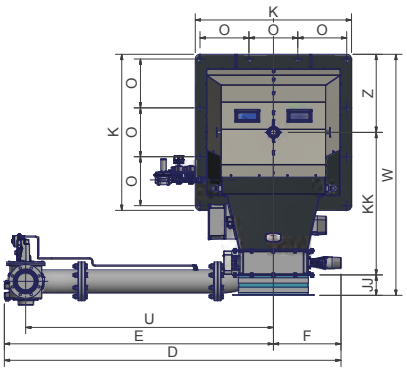
Burner flange

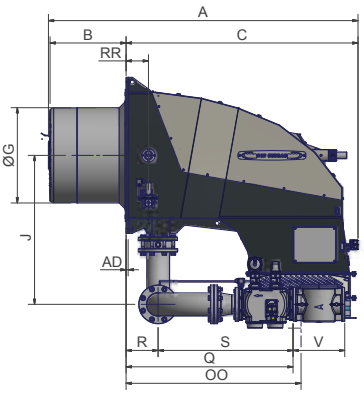


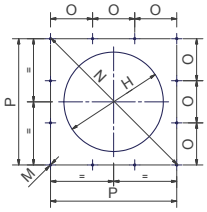
Air inlet flange

Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
KTP2000	100	2615	650	1875	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	635	425
KTP2000	125	2615	650	1875	1847	1339	507	545	700	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	635	425
KTP2500	125	2606	650	1875	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	698	425
KTP2500	150	2606	650	1875	1847	1373	473	698	760	775	160	850	882	1468	M16	1117	395	1337	790	1114	239	215	875	1195	481	1468	698	425

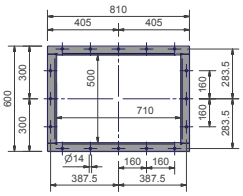
OVERALL DIMENSIONS







Boiler recommended drilling template

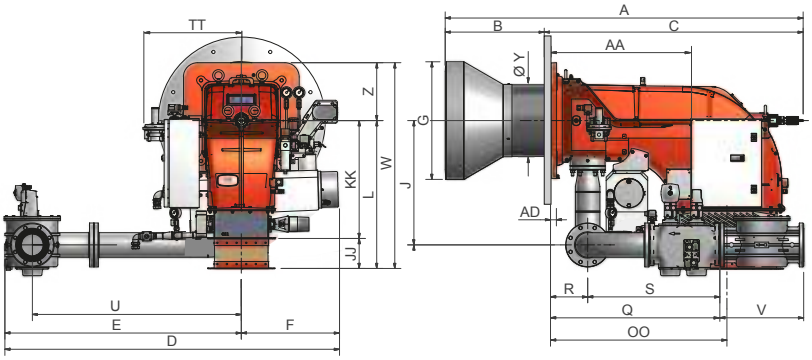


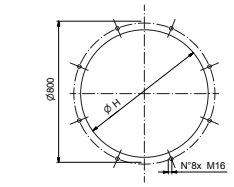
Air inlet flange

Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
KTP3000	150	2713	750	1951	1847	1374	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	1113	239	215	874	1196	481	1468	651	425
KTP3000	200	2713	750	1951	-	-	414	698	850	775	160	850	882	1042	M16	1117	395	1289	790	-	239	215	-	-	-	-	-	-

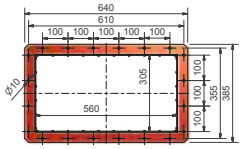
KTPBY90 KTPBY91 KTPBY92 KTPBY93 KTPBY TYPE

OVERALL DIMENSIONS

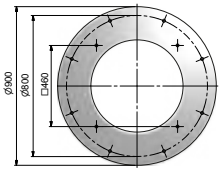




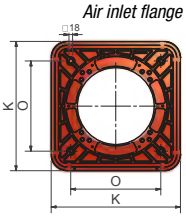
Boiler recommended drilling template



Air inlet flange



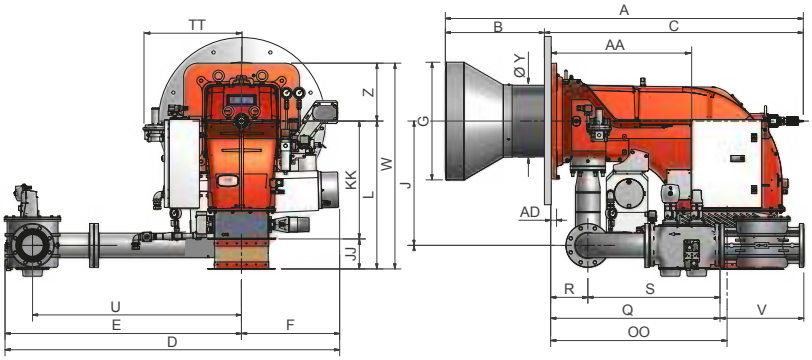
Counterflange

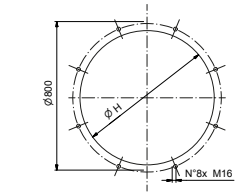


Burner flange

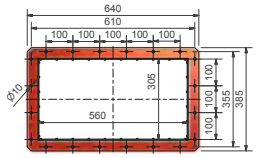
Type	DN	Overall dimensions (mm)																												
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	Q	R	S	TT	U	V	W	Y	Z
KTPBY90	50	1618	454	28	552	1066	305	1349	859	490	365	405	449	175	360	510	685	M12	424	300	610	522	148	374	524	624	216	870	198	185
KTPBY90	65	1618	454	28	552	1066	305	1543	1053	490	365	405	447	175	360	510	685	M12	424	300	610	632	148	484	524	846	292	870	198	185
KTPBY90	80	1618	454	28	552	1066	305	1574	1084	490	365	405	447	175	360	510	685	M12	424	300	610	683	148	535	524	875	313	870	198	185
KTPBY90	100	1618	454	28	552	1066	305	1657	1167	490	365	405	447	175	360	510	685	M12	424	300	610	790	148	642	524	942	353	870	198	185
KTPBY91	50	1618	454	28	552	1066	305	1349	859	490	365	405	449	175	360	510	685	M12	424	300	610	522	148	374	524	624	216	870	228	185
KTPBY91	65	1618	454	28	552	1066	305	1543	1053	490	365	405	447	175	360	510	685	M12	424	300	610	632	148	484	524	846	292	870	228	185
KTPBY91	80	1618	454	28	552	1066	305	1574	1084	490	365	405	447	175	360	510	685	M12	424	300	610	683	148	535	524	875	313	870	228	185
KTPBY91	100	1618	454	28	552	1066	305	1657	1167	490	365	405	447	175	360	510	685	M12	424	300	610	790	148	642	524	942	353	870	228	185
KTPBY92	50	1618	454	28	552	1066	305	1349	859	490	365	405	449	175	360	510	685	M12	424	300	610	522	148	374	524	624	216	870	228	185
KTPBY92	65	1618	454	28	552	1066	305	1543	1053	490	365	405	447	175	360	510	685	M12	424	300	610	632	148	484	524	846	292	870	228	185
KTPBY92	80	1618	454	28	552	1066	305	1574	1084	490	365	405	447	175	360	510	685	M12	424	300	610	683	148	535	524	875	313	870	228	185
KTPBY92	100	1618	454	28	552	1066	305	1657	1167	490	365	405	447	175	360	510	685	M12	424	300	610	790	148	642	524	942	353	870	228	185
KTPBY93	50	1580	454	28	514	1066	305	1349	859	490	410	460	449	175	360	510	685	M12	424	300	610	522	148	374	524	624	216	870	228	185
KTPBY93	65	1580	454	28	514	1066	305	1543	1053	490	410	460	447	175	360	510	685	M12	424	300	610	632	148	484	524	846	292	870	228	185
KTPBY93	80	1580	454	28	514	1066	305	1574	1084	490	410	460	447	175	360	510	685	M12	424	300	610	683	148	535	524	875	313	870	228	185
KTPBY93	100	1580	454	28	514	1066	305	1657	1167	490	410	460	447	175	360	510	685	M12	424	300	610	790	148	642	524	942	353	870	228	185

OVERALL DIMENSIONS

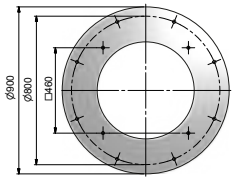




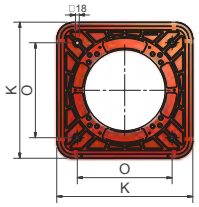
Boiler recommended drilling template



Air inlet flange



Counterflange

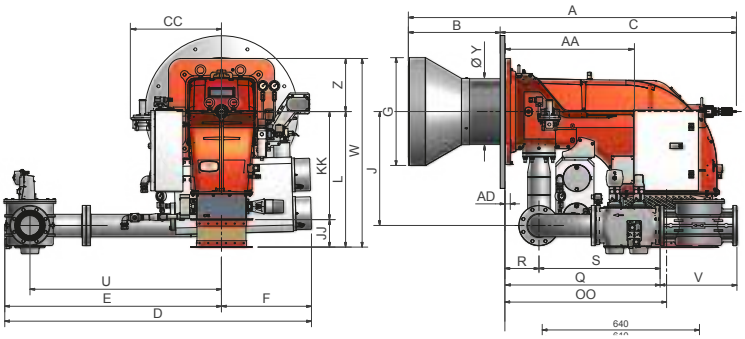


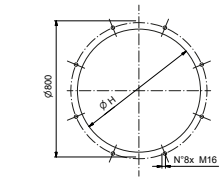
Burner flange

Type	DN	Overall dimensions (mm)																													
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	S	TT	U	V	W	Y	Z
KTPBY512	50	1648	536	25	593	1055	314	1308	946	362	500	550	494	175	460	532	707	M14	552	390	686	390	765	160	605	524	843	216	977	319	270
KTPBY512	65	1648	536	25	593	1055	314	1331	969	362	500	550	494	175	460	532	707	M14	552	390	686	390	644	160	484	524	843	292	977	319	270
KTPBY512	80	1648	536	25	593	1055	314	1364	1002	362	500	550	494	175	460	532	707	M14	552	390	686	390	695	160	535	524	875	313	977	319	270
KTPBY512	100	1648	536	25	593	1055	314	1444	1082	362	500	550	494	175	460	532	707	M14	552	390	686	390	802	160	642	524	942	353	977	319	270
KTPBY515	50	1627	536	25	572	1055	314	1308	946	362	500	550	494	175	460	532	707	M14	552	390	686	390	765	160	605	524	843	216	977	319	270
KTPBY515	65	1627	536	25	572	1055	314	1331	969	362	500	550	494	175	460	532	707	M14	552	390	686	390	644	160	484	524	843	292	977	319	270
KTPBY515	80	1627	536	25	572	1055	314	1364	1002	362	500	550	494	175	460	532	707	M14	552	390	686	390	695	160	535	524	875	313	977	319	270
KTPBY515	100	1627	536	25	572	1055	314	1444	1082	362	500	550	494	175	460	532	707	M14	552	390	686	390	802	160	642	524	942	353	977	319	270
KTPBY520	50	1618	536	25	552	1055	314	1308	946	362	365	405	494	175	460	532	707	M14	552	390	686	390	765	160	605	524	843	216	977	335	270
KTPBY520	65	1618	536	25	552	1055	314	1331	969	362	365	405	494	175	460	532	707	M14	552	390	686	390	644	160	484	524	843	292	977	335	270
KTPBY520	80	1618	536	25	552	1055	314	1364	1002	362	365	405	494	175	460	532	707	M14	552	390	686	390	695	160	535	524	875	313	977	335	270
KTPBY520	100	1618	536	25	552	1055	314	1444	1082	362	365	405	494	175	460	532	707	M14	552	390	686	390	802	160	642	524	942	353	977	335	270
KTPBY525	65	1580	536	25	514	1055	314	1331	969	362	410	460	494	175	460	532	707	M14	552	390	686	390	644	160	484	524	843	292	977	328	270
KTPBY525	80	1580	536	25	514	1055	314	1364	1002	362	410	460	494	175	460	532	707	M14	552	390	686	390	695	160	535	524	875	313	977	328	270
KTPBY525	100	1580	536	25	514	1055	314	1444	1082	362	410	460	494	175	460	532	707	M14	552	390	686	390	802	160	642	524	942	353	977	328	270

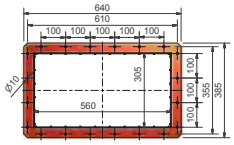
KTPBY1030 KTPBY1050 KTPBY1080 KTPBY TYPE

OVERALL DIMENSIONS

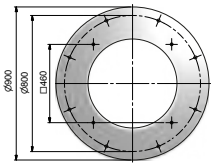




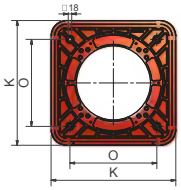
Boiler recommended drilling template



Air inlet flange



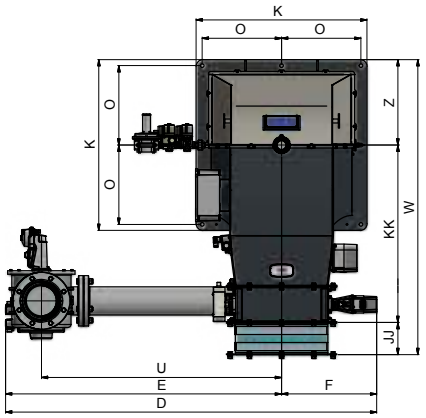
Counterflange

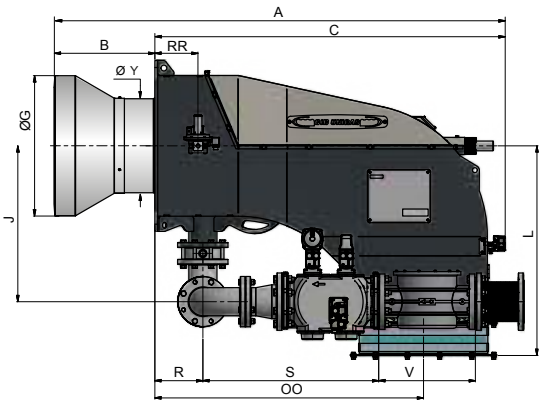


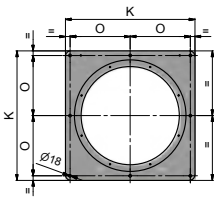
Burner flange

Type	DN	Overall dimensions (mm)																											
		A	AA	AD	B	C	CC	D	E	F	G	H	J	JJ	K	KK	L	M	O	OO	Q	R	S	U	V	W	Y	Z
KTPBY1030	80	2009	848	30	571	1438	556	1816	1219	520	600	731	709	175	660	672	845	M16	460	1000	937	204	733	1092	310	1175	372	329
KTPBY1030	100	2009	848	30	571	1438	556	1816	1219	520	600	731	709	175	660	672	845	M16	460	1000	937	204	733	1092	350	1175	372	329
KTPBY1050	80	2009	848	30	571	1438	556	1816	1219	520	600	731	709	175	660	672	845	M16	460	1000	937	204	733	1092	310	1175	408	329
KTPBY1050	100	2009	848	30	571	1438	556	1816	1219	520	600	731	709	175	660	672	845	M16	460	1000	937	204	733	1092	350	1175	408	329
KTPBY1080	100	2042	848	30	604	1438	556	1909	1349	560	671	731	709	175	660	672	845	M16	460	1000	937	204	733	1192	350	1175	417	329
KTPBY1080	125	2042	848	30	604	1438	556	1909	1349	560	671	731	709	175	660	672	845	M16	460	1000	937	204	733	1192	478	1175	417	329

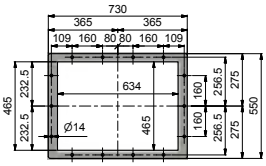
OVERALL DIMENSIONS



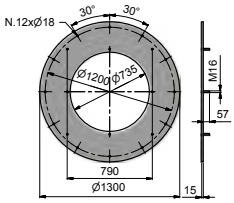




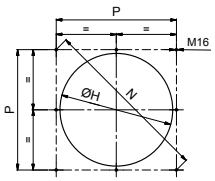
Burner flange



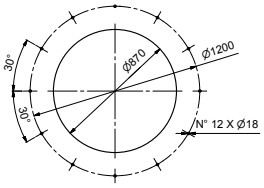
Air inlet flange



Counterflange



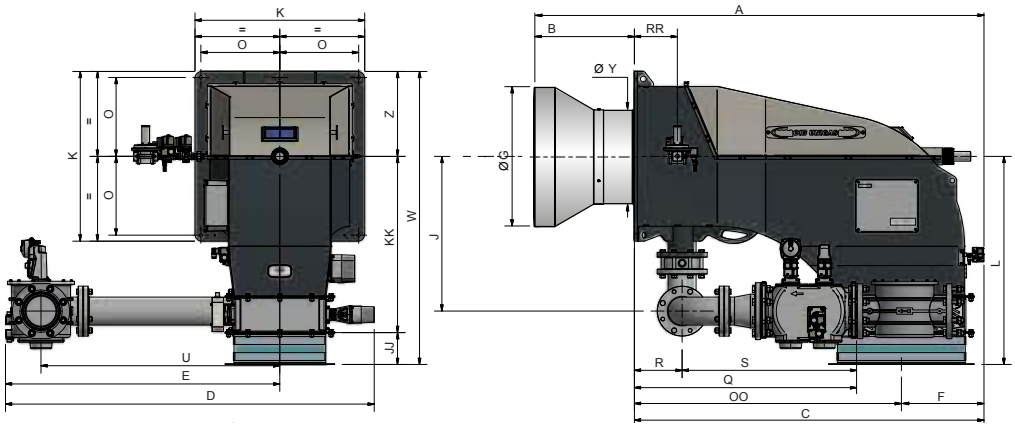
Boiler recommended drilling template - KTPBY2000

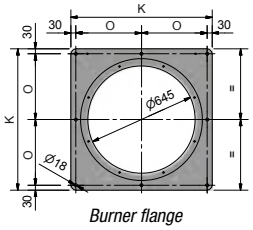


Boiler recommended drilling template - KTPBY2500

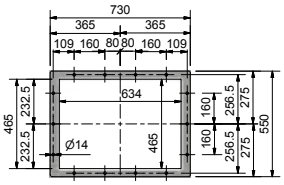
Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
KTPBY2000	100	2425	550	1875	1847	1339	507	700	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	353	1468	635	425
KTPBY2000	125	2425	550	1875	1847	1339	507	700	760	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	635	425
KTPBY2500	125	2425	550	1875	1847	1373	473	810	870	775	160	850	882	1468	M16	1117	395	1337	790	970	239	215	731	1195	481	1468	698	425
KTPBY2500	150	2425	550	1875	1847	1373	473	810	870	775	160	850	882	1468	M16	1117	395	1337	790	1114	239	215	875	1195	481	1468	698	425

OVERALL DIMENSIONS

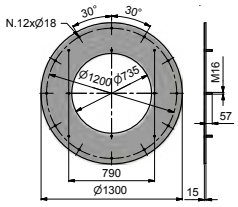




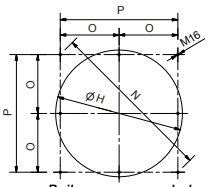
Burner flange



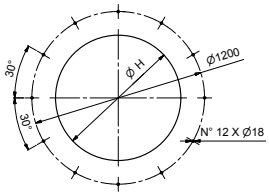
Air inlet flange



Counterflange



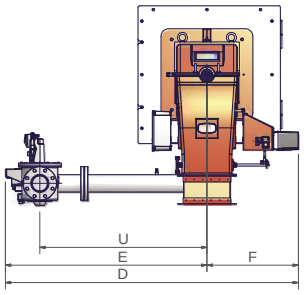
Boiler recommended drilling template

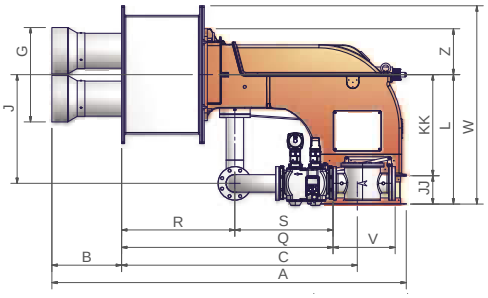


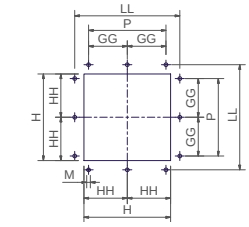
Boiler recommended drilling template

Type	DN	Overall dimensions (mm)																										
		A	B	C	D	E	F	G	H	J	JJ	K	KK	L	M	N	O	OO	P	Q	R	RR	S	U	V	W	Y	Z
KTPBY3000	150	-	-	1951	1847	1374	414	-	-	775	160	850	882	1042	M16	1117	395	-	790	1113	239	-	874	1196	481	1468	-	425
KTPBY3000	200	-	-	1951	-	-	414	-	-	775	160	850	882	1042	M16	1117	395	-	790	-	239	-	-	-	-	-	-	-

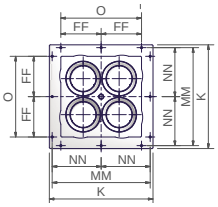
OVERALL DIMENSIONS



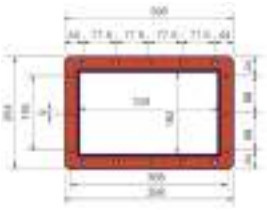




Boiler recommended drilling template



Burner flange

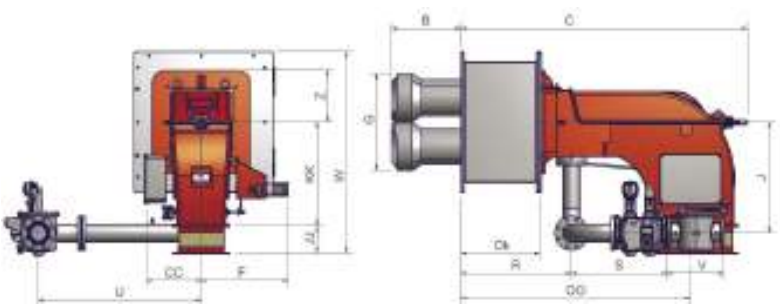


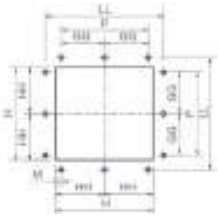
Air inlet flange

Type	DN	Overall dimensions (mm)																											
		A	B	C	D	E	F	FF	G	GG	H	HH	J	JJ	K	KK	L	LL	M	MM	NN	O	P	Q	R	S	U	V	W	Z
KTPBY93	50	1361	304	1122	1342	852	490	255	386	255	442	221	449	185	550	510	695	510	M12	510	255	510	510	778	404	374	624	216	825	180
KTPBY93	65	1361	304	1122	1447	957	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	887	404	403	750	293	840	180
KTPBY93	80	1361	304	1122	1449	959	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	939	404	444	750	322	854	180
KTPBY93	100	1361	304	1122	1539	1049	490	255	386	255	442	221	447	185	550	510	695	510	M12	510	255	510	510	1046	404	524	824	382	867	180

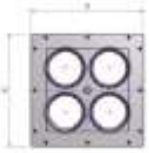
KTPBY515 KTPBY525 KTPBY...VS TYPE

OVERALL DIMENSIONS

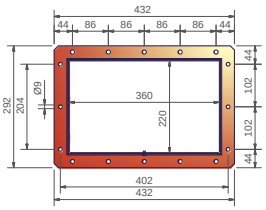




Boiler recommended drilling template



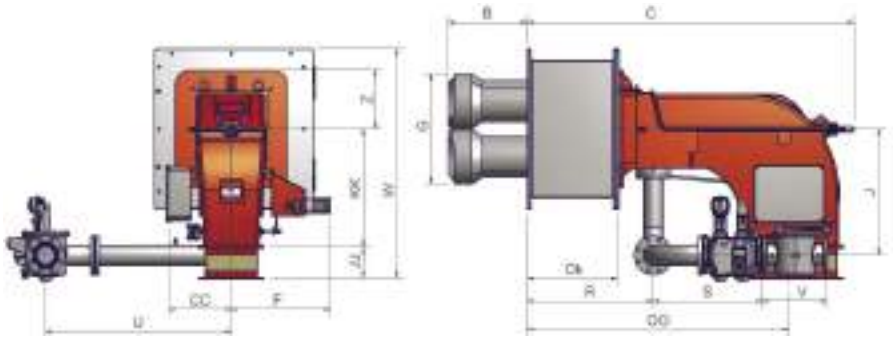
Burner flange

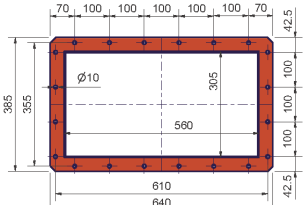


Air inlet flange

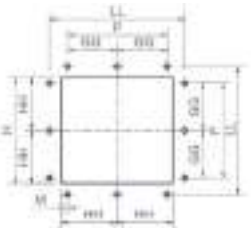
Type	DN	Overall dimensions (mm)																							
		B	C	CC	D	Dk	E	F	GG	H	HH	J	JJ	K	KK	L	LL	M	OO	P	R	S	U	V	W	Z
KTPBY515	50	-	1287	-	1613	310	1071	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	605	843	216	970	235
KTPBY515	65	-	1287	-	1591	310	1049	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	484	843	292	970	235
KTPBY515	80	-	1287	-	1626	310	1084	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	535	875	313	970	235
KTPBY515	100	-	1287	-	1709	310	1167	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	642	942	353	970	235
KTPBY525	65	478	1287	-	1591	310	1049	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	484	843	292	970	235
KTPBY525	80	478	1287	-	1626	310	1084	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	535	875	313	970	235
KTPBY525	100	478	1287	-	1709	310	1167	542	275	-	300	494	175	750	532	707	700	M16	693	550	470	642	942	353	970	235

OVERALL DIMENSIONS

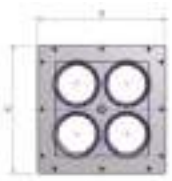




Air inlet flange

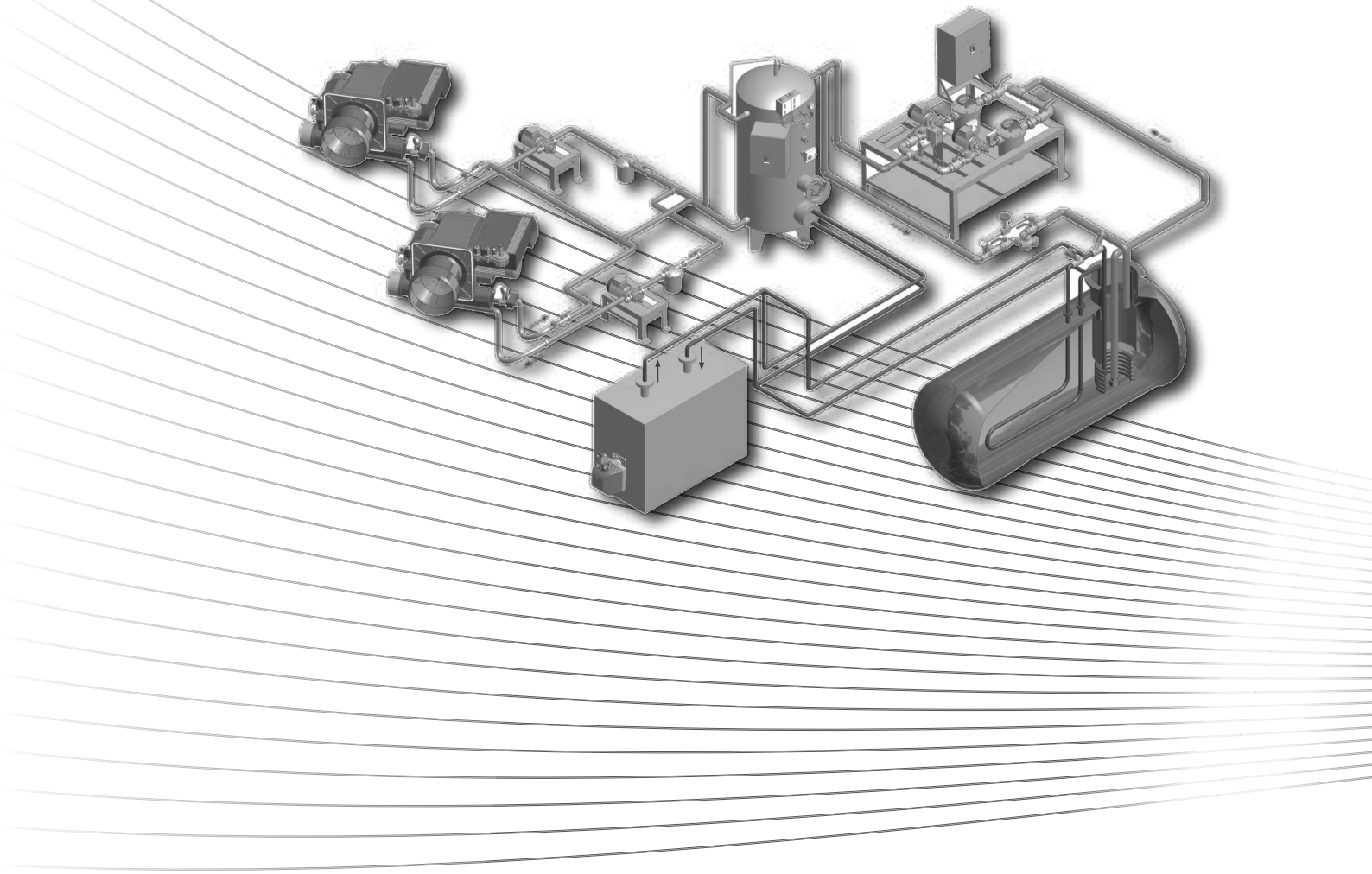


Boiler recommended drilling template



Burner flange

Type	DN	Overall dimensions (mm)																						
		B	C		CC	Dk	F	G	GG	H	HH	J	JJ	K	KK	LL	M	OO	P	R	S	U	V	W	Z
			min.	max.																					
KTPBY1030	80	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	736	1092	322	1170	330
KTPBY1030	100	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	642	1092	382	1170	330
KTPBY1030	125	435	1660	1961	348÷383	340	450÷670	560	275	600	300	710	175	750	665	700	16	1000	550	200	754	1192	480	1170	330
KTPBY1080	100	422	1860	2161	348÷383	540	450÷670	700	350	750	375	710	175	900	665	850	16	1000	700	200	642	1092	382	1170	330
KTPBY1080	125	422	1860	2161	348÷383	540	450÷670	700	350	750	375	710	175	900	665	850	16	1000	700	200	754	1192	480	1170	330



WITH LMV 2... MICRO PROCESSOR

EA Medium-large burners complete with electronic cam

EB Medium-large burners complete with electronic cam and inverter

EC Medium-large dual fuel burners complete with electronic cam

ED Medium-large dual fuel burners complete with electronic cam and inverter

WITH LMV 5... MICRO PROCESSOR

ES Medium-large burners complete with electronic cam, without O_2 control, without Inverter.

EO Medium-large burners complete with electronic cam and O_2 control, without Inverter

EI Medium-large burners complete with electronic cam and Inverter, without O_2 control

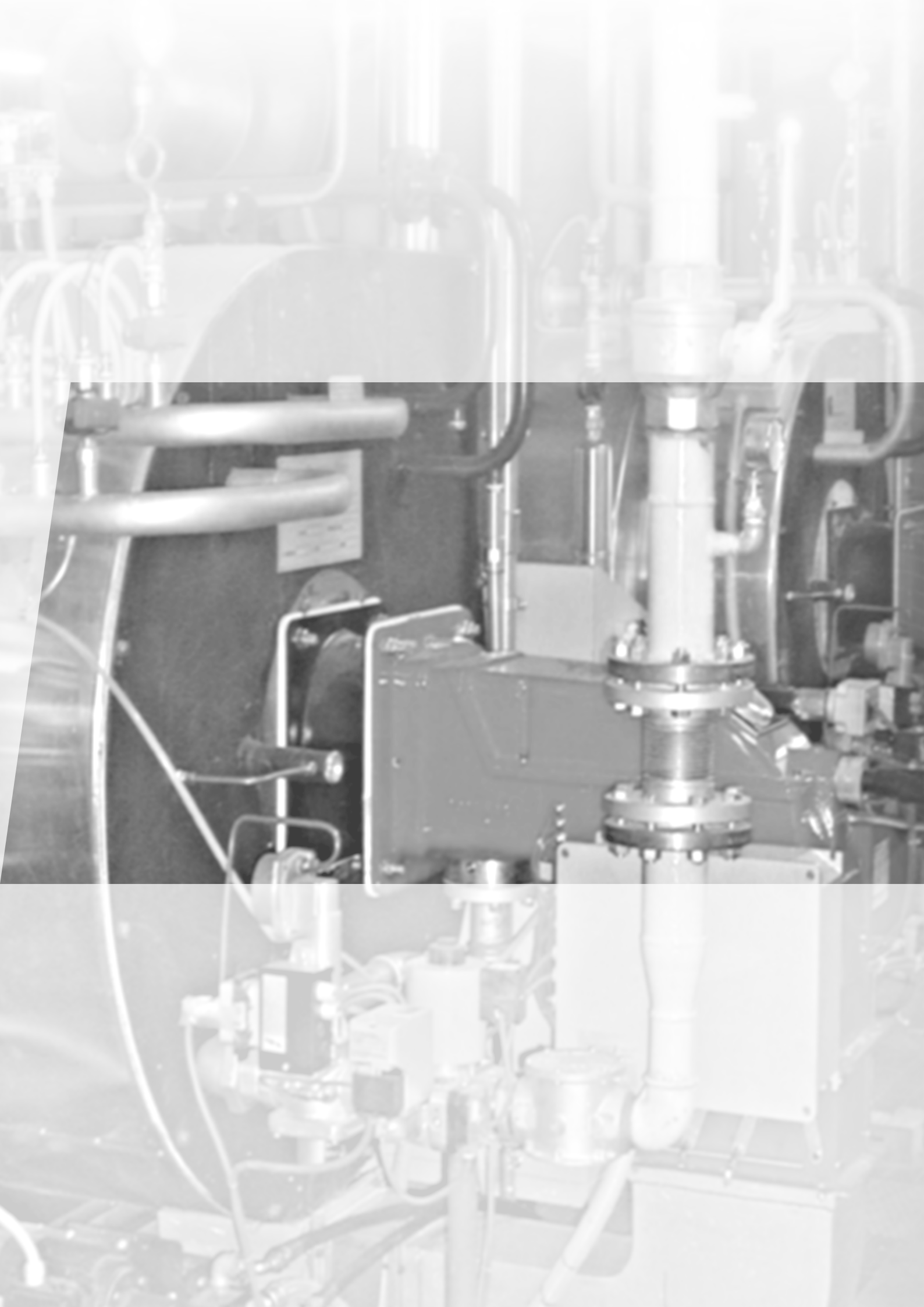
EK Medium-large burners complete with electronic cam with O_2 control and with Inverter

EF Medium-large burners complete with electronic cam and temperature-compensated flue gas recirculation FGR without O_2 monitoring, without inverter

EG Medium-large burners complete with electronic cam, inverter and temperature-compensated flue gas recirculation FGR without O_2 monitoring

EP Medium-large burners complete with electronic cam and temperature-compensated flue gas recirculation FGR with O_2 monitoring and without inverter

ER Medium-large burners complete with electronic cam, inverter and temperature-compensated flue gas recirculation FGR with O_2 monitoring

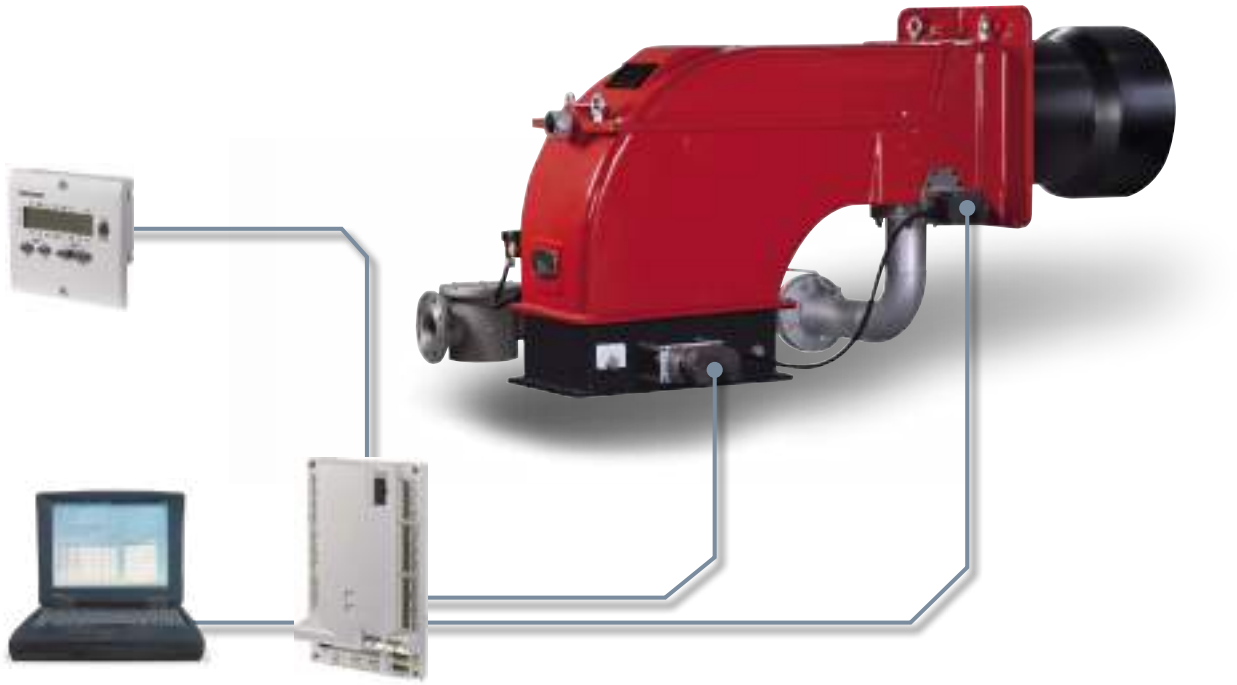


WITH LMV 2... 3... MICROPROCESSOR for medium-large burners

CIB UNIGAS S.p.A. can provide medium size burners (up to 15.200 kW), with an electronic control system. It can be used both on single fuel burners (gas or light oil), and on dual fuel burners (gas/light oil).

This system offers the following features:

- Reduction of mechanical moving parts
- Built-in burner management system (BMS)
- Integrated gas proving system
- Possibility to install different types of flame sensors, in order to use the electronic cam system on all applications
- Variable speed drive VSD (only on certain versions)
- Error-code display on screen in case of lock-out
- Possibility to program or to exclude the post purge time
- Display mode of operating hours



Modbus communication, upon request, except the base version.

Optimal air/fuel ratio regulation, with high precision and repeatability of the regulations made.

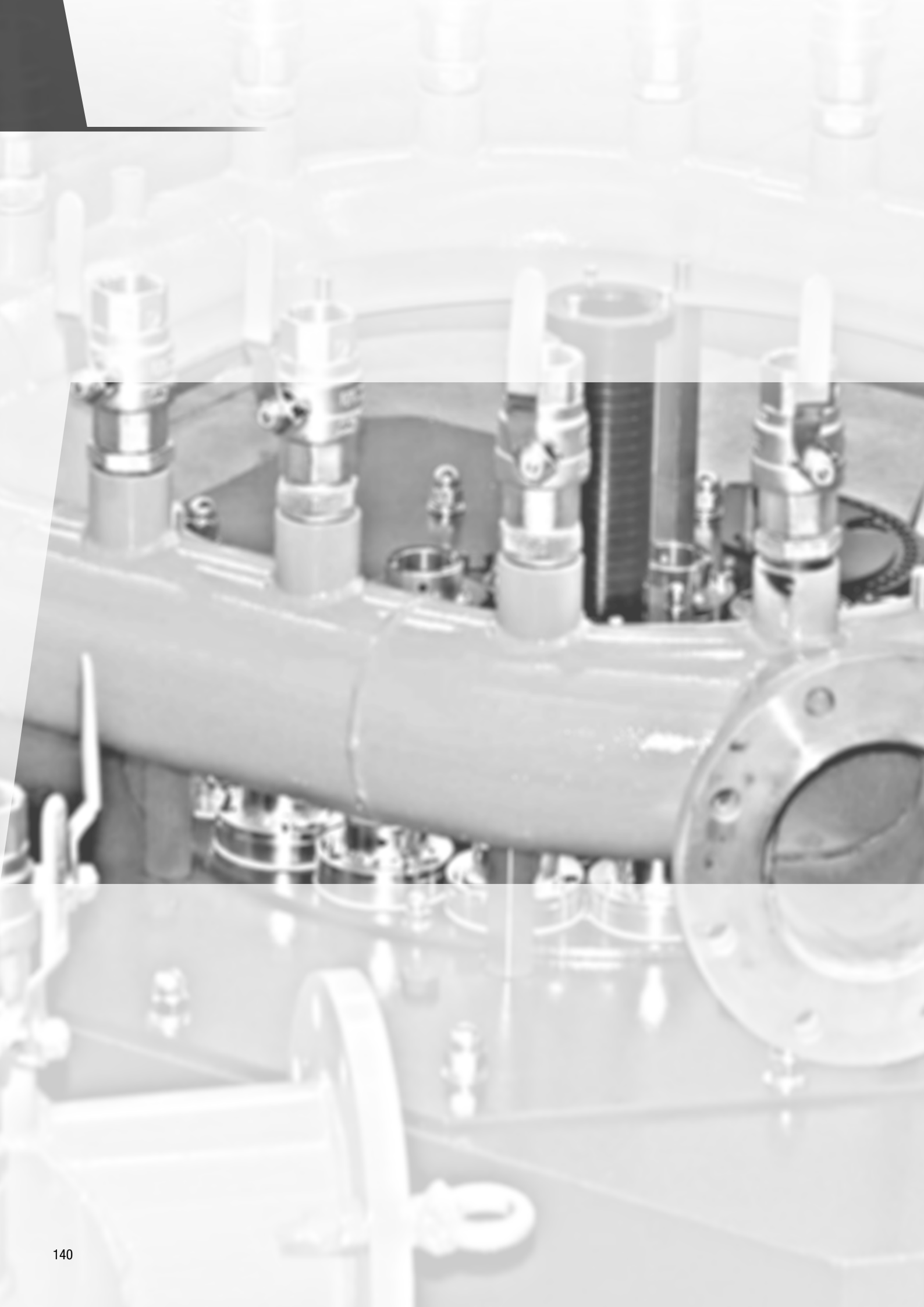
Easy programming, both through the AZL programmer, and the Siemens software.

WITH LMV 2... 3... MICROPROCESSOR
for medium-large burners

								
Model	Series	Fuel	LMV 20	LMV 26	LMV 27	LMV 37	AGM60	
EA	TECNOPRESS NOVANTA CINQUECENTO	gas	●					
EA	MILLE DUEMILA	gas			●			
EA	TECNOPRESS NOVANTA CINQUECENTO	liquid fuel	●		● light oil			
EA	MILLE DUEMILA	liquid fuel			●			
EB	TECNOPRESS NOVANTA CINQUECENTO	gas				●		
EB	MILLE DUEMILA	gas				●		
EB	TECNOPRESS NOVANTA CINQUECENTO	liquid fuel				●		
EB	MILLE DUEMILA	liquid fuel				●		
EC	TECNOPRESS NOVANTA CINQUECENTO	dual fuel burners HR-KP		●				
EC	MILLE	dual fuel burners N		●				
EC	MILLE DUEMILA	dual fuel burners HR-KR		●			●	
EC	TECNOPRESS NOVANTA CINQUECENTO	dual fuel burners KRBY		●			●	
EC	MILLE DUEMILA	dual fuel burners KRBY		●			●	
ED	TECNOPRESS NOVANTA CINQUECENTO	dual fuel burners HR-KR		●				
ED	MILLE	dual fuel burners N		●				
ED	MILLE DUEMILA	dual fuel burners HR-KR		●			●	
ED	TECNOPRESS NOVANTA CINQUECENTO	dual fuel burners KRBY		●			●	
ED	MILLE DUEMILA	dual fuel burners KRBY		●			●	

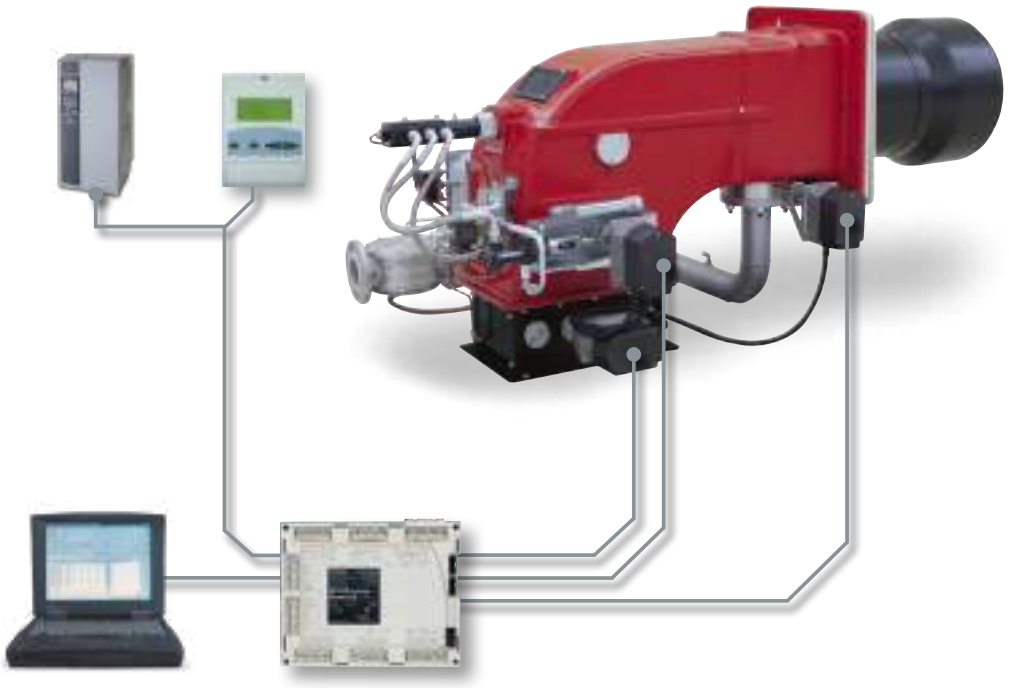
● = SQM33.711A9

					
	AZL 23	SQM33 air	SQM33 gas	SQM33 liquid fuel	INVERTER
	●	●	●		
	●	●	●		
	●	●		●	
	●	●		●	
	●	●	●		●
	●	●	●		●
	●	●		●	●
	●	●		●	●
	●	●	●		
	●	●	●		
	●	●	●	●	
	●	●	●	●	
	●	●	●	●	
	●	●	●		●
	●	●	●		●
	●	●	●	●	●
	●	●	●	●	●
	●	●	●	●	●



ELECTRONIC SUPERVISION AND CONTROL SYSTEM WITH LMV 5... for medium-large burners

CIB UNIGAS S.p.A has provided its burners with an electronic system of adjustment and control.
This innovative system, divided into two types of devices, can be used for both civil and industrial applications (up to 39 MW), and for burners which use a single or mixed fuel and with continuous or intermittent operation. This system allows the control of the various elements that play an important role in the correct mixture of the fuel and combustion air.
This solution allows to achieve the maximum precision in the combustion adjustment.
The system can be also expanded through interface with an oxygen control probe and/or a fan speed adjustment inverter, in order to improve the performance. In this way we can achieve high savings both in terms of fuel and electric consumption.
The adjustment and control system are made of a twin microprocessor electronic unit to integrate all burner's functions, and of a programming unit.
Integrated functions include: air/fuel ratio adjustment (with working point configuration possibility), PID temperature or pressure regulator, gas valve leakage control, adjustable cycle times, preconfigured fuel trains, and input/output configuration.
The programming levels are protected by password for the three types of user (OEM, service, final user); the dialogue between servocontrol and sensors is performed using twin channel CAN Bus protocol in order to guarantee the greatest safety and reliability.
The unit can be installed directly on the machine or inside a separate electric control panel positioned not more than 100 meters far away from the burner.



Using the appropriate optional software, the system can be configured directly by PC.

Flame control box integrated functions:

- Burner control;
- Built-in burner management system (BMS);
- Electronic cam;
- Power regulator;
- Gas valve leakage control system;
- Oxygen control;
- Inverter control;
- FGR control;
- Dialogue with BMS systems or PLC (MODBUS);
- Burner commissioning and configuration via PC-tool;
- Simple programming with AZL and PC-tool;
- Complete self-diagnostic function error memory, number of firings, burner operation time, clock, etc.;
- 3 levels of parameter access (manufacturer, servicing personell, final user);
- Remote diagnostics;
- All components can be easily interchanged;
- Parameter upgrading with PC-tool;
- Dialogue with MODBUS protocol.

ELECTRONIC SUPERVISION AND CONTROL SYSTEM WITH LMV 5... for medium-large burners




Model	Series	Fuel	LMV 51.100	LMV 51.300	LMV 52.200	LMV 52.400	
ES	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas	●				
ES	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	liquid fuel	●				
ES	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners	●				
EO	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas			●		
EO	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners			●		
EI	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas		●			
EI	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	liquid fuel		●			
EI	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners		●			
EK	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas			●		
EK	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners			●		
EF	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas				●	
EF	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners				●	
EG	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas				●	
EG	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners				●	
EP	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas				●	
EP	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners				●	
ER	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	gas				●	
ER	TECNOPRESS - NOVANTA CINQUECENTO - MILLE DUEMILA - TREMILA	dual fuel burners				●	

* Only monitoring

								
	AZL 5x	SQM4x air	SQM4x gas	SQM4x liquid fuel	SQM4x FGR	O_2 PROBE	FGR PROBE	INVERTER
	●	●	●					
	●	●		●				
	●	●	●	●				
	●	●	●			●		
	●	●	●	●		●		
	●	●	●					●
	●	●		●				●
	●	●	●	●				●
	●	●	●			●		●
	●	●	●	●		●		●
	●	●	●		●		●	
	●	●	●	●	●		●	
	●	●	●		●		●	●
	●	●	●	●	●		●	●
	●	●	●		●	●*	●	
	●	●	●	●	●	●*	●	
	●	●	●		●	●*	●	●
	●	●	●	●	●	●*	●	●

FLAME CONTROL UNITS, SIGNALS AND FUNCTIONS

Progressive burners can be controlled by a 3-points signal (high/low flame) through the appropriate terminals. However, depending on the type of application and automation of the boiler, other types of signal can also be used, both at burner input (analogue modulation), and at the output (feedback signal proportional to load percentage, corresponding to actual output). A typical configuration in many boiler rooms may be, for example, using a 4÷20 mA input signal, with feedback through a potentiometer on the burner servomotor. Another very common case is the use of serial communication between several electronic control units in the boiler room. In this case different protocols (for example, Modbus), as well as different standards for signal connection and control (for example, RS-485), may be used.

BURNERS	CONTROL UNITS	FUELS		INPUT		
		SINGLE FUEL	DUAL FUEL	3-point modulation (high/low flame)	analog modulation [4÷20 mA]	analog modulation [0÷10 V]
mechanical models	LME 73.000 + PME 73.831	●	●	●	○	○
electronic models (EA)	LMV 20.100	●	–	●	–	–
	LMV 27.100	●	–	●	–	–
	LMV 37.400	●	–	●	●	○
el. mod. (EB)	LMV 37.400	●	–	●	●	○
el. mod. (EC)	LMV 26.300	–	●	●	●	○
el. mod. (ED)	LMV 26.300	–	●	●	●	○
el. mod. (ES)	LMV 51.100	●	●	●*	●	●
el. mod. (EI)	LMV 51.300	●	●	●*	●	●
el. mod. (EO)	LMV 52.400	●	●	●*	●	●
el. mod. (EK)	LMV 52.400	●	●	●*	●	●

NOTES:

INPUT analogue modulation

OUTPUT feedback signal proportional to load

● function available on standard burner

○ function available upon request; extra price may be applied on custom products

* configurations subject to limitations; for technical details, please contact the nearest CIB Unigas branch office

Configuration samples

1) Let's assume the project requires a burner R515A with direct interface to boiler control unit. Analogue input signal to the burner: 4÷20 mA (input from external load controller) Feedback signal to the boiler: potentiometer on servo drive, 0÷1000 Ω (output proportional to load percentage).
   According to above table, first row, select a mechanical burner; in this case a simple progressive unit (PR) is enough.
   For example, TP515A model M-.PR.S.IT.Y.1.65
   Letter "Y" identifies burner customization.

2) Let's suppose a different case. Plant specs require a modulating gas burner, with signal 0÷10 V (output proportional to load percentage). The burner has to work in continuous service mode (without stopping every 24 h).
   In this case the selected control unit is a LMV37.400 (see table, 4th row) and the burner model is electronic, EA.
   Thus, burner type TP515A model M-.MD.S.IT.Y.1.65.EA

Some functions are present on standard CIB Unigas burners, others may be requested during quotation phase and will require, as a result, modifications to standard products (such as adding a signal converter at the input or output terminals). The following is a table list of available configurations, depending on the burner model and the required functions.
Customers are advised to specify in detail all the required functions when applying for a commercial offer, which will allow us to configure the correct burner model, including OEM parameters of electronic control units, where necessary.
If the desired signal combination is not included in this table, please contact our technical department in order to find a suitable solution.

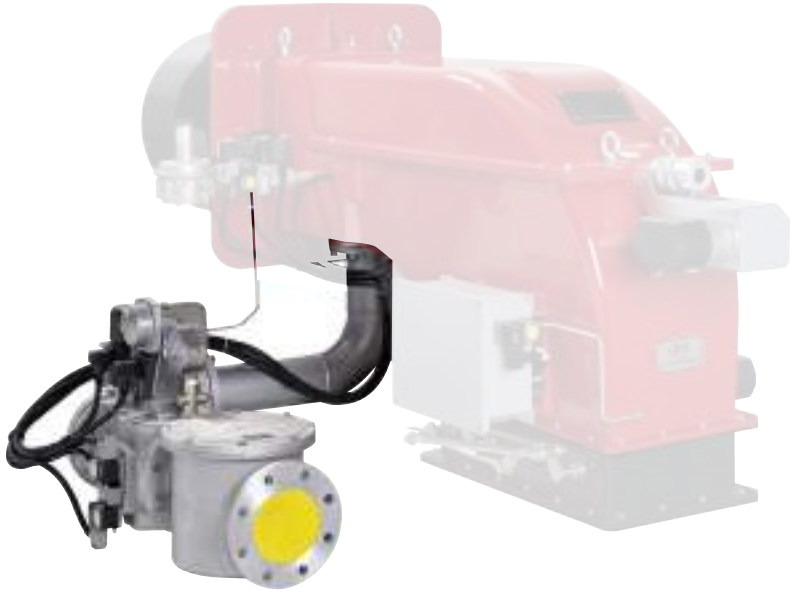
	OUTPUT			OTHER FUNCTIONS			
	load signal [4÷20 mA]	load signal [0÷10 V]	load signal [0÷1000 Ω]	INVERTER	OPERATION 24h/24h non-stop (continuous operation)	MODBUS via RS-485	OXYGEN CONTROL
	○	○	○	–	–	–	–
	–	–	–	–	–	–	–
	○	○	–	–	–	○	–
	○	○	–	–	○*	○	–
	–	–	–	●	○*	○	–
	○	○	–	–	–	○	–
	–	–	–	●	–	○	–
	●	○	–	–	●	●	–
	●	○	–	●	●	●	–
	●	○	–	–	●	●	●
	●	○	–	●	●	●	●

3) Like in the previous example, let's suppose the designer requires to add VSD (variable speed drive, or inverter) to the fan motor instead of 0÷10 V signal. The control unit is still a LMV37.400 but the burner model is now EB (see table, 4th row).
Burner type TP515A model M-.MD.S.IT.Y.1.65.EB

4) Last example, similar to previous ones but suppose now that both functions are required (feedback signal and motor VSD), plus continuous service as before. The burner control unit must support all these functions at the same time, hence select an electronic cam LMV51.300 and a burner model EI (see table, 9th row). The burner will be an TP515A model M-.MD.S.IT.A.1.65.EI

SCOPE OF SUPPLY

The specifications for the standard equipment included in the burners can be found on the following pages.
More detailed information can be found in the operating instruction manual.

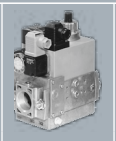
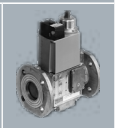


GAS BURNERS **Pag. 147- 148 - 149 - 150**

LIQUID FUEL BURNERS **Pag. 219 - 220 - 224 - 225 - 226 - 227**

Dual fuel burners include all the necessary equipment for both gas and oil operation.

The gas and LPG burners include as standard supply: filter, ball manual valve (optional), pressure regulator, minimum gas pressure switch, butterfly valve.
On customer's request the maximum gas pressure switch and the tightness control function, pressure gauges (with ball valve), anti-vibration joint and other spare parts can be ordered separately.
This table includes all burner configurations according to burner type and size.
For a detailed review of these burners, it is possible to see the technical details in the diagrams.

SCHEMATIC DIAGRAM	1	2	3	4	5	6	7	8	9
									
GAS TRAIN DUNGS MODEL	MB-DLE	MB-DLE	MB-DLE	MBE	MBE	MBE	MBE	MBE	DMV-DLE
GAS TRAIN SIEMENS MODEL	-	-	-	VGD	VGD	VGD-VRD	VGD	VGD-VRD	-
Max inlet gas pressure	360 mbar	360 mbar	360 mbar	500 mbar*	500 mbar	500 mbar*	500 mbar	500 mbar*	360 mbar
Leakage control		■	■		■	■	■	■	■
BURNERS									
TECNOPRESS (up to 2")	●	●	●						
TECNOPRESS (from 65)				●	●	●			
NOVANTA - CINQUECENTO					●	●			
MILLE - DUEMILA - TREMILA							●	●	
TECNOPRESS - NOVANTA - CINQUECENTO (Biogas)						●		●	●

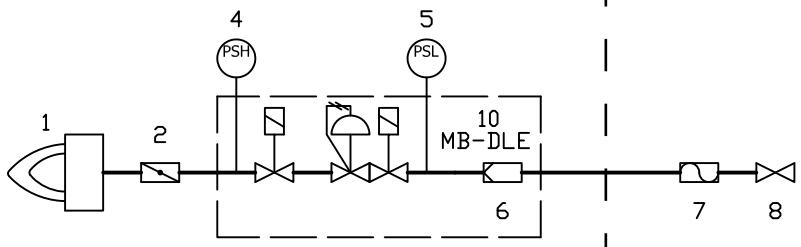
*700 mbar with pressure switch GW HP (except MBE 2").

VGD series gas train, DN50 and larger, are fitted with separate gas filters.
These are supplied complete with external gas filters. MB-DLE Multiblocs up to 2" are provided with built-in gas filter.
The leakage control is included in all burners with power over 1200 kW.
This table includes only standard burners. CIB UNIGAS is ready to supply special configurations for individual orders.

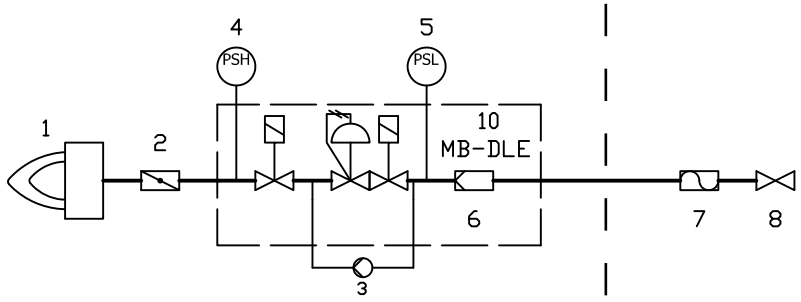
GAS TRAINS MB-DLE

MANUFACTURER | INSTALLER

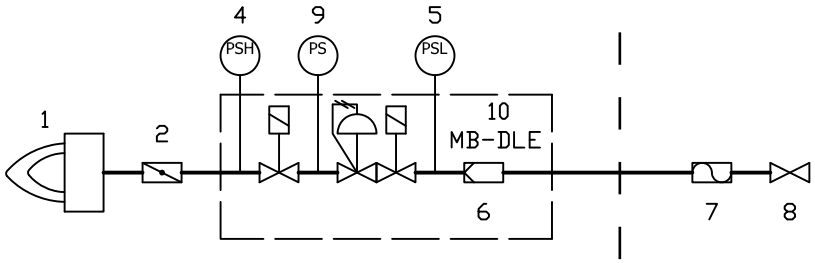
Gas train with valves group MB-DLE
(2 valves + gas filter + pressure governor).



Gas train with valves group MB-DLE
(2 valves + gas filter + pressure
governor) + leakage control VPS504.



Gas train with valves group MB-DLE
(2 valves + gas filter + pressure
governor) + leakage control pressure
switch.

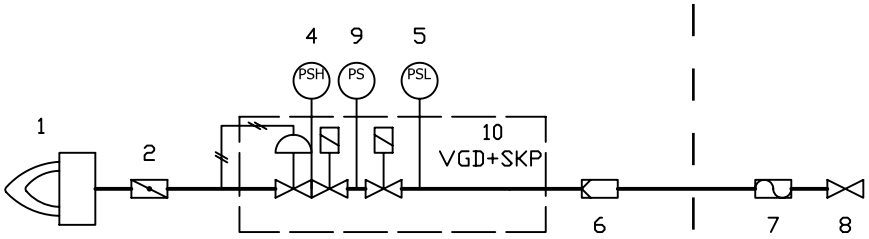


LEGEND

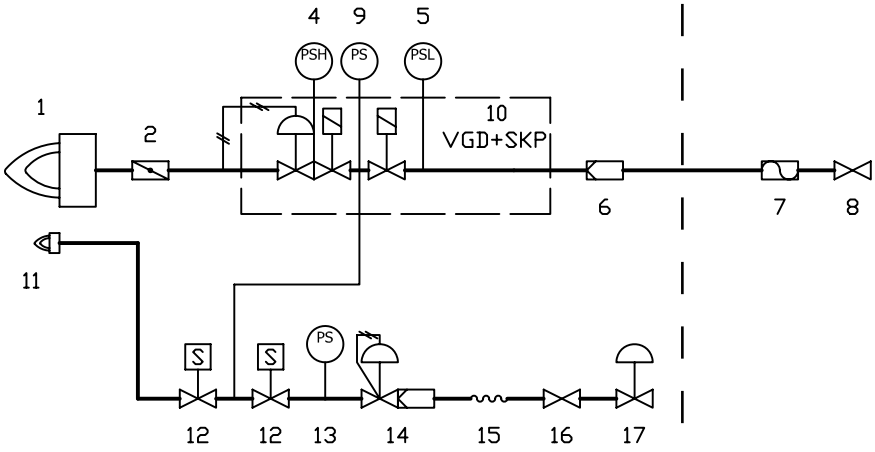
1	Burner	6	Gas filter
2	Butterfly valve	7	Anti-vibrating joint
3	Leakage control device (optional if output < 1200 kW)	8	Manual cut off valve
4	Maximum gas pressure switch (optional)	9	Leakage control pressure switch (optional if output < 1200 kW)
5	Minimum gas pressure switch	10	Valves group

MANUFACTURER | INSTALLER

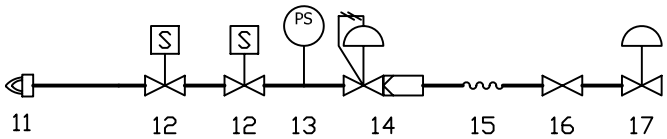
Gas train with valve group VGD,
c/w built-in pressure governor
+ leakage control pressure switch.



Gas train with valve group VGD,
c/w built-in pressure governor
+ leakage control pressure switch.
Pilot train with
double valve and filter/governor.



Pilot train with double valve and pressure
governor with filter.



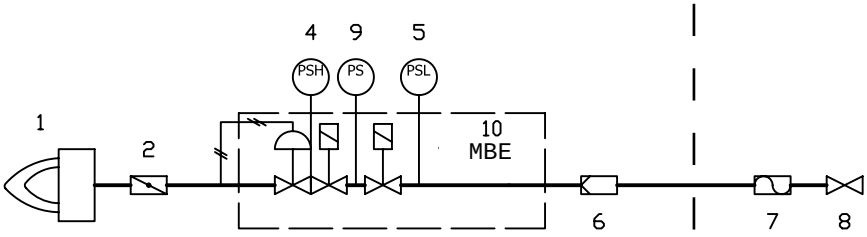
LEGEND

1	Burner
2	Butterfly valve
3	-
4	Maximum gas pressure switch (optional)
5	Minimum gas pressure switch
6	Gas filter
7	Anti-vibrating joint
8	Manual cut off valve
9	Leakage control pressure switch
10	Valves group VGD
11	Pilot burner
12	Pilot valve
13	Pilot minimum gas pressure switch
14	Pilot pressure governor
15	Pilot anti-vibrating joint (optional)
16	Pilot manual cut off valve (optional)
17	Pilot gas reducer (optional)

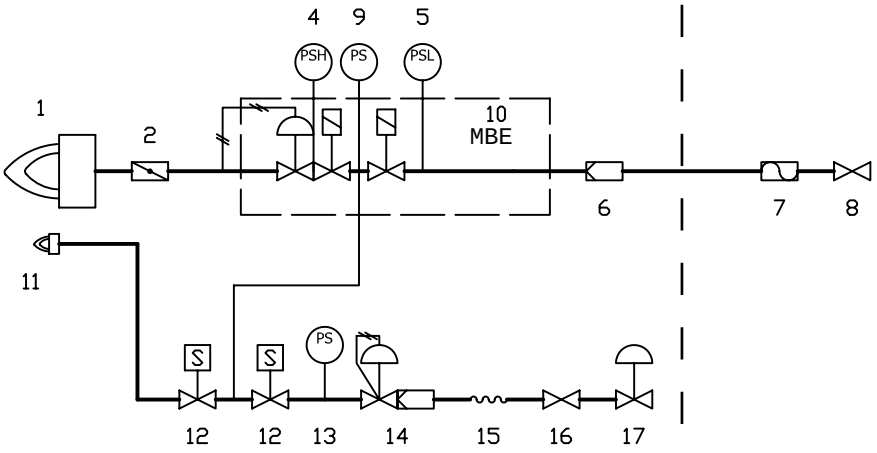
GAS TRAINS DUNGS MBE

MANUFACTURER | INSTALLER

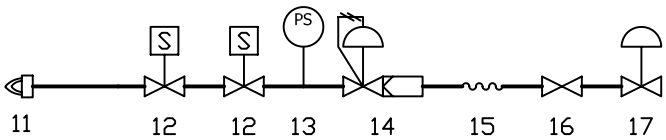
Gas train with valve group MBE,
c/w built-in pressure governor
+ leakage control pressure switch
+ max pressure switch.



Gas train with valve group MBE,
c/w built-in pressure governor
+ leakage control pressure switch
+ max pressure switch.
Pilot train with
double valve and filter/governor.



Pilot train with double valve and pressure
governor with filter.



LEGEND

1	Burner
2	Butterfly valve
3	-
4	Maximum gas pressure switch
5	Minimum gas pressure switch
6	Gas filter
7	Anti-vibrating joint
8	Manual cut off valve
9	Leakage control pressure switch
10	Valves group MBE
11	Pilot burner
12	Pilot valve
13	Pilot minimum gas pressure switch
14	Pilot pressure governor
15	Pilot anti-vibrating joint (optional)
16	Pilot manual cut off valve (optional)
17	Pilot gas reducer (optional)

The standard burners are equipped with a gas train, with two safety valves, governor, filter and a pressure switch.
The inlet pressure limits for the standard gas trains are shown in the table at page 147.
For higher pressures up to 6 bar, pressure reducing units are available.
The variants are described below.

Pressure regulator supplied separately
In this case the delivery includes only the pressure reducer/pressure regulator with integrated lock-up valve pressure reducer/pressure regulator with integrated shut-off valve only.
Production of a complete decompression station, is at customer's expense.

Complete pressure reducing group, single line
This group consists of a 1st line pressure reducing station consisting of filter, pressure regulator, PPK, pressure gauges, valves and connecting pipes. The decompression station is supplied assembled.
Option: The insulating dielectric connections are delivered separately.

Complete pressure reducing group, with double line
This group consists of 2 parallel pressure reducing lines (one as a stand-by line); each line includes Gas filter, pressure regulator, safety valve, pressure gauge, cocks and connections. Decompression station is delivered assembled.

To order a complete control group, it is necessary to determine the type of gas:
1. type of gas to be used (natural gas, biogas or other)
2. The flow rate of the gas to be burnt (or which and how many burners are to be supplied)
3. Gas inlet pressure
4. Possible dimensional limits

Fig. 01
Pressure reduction group on one line

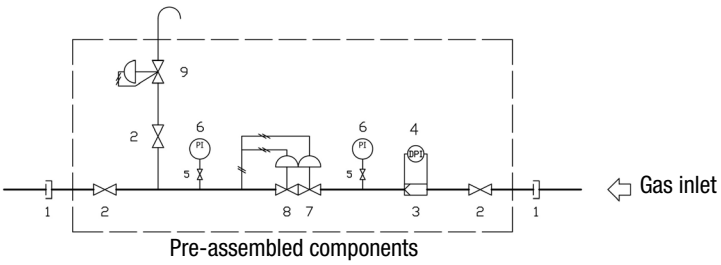
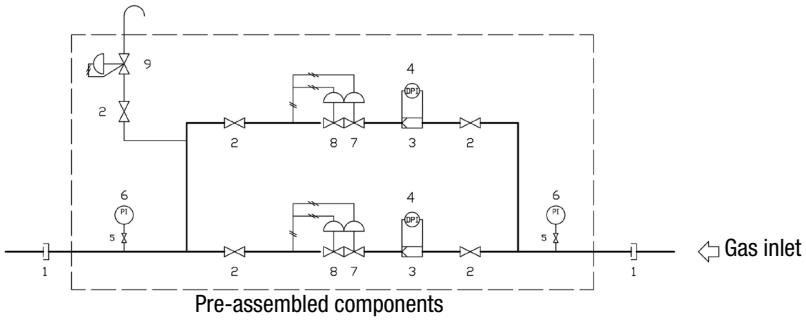


Fig. 02
Pressure reduction group with 2 lines



LEGEND

1	Dielectric connection in the form of in the form of a cup (option)	4	Filter condition indicator (Option)	7	Safety shut-off valve valve (PPK)
2	Manual gas shut-off valve	5	Push botton	8	Pressure regulator
3	Filter	6	Manometer	9	Safety relief valve (SSC) valve (PSK)

NATURAL/LPG IGNITION BURNERS

The following burner models are equipped with pilot burner:
- 1000 series, single-head
- 90 / 500 series oil (single-head)
- Low-emission NOx burners, size 2000 and upwards

The following models are equipped with ignition electrodes:
- VS type burners (all)
- 90 / 500 series, gas and diesel (single-head)

SUMMARY TABLE: CONFIGURATIONS

Burners	Fuel types				
	gas	light oil	gas / light oil	heavy oil	gas / heavy oil
90 Series (single-head)	•	•	•	Δ	•
500 Series (single-head)	•	•	•	Δ	•
1000 Series (single-head)	Δ	Δ	Δ	Δ	Δ
Low NO_x series (up to size 1030.1)	•	-	•	-	-
Low NO_x series (2020 and larger)	Δ	-	Δ	-	-
VS series	•	•	•	•	•

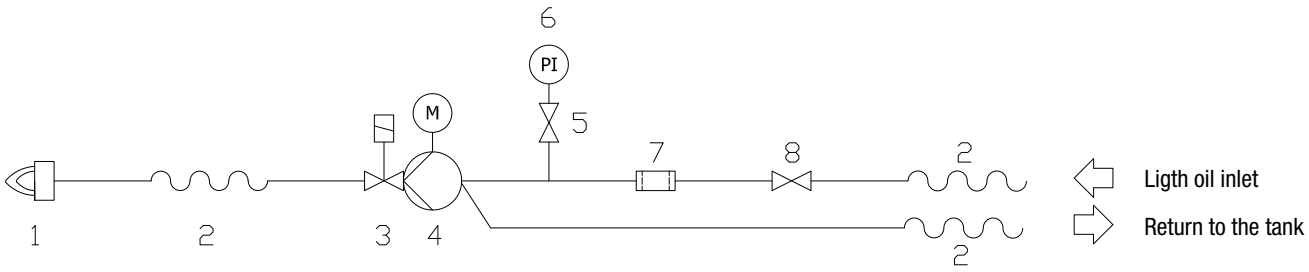
• ignition with electrodes
Δ ignition with pilot burner

All pilot burners are designed to operate with natural gas or LPG.
Min/max supply pressure is 100÷360 mbar.
For complete pilot burner configuration, see page 150.

The price list includes the price of the pilot burner for all burners on which it is provided as standard (see table).
It is not possible to ignite with a pilot burner on the VS models.
However, it is possible to order burner size 90-500 (single-head burner) in a special configuration with pilot burner:
In this case, an extra charge must be added to the price of the standard burner.

Upon customer's request it is possible to supply a light oil pilot burner instead of a gas burner.
In this case the supply includes the components described below.

Fig. 01



LEGEND

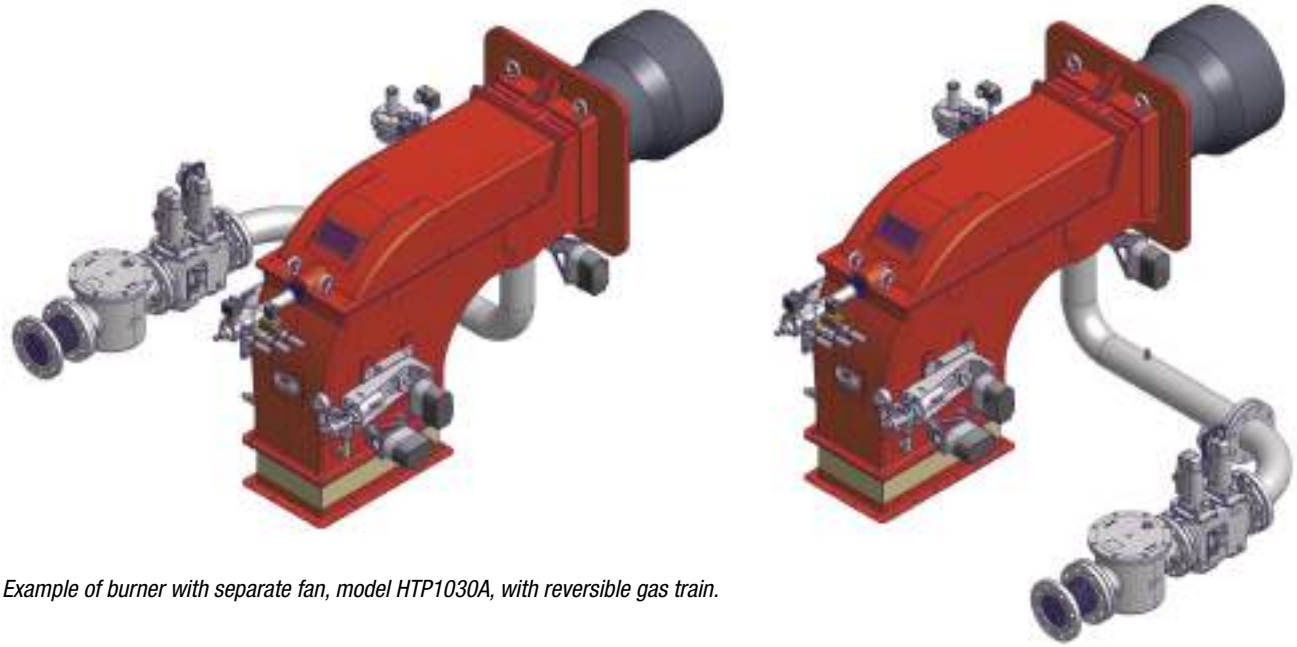
1	Light oil pilot burner	4	Pump and motor	7	Filter
2	Light oil fuel hose	5	Manometer holding cup	8	Manual ball valve (optional)
3	Electrical valve	6	Manometer		

Notes and limits on light oil use: oil must be supplied at a pressure of 0÷1,5 bar and a temperature not below 5°C.
The fuel supply pressure at the pilot burner nozzle is 12 bar; the output is 40÷150 kW, depending on burner size.
The final configuration of the light oil pilot burner train is variable, depending on customer's specifications. For example, if the standard burner already includes a pump (e.g. TG diesel burners), the ignition burner pump may be left out from the scope of supply because it is unnecessary.
In case oil supply pressure higher than 1,5 bar, please contact CIB UNIGAS.

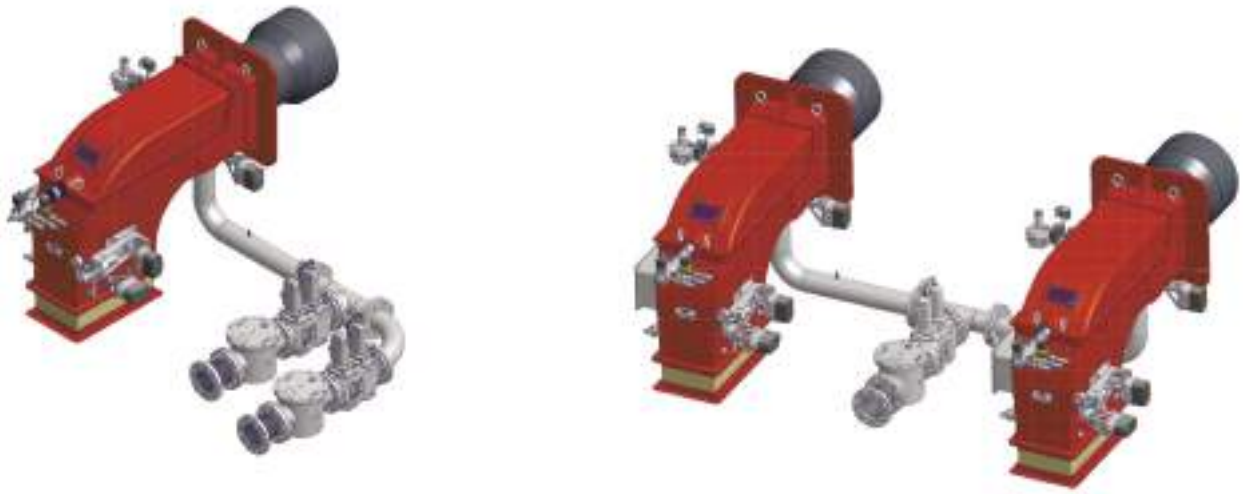
To order a burner with a light oil pilot burner, select a model equipped with gas ignition burner (see table on the previous page).

REVERSIBLE GAS TRAIN

During the installation phase of the burner, the gas train can be installed either on the right or on the left side by simply turn the flanged connection in the desired direction.
The installation can be completed with anti-vibration joint, manual ball valves and other options.
All sizes (series 90, 500, 1000, 2000, 3000) are equipped with reversible gas train (right and left).
This applies to all models of gas and dual gas-light oil burners (e.g. for TP and HTP series).
On dual fuel gas-heavy oil burners (KTPBY and KTP) the gas outlet is exclusively located on the left side of the burner, due to the built-in oil pre-heater tanks.



Example of burner with separate fan, model HTP1030A, with reversible gas train.



Examples of special configurations made on request, 2 gas types.

BURNERS OPERATING WITH COMBUSTION AIR HIGH TEMPERATURE

Some processes or industrial applications require the use of hot combustion air, mainly for the purpose of saving fuel and improving the efficiency of the boiler plant.
Burners with a separate fan and electrical panel, with appropriate modifications, can be used with hot combustion air temperatures of up to 250 °C.
When ordering, simply declare the required operating temperature of the combustion air.

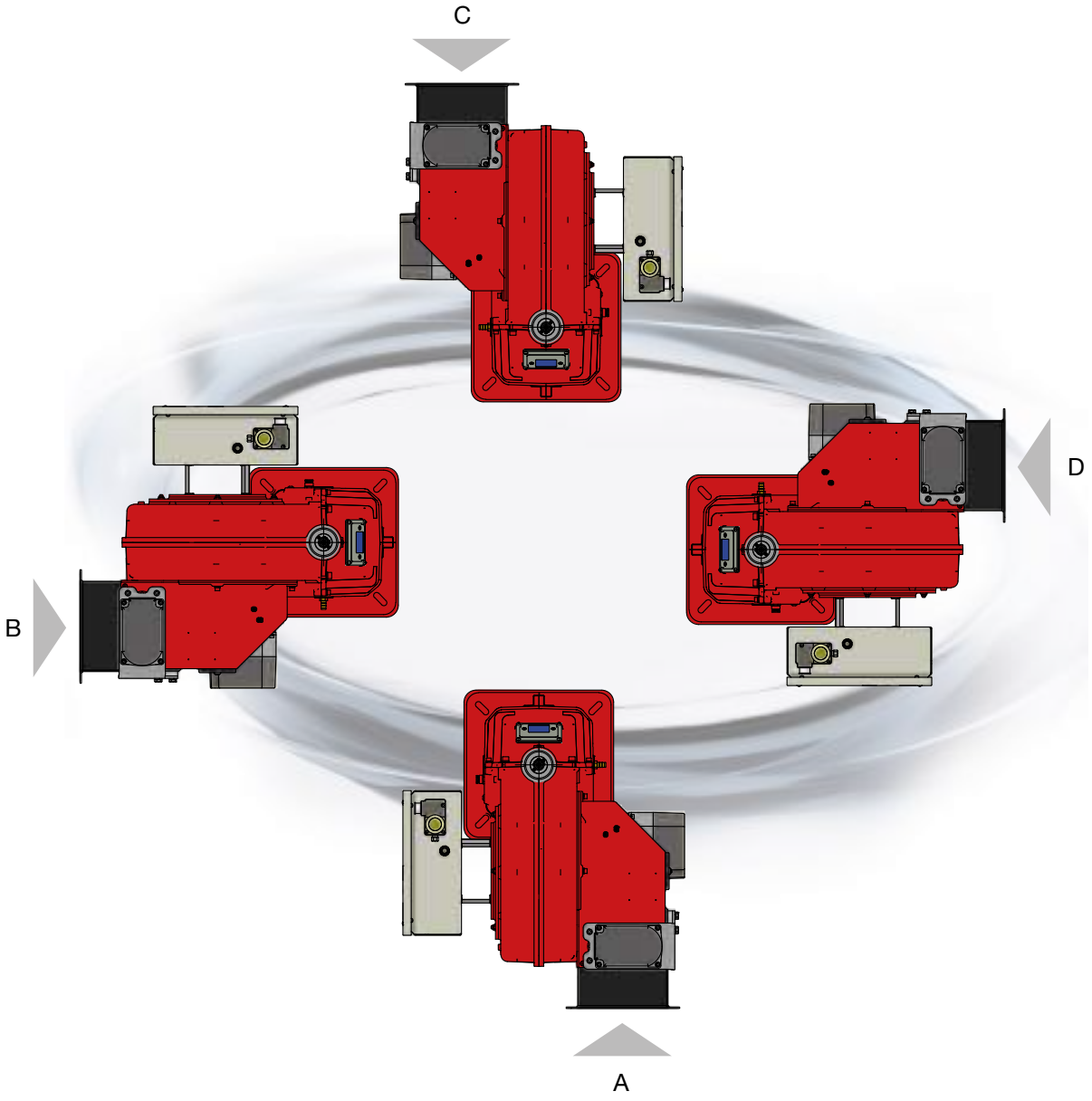
Attention: the standard burners are able to operate at combustion air temperatures up to 50 °C; to order a modified burner capable of operating with hot combustion air, it is necessary to add an extra charge to standard burner price.

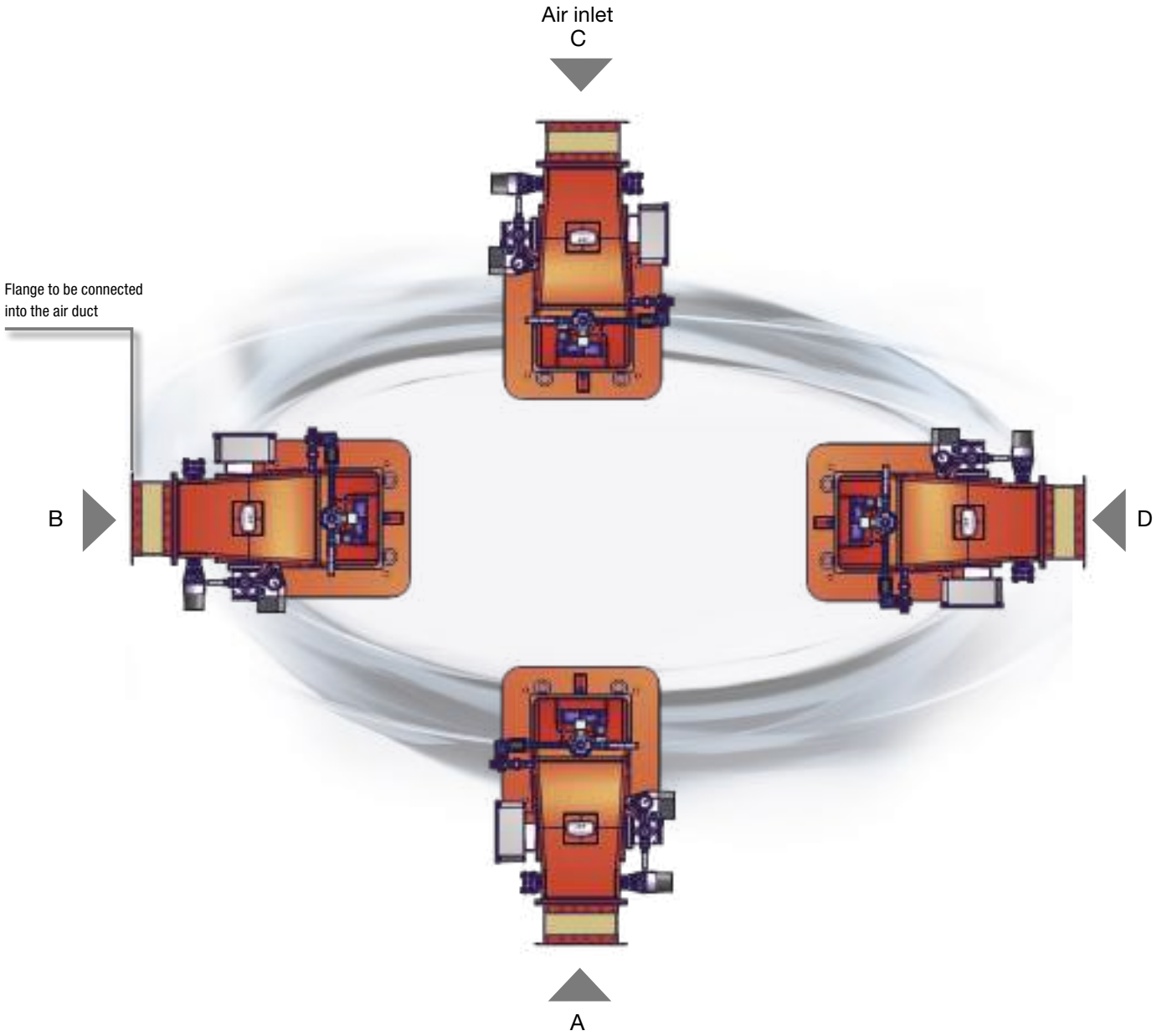
Example of a burner with a separate fan, capable of handling high-temperature combustion air.
Burner colour can be selected in the order.

If a combustion air temperature higher than 250 °C is required, send a request to our R&D.
CIB Unigas Technical Department is ready to review your project specifications and find a solution to satisfy every customer.

BURNER HEAD ORIENTATION

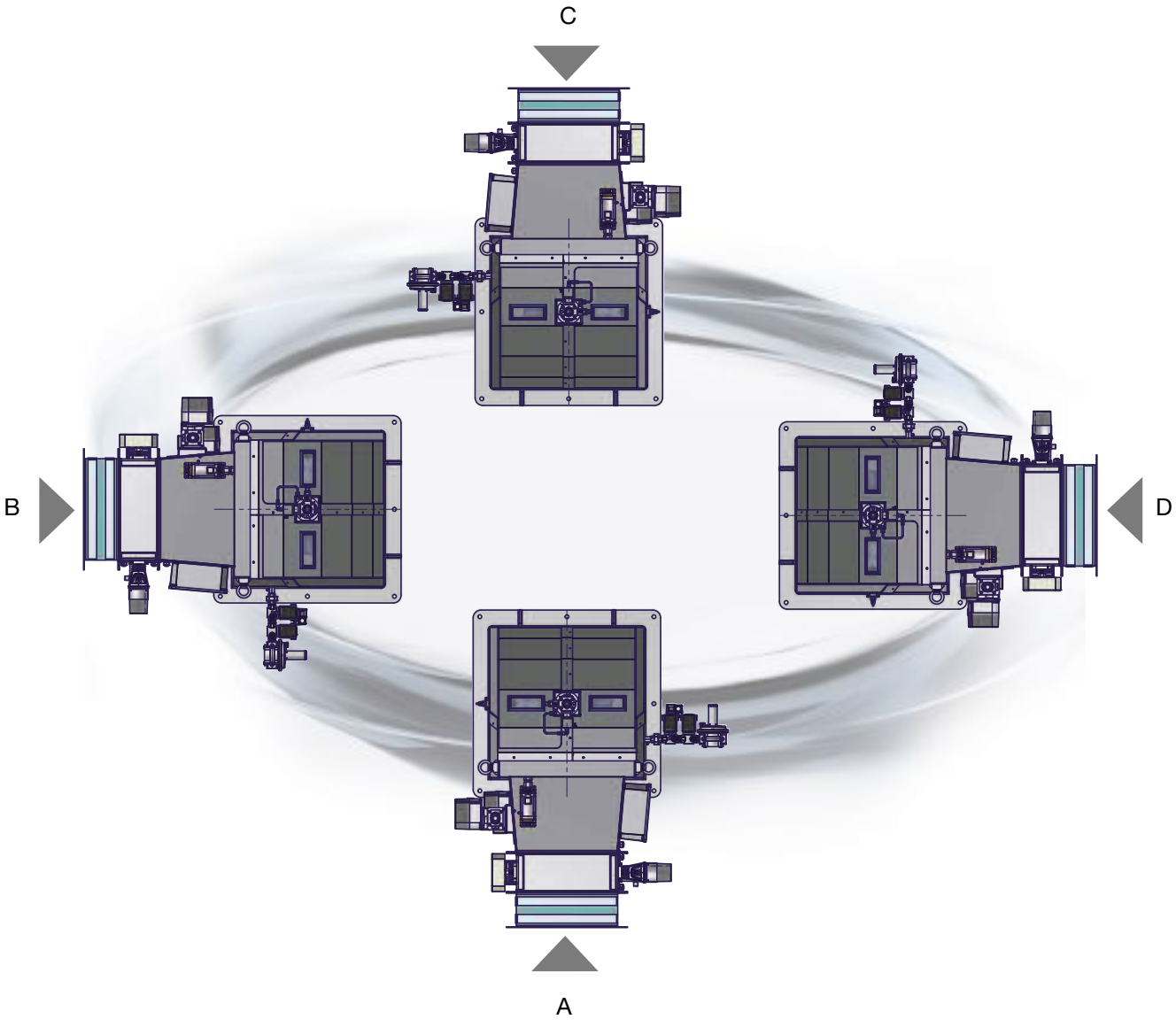
Burners of this type are supplied with separate fans. The delivery includes motorised air damper with actuator, and a corrugated flange connecting the burner to air duct.
The duct and fan can be positioned according to the design, taking into account the specifications and limits of the location.
For example the fan is usually installed below or behind the boiler level, depending on customer's requirements.
Our burners can easily accept combustion air coming from four different directions, as shown in the following picture.





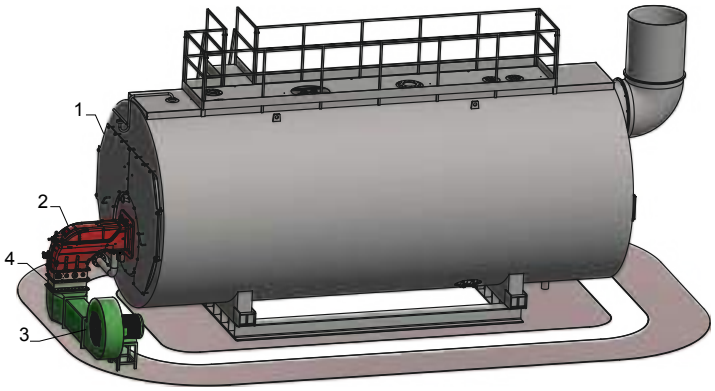
The desired orientation must be specified when ordering: example HTP1030A burner with combustion air inlet from above, position C

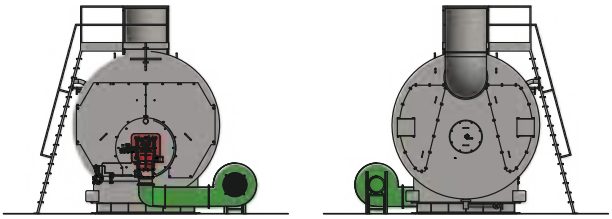
BURNER HEAD ORIENTATION

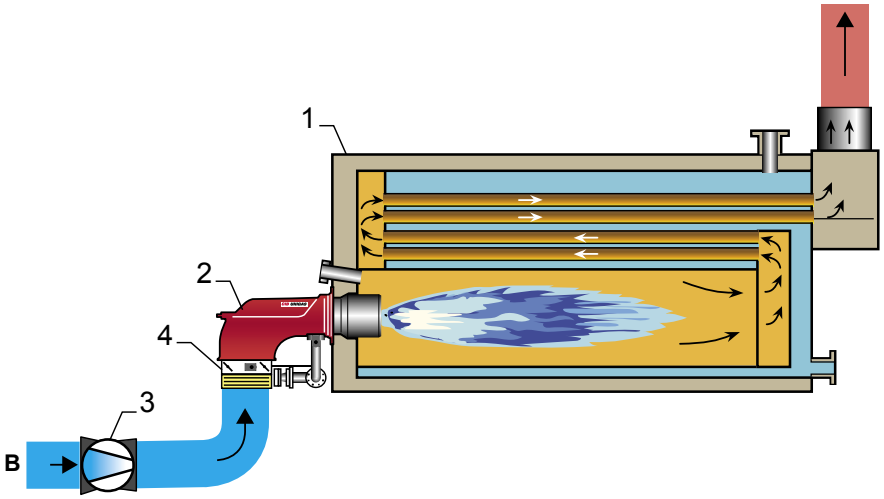


The desired orientation must be specified when ordering: example TLX2020 burner with combustion air inlet from above, position C.

BURNER AMBIENT AIR FROM BELOW



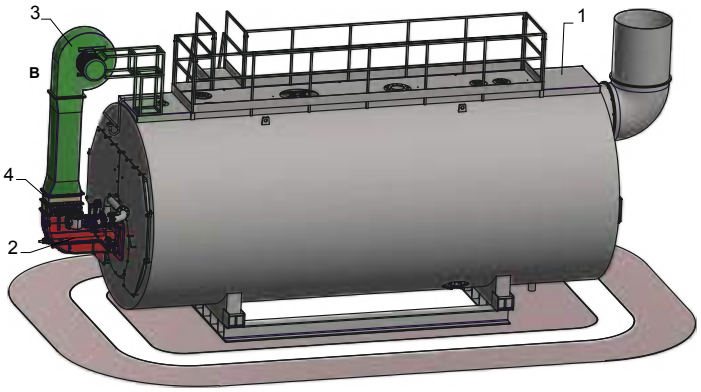


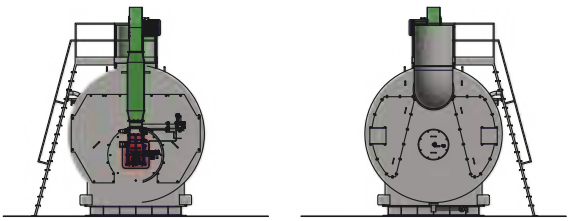


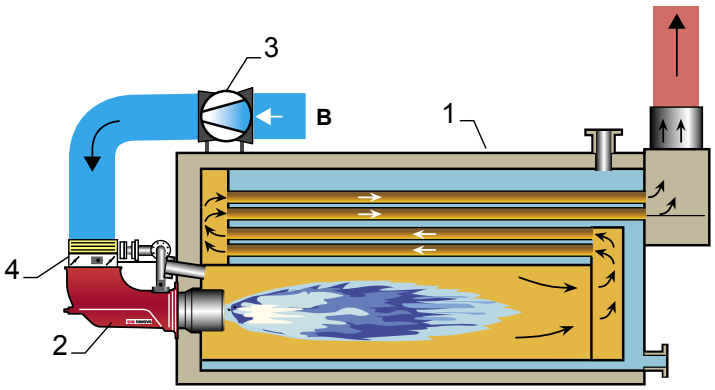
LEGEND

1 Boiler
2 Burner
3 Fan ventilator
4 Cold combustion air regulation damper
B Ambient air

BURNER AMBIENT AIR FROM ABOVE



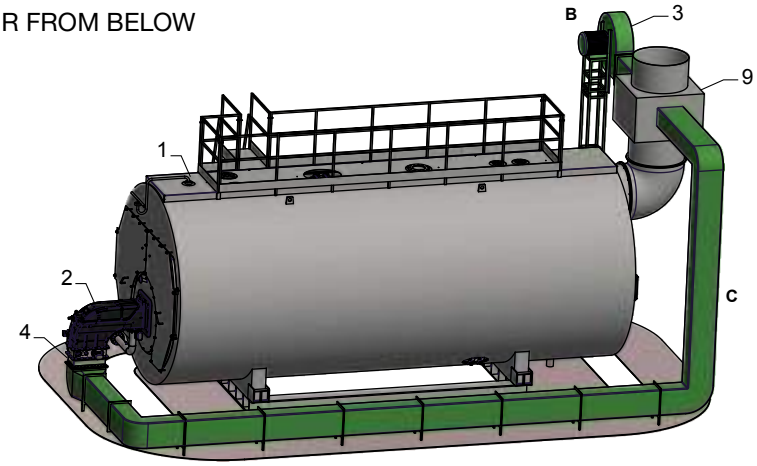


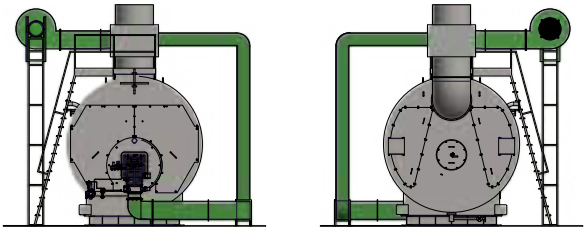


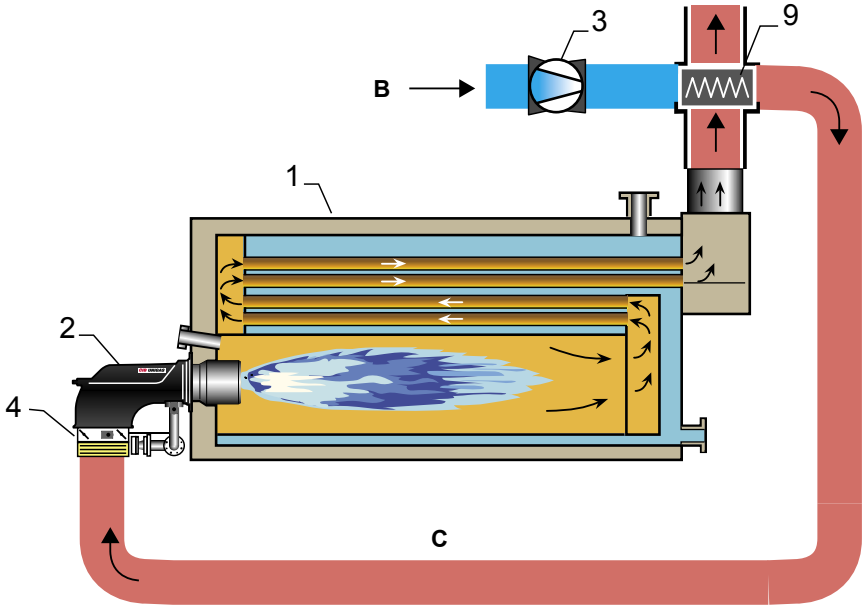
LEGEND

1 Boiler
2 Burner
3 Fan ventilator
4 Cold combustion air regulation damper
B Ambient air

BURNER HOT AIR FROM BELOW



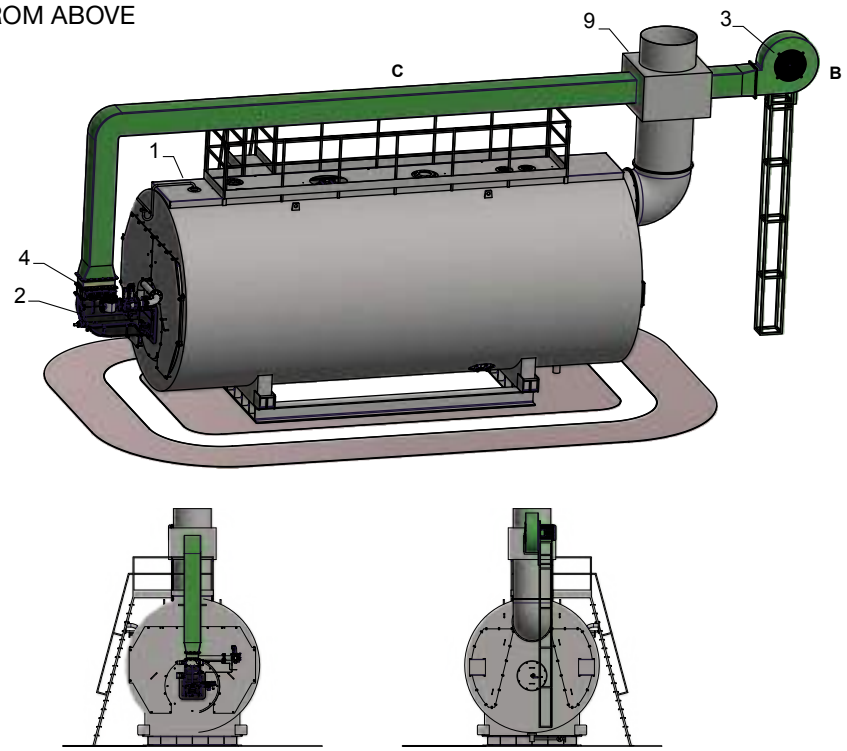


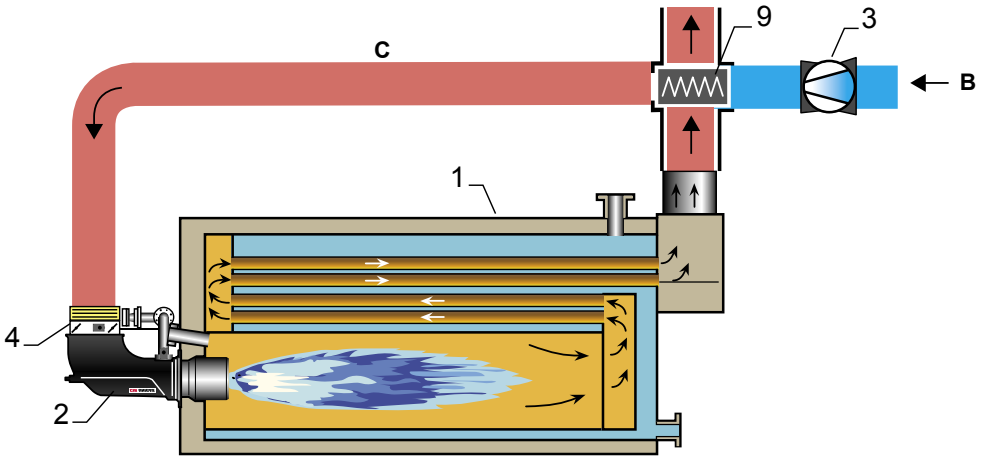


LEGEND

1 Boiler
2 Burner
3 Fan ventilator
4 Cold combustion air regulation damper
9 Economizer
B Ambient air
C Heated air

BURNER HOT AIR FROM ABOVE

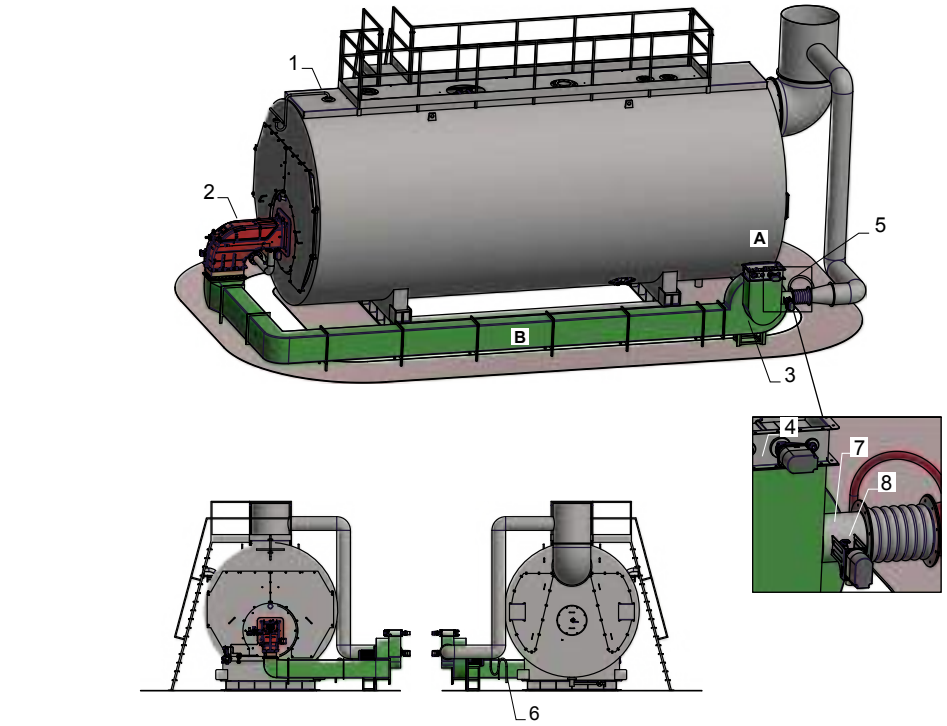


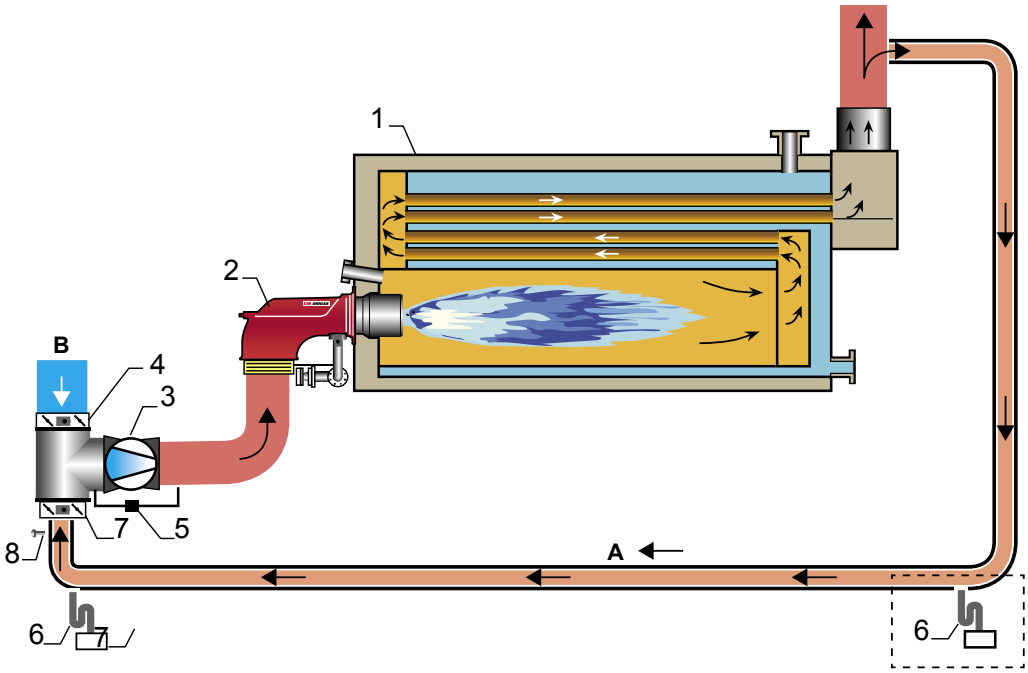


LEGEND

1 Boiler
2 Burner
3 Fan ventilator
4 Cold combustion air regulation damper
9 Economizer
B Ambient air
C Heated air

BURNER AMBIENT AIR WITH FGR

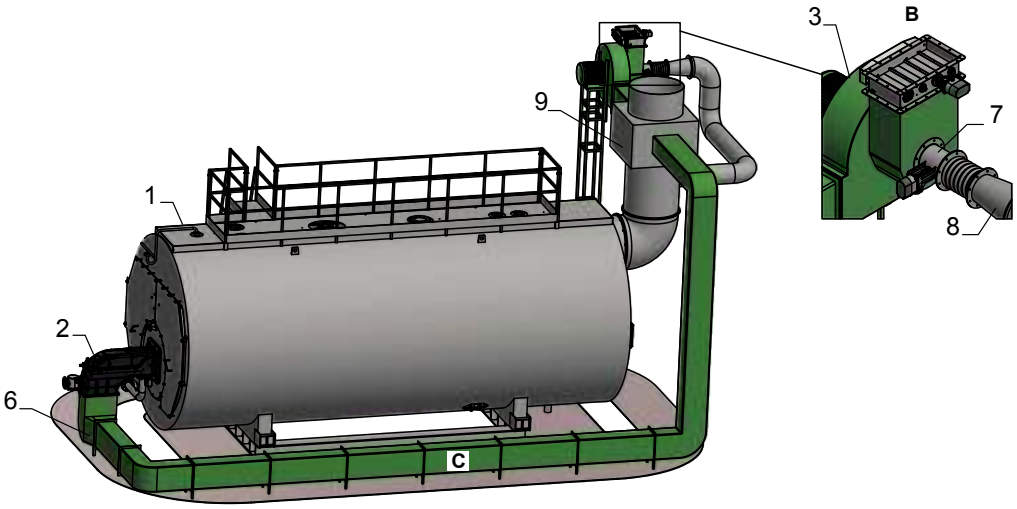


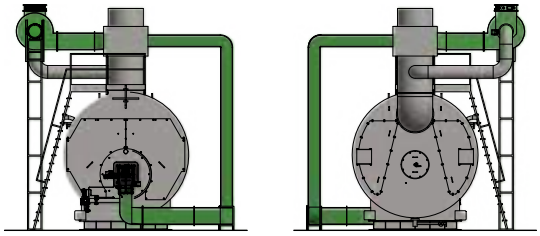


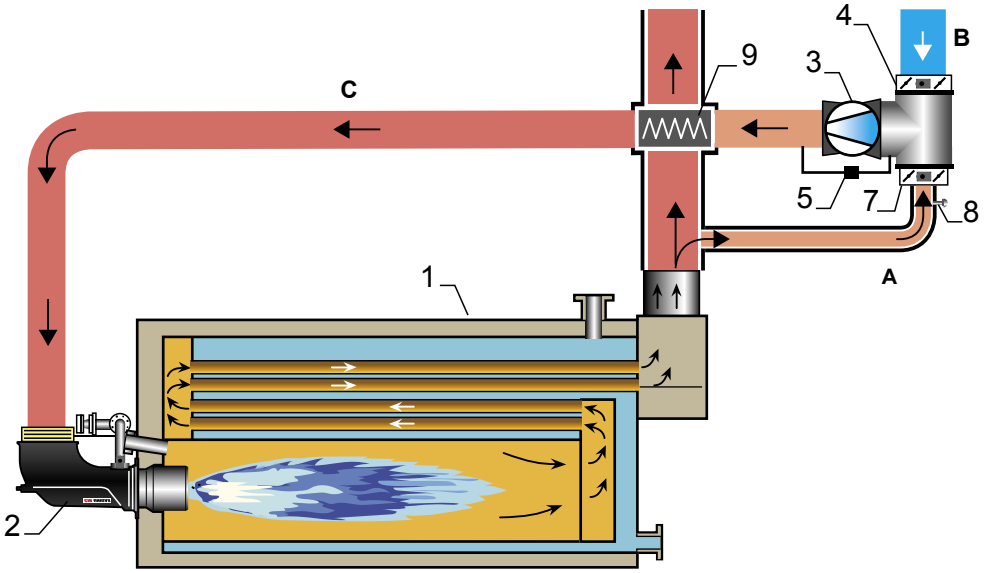
LEGEND

1 Boiler
2 Burner
3 Fan ventilator
4 Cold combustion air regulation damper
5 Differential pressure switch
6 Condensate drain
7 FGR regulation damper
8 FGR temperature probe
A Flue gas recirculation
B Ambient air

BURNER HOT AIR FROM ABOVE WITH FGR BEFORE THE ECONOMIZER
Used when the smoke temperature is < 200 °C before economizer



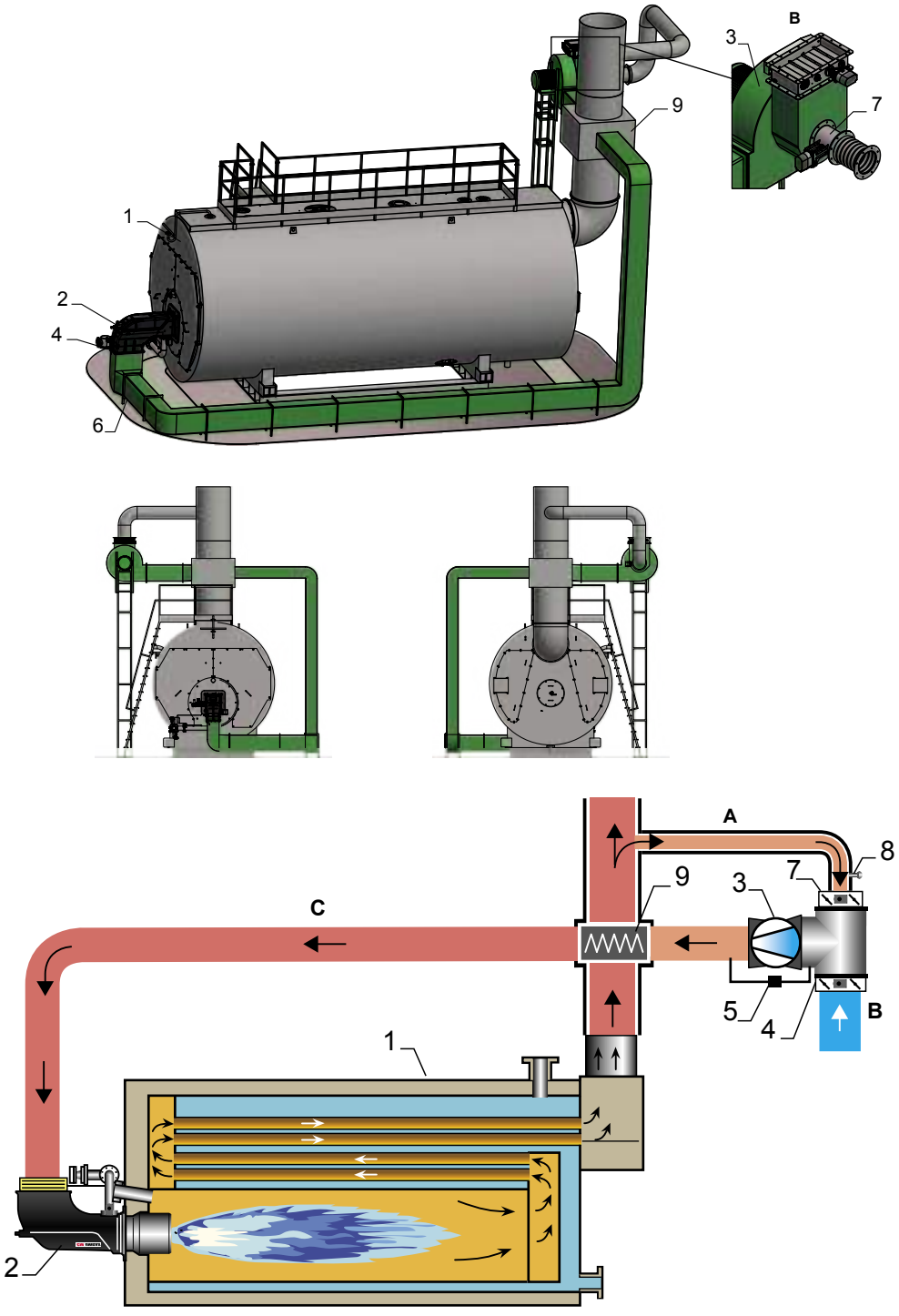




LEGEND

1 Boiler	4 Cold combustion air regulation damper	7 FGR regulation damper	A Flue gas recirculation
2 Burner	5 Differential pressure switch	8 FGR temperature probe	B Ambient air
3 Fan ventilator	6 Condensate drain	9 Economizer	C Hot air

BURNER HOT AIR FROM ABOVE WITH FGR AFTER THE ECONOMIZER
Used when the smoke temperature is > 200 °C before economizer



LEGEND

1 Boiler
2 Burner
3 Fan ventilator
4 Cold combustion air regulation damper
5 Differential pressure switch
6 Condensate drain
7 FGR regulation damper
8 FGR temperature probe
9 Economizer
A Flue gas recirculation
B Ambient air
C Hot air

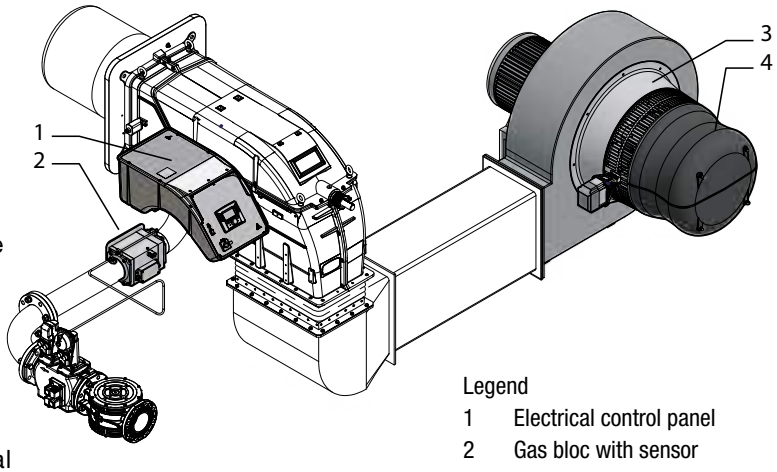
FACILE SYSTEM

THE FIRST BURNER WITH SELF REGULATION

The ***FACILE*** can also be applied to duo bloc burners by assembling the components as shown in the drawing.

OVERTURNING THE PERSPECTIVE IS ***FACILE***

The ***FACILE*** " project stems from the vision of creating an easy commissioning burner, and, at the same time, making it more efficient in terms of energy consumption. From the beginning, the goal was to observe the "machine" from a different point of view, away from the classic design stereotypes of the burner, and developing a new concept. The burner is no longer seen as a passive device but, on the contrary, interactive and autonomous in relation to the environmental variables and plant conditions.



Legend

1 Electrical control panel
2 Gas bloc with sensor
3 Fan ventilator
4 Air inlet with air sensor

INDIRECT O_2 CONTROL

Indirect Oxygen Control: the air/gas ratio is guaranteed and corrected, measuring in real time the mass flow.

FACILE is provided with a system for remote data transmission which allows an analysis of the functioning by the end user, and a service of predictive maintenance.

VARIABLE PERFORMANCE CURVE

Variable performance curve: the performance curve is automatically adapted to the peculiarities of the boiler. Moreover the system guarantees the correct combustion, by limiting the working point where the fan cannot provide the necessary air flow rate.

A SMART SYSTEM

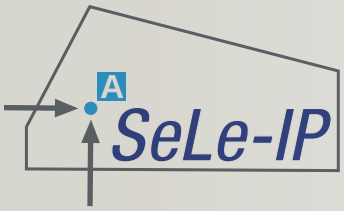
There are already electromechanical and electronic burner control systems which allow a certain elasticity and reactivity of the machine according to the change of external variables. However, we decided to go a step further and achieved a new technological breakdown in this field, by providing the machine with a "brain" which self-tune the fuel/air ratio in the initial start-up phase, and maintains the combustion throughout its use in an optimum range of safety and efficiency according to environmental variables and plant conditions.

THERE IS A TECHNICIAN BUT YOU CAN'T SEE HIM

The main feature of the system is that it does not need the setting of the burner on plant, and therefore it skips the (sometimes) laborious and expensive commissioning operated by a qualified technician.
The fuel curves of the burner are automatically created by the system in the initial start-up phase, according to the type of generator and process. This phase, completely automatic, is generally carried out in 10/20 minutes time, and it does not need any intervention by a technician other than a general supervision. This saves a significant amount of time and resources in the initial start-up phase.

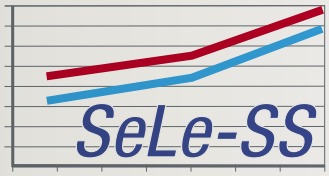
AS SIMPLE AS ***FACILE***

The system does not provide a "Closed Loop" type check with a feedback on combustion (Lambda sensor - O_2 sensor – probe CO), and it is ready to work without any changes which can affect the generator. Of course, the "Closed Loop" type check remains available as an optional. ***FACILE*** includes a full modulating system with settable PID parameters, which allow management of the thermoregulation function without adding further devices.
Furthermore the system manages the inverter to increase the power ratio between maximum and minimum, and to reduce the electrical consumption.



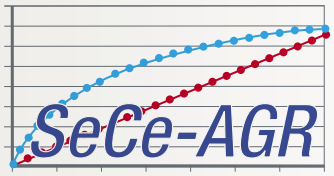
SELF LEARNING IGNITION POINT

Self Learning - Ignition Point: the ignition point is automatically regulated on a capacity suitable to ensure an optimal ignition, always complying to the EN 676 standards. The ignition point can be chosen manually up to 50% of the maximum load.



SELF LEARNING SERVO MOTORS SETTINGS

Self Learning - Servo Motors Settings: the system memorizes automatically the working curves of servo-motors to guarantee the functioning also in case of sensors malfunction. The interface warns the user about the change occurred. Based on the flow totalizators, the service can be easily scheduled.



SELF CHECKING AIR/GAS RATIO

Self Checking - Air/Gas Ratio: the air/gas ratio is constantly monitored and adapted to guarantee the required power and to maintain the optimal efficiency of the installation.

MORE THAN A SIMPLE BURNER

"FACILE" is not a simple burner, but a "combustion philosophy". With ***FACILE*** the burner operation is granted within its performance characteristics according to the applicable regulations. The system, thus, guarantees safety, and excludes any non-compliant adjustments.
FACILE is also equipped with a device for remote data control which allows to monitor burner operations and obtaining parameters and statistics useful to the end user. A specific platform is developed to the benefit of the technical servicemen in order to provide a predictive maintenance schedule, and to simplify the service management and costs.

ADJUSTMENT OF THE BURNERS

When choosing the burner, the customer may select one among the following configurations.

TN (single-stage)
Burners with single-stage regulation operate in ON-OFF configuration: when an external switch (e.g. the boiler regulation thermostat) closes, the burner is switched on, and then operates at maximum power. When the generator set-point is reached, the contact opens, the flame is switched off and the burner is kept in stand-by.

AB (two-stage)
Burners with two-stage regulation operate in HIGH-LOW flame configuration: a signal from the boiler regulation thermostat takes the burner to high flame (maximum power); as soon as the high flame threshold is reached, the burner shifts quickly to low flame (minimum power). When the lower threshold is reached, the burner reverts to high flame. Boiler temperature will thus oscillate around the desired setpoint. If the thermostat limit threshold is exceeded, the flame is switched off and the burner goes into stand-by. The two-stage regulation allows higher efficiency.

PR (progressive)
Conceptually, progressive burners operate like two-stage ones, i.e. with high-low flame type regulation. The difference is that transients between two stages follow a regulation control curve (combustion air-fuel ratio). AB burners are limited by the power difference between high flame and low flame stages; PR regulation, while retaining the same functional characteristics, does not pose such limits - the combustion is always well regulated, even at intermediate power outputs.
Additionally, liquid fuel PR burners are equipped with a single by-pass (variable flow) nozzle instead of two nozzles (one for each stage); in case of variable load operation, load transients do not require large power jumps.

Note: if the boiler control unit requires burner control via an analogue input signal (e.g. 4 ÷ 20 mA or 0 ÷ 10 V), please select a PR model burner. When requesting a quotation, specify the signal type given by the control unit, and the required feedback signal (e.g. 0 ÷ 1000 Ω via potentiometer on the actuator).
Attention, the burner configuration may vary according to the specific requests. See page 144 for a detailed explanation of I/O signal options.

MD (modulating)
Modulating burners are equivalent to PR ones, but supply includes by default a power regulator based on PID control system. The regulator synchronizes burner power and required load, via a feedback signal coming from a sensor installed on the boiler (also called modulation probe). Thermocouples can be used (for hot water and superheated water boilers, diathermic oil heaters, hot air generators, ovens and furnaces), or pressure transducers (for steam boilers). The air-fuel ratio is adjusted along a curve over the entire working range.

PR or MD burners with electronic cam
Electronic cam burners employ the same operating principle as the corresponding mechanically regulated burners: the air-fuel ratio curve is stored in the electronic unit memory, rather than being physically set by a variable cam connected to servo motors. The electronic cam is extremely precise and offers several advantages, first of all it overcomes all limitations typical of mechanical linkages (e.g. tear and wear, play between the moving parts, hysteresis). On the other hand, control units are more sensitive to electromagnetic interference, therefore quality of power supply is a fundamental factor in thermal plant design.

Note: to order a modulating burner, please select the desired probe separately.

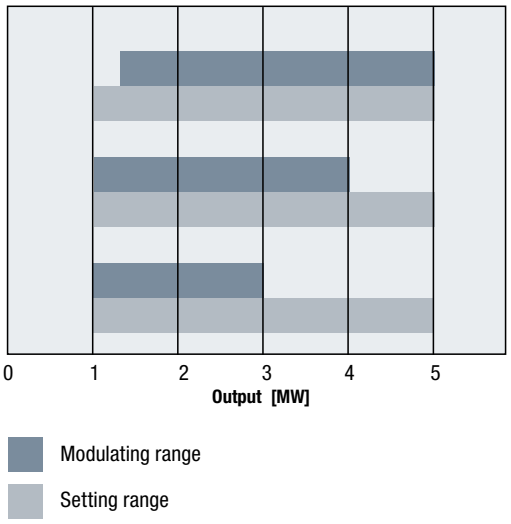
Controlled variable	Temperature/pressure range
Temperature	-15 ÷ 50 °C
Temperature	30 ÷ 130 °C
Temperature	0 ÷ 400 °C
Temperature	0 ÷ 1200 °C
Pressure	3 bar
Pressure	10 bar
Pressure	16 bar
Pressure	25 bar
Pressure	40 bar

Other sensors and/or different scales available upon request.

Control range and modulating ratio of a burner

Each burner, whether with an on-board or separate fan, is characterized by its performance curve defined by the minimum and maximum output within which it can operate. The modulating ratio is defined as the actual ratio between the minimum and maximum output of a specific thermal group burner-boiler (or burner-generator). The Performance curve is therefore quite different from the modulating range of the burner.

To better understand this concept let's make an example:
Let's consider a burner with a performance curve of 1.000 kW – 5.000 kW matched to a boiler that requires an output of 5 MW. If we assume a modulating ratio of 1:4, the minimum achievable output is 5.000 kW: 4 = 1.250 kW.
The same burner, matched to a boiler which requires a max output of 4 MW, with exactly the same modulating ratio of 1:4, delivers a minimum output of 1.000 kW.
Let's consider the very same burner matched to a boiler which requires 3 MW only. Since the burner cannot work below its mechanical limits, it will operate with a reduced modulating ratio 1.000 kW: 3.000 kW = 1:3.



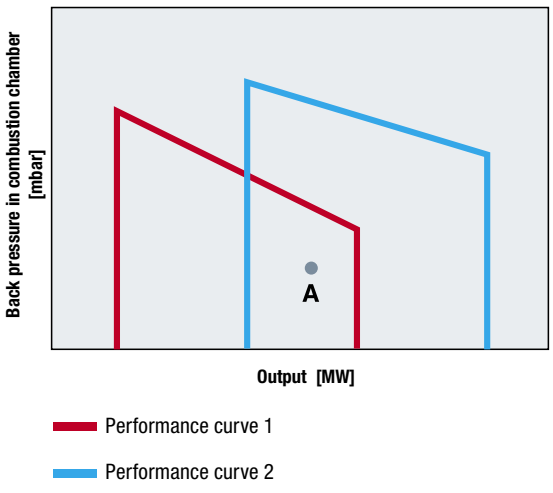
It's important to remember that the modulating ratio of any burner is strongly affected by the boiler on which it is installed.

To obtain the best performance, it is recommended to choose the burner with the widest possible modulating ratio, and the maximum output as close as possible to that required by the boiler.

For example, if the working point of the boiler (point A in the picture) can suit many burners, it is recommended to pick up the model whose maximum output is closer to that required (curve 1). This is the best choice, both economically (smaller burner size), and technically, because it provides the widest modulating ratio.

A burner similar to curve 2 in the example, could only operate at an output which is already close to its min limit, and this would not allow any modulating ratio, meaning a completely negative situation.

Finally, let us remember two additional factors that can affect the modulating ratio:
- the boiler or heat generator manufacturer, as a rule, writes the maximum recommended modulating ratio to prevent the temperature of the flue gases at the minimum output to fall below the condensation limit.
- liquid fuel burners are bounded to the modulating ratio of the nozzles (typically 1:3 - 1:4, except special applications).



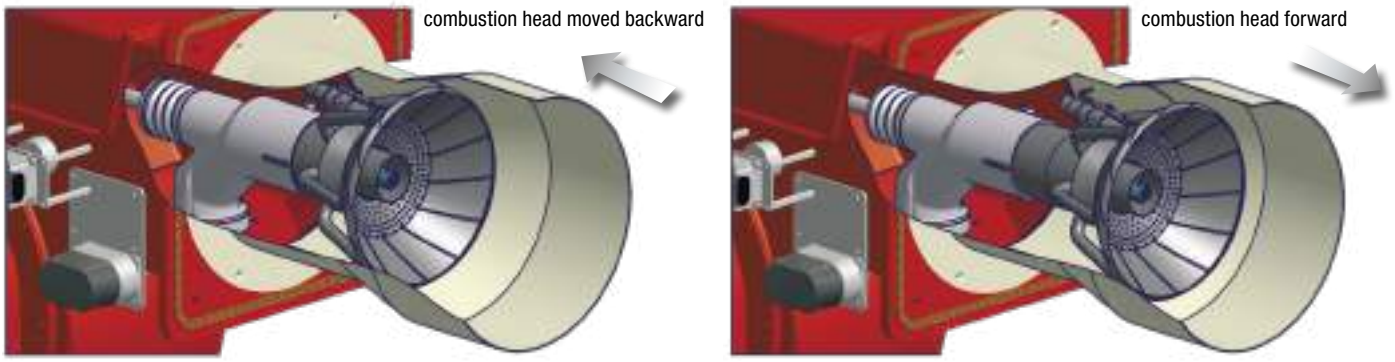
ADJUSTMENT OF THE BURNERS

Burners with high modulating ratio

A special high modulating ratio customization is available on Class 2 gas and dual fuel burners with electronic control (variants with LMV51/52 units). This configuration can guarantee a ratio 1:6 between minimum and maximum power (1:10 with inverter).

This excellent performance is achieved by precisely dosing air flow at low power, while maintaining required flame stability. High modulation ratio is recommended when project specifications call for an extremely low minimum load, and it is not possible to achieve this with other means (e.g. several smaller burners in cascade control).

Typical examples include burners for condensing boilers, applications such as processing plants or furnaces, e.g. food cooking ovens.
x
However, it is not recomended to use such configuration when there is risk of acidic condensate formation at the chimney (exhaust gases temperature too low), or on ordinary steam boilers for example. The use of burners with a high modulating ratio should always be agreed upon with the boiler or furnace manufacturer.



How to choose a duo-bloc burner at sea level and at altitude

To ensure a complete and safe combustion, the burner must be supplied with the correct flow of oxygen. The amount of oxygen available is proportional to the density of the combustion air, and the density depends on the environmental conditions.
For this reason, the performance curves of the burners are defined under standard environmental conditions at sea level with temperature 15 °C and pressure 101,3 kPa.
Of course, under real operating conditions, the temperature and pressure of the air change constantly. If the air density decreases (e.g. when summer temperatures are very high) also the oxygen available in one cubic meter of air is reduced and vice versa: this difference must therefore be taken into account.
Small daily variations are usually within the tolerance defined by the standard, so they are negligible.
On the other hand seasonal variations must be compensated, therefore it is suggested to schedule periodical checks of the combustion during the year. In this way, the formation of carbon monoxide (CO) is avoided, as the combustion is always in excess of air: typically the residual oxygen is fixed at 3%. It should be also remembered that the atmospheric pressure and air density decrease as the altitude increases. Up to 300 meters this variation is negligible. However in case the burner is intended to work in mountainous regions such as the Alps, it is necessary to recalculate the parameters of the system.

In order to avoid mistakes in calculations always remember to provide also the altitude of the plant at the moment of the enquiry!

The table on the right gives the correction factors to be applied to the calculations. Below is an example of how to choose a duo-bloc burner at altitude.

Suppose you have to select a burner intended for the city at altitude. This city is surrounded by mountains, and the thermal output plant will be built at approximately 1.000 meters above sea level.

The data of the boiler to be matched are:
- nominal output Pn 9.500 kW
- efficiency η 91 %
- back pressure in combustion chamber Cp 12 mbar
- fuel natural gas

The first step is to calculate the output (Pb) required to the burner:

$$P_b = \frac{P_n}{\eta} = \frac{9.500}{0,91} = 10.339 \text{ kW}$$

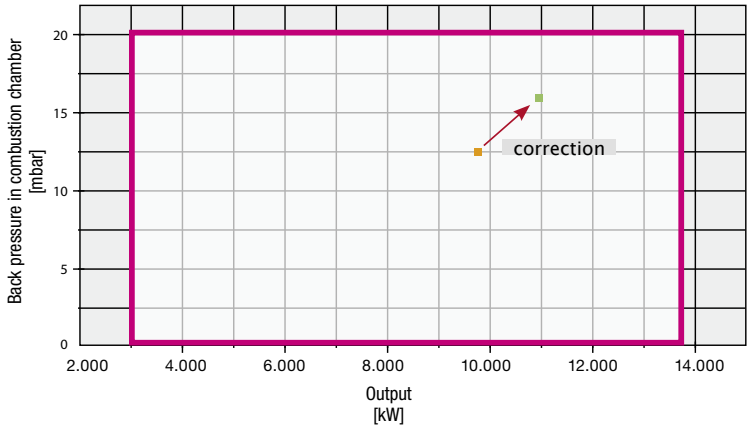
Note the altitude of the plant above sea level (1.000 meters) and obtain the correction coefficients K1 and K2 from the table. In this case:
$K_1 = 1,128$
$K_2 = 1,272$

Installation height above sea level	CORRECTION FACTORS	
	K_1 (Power)	K_2 (Back-pressure in the combustion chamber)
300	1,036	1,074
400	1,049	1,100
500	1,061	1,127
600	1,074	1,154
700	1,087	1,182
800	1,100	1,211
900	1,114	1,241
1.000	1,128	1,272
1.200	1,155	1,334
1.400	1,184	1,402
1.600	1,213	1,472
1.800	1,243	1,546
2.000	1,276	1,628
2.400	1,342	1,801
2.800	1,410	1,988
3.200	1,483	2,199
3.600	1,561	2,437
4.000	1,644	2,703

Correct the output and back pressure by applying K1 and K2 respectively:
P_b (corrected) = P_b x K_1 = 10.339 x 1,128 = 11.775 kW
C_p (corrected) = C_p x K_2 = 12 x 1,272 = 15,3 mbar

The correct burner is TP1030.

To ensure a complete and safe combustion, the burner must be supplied with the correct flow of oxygen. The amount of oxygen available is proportional to the density of the combustion air, and the density depends on the environmental conditions.



Attention! The correction applied does not change the actual output that the burner must develop. If the boiler is always 9.500 kW, and the burner always develops 10.339 kW, then why was a 11.775 kW burner selected?
What has changed is the performance of the fan, which must deliver a sufficient oxygen flow to the fuel combustion.
The choice of burner is therefore made in the following way: the performance curve of the burner is maintained as if the system was located at sea level, but we pretend that the boiler requires a higher performance according to the K1 and K2 coefficients.
This operation is equivalent to maintaining the real working point, and reducing the performance curve of the burner. The result is the same but the calculation is simpler and faster.

How to choose the correct ventilator

According to the application output or the fuel flow rate we need to calculate the needed air considering the following data:
- Output / Fuel air flow;
- Temperature of combustion air;
- Backpressure in the combustion chamber;
- Sea level altitude.

In order to size the correct fan motor the following calculation has to be made:
1. Air flow needed;
2. Pressure needed.

First of all we need to calculate the air flow needed in function of Nm3/h for gas or kg/h for oil and multiply it for the following coefficients:
Gas: K = 12
Light oil: K = 15,7
Heavy oil: K = 15

Example:
Burner capacity : 10.339 kW
10.339 x 860/8.125 = 1.094 Nm^3/h of gas
The quantity of air will be:
1094 [Nm^3/h] x 12 = 13.132 m^3/h of air

This value must be adjusted according to the following:
1. temperature of combustion air (standard 20 °C - table for different temperature);
2. sea level (refer to the table for correction factors);
3. air loss of the connecting pipes between burner head and ventilator (estimated to 5 %).

Example at 100 mt sea level:
Results will be the following for an installation at 100 m from the sea level and with 15 °C of air:
13.132 [m^3/h] x 1,05 / 0,988 = 13.956 m^3/h

Example at 1500 mt sea level:
Results will be the following for an installation at 1500 m from the sea level and with 15 °C of air:
13.132 [m^3/h] x 1,05 / 0,852 = 16.183 m^3/h

TOTAL AIR PRESSURE
To finalize the calculation we shall consider the following:
• draught loss of burner head (see graphics for each burner);
• backpressure in the combustion chamber;
• additional loss given from accessories like heat exchanger, filters, …;
• correction factor for safety: multiply value for 1,2.

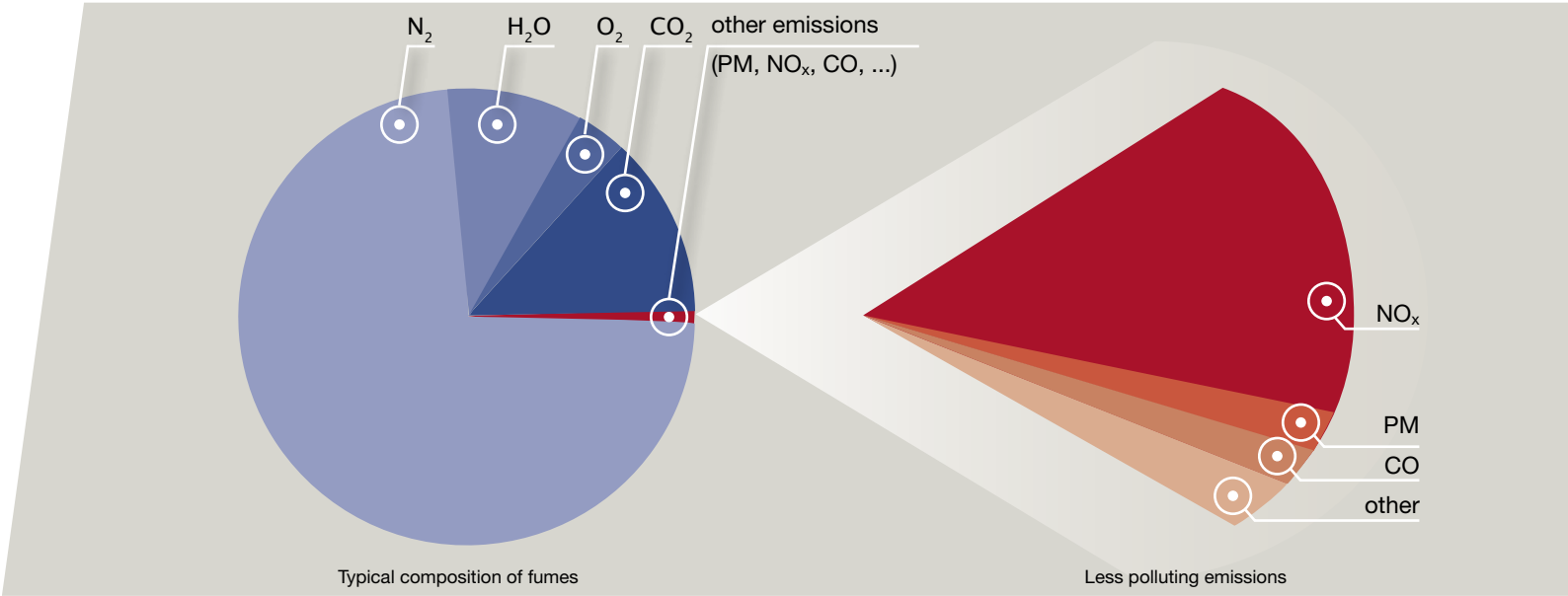
Example of sea level:
Burner capacity: 10.339 kW 1094 Nm^3/h gas for TP1030
• head loss = 25 mbar (see graph at pag. 189)
• backpressure installation = 12 mbar
• correction factor = value x 1,2
Total: (25+12) x 1,2 = 44,4 mbar
Final calculated data for selecting the ventilator:
Air pressure = 44,4 mbar
Example of 1000 mt sea level:
Burner capacity: 11.775 kW
• head loss = 25 mbar (see graph at pag. 191) 25 x 1,128 = 32 mbar
• backpressure correction 12 x 1,4 = 16,8 mbar
• safety correction factor = value x 1,2
Total: (32+16.8) x 1,2 = 58,5 mbar
Final data achieved for selecting the ventilator:
Air pressure = 58,5 mbar

Temperature (°C)	Air density (kg/m)	CORRECTION FACTORS Sea level altitude (m)												
		0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
o	1,293	1,073	1,042	1,012	0,982	0,954	0,926	0,899	0,873	0,847	0,823	0,799	0,775	0,753
5	1,270	1,054	1,023	0,993	0,965	0,936	0,909	0,883	0,857	0,832	0,808	0,784	0,761	0,739
10	1,247	1,035	1,005	0,976	0,947	0,920	0,893	0,867	0,842	0,817	0,793	0,770	0,748	0,726
15	1,226	1,017	0,988	0,959	0,931	0,904	0,878	0,852	0,827	0,803	0,780	0,757	0,735	0,714
20	1,205	1,000	0,971	0,943	0,915	0,888	0,863	0,837	0,813	0,789	0,766	0,744	0,722	0,701
25	1,185	0,983	0,955	0,927	0,900	0,874	0,848	0,823	0,799	0,776	0,754	0,732	0,710	0,690
30	1,165	0,967	0,939	0,911	0,885	0,859	0,834	0,810	0,786	0,763	0,741	0,720	0,699	0,678
40	1,128	0,936	0,909	0,882	0,857	0,832	0,807	0,784	0,761	0,739	0,717	0,697	0,676	0,657
so	1,093	0,907	0,881	0,855	0,830	0,806	0,782	0,760	0,738	0,716	0,695	0,675	0,655	0,636
60	1,060	0,880	0,854	0,829	0,805	0,782	0,759	0,737	0,715	0,695	0,674	0,655	0,636	0,617
80	1,000	0,830	0,806	0,782	0,760	0,737	0,716	0,695	0,675	0,655	0,636	0,618	0,600	0,582
100	0,946	0,786	0,763	0,740	0,719	0,698	0,678	0,658	0,639	0,620	0,602	0,585	0,567	0,551
150	0,834	0,693	0,672	0,653	0,634	0,615	0,598	0,580	0,563	0,547	0,531	0,515	0,500	0,486
200	0,746	0,619	0,601	0,584	0,567	0,550	0,534	0,519	0,504	0,489	0,475	0,461	0,448	0,434
250	0,675	0,560	0,544	0,528	0,513	0,498	0,483	0,469	0,456	0,442	0,429	0,417	0,405	0,393

EMISSIONS

The subject of emissions is very wide and complex. The scientific literature in this field is under continuous update and there's no way to describe it briefly.
The boiler room is a source of pollution caused by the combustion of hydrocarbons. Combustion products consist mainly of nitrogen, carbon dioxide and steam delivered into the atmosphere through the chimney. The products of secondary combustion include a long list of chemicals, such as (CO), nitrogen oxides (NO_x), fine particulate matter (PM) and others. The normative in force provide their max limits.
The level of emissions depends on many factors, including:
- fuel composition;
- shape of the combustion chamber and characteristics of the boiler;
- type of burner head.

For example, liquid fuels usually contain sulphur and other impurities.
These substances do not burn, therefore, if there is a need to reduce emissions, it is necessary to use a high performance burner or to use complex systems for the treatment of fumes.
The emissions of nitrogen oxide also depend on the characteristics of the combustion chamber and the combustion head.
Due to the fact that the limit values required by the technical standards for the environmental protection are more and more restricted, it is necessary to pay particular attention to propose a correct choice of burner and boiler.
CIB UNIGAS Technical Management keeps always an eye on new technologies to reduce emissions. For these reasons CIB UNIGAS has been investing in the development of low environmental impact burners.



All CIB UNIGAS burners are certified for both gaseous and liquid fuels in accordance with European standards and meet the requirements for polluting emissions.
Measurements of CO and NO_x emissions are carried out on standard size boilers, on all test conditions.

TABLE: LIMIT VALUES FOR EMISSIONS OF NITROGEN OXIDES AND CARBON MONOXIDE ACCORDING TO THE EUROPEAN STANDARD

Type of fuel	Burner class	Unit of measurement	CO	NO_x	Standards
natural gas	Class 1	mg/kWh	100	170	UNI EN 676
natural gas	Class 2	mg/kWh	100	>80 <120	UNI EN 676
natural gas	Class 3	mg/kWh	100	>60 <80	UNI EN 676
natural gas	Class 4	mg/kWh	100	<60	UNI EN 676
LPG gas	Class 1	mg/kWh	100	230	UNI EN 676
LPG gas	Class 2	mg/kWh	100	180	UNI EN 676
LPG gas	Class 3	mg/kWh	100	140	UNI EN 676
LPG gas	Class 4	mg/kWh	100	110	UNI EN 676
light oil	Class 1	mg/kWh	110	250	UNI EN 267
light oil	Class 2	mg/kWh	110	185	UNI EN 267
light oil	Class 3	mg/kWh	60	120	UNI EN 267

CIB UNIGAS burners, NO_x emissions:
- Low NO_x gas burners correspond to Class 2, Ultra Low NO_x burners without FGR correspond to Class 3.
- LPG burners correspond to Class 1, Low NO_x LPG burners correspond to Class 3;
- Oil burners have a maximum NO_x emission of 250 mg/kWh (Class 1);
- Heavy fuel oil burners (non-standard fuel oil) can, in the worst case, reach a maximum NO_x emission of 700 mg/kWh.

CIB Unigas also offers Low NO_x solutions for complex systems and revamping existing plants.
As far as carbon monoxide (CO) is concerned, a properly set CIB UNIGAS burner delivers a very small CO level.

If necessary, CIB UNIGAS offers FGR solutions – these are burners with Flue Gas Recirculation system which deliver emissions of less than 50 or 30 mg/kWh. Burners with FGR are designed for installations with Low NO_x emissions requirements, such as greenhouses or boilers in large residential areas where low levels of contaminants are a priority. Our FGR solutions meet environmental impact requirements.

The burners belonging to the different classes of NO_x emissions are identified by the following logos:

FGR 30-50 mg/kWh

Often non-EU countries follow different normatives and measurement conditions. To ensure that the levels of pollutant emissions are always correct, it is necessary to know exactly the conditions in which tests were carried out, i.e. measurement of the gas, the error, type of fuel, boiler size, atmospheric conditions, etc.
In addition, standards can use different units of measurement*. Therefore for the comparison, it is necessary to translate the limit values expressed as follows in mg/kWh (milligrams per kilowatt hour), using the correct formula, depending on the selected fuel and residual oxygen in the exhaust gases.

* For example: ppm (parts per million), mg/Nm^3 (milligrams per normal cubic meter), etc.

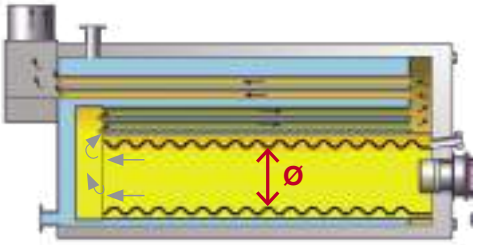
WHY DIFFERENT THERMAL GROUPS RELEASE DIFFERENT LEVELS OF NITROGEN OXIDES AT THE SAME OUTPUT?

The CO, NO_x and other pollutants are strongly influenced by a number of factors, not always burner related. There are factors independent from the thermal plant, such as environmental conditions (altitude, humidity, fuel composition, etc…) and factors related in particular to the design of the generator. The most important factors are summarized below.
It becomes evident that burner and boiler must be evaluated as a single thermal group, in order to comply to the rule on emission levels, or to the specific requirements of designers. The correct match between burner and boiler is discussed in greater detail on the following pages.

BOILER TYPE

↓

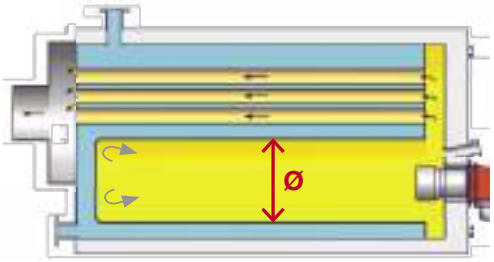
- type of generator (reverse flame, or 3 smoke-pass)
- dwell time of the flame within the combustion chamber
- heat exchange surface
- temperature and type of heat transfer fluid



DIMENSIONS OF THE COMBUSTION CHAMBER

↓

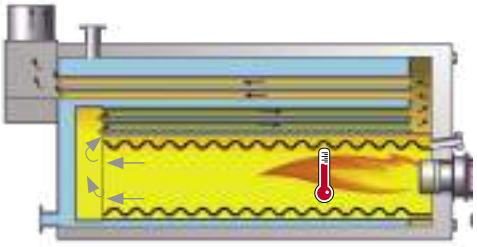
- combustion chamber internal gas circulation
- dwell time of the flame within the combustion chamber
- thermal load of the chamber



THERMAL LOAD OF THE COMBUSTION CHAMBER

↓

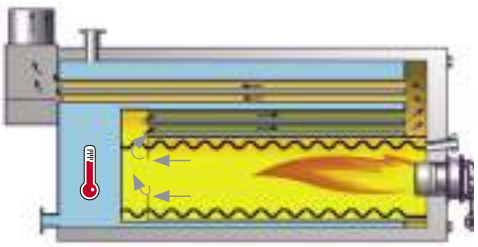
- flame temperature
- speed at which the NO_x is formed



BOILER TEMPERATURE

↓

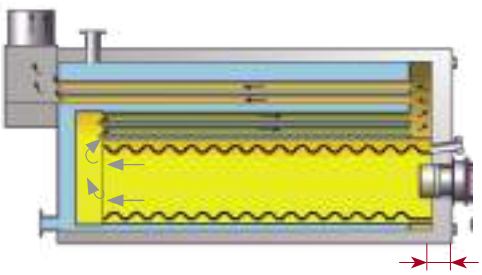
- flame temperature
- speed at which the NO_x is formed



THICKNESS OF THE REFRACTORY OR BOILER DOOR

↓

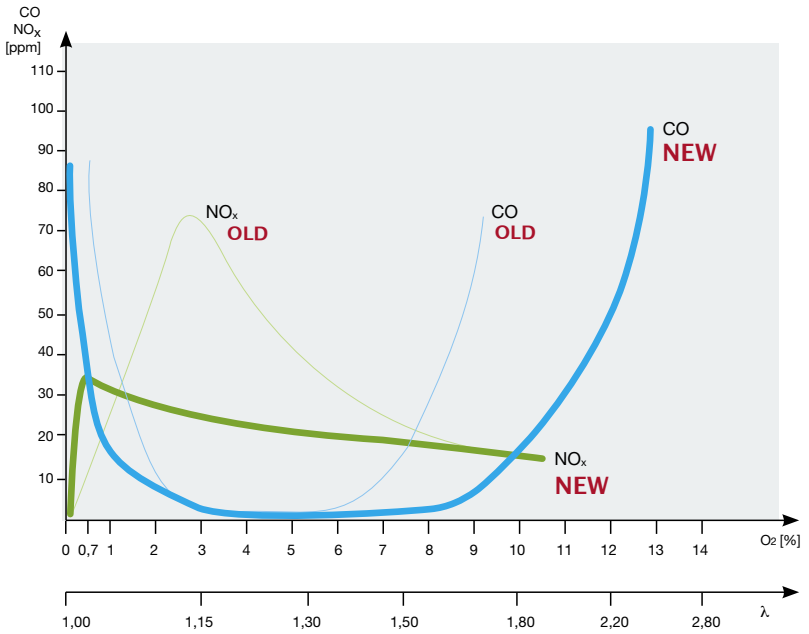
- length of the combustion head
- internal combustion gas circulation



Reverse flame boilers: contact our Technical Department.

Relation between NO_x emissions and CO

Emissions of nitrogen oxides and carbon monoxide are strongly correlated as both depend on the stoichiometry of the combustion. Excess of air affects both emissions and the efficiency of the generator. In a logic of compromise, reducing fuel consumption requires a reduction of excess air.
The limit is given by the emission of CO.
In the burners of the previous generation this choice had priority on NO_x emissions.

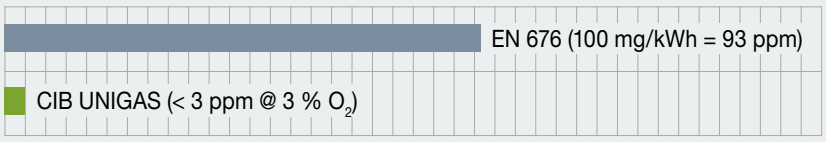


THE "ECOLOGIC" BURNER SERIES HAS REACHED A GREAT GOAL: WIDE RANGE OF COMBUSTION FLEXIBILITY

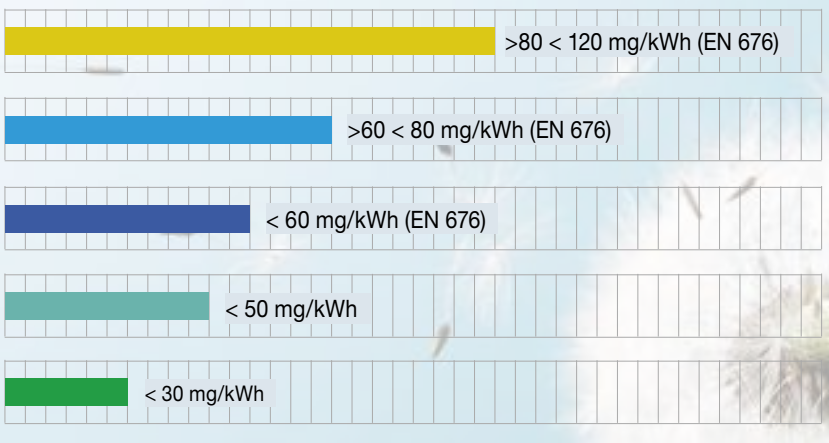
The development of low burners emissions represent a real revolution in the way NO_x and CO interact when changing the excess of air.
The new series of Low NO_x burners from the CIB UNIGAS ensures zero CO values in a very wide range of operation, with residual oxygen between 0,5 % and 8 %, while maintaining low NO_x emissions almost constant.
The advantage is obvious: the careful choice of the the generator makes possible, for example, to set the oxygen at 1,5 % without formation of CO; increasing the efficiency of the thermal group without deteriorate the NO_x emissions.
Economical and ecological.

ECOLOGIC

EMISSION LIMIT CO



NO_x EMISSION LIMITS ON 3 SMOKE-PASS BOILERS



Reverse flame boilers: contact our Technical Department.

MATCHING LOW NO_x BURNER AND HEAT GENERATOR

INTRODUCTION

To choose any burner, the following data are mandatory:
- Boiler type
- Burner input
- Backpressure in the combustion chamber
- Dimensions of the combustion chamber included the reverse smoke chamber
- NO_x emissions requested, 80, 50, 30 mg/kWh

The procedure is divided into three steps:
- choosing the burner;
- to obtain the correct emissions
- choosing the blast tube length.

CHOOSING THE BURNER

Introduction

To clearly explain the procedure please follow the example.

Example:	
Boiler type	3 pass
Furnace input	7.300 kW
Backpressure in combustion chamber	12 mbar
Dimensions of combustion chamber	Length L = 4.450 mm (4,45 m)
Smoke reverse chamber	Length L = 400 mm (0,4 m)
Total length of combustion chamber	Length TL = 4.850 mm (4,85 m)
Diameter	D = 1.250 mm (1,25 m)
Combustion chamber volume	D x D x 0,78 x TL 1,25 m x 1,25 m x 0,78 x 4,85 m = 5,91 m^3
Thermal load MW/m^3	Furnace input kW/Combustion chamber volume /1000 7.300/5,91/1.000 = 1,23 MW/m^3
Gas type	Natural gas

Next step, identify the burners whose requested outputs are included within their performance curves.

BURNER SELECTION FOR NO_x < 80 mg/kWh

COMBUSTION CHAMBER BACKPRESSURE

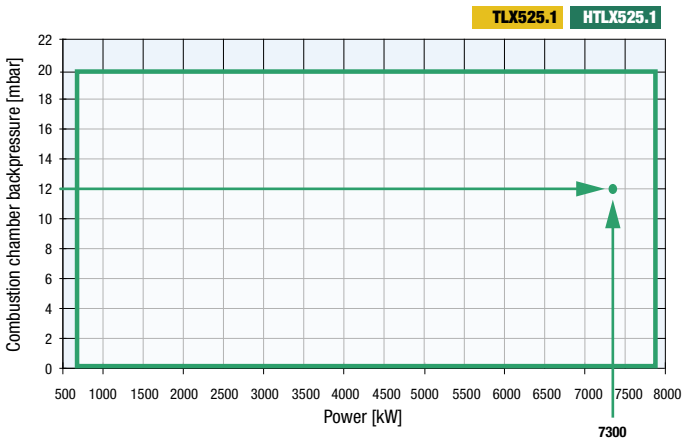


Fig. 1

NO_x DIAGRAM IN REFERENCE TO THE THERMAL LOAD

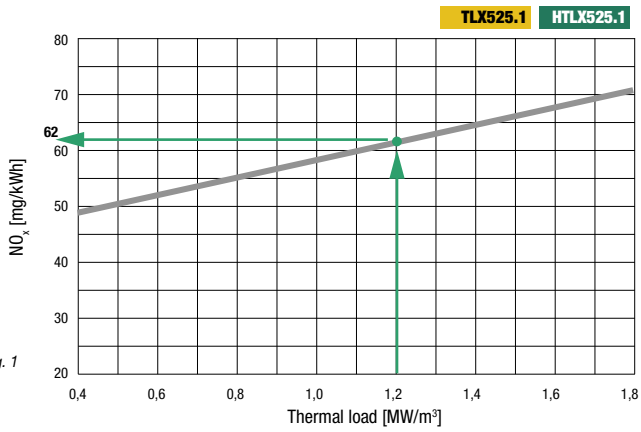
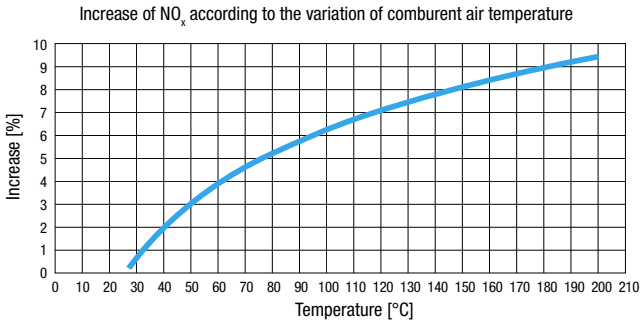


Fig. 2

Consider the operating range of the burner chosen in the above diagram: draw a vertical line matching the furnace input value (7.300 kW) and a horizontal line matching the backpressure value (12 mbar) (Fig. 1).
The burner is suitable if the intersection is inside the performance curve (these curves are correct for the NO_x < 80 mg/kWh).
In this case we have 62 mg/kWh at 3 % O_2 (Fig. 2).



Reference conditions

- Measurement tolerances according to EN 676 standard
- Temperature: 20 °C
- Dried flue gases
- Barometric pressure: 1013 millibars
- Relative humidity: 70 % (equivalent to 10 g H_2O/kg of air)
- Boiler temperature: 110 °C
- Fuel: G20 (natural gas, 100 % CH_4)
- Three-smoke pass boiler

The final step is to check blast tube dimensions, in relation to combustion chamber, because they are a critical parameter to obtain the expected emissions.
Two conditions should be met:

1) It is recommended that the diameter of the chamber is 2,5 to 3 times larger than the diameter of the burner blast tube.
2) The low NO_x blast tube must penetrate 150÷200 mm into the combustion chamber.

In the cited example, the boiler chamber diameter was 1.250 mm, so the optimal blast tube diameter lies in the range between 400 mm and 500 mm.
The dimensional table on page 83 shows that TLX525.1 blast tube diameter is equal to 419 mm, thus the first condition is met.
Regarding the blast tube length, suppose the boiler door is 350 mm thick, refractory included. The blast tube must penetrate at least 150 mm as said above, thus the long blast tube variant is selected (530 mm). The short blast tube (430 mm) is insufficient as it only penetrates by 80 mm into the combustion chamber.
In this case we have 180 mm.
To properly install the burner, please refer to Fig. 3 to the side.
Of course, it is possible to carry out the reverse procedure as well: given an emission limit that cannot be exceeded by design, the NO_x diagram provides the admissible thermal load for a given heat generator. This way, designer can select a suitable boiler based on project specifications and required power. In any case, burner blast tube dimensions must be checked to complete the matching procedure.

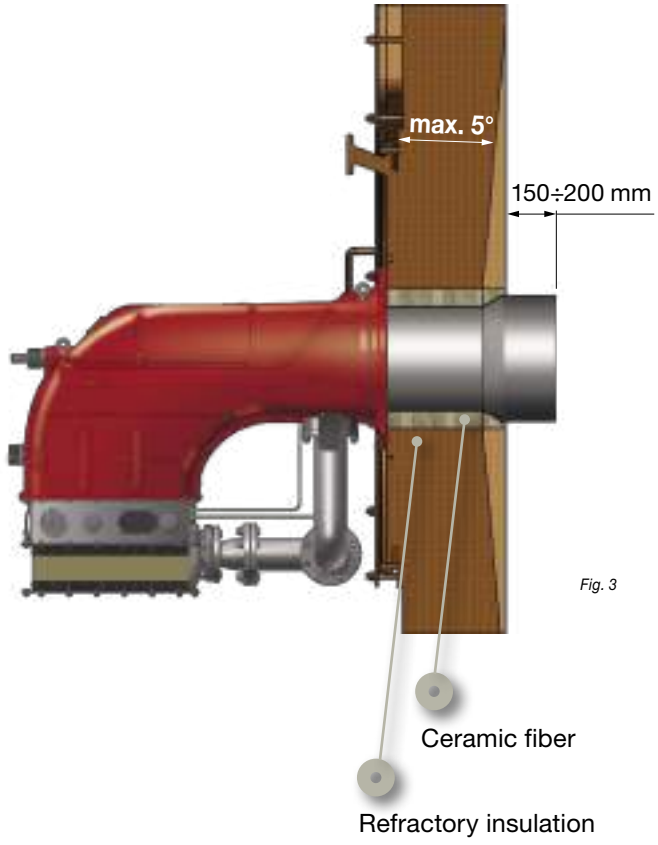
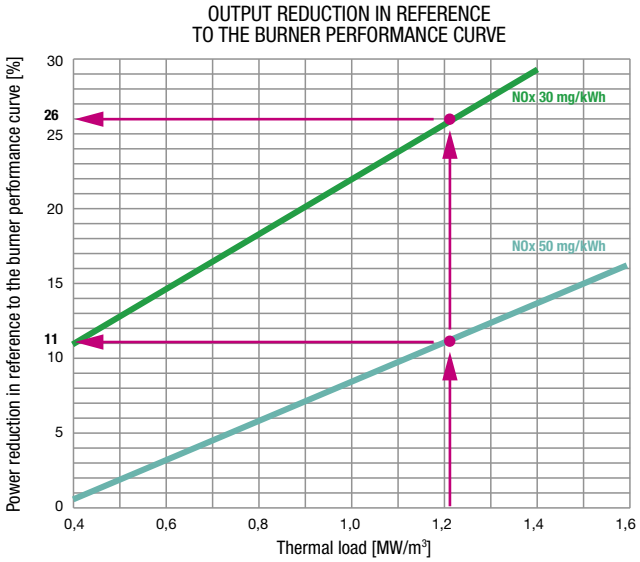


Fig. 3

BURNER SELECTION FOR NO_x < 50 mg/kWh and < 30 mg/kWh

With NO_x < 50 mg/kWh and < 30 mg/kWh we need to have a smoke recirculation (FGR).
The smoke recirculation decreases a percentage of the performance curves and increases the backpressure in the combustion chamber. This percentage depend also of the thermal load of the combustion chamber.
In order to select the correct burner we can calculate the depowering percentage needed.

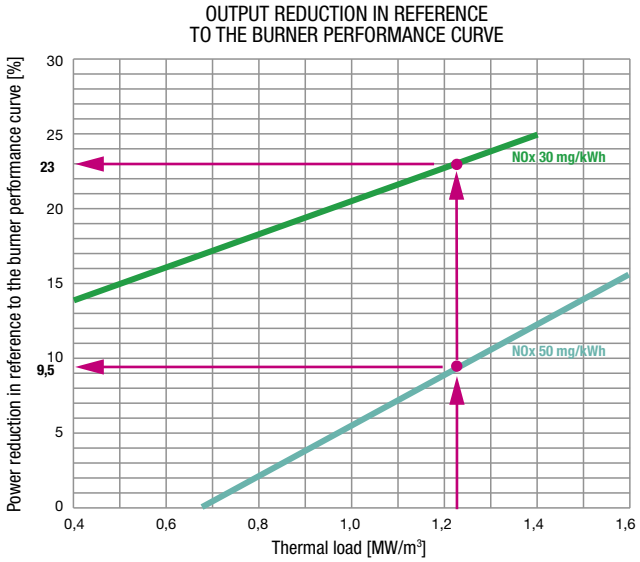
SELECTION 1: TLX525.1...FGR



< 50 mg/kWh
In the selection 1 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **11 %**.

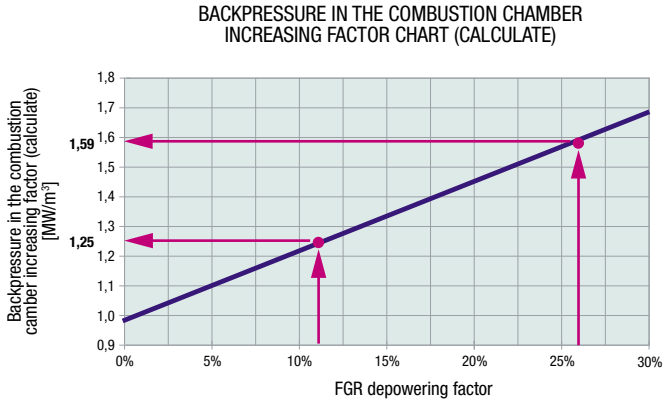
< 30 mg/kWh
In the selection 1 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **26 %**.

SELECTION 2: TLX1030.1...FGR



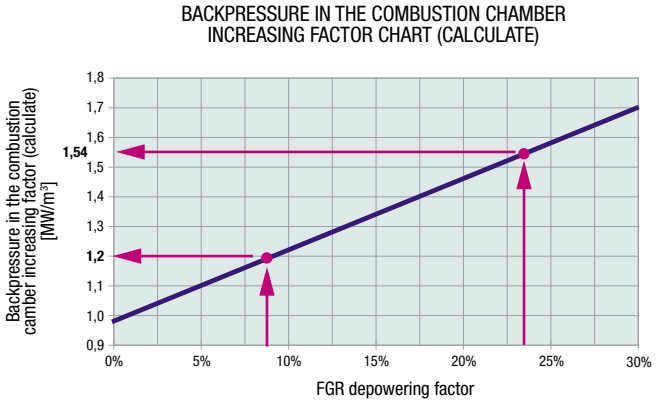
< 50 mg/kWh
In the selection 2 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **9,5 %**.

< 30 mg/kWh
In the selection 2 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **23 %**.



< 50 mg/kWh
In the selection 1 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **11 %** and the backpressure in the combustion chamber increases
12 x 1,25 = **15 mbar**

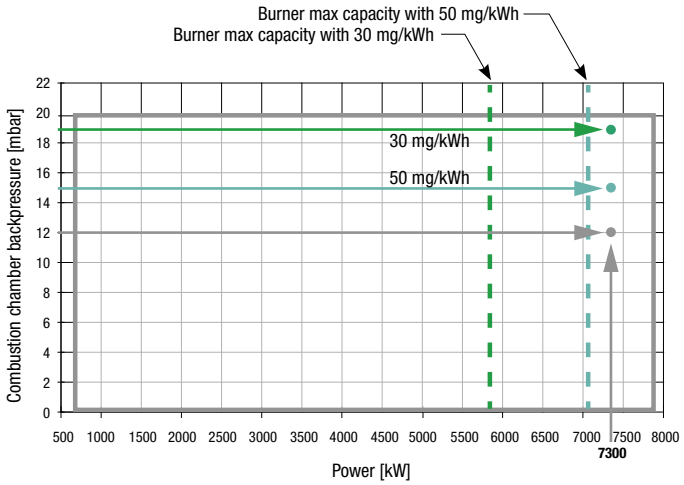
< 30 mg/kWh
In the selection 1 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **26 %** and the backpressure in the combustion chamber increases
12 x 1,6 = **19,2 mbar**



< 50 mg/kWh
In the selection 2 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **9,5 %** and the backpressure in the combustion chamber increases
12 x 1,2 = **14,4 mbar**

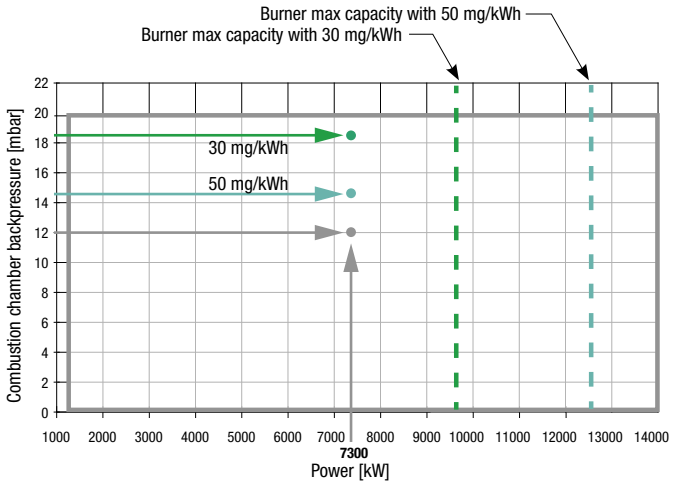
< 30 mg/kWh
In the selection 2 with the thermal load 1,22 MW/m³ the percentage of the depowering of the burner is **23 %** and the backpressure in the combustion chamber increases
12 x 1,54 = **18,48 mbar**

SELECTION 1: TLX525.1...FGR



The burner TLX525.1 in the **selection 1 is outside** of the performance curve, for this reason we can not choose this burner.

SELECTION 2: TLX1030.1...FGR



The burner TLX1030.1 in the **selection 2 is correct** because is inside of the performance curve with emissions 50 and 30 mg/kWh.

The final step is to check blast tube dimensions with a new burber selected, in relation to combustion chamber, because they are a critical parameter to obtain the expected emissions.

SELECTION 1
It is recommended that the diameter of the chamber is 2,5 to 3 times larger than the diameter of the burner blast tube.
SELECTION 2
The low NO_x blast tube must penetrate 150÷200 mm into the combustion chamber.
In the cited example, the boiler chamber diameter was 1.250 mm, so the optimal blast tube diameter lies in the range between 400 mm and 500 mm.
The dimensional table on page 84 shows that TLX1030.1 blast tube diameter is equal to 491 mm, thus the first condition is met.
Regarding the blast tube length, suppose the boiler door is 350 mm thick, refractory included. The blast tube must penetrate at least 150 mm as said above, thus the long blast tube variant is selected (545 mm). The short blast tube (445 mm) is insufficient as it only penetrates by 95 mm into the combustion chamber.
In this case we have 195 mm.
To properly install the burner, please refer to Fig. 4 to the side.
Of course, it is possible to carry out the reverse procedure as well: given an emission limit that cannot be exceeded by design, the NO_x diagram provides the admissible thermal load for a given heat generator. This way, designer can select a suitable boiler based on project specifications and required power. In any case, burner blast tube dimensions must be checked to complete the matching procedure.

If design specifications are very demanding, for example if the boiler thermal load is extremely high, CIB Unigas offers a proven low NO_x solution for your needs: the FGR (flue gas recirculation) system.
Please contact our Technical Dept for further details.

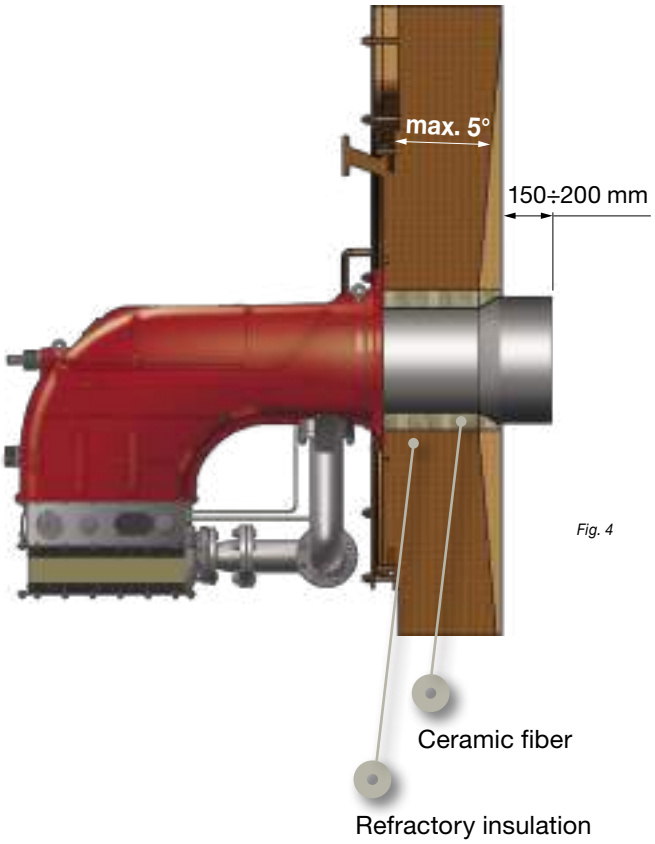
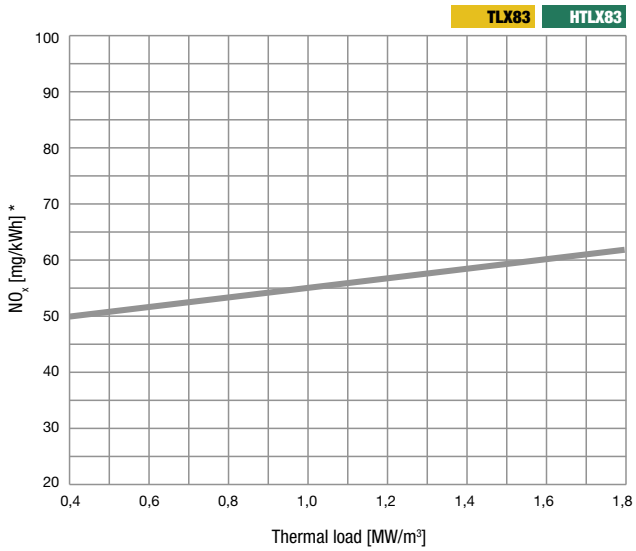


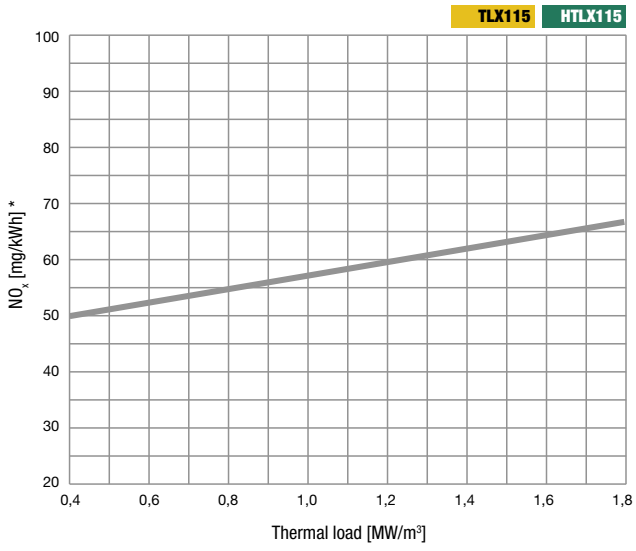
Fig. 4

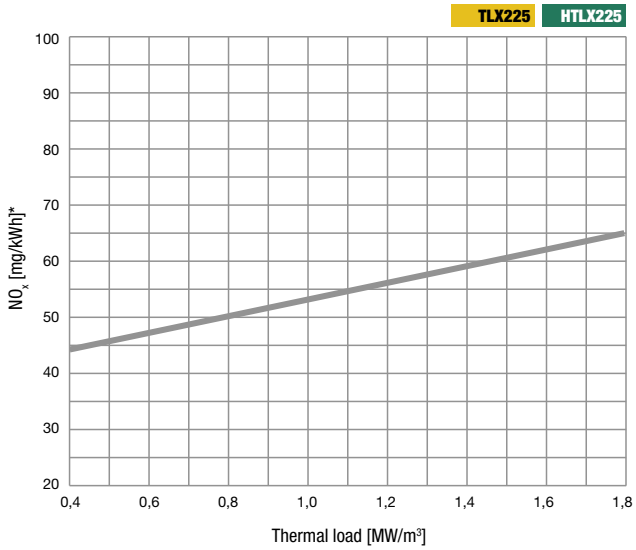
Reverse flame boilers: contact our Technical Department.

MATCHING LOW NO_x BURNER AND HEAT GENERATOR

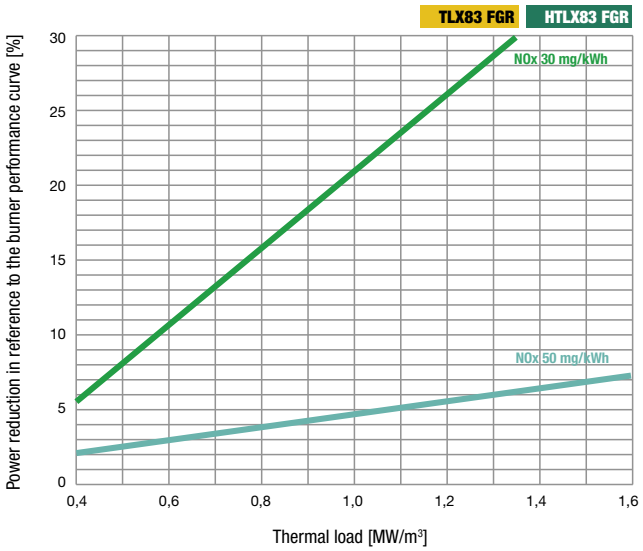
NO_x DIAGRAM IN REFERENCE TO THE THERMAL LOAD

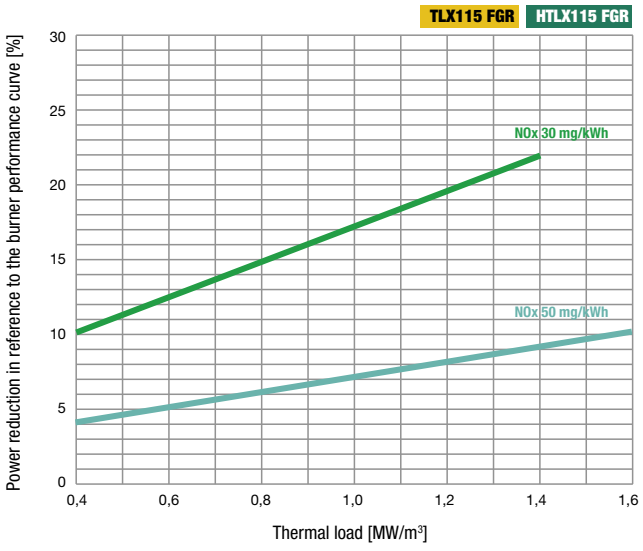


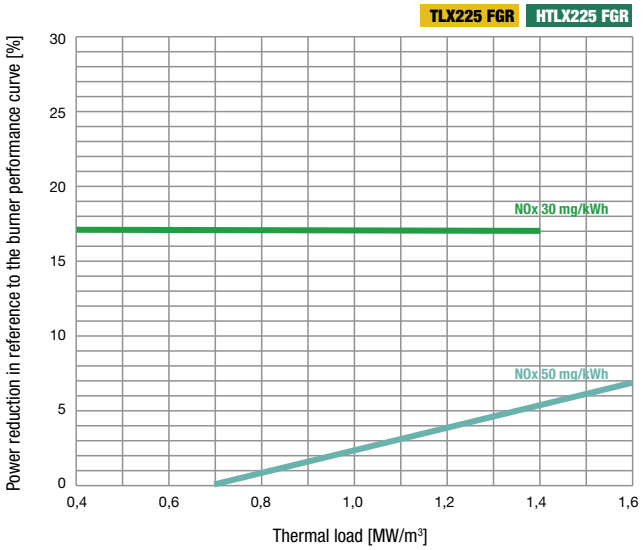




OUTPUT REDUCTION IN REFERENCE TO THE BURNER PERFORMANCE CURVE



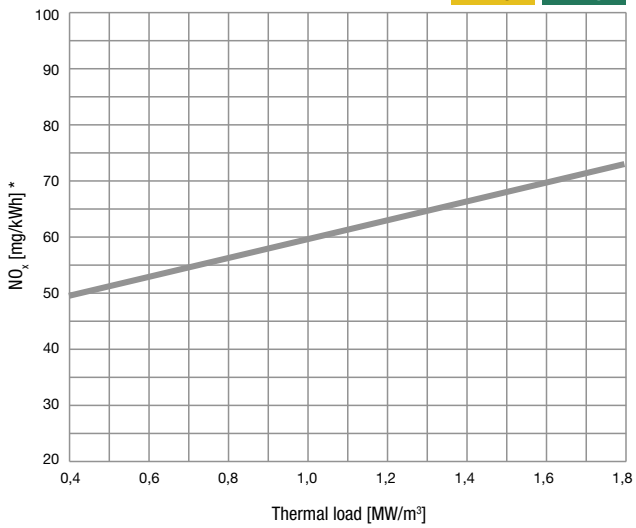




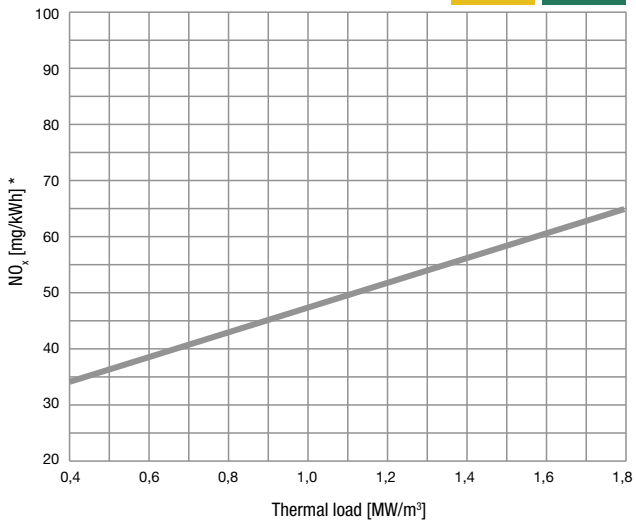
* According to UNI EN 676 correction method; p amb 1013 mbar; t amb 20 °C; h 10 g/kg.

NO_x DIAGRAM IN REFERENCE TO THE THERMAL LOAD

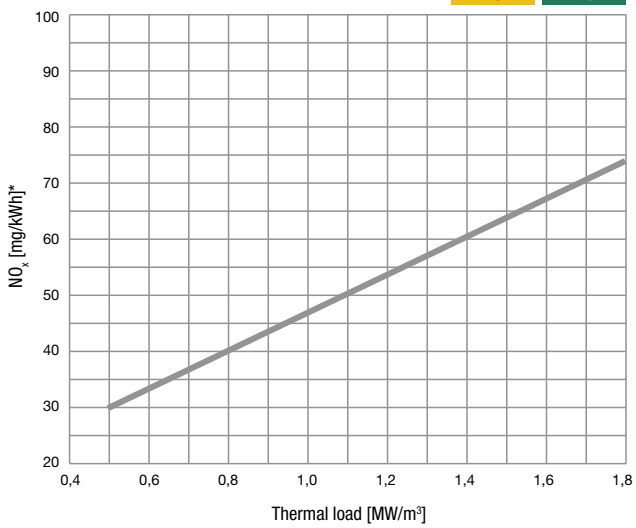
TLX92R **HTLX92R**



TLX92.1 **HTLX92.1**

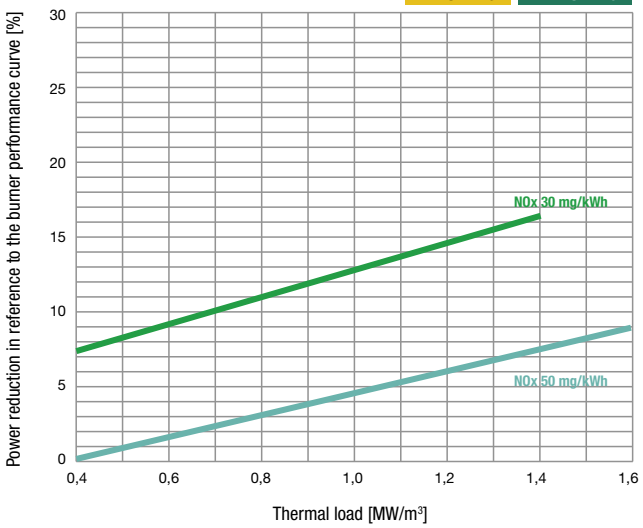


TLX512R **HTLX512R**

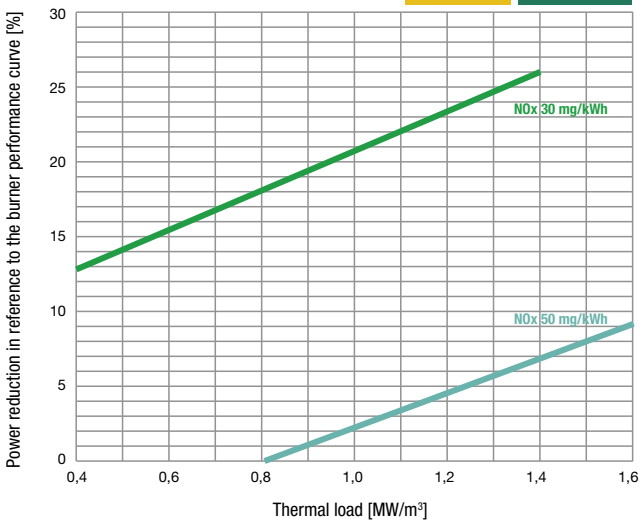


OUTPUT REDUCTION IN REFERENCE TO THE BURNER PERFORMANCE CURVE

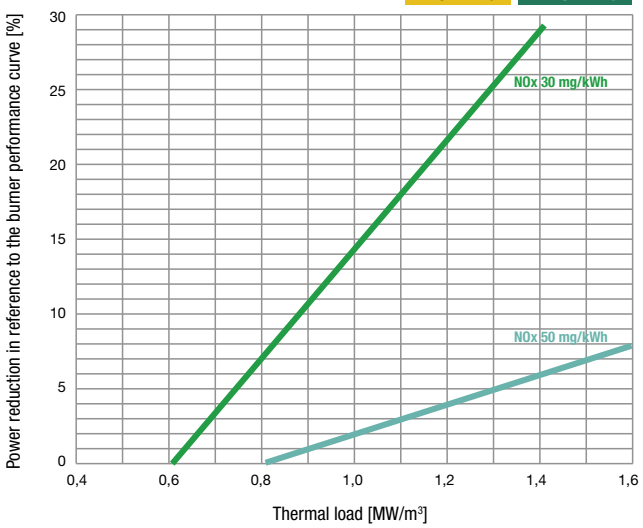
TLX92R FGR **HTLX92R FGR**



TLX92.1 FGR **HTLX92.1 FGR**



TLX512R FGR **HTLX512R FGR**

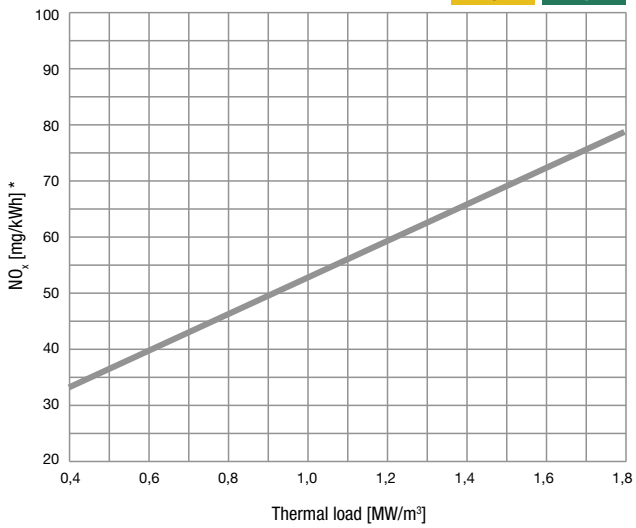


* According to UNI EN 676 correction method; p amb 1013 mbar; t amb 20 °C; h 10 g/kg.

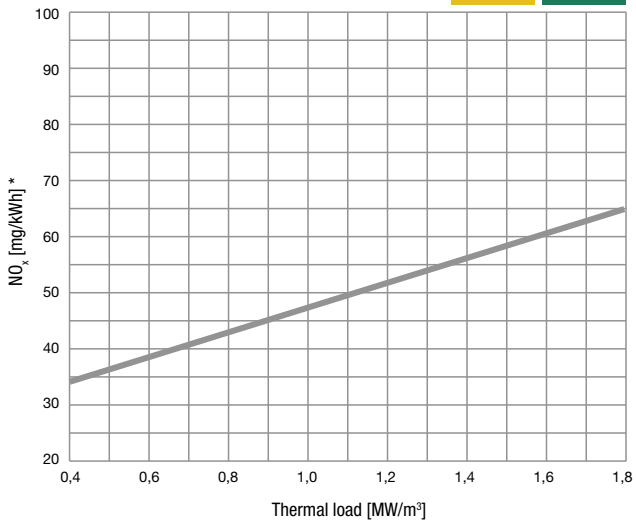
MATCHING LOW NO_x BURNER AND HEAT GENERATOR

NO_x DIAGRAM IN REFERENCE TO THE THERMAL LOAD

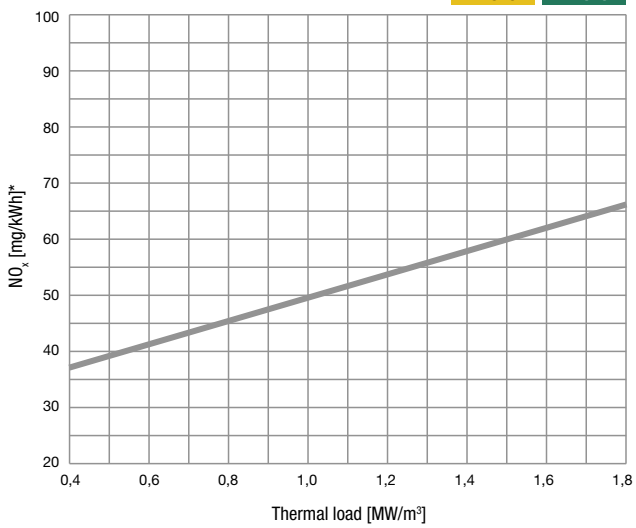
TLX512.1 **HTLX512.1**



TLX515.1 **HTLX515.1**

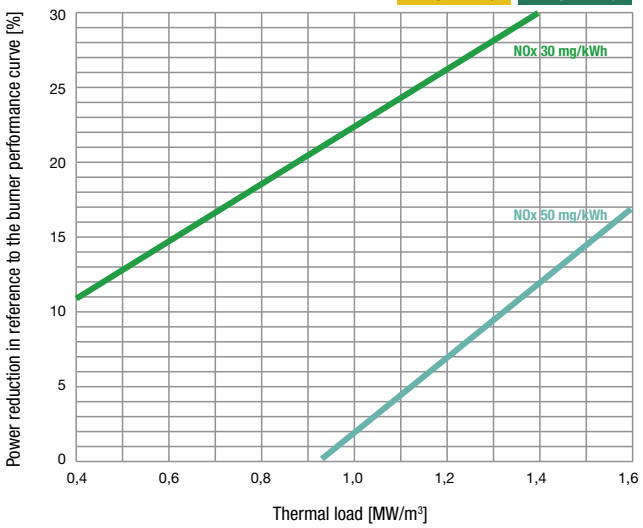


TLX520.1 **HTLX520.1**

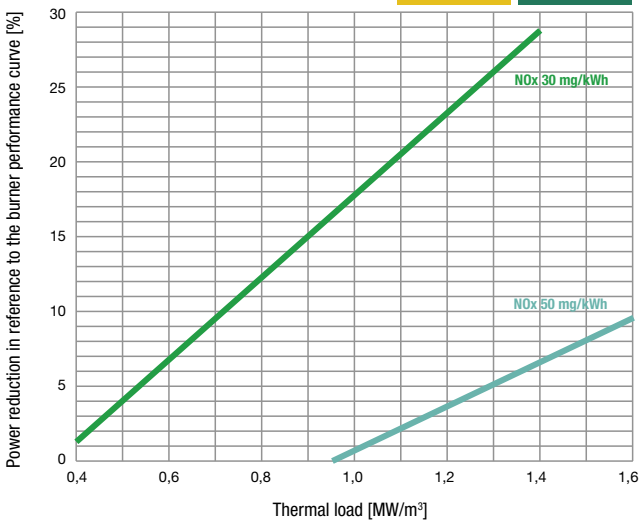


OUTPUT REDUCTION IN REFERENCE TO THE BURNER PERFORMANCE CURVE

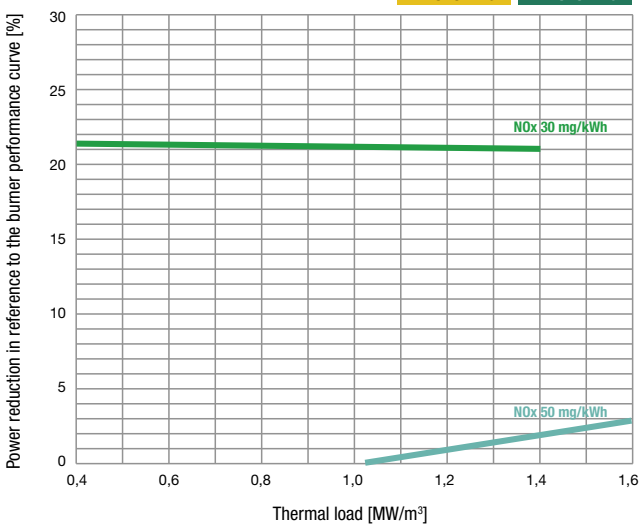
TLX512.1 FGR **HTLX512.1 FGR**



TLX515.1 FGR **HTLX515.1 FGR**



TLX520.1 FGR **HTLX520.1 FGR**

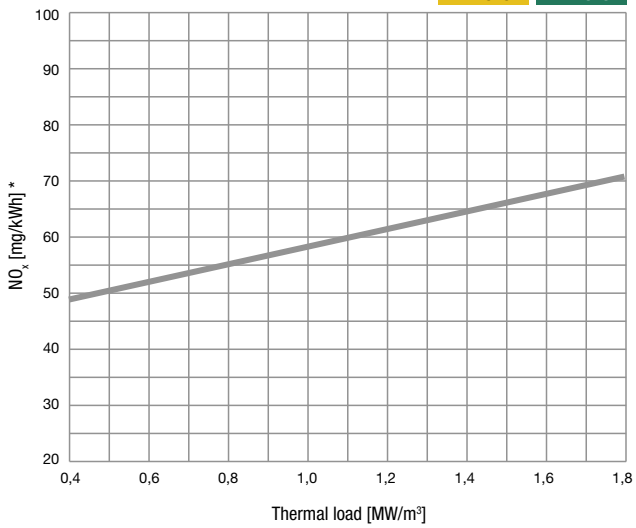


* According to UNI EN 676 correction method; p amb 1013 mbar; t amb 20 °C; h 10 g/kg.

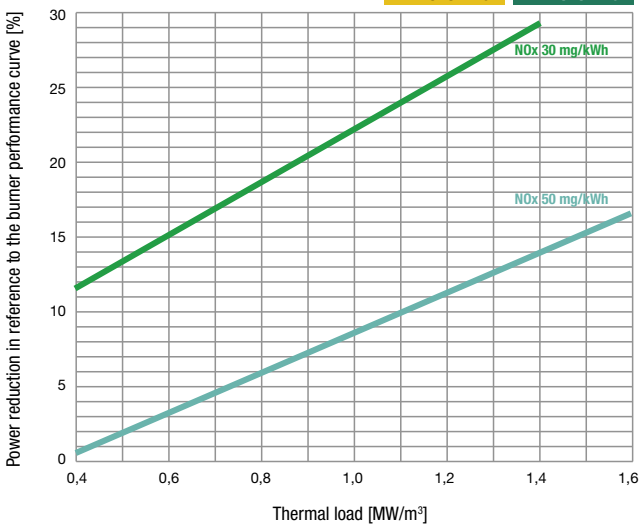
NO_x DIAGRAM IN REFERENCE TO THE THERMAL LOAD

OUTPUT REDUCTION IN REFERENCE TO THE BURNER PERFORMANCE CURVE

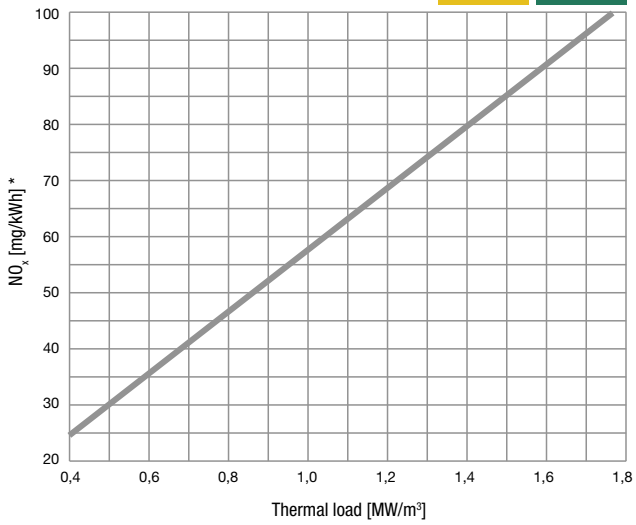
TLX525.1 **HTLX525.1**



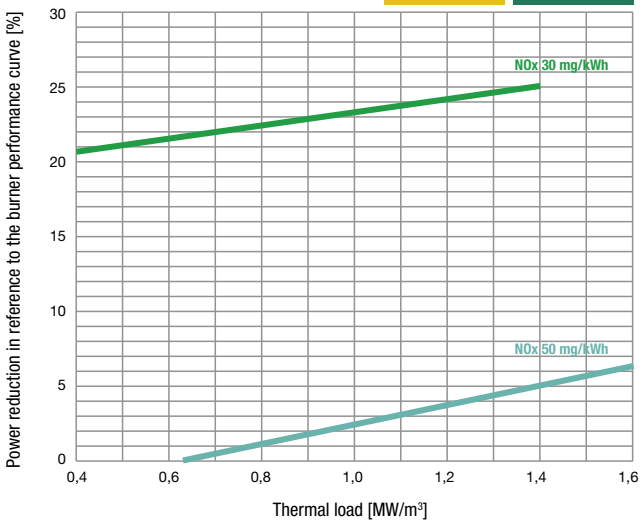
TLX525.1 FGR **HTLX525.1 FGR**



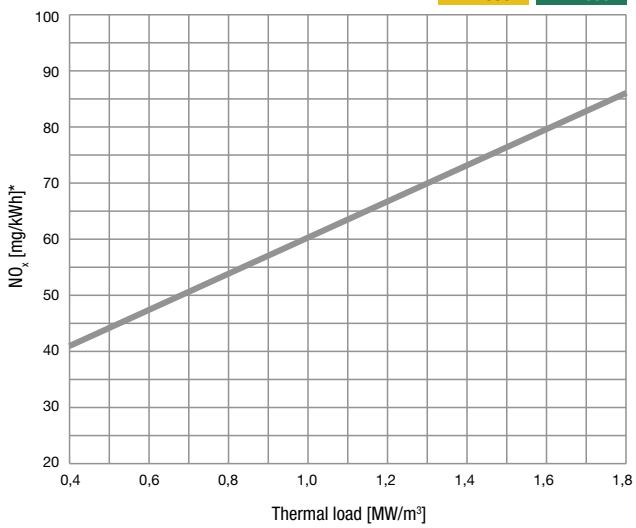
TLX1030R **HTLX1030R**



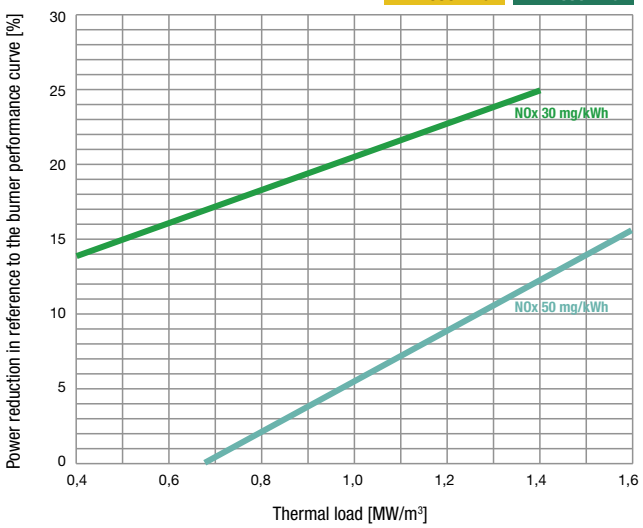
TLX1030R FGR **HTLX1030R FGR**



TLX1030.1 **HTLX1030.1**



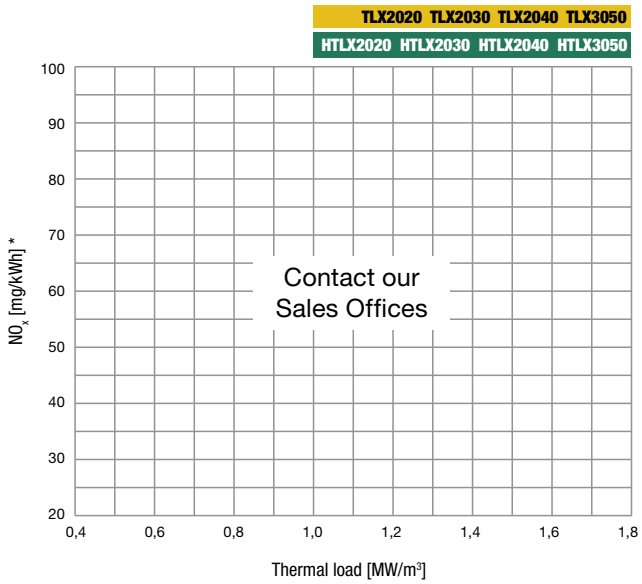
TLX1030.1 FGR **HTLX1030.1 FGR**



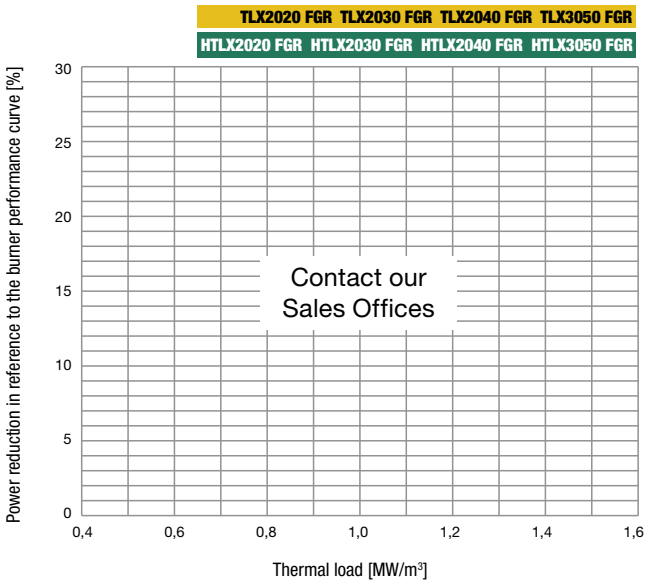
* According to UNI EN 676 correction method; p amb 1013 mbar; t amb 20 °C; h 10 g/kg.

MATCHING LOW NO_x BURNER AND HEAT GENERATOR

NO_x DIAGRAM IN REFERENCE TO THE THERMAL LOAD



OUTPUT REDUCTION IN REFERENCE TO THE BURNER PERFORMANCE CURVE

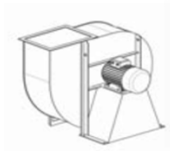
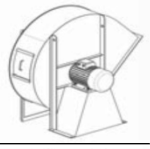
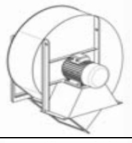
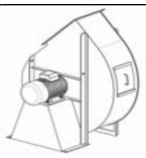
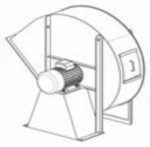


* According to UNI EN 676 correction method; p amb 1013 mbar; t amb 20 °C; h 10 g/kg.

Delivery condition
- Fans: packing INCLUDED
- Acoustic hoods box fan covers: Packing INC.
- Fan hoods in special design with orientation LG/RD 180/225:

Price quotation upon request
- Anti-vibration coupling at fan delivery: INCLUDED
- Packaging is included in the delivery (the packages consist of blank wooden crates, suitable for overland transport)

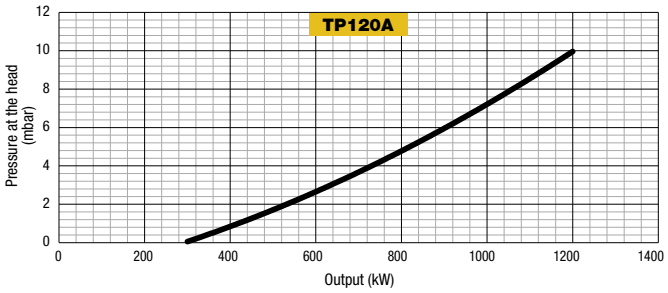
To order a centrifugal fan, it is necessary to specify its orientation.
The fan is available in the following configurations:

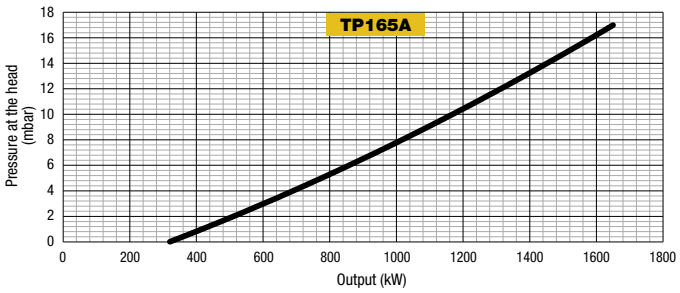
	0	45	90	135	180	225	270	315
RD								
LG								

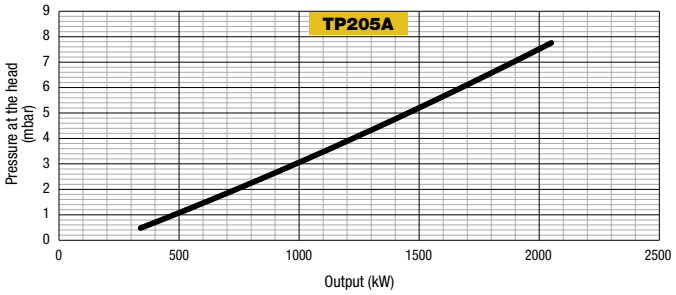
Examples: RD45, RD270, LG90, ...

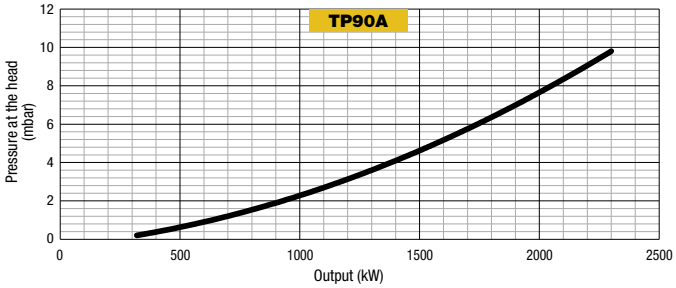
AIR PRESSURE AT THE BURNER HEAD

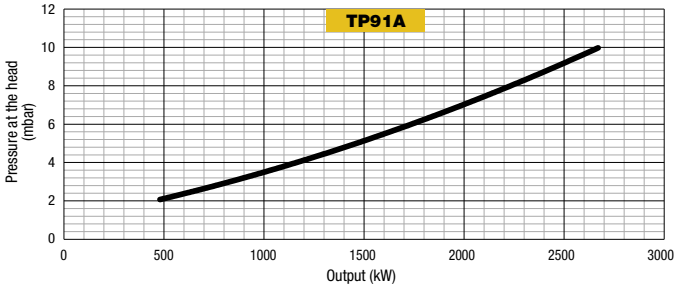
TP TYPE

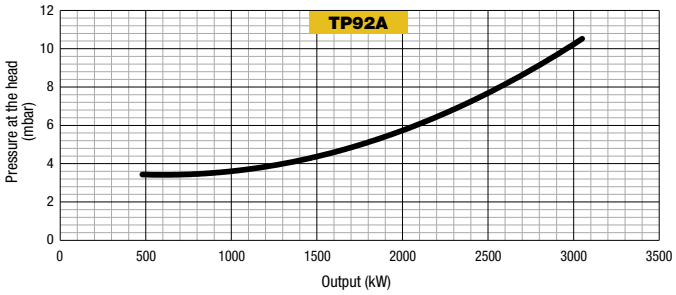


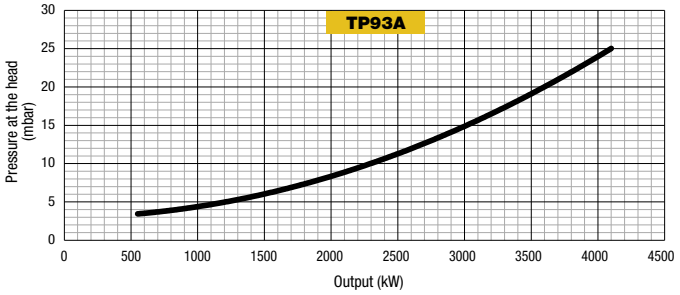




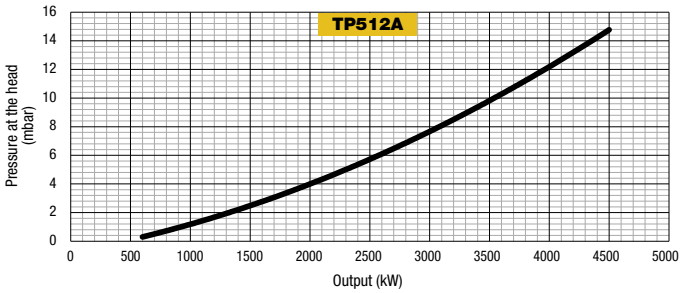


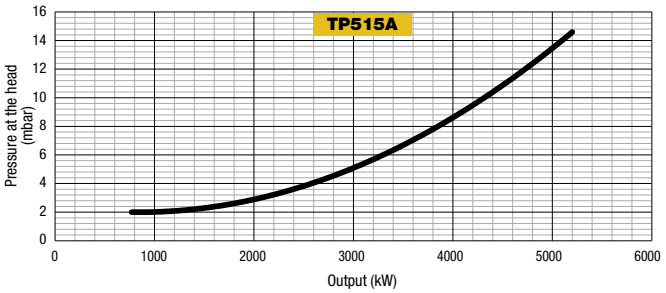


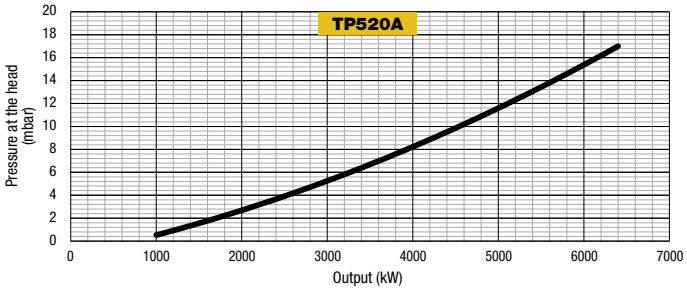


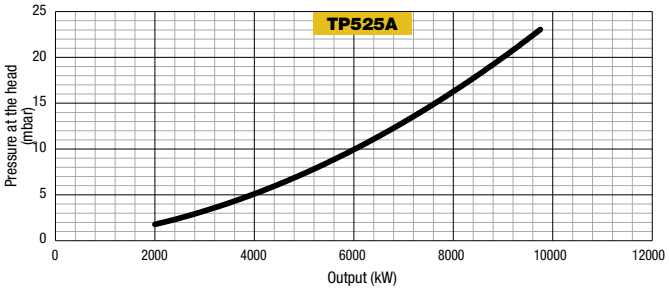


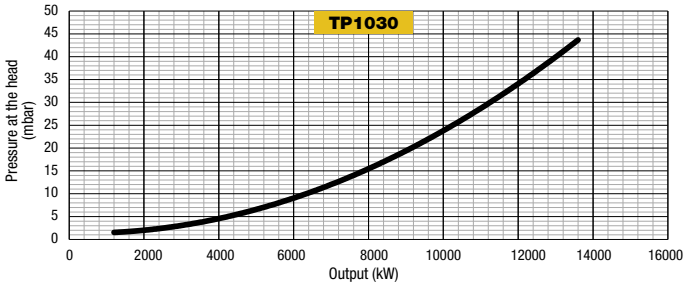
TP TYPE

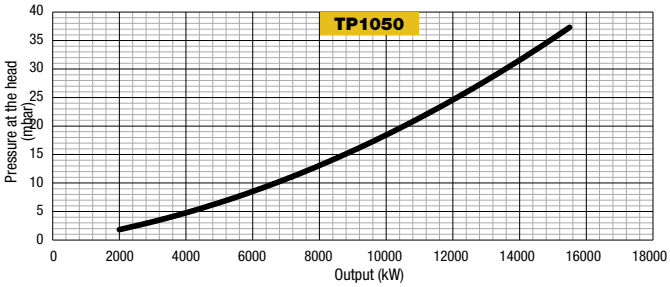

TP512A
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Output (kW)

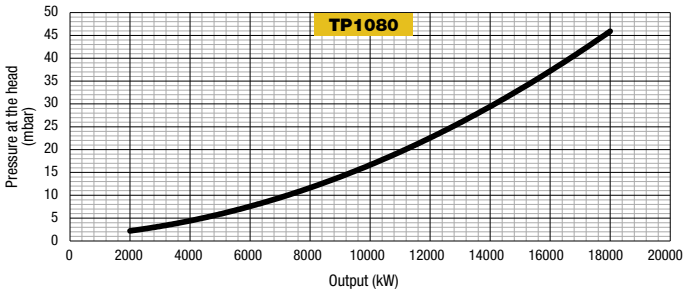

TP515A
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 1000 2000 3000 4000 5000 6000
Output (kW)

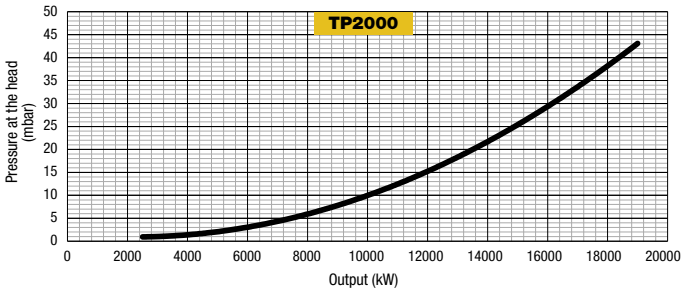

TP520A
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16 18 20
0 1000 2000 3000 4000 5000 6000 7000
Output (kW)

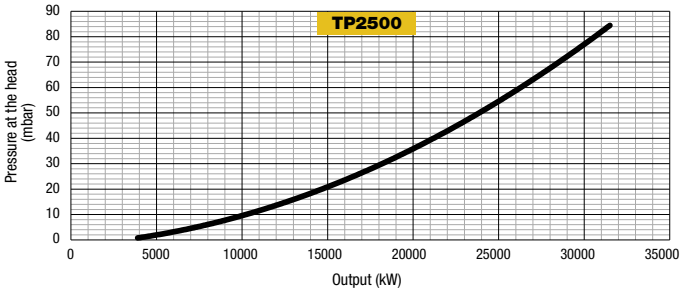

TP525A
Pressure at the head (mbar)
0 5 10 15 20 25
0 2000 4000 6000 8000 10000 12000
Output (kW)

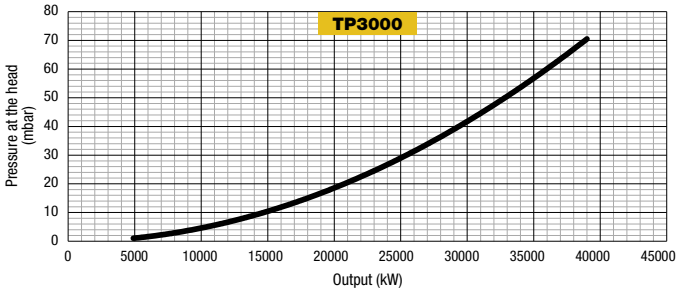

TP1030
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40 45 50
0 2000 4000 6000 8000 10000 12000 14000 16000
Output (kW)


TP1050
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40
0 2000 4000 6000 8000 10000 12000 14000 16000 18000
Output (kW)


TP1080
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40 45 50
0 2000 4000 6000 8000 10000 12000 14000 16000 18000 20000
Output (kW)


TP2000
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40 45 50
0 2000 4000 6000 8000 10000 12000 14000 16000 18000 20000
Output (kW)

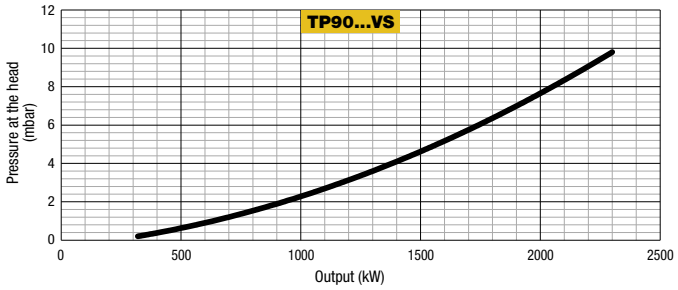

TP2500
Pressure at the head (mbar)
0 10 20 30 40 50 60 70 80 90
0 5000 10000 15000 20000 25000 30000 35000
Output (kW)


TP3000
Pressure at the head (mbar)
0 10 20 30 40 50 60 70 80
0 5000 10000 15000 20000 25000 30000 35000 40000 45000
Output (kW)

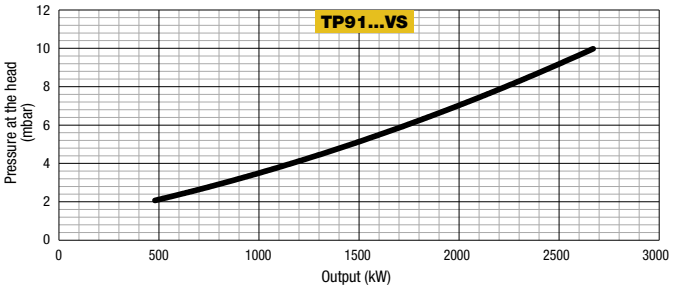
AIR PRESSURE AT THE BURNER HEAD

TP...VS TYPE

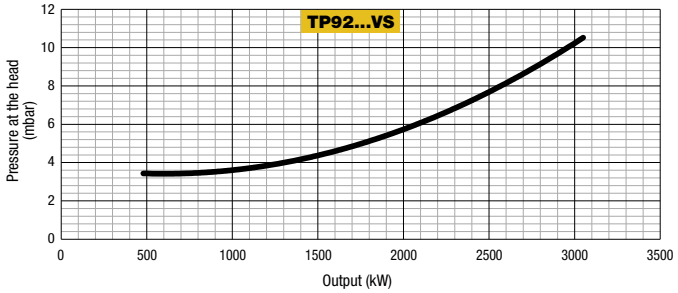
TP90...VS



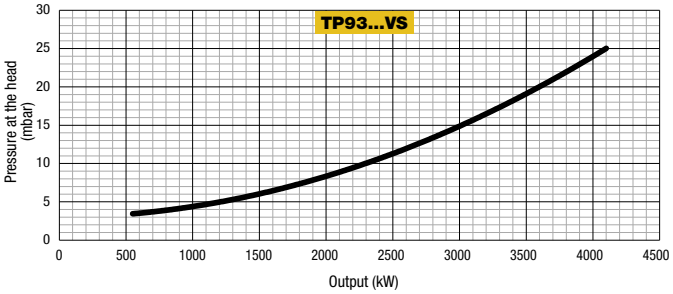
TP91...VS



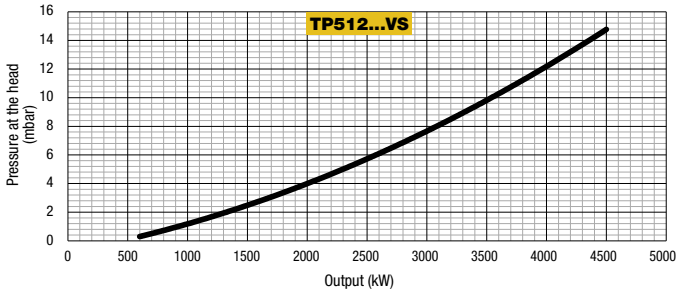
TP92...VS



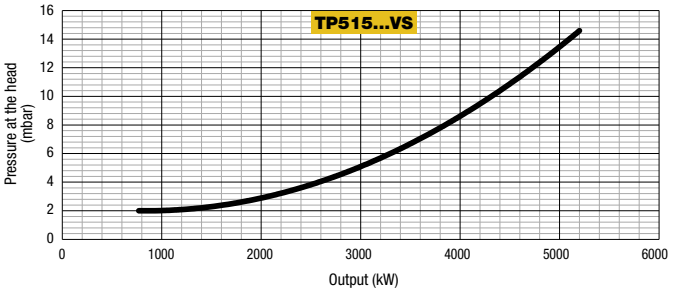
TP93...VS



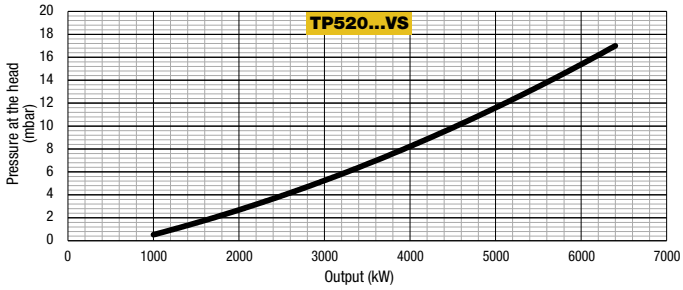
TP512...VS



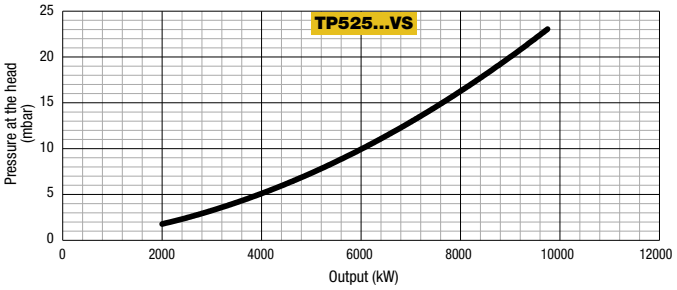
TP515...VS



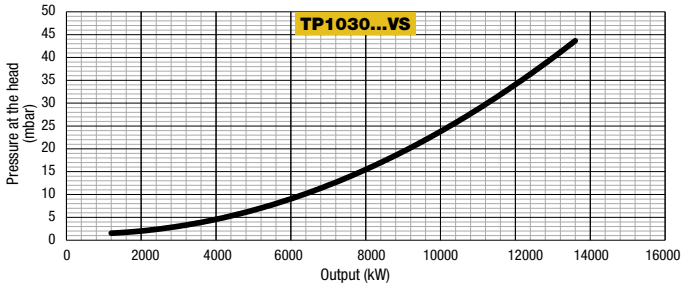
TP520...VS



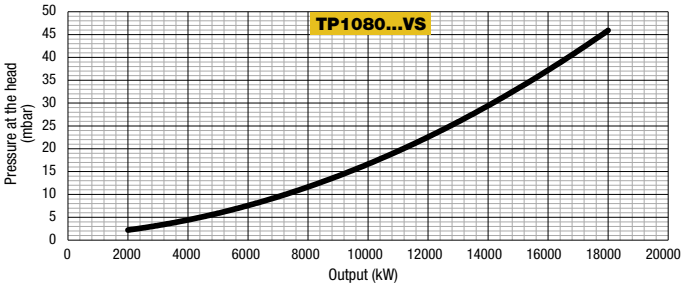
TP525...VS



TP1030...VS

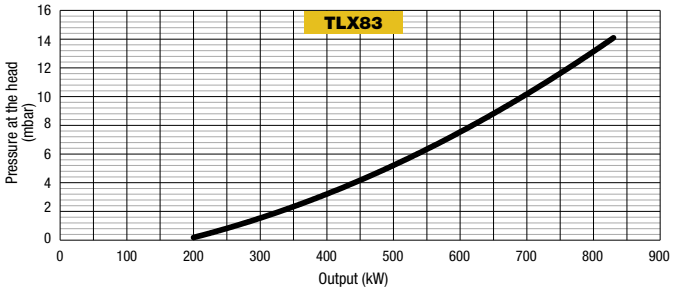


TP1080...VS

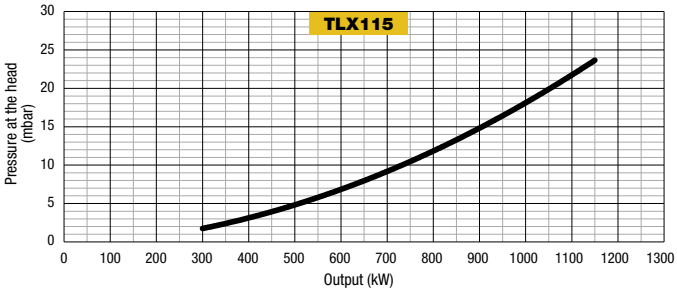


TLX - TLX...FGR TYPE

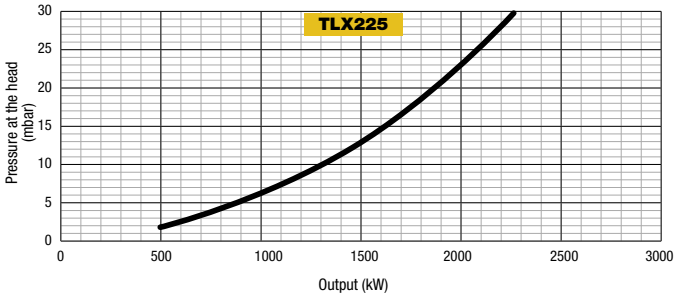
TLX83



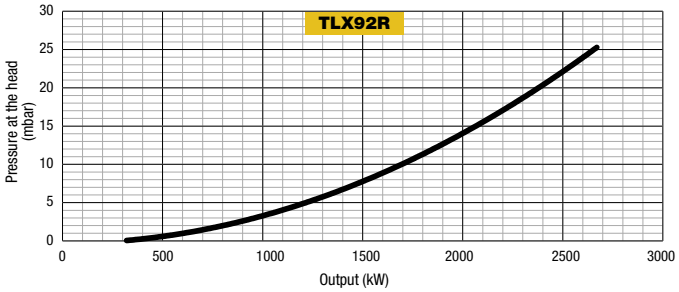
TLX115



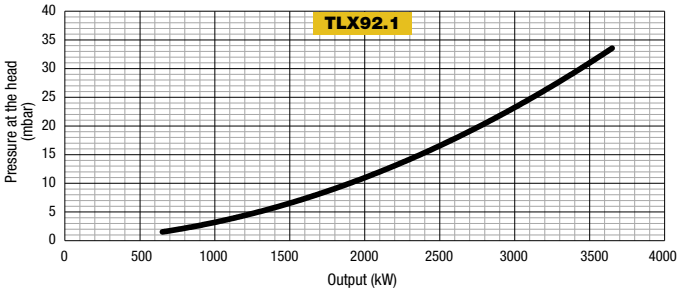
TLX225



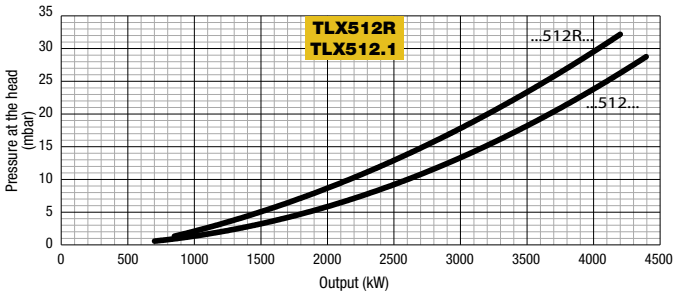
TLX92R



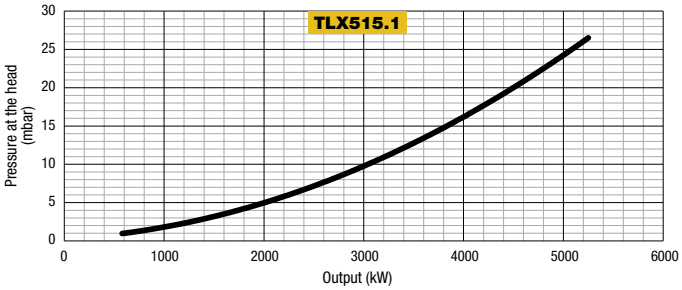
TLX92.1



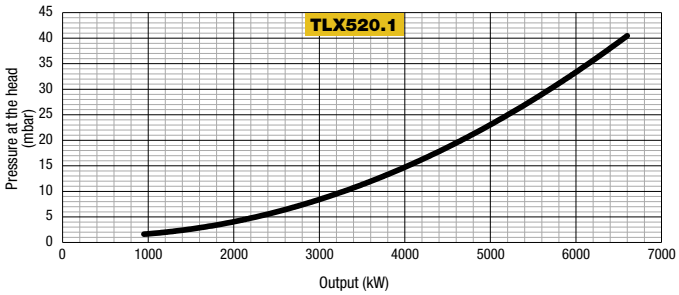
TLX512R
TLX512.1



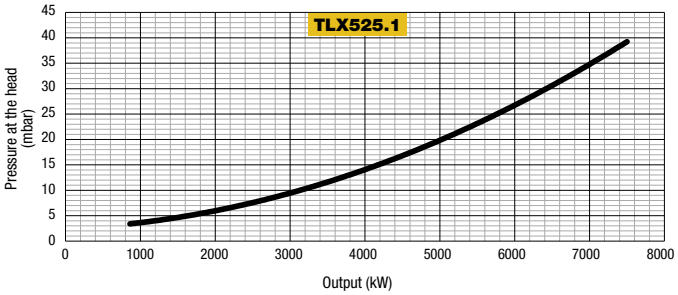
TLX515.1



TLX520.1



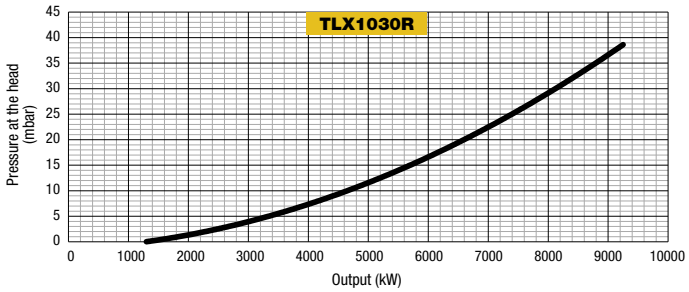
TLX525.1



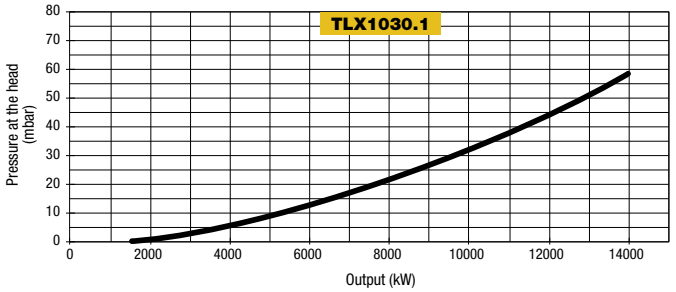
AIR PRESSURE AT THE BURNER HEAD

TLX - TLX...FGR TYPE

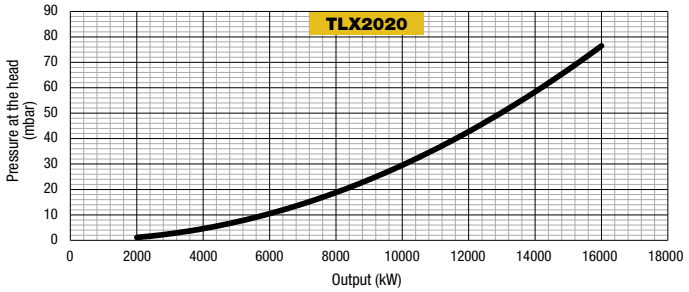
TLX1030R



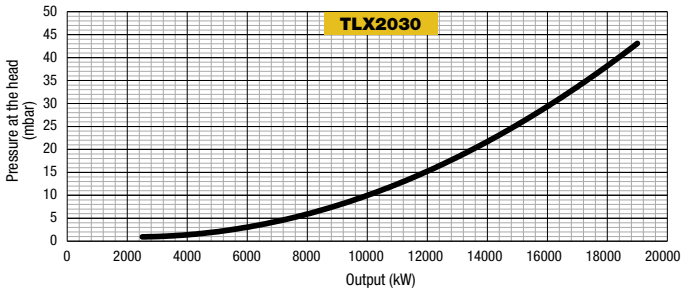
TLX1030.1



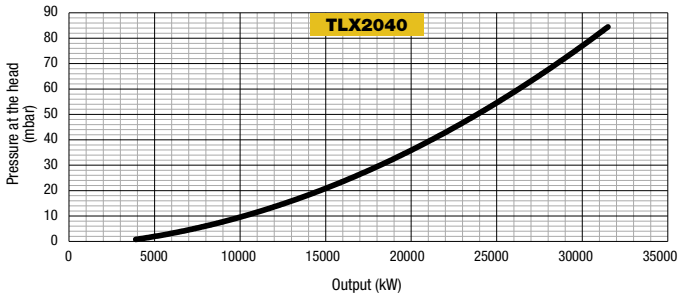
TLX2020



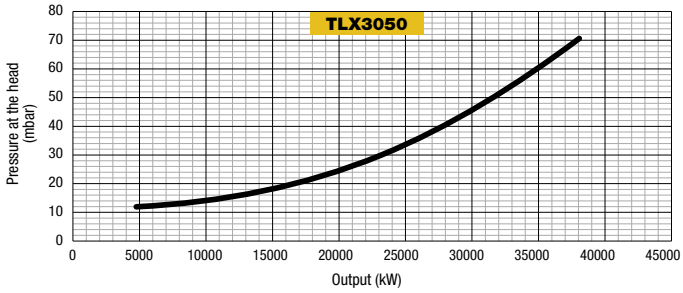
TLX2030



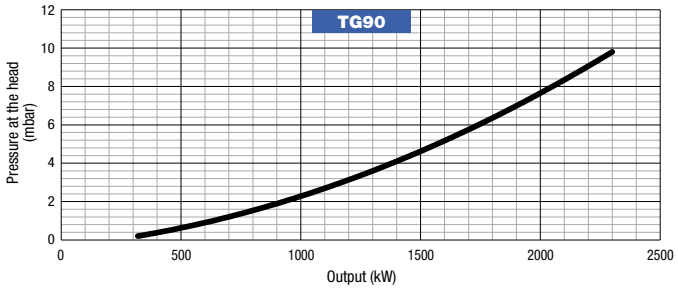
TLX2040

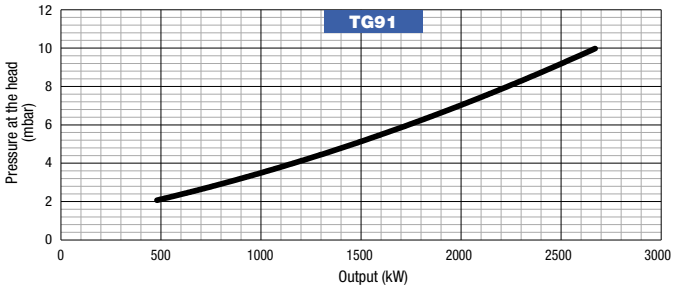


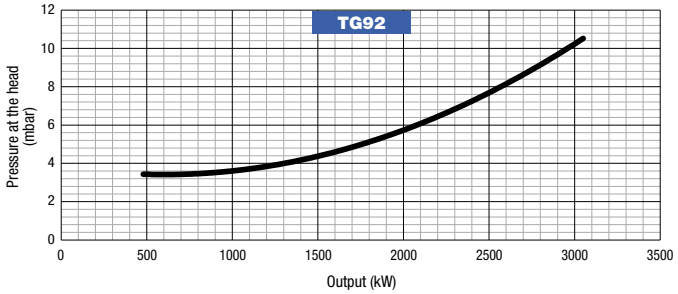
TLX3050

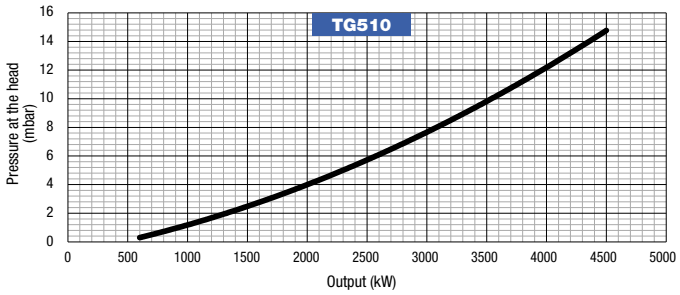


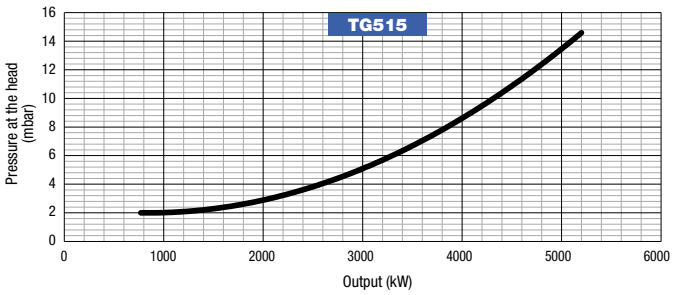
TG TYPE

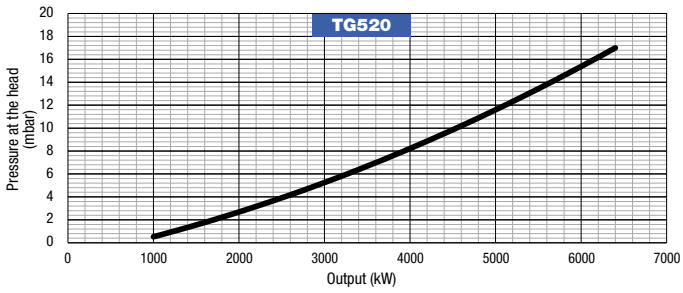

TG90
Pressure at the head (mbar)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
Output (kW)

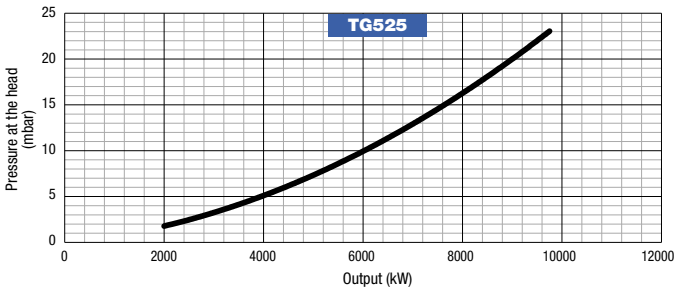

TG91
Pressure at the head (mbar)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
Output (kW)


TG92
Pressure at the head (mbar)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
Output (kW)


TG510
Pressure at the head (mbar)
0
2
4
6
8
10
12
14
16
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Output (kW)

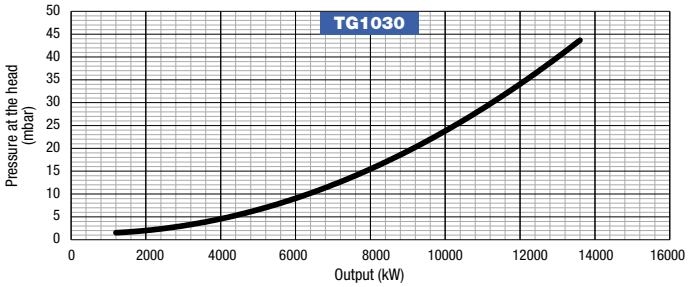

TG515
Pressure at the head (mbar)
0
2
4
6
8
10
12
14
16
0
1000
2000
3000
4000
5000
6000
Output (kW)

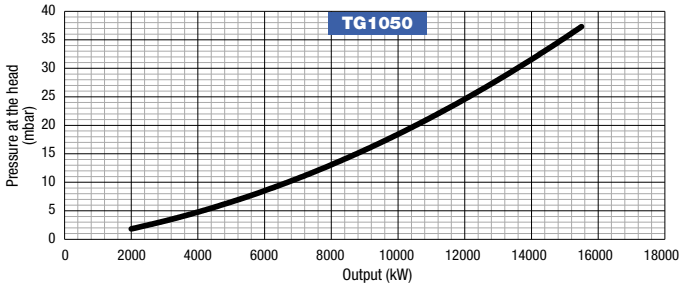

TG520
Pressure at the head (mbar)
0
2
4
6
8
10
12
14
16
18
20
0
1000
2000
3000
4000
5000
6000
7000
Output (kW)

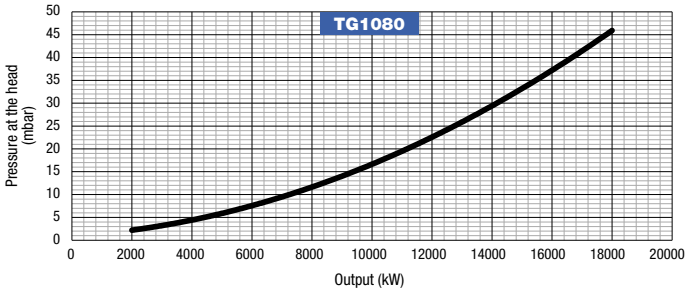

TG525
Pressure at the head (mbar)
0
5
10
15
20
25
0
2000
4000
6000
8000
10000
12000
Output (kW)

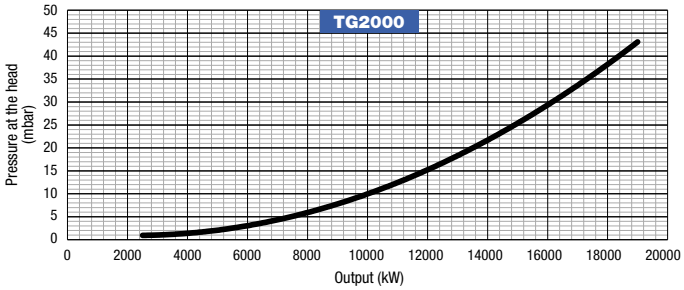
AIR PRESSURE AT THE BURNER HEAD

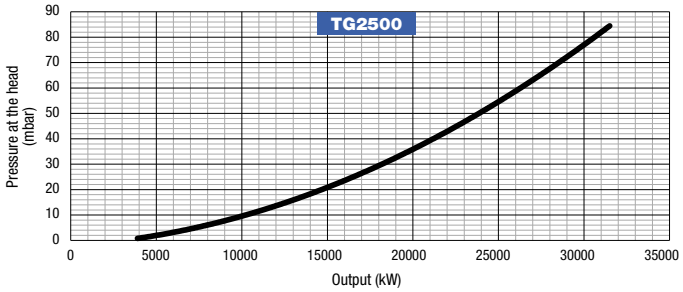
TG TYPE

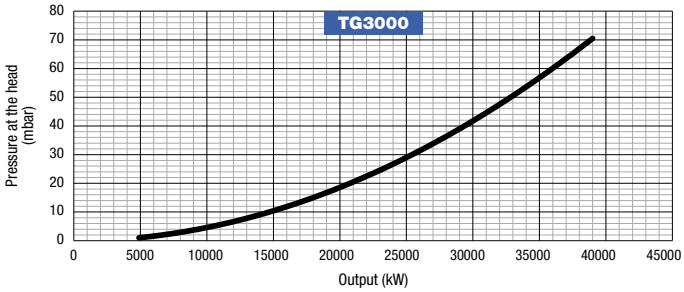




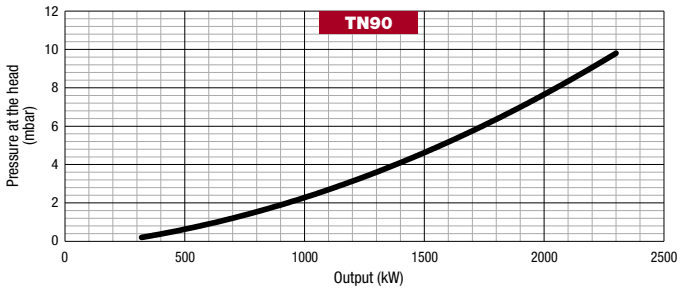


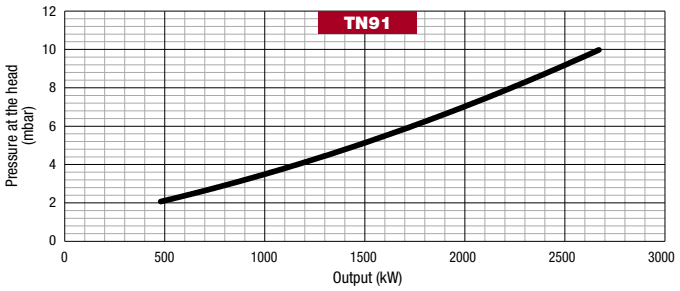


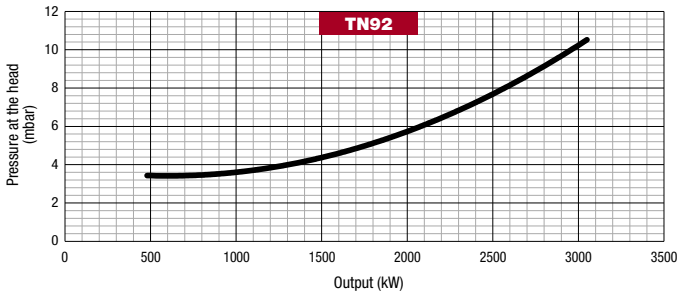


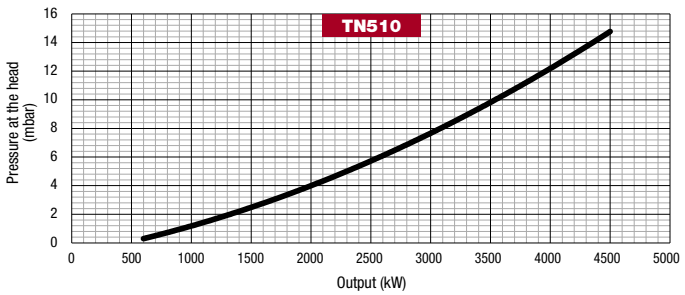


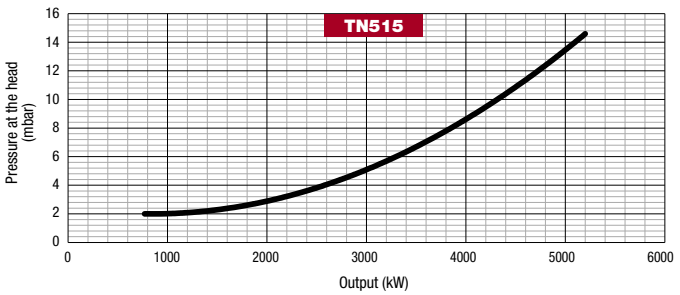
TN TYPE

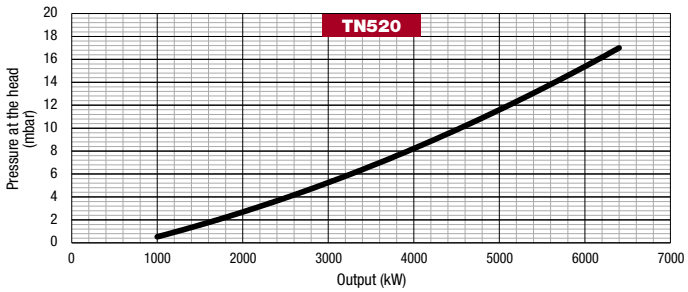

TN90
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500
Output (kW)

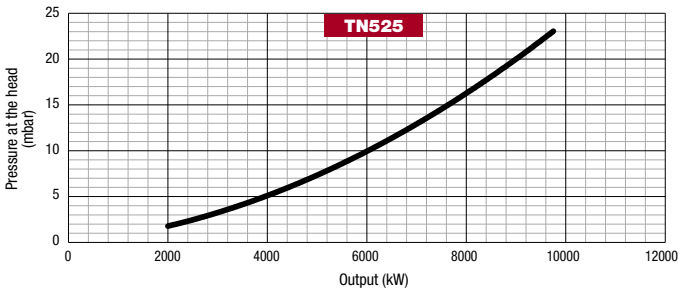

TN91
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000
Output (kW)


TN92
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000 3500
Output (kW)


TN510
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Output (kW)

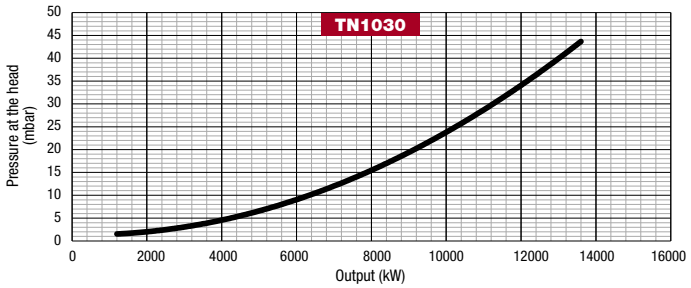

TN515
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 1000 2000 3000 4000 5000 6000
Output (kW)

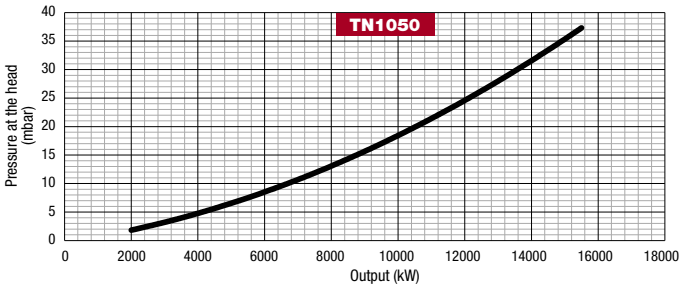

TN520
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16 18 20
0 1000 2000 3000 4000 5000 6000 7000
Output (kW)

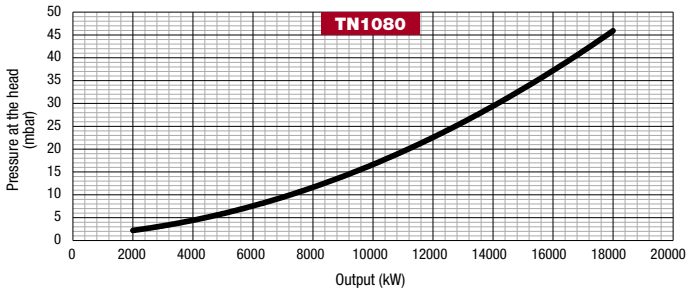

TN525
Pressure at the head (mbar)
0 5 10 15 20 25
0 2000 4000 6000 8000 10000 12000
Output (kW)

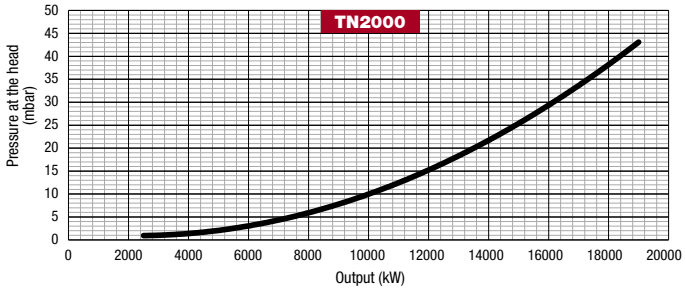
AIR PRESSURE AT THE BURNER HEAD

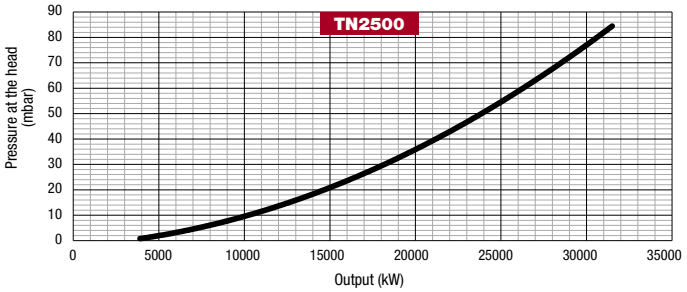
TN TYPE

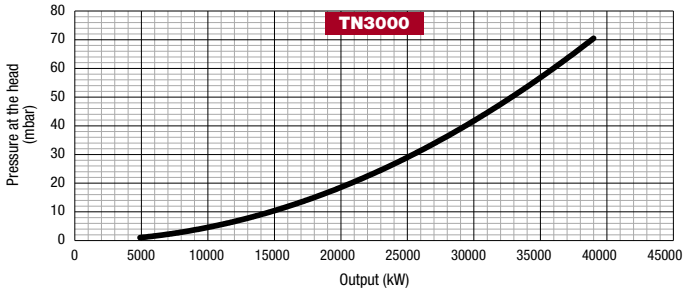




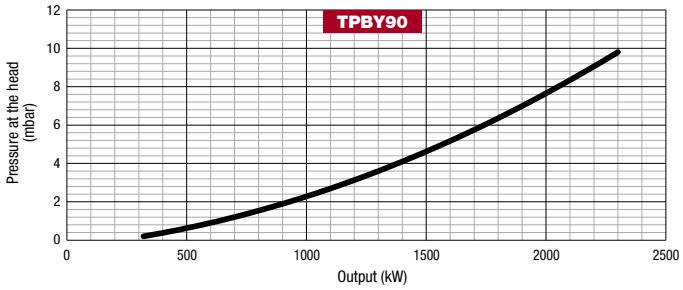


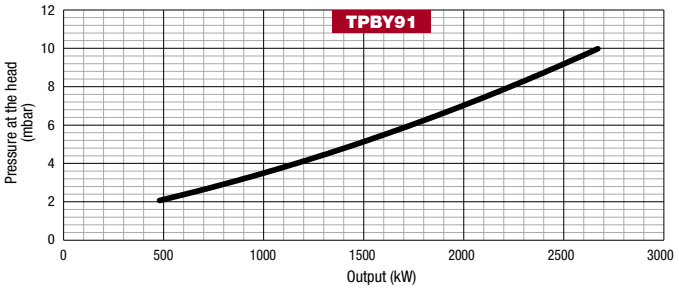


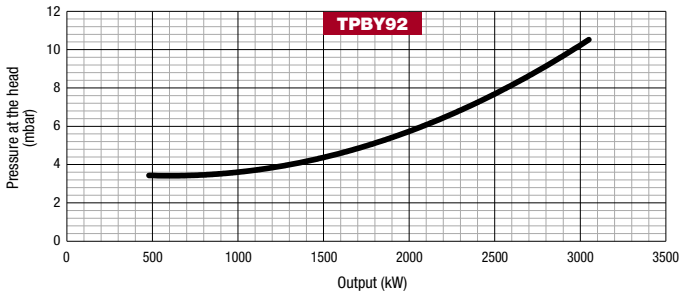


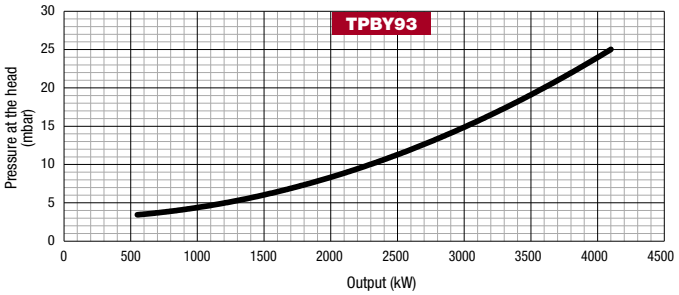


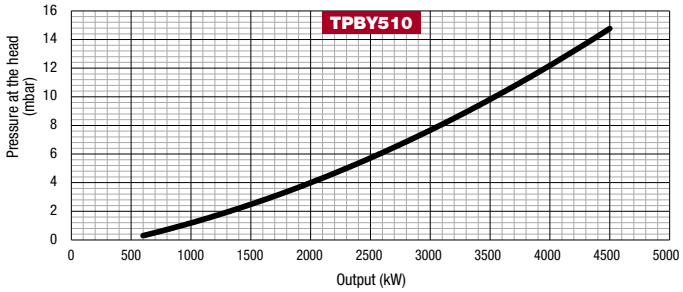
TPBY TYPE

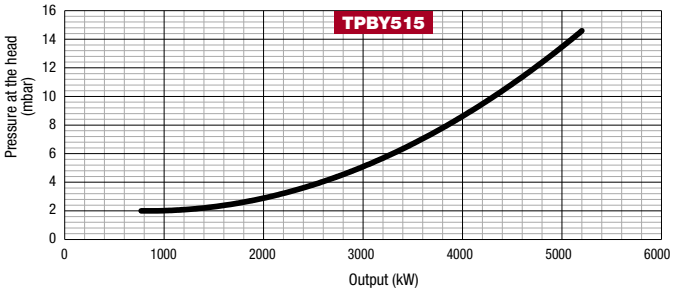

TPBY90
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500
Output (kW)

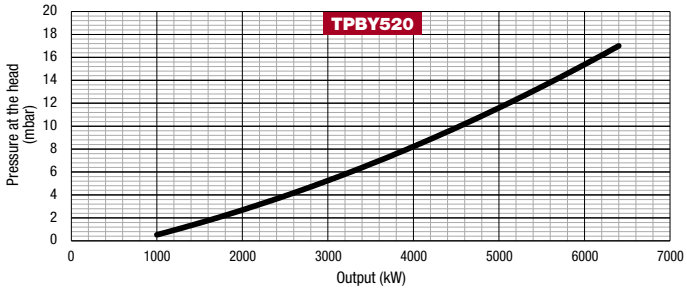

TPBY91
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000
Output (kW)

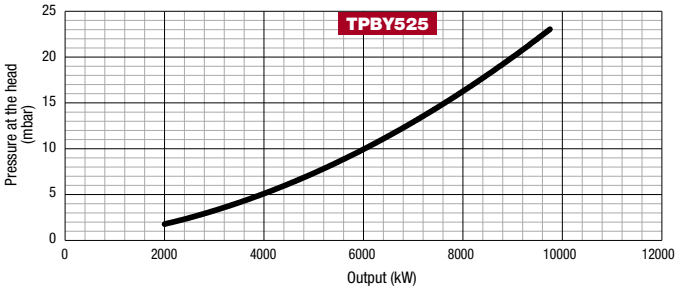

TPBY92
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000 3500
Output (kW)


TPBY93
Pressure at the head (mbar)
0 5 10 15 20 25 30
0 500 1000 1500 2000 2500 3000 3500 4000 4500
Output (kW)


TPBY510
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Output (kW)

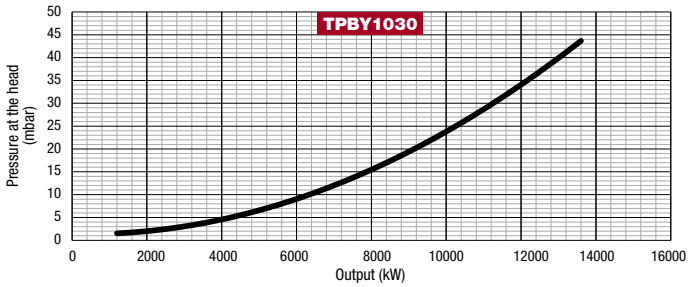

TPBY515
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 1000 2000 3000 4000 5000 6000
Output (kW)

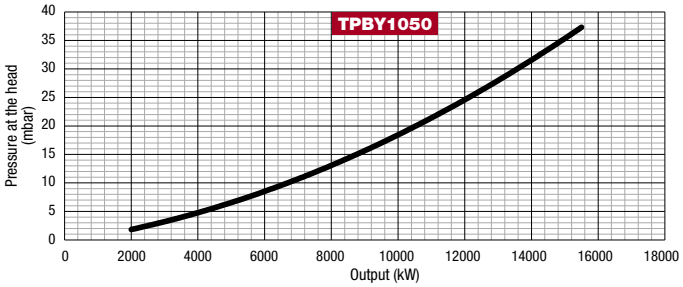

TPBY520
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16 18 20
0 1000 2000 3000 4000 5000 6000 7000
Output (kW)

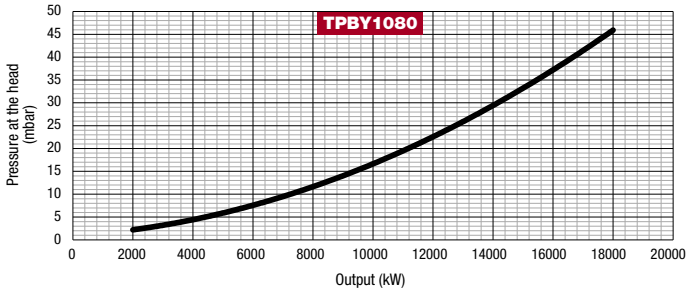

TPBY525
Pressure at the head (mbar)
0 5 10 15 20 25
0 2000 4000 6000 8000 10000 12000
Output (kW)

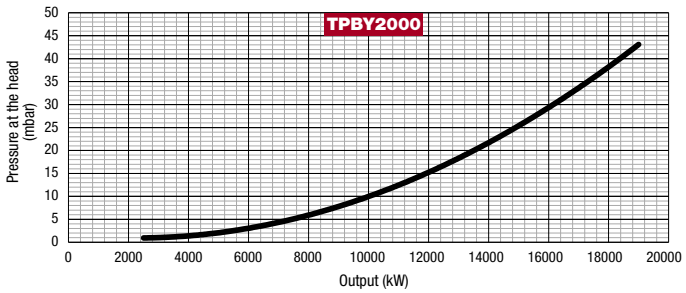
AIR PRESSURE AT THE BURNER HEAD

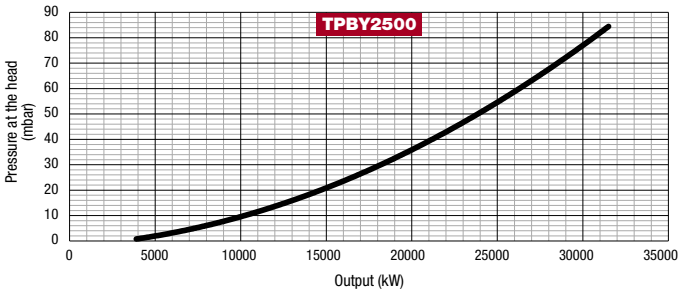
TPBY TYPE

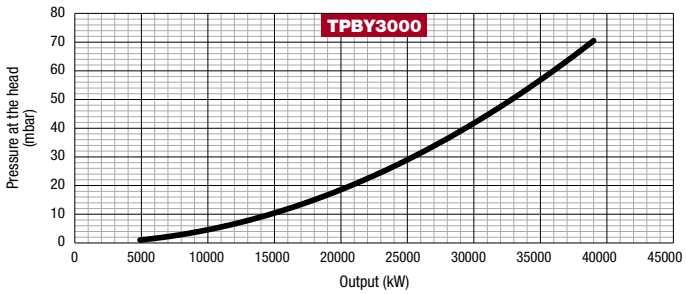




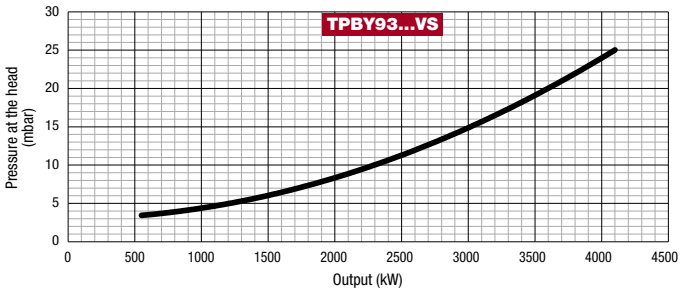


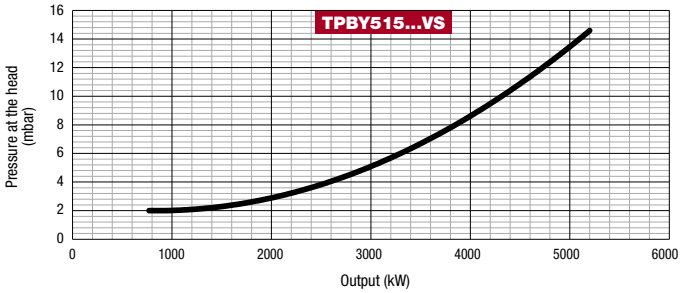


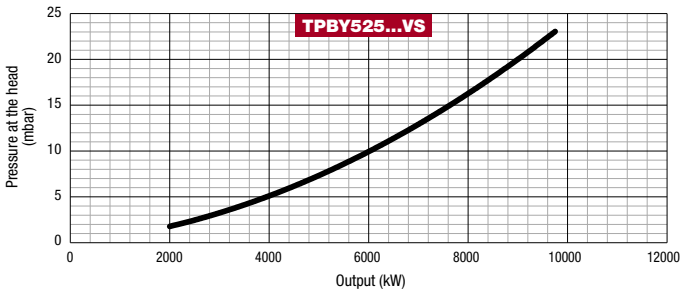


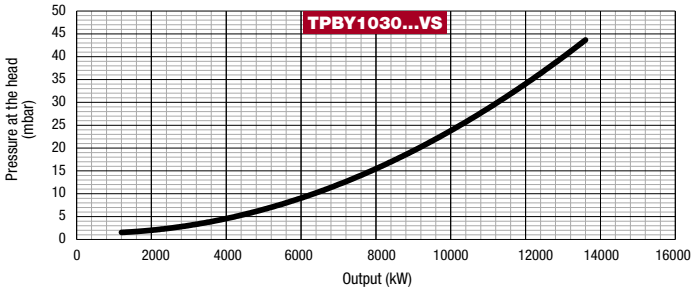


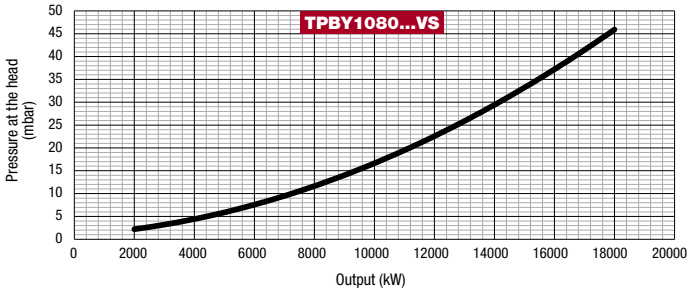
TPBY...VS TYPE


TPBY93...VS
Pressure at the head (mbar)
0
5
10
15
20
25
30
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Output (kW)


TPBY515...VS
Pressure at the head (mbar)
0
2
4
6
8
10
12
14
16
0
1000
2000
3000
4000
5000
6000
Output (kW)

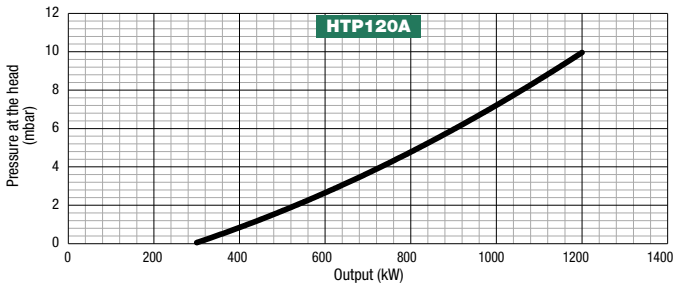

TPBY525...VS
Pressure at the head (mbar)
0
5
10
15
20
25
0
2000
4000
6000
8000
10000
12000
Output (kW)

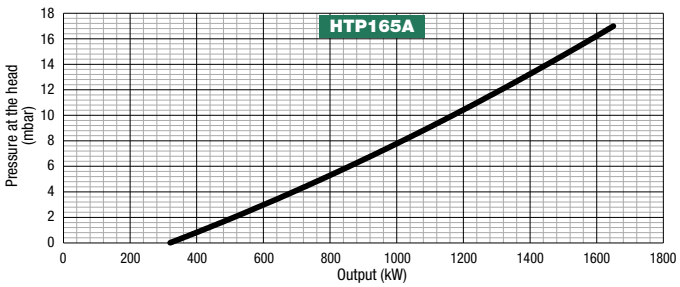

TPBY1030...VS
Pressure at the head (mbar)
0
5
10
15
20
25
30
35
40
45
50
0
2000
4000
6000
8000
10000
12000
14000
16000
Output (kW)

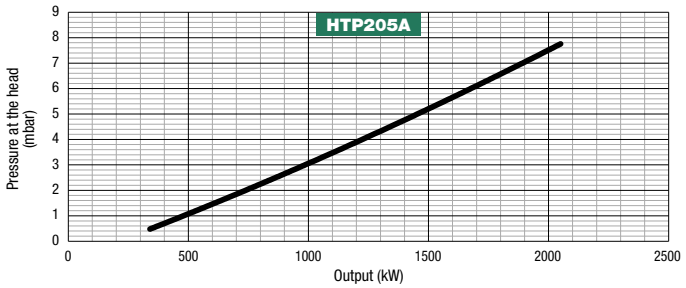

TPBY1080...VS
Pressure at the head (mbar)
0
5
10
15
20
25
30
35
40
45
50
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Output (kW)

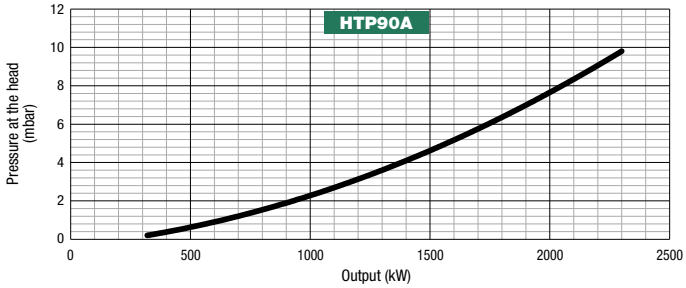
AIR PRESSURE AT THE BURNER HEAD

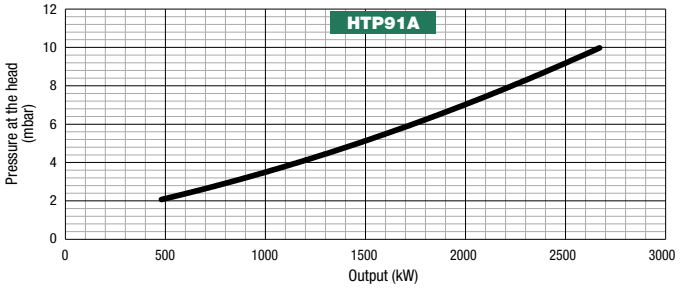
HTP TYPE

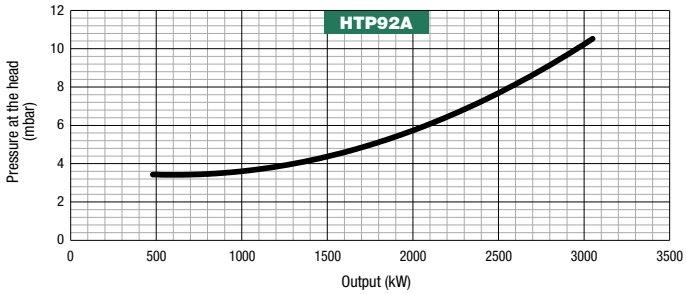


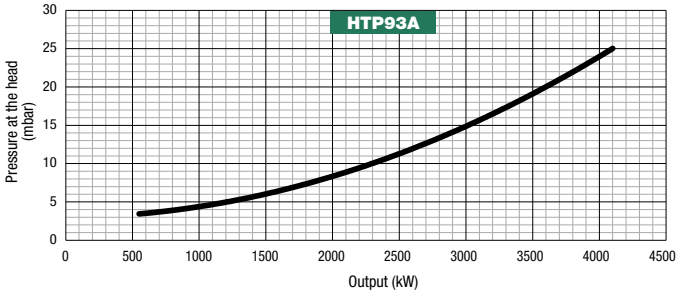




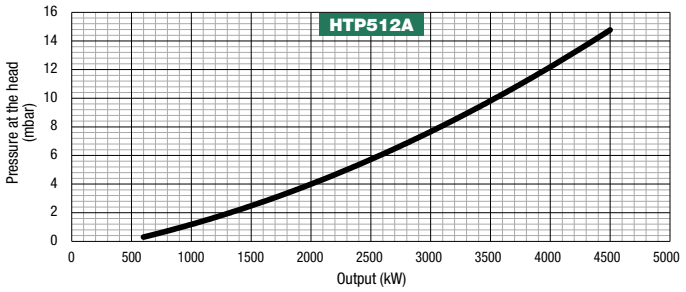


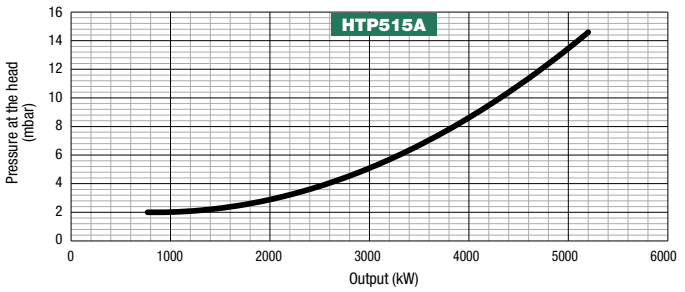


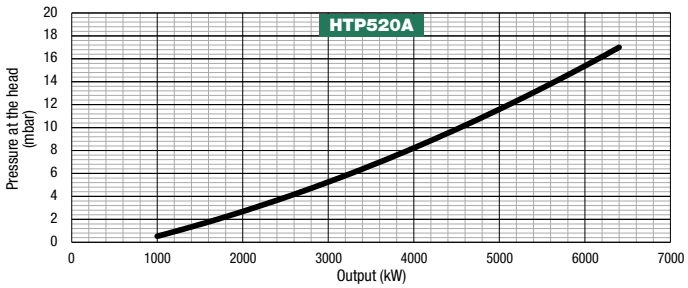


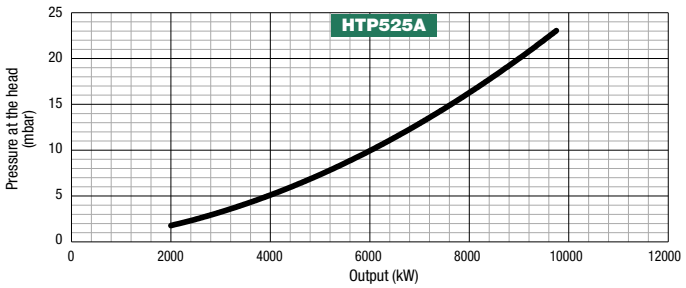


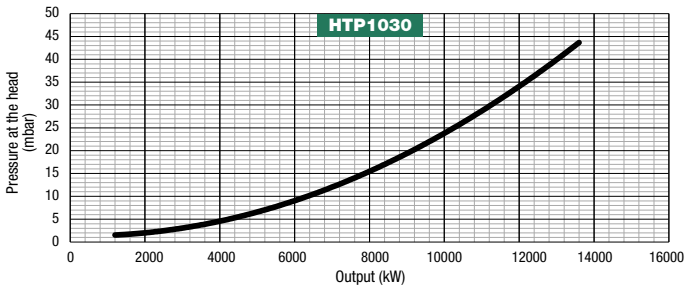
HTP TYPE

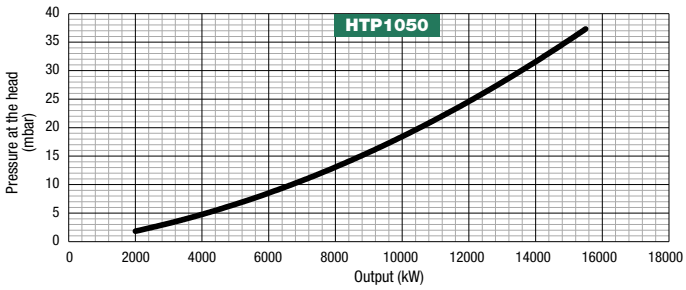

HTP512A
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Output (kW)

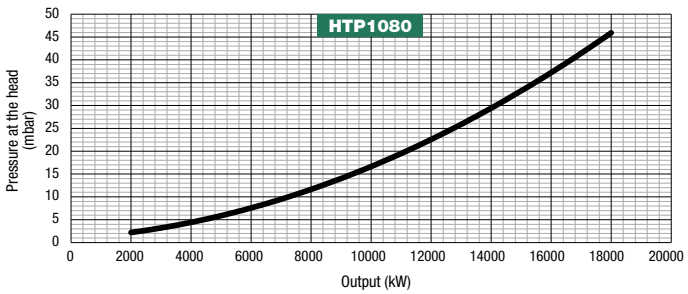

HTP515A
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 1000 2000 3000 4000 5000 6000
Output (kW)

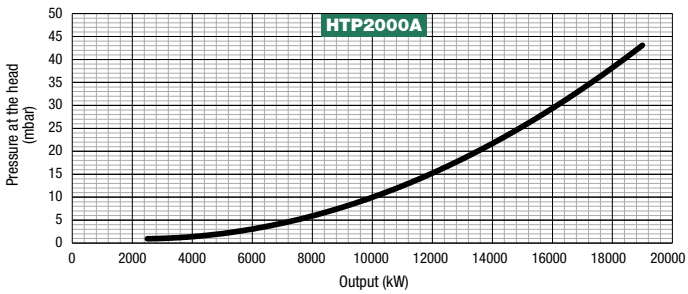

HTP520A
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16 18 20
0 1000 2000 3000 4000 5000 6000 7000
Output (kW)

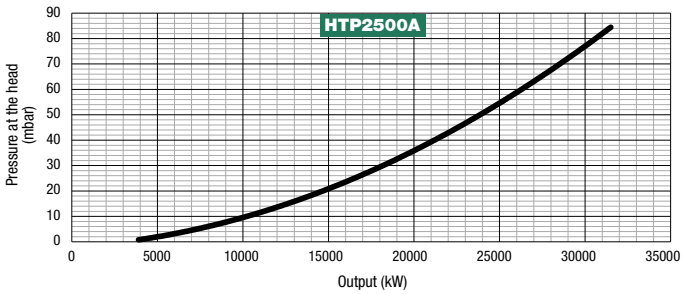

HTP525A
Pressure at the head (mbar)
0 5 10 15 20 25
0 2000 4000 6000 8000 10000 12000
Output (kW)

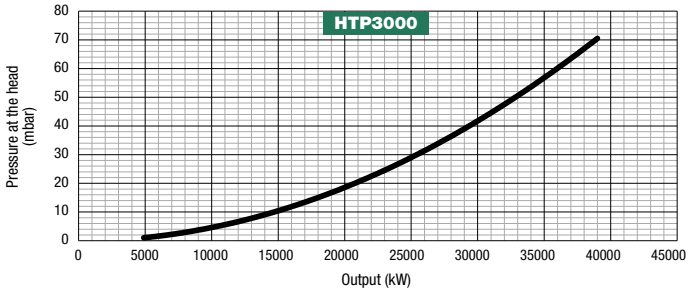

HTP1030
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40 45 50
0 2000 4000 6000 8000 10000 12000 14000 16000
Output (kW)


HTP1050
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40
0 2000 4000 6000 8000 10000 12000 14000 16000 18000
Output (kW)


HTP1080
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40 45 50
0 2000 4000 6000 8000 10000 12000 14000 16000 18000 20000
Output (kW)


HTP2000A
Pressure at the head (mbar)
0 5 10 15 20 25 30 35 40 45 50
0 2000 4000 6000 8000 10000 12000 14000 16000 18000 20000
Output (kW)

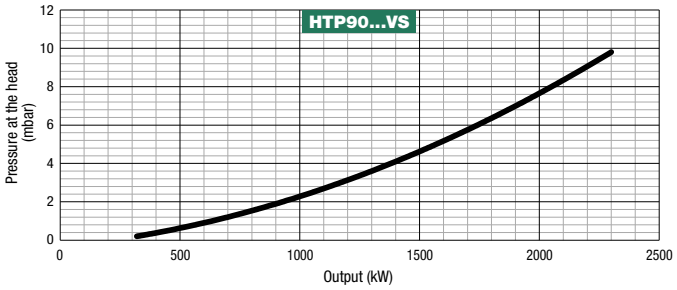

HTP2500A
Pressure at the head (mbar)
0 10 20 30 40 50 60 70 80 90
0 5000 10000 15000 20000 25000 30000 35000
Output (kW)


HTP3000
Pressure at the head (mbar)
0 10 20 30 40 50 60 70 80
0 5000 10000 15000 20000 25000 30000 35000 40000 45000
Output (kW)

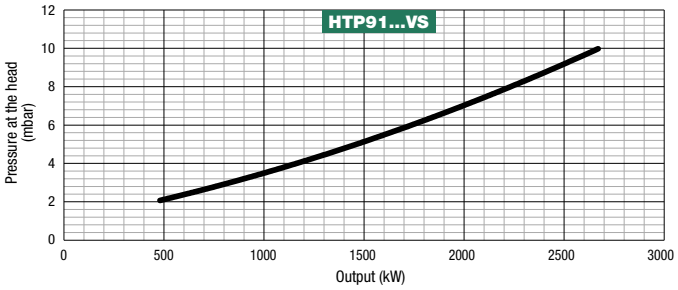
AIR PRESSURE AT THE BURNER HEAD

HTP...VS TYPE

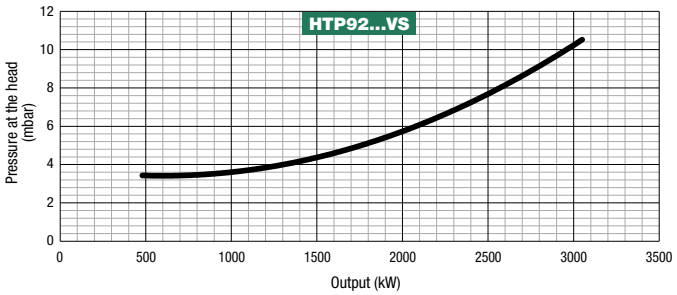
HTP90...VS



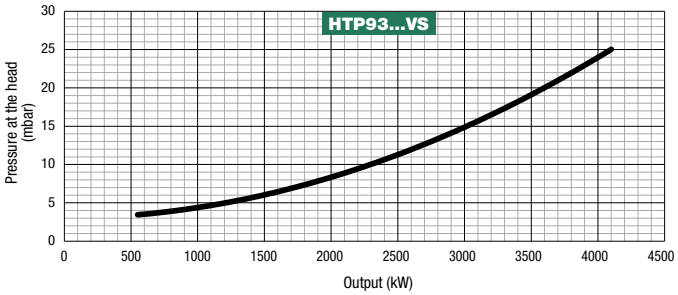
HTP91...VS



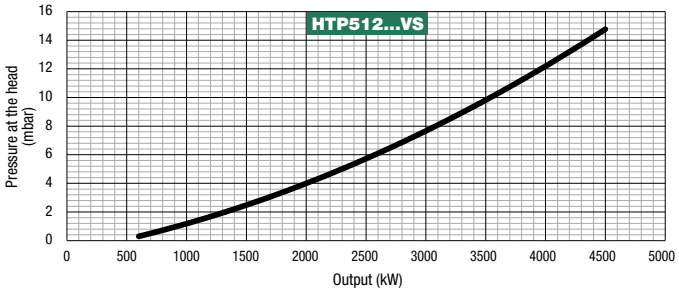
HTP92...VS



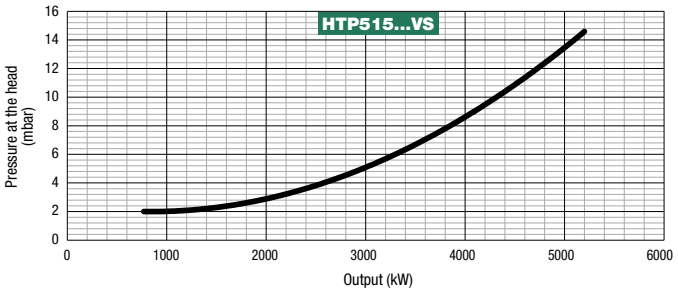
HTP93...VS



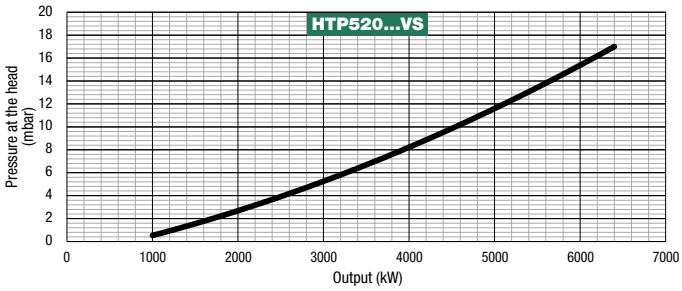
HTP512...VS



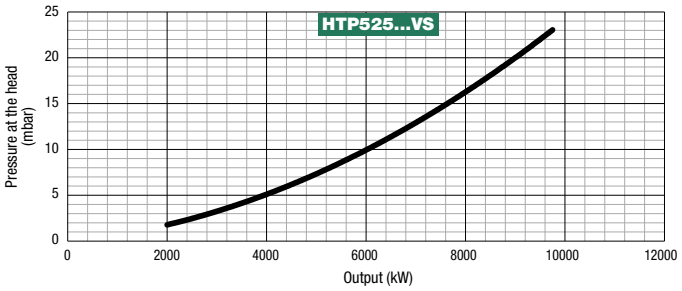
HTP515...VS



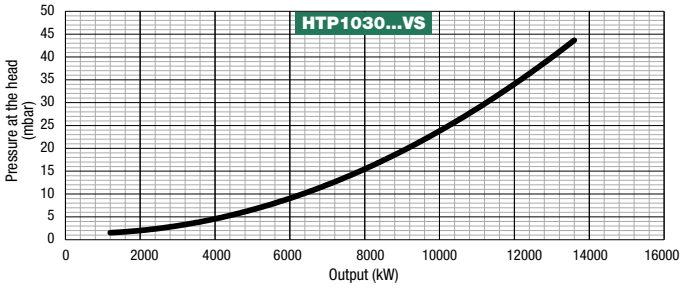
HTP520...VS



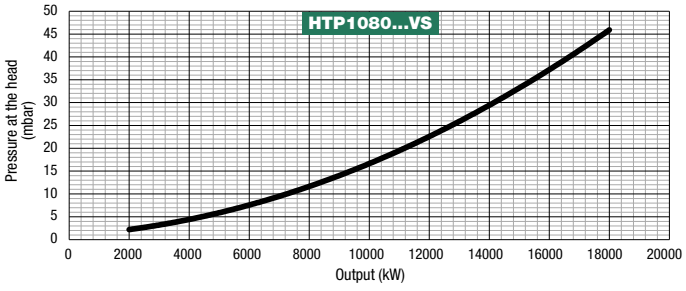
HTP525...VS



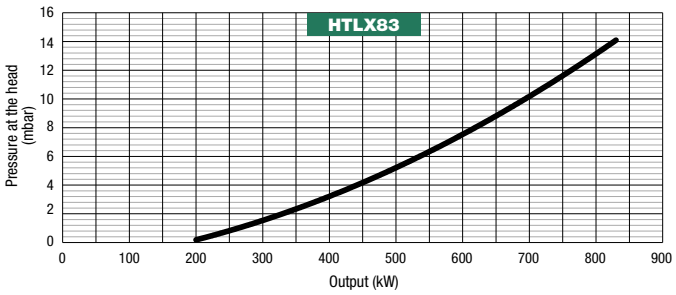
HTP1030...VS

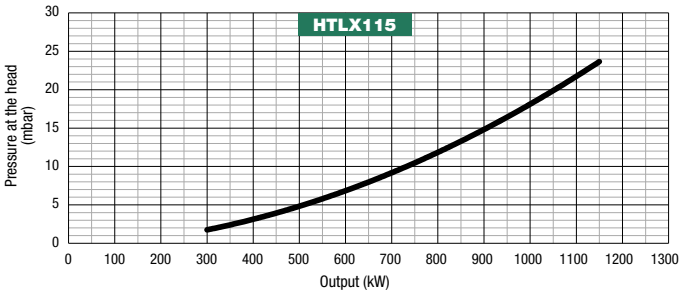


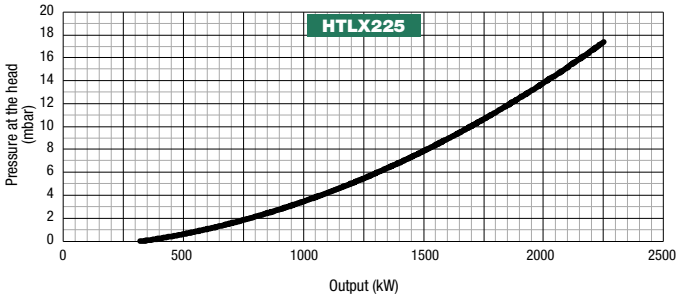
HTP1080...VS

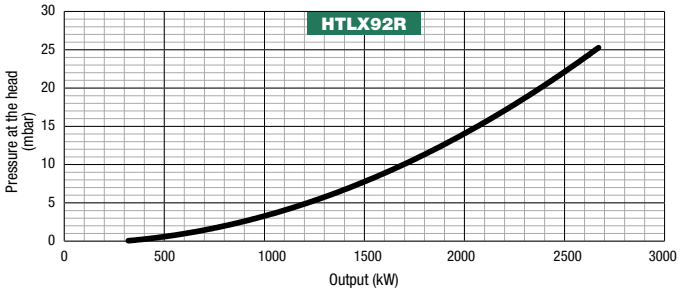


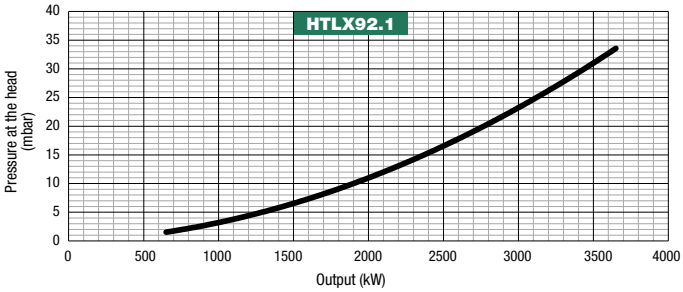
HLX - HTLX...FGR TYPE

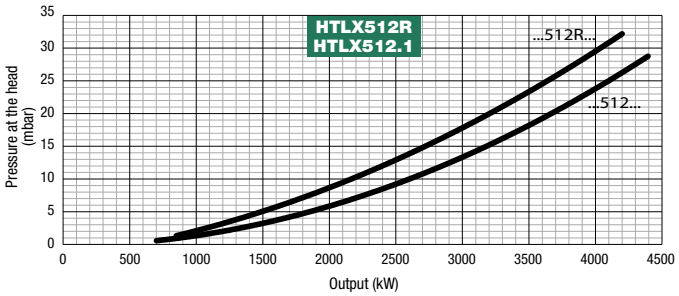


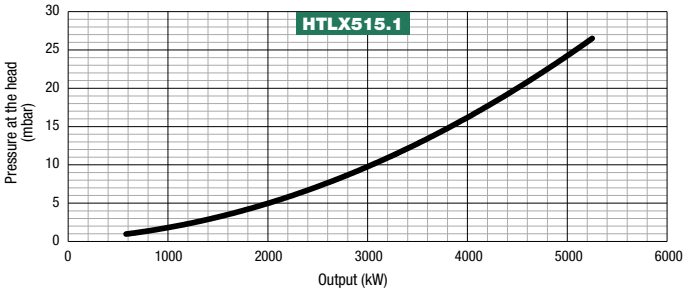


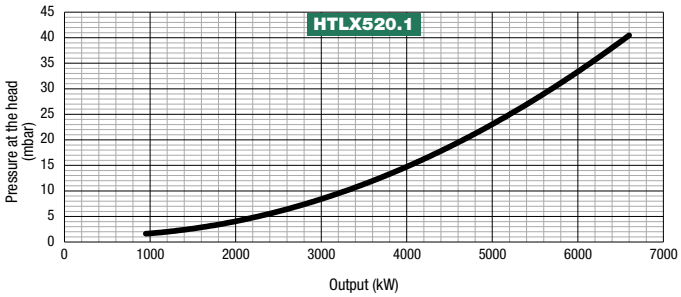


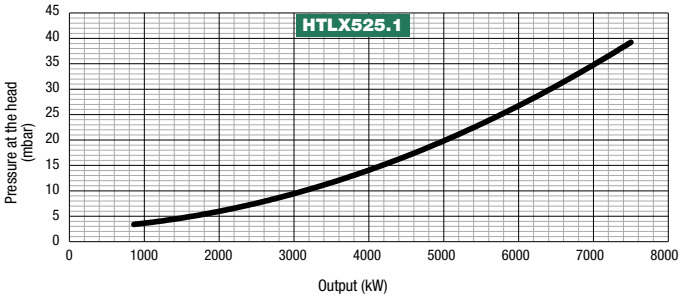






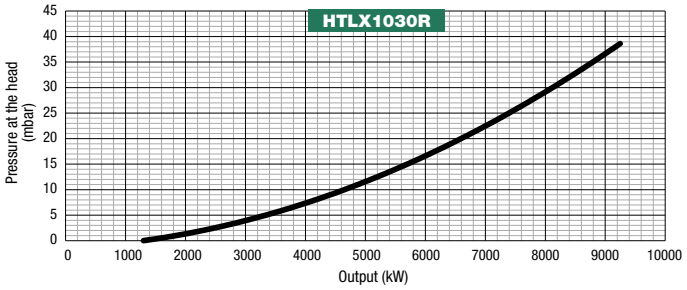


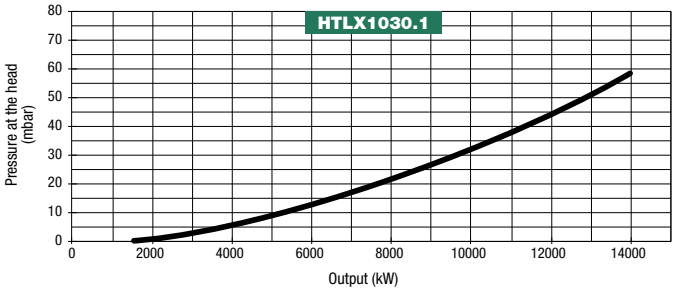


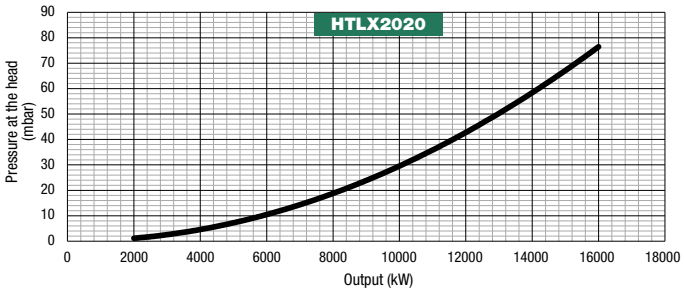


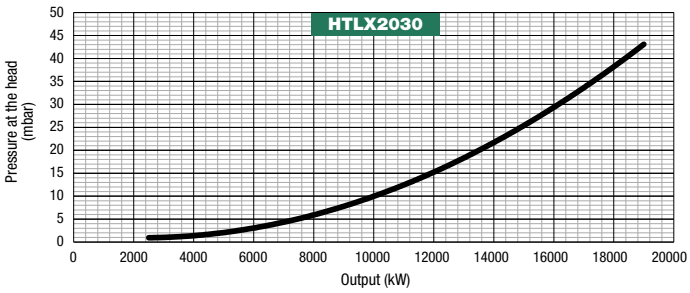
AIR PRESSURE AT THE BURNER HEAD

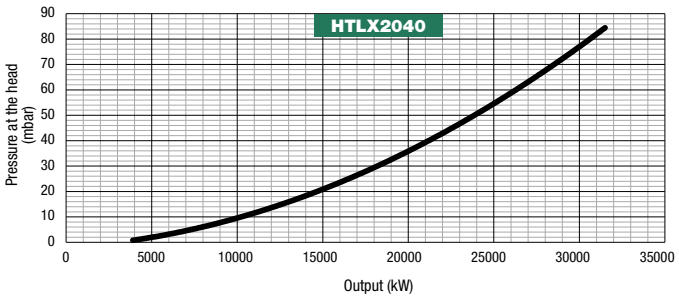
HLX - HTLX...FGR TYPE

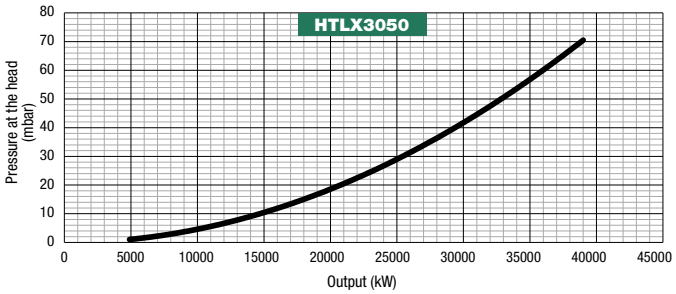




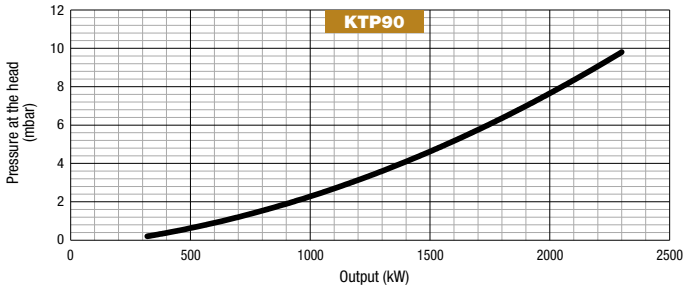


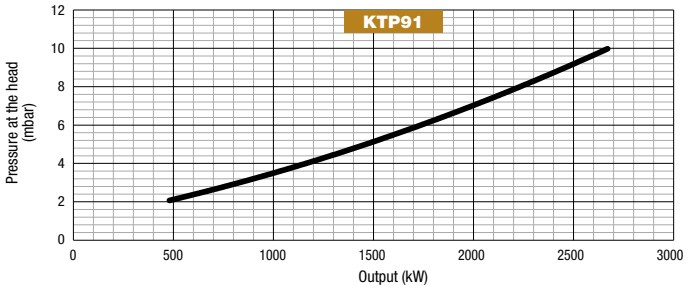


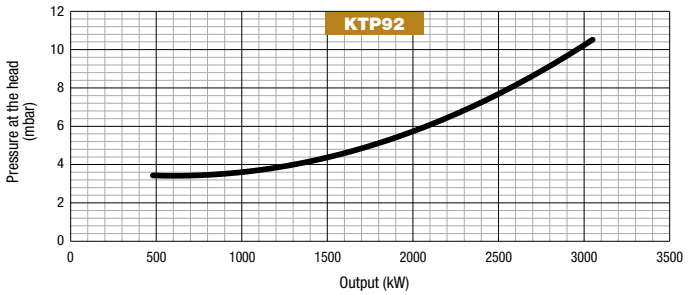


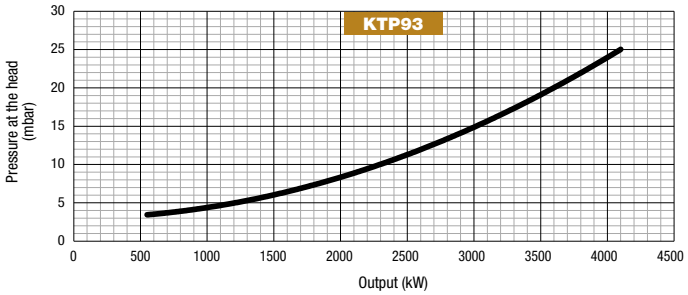


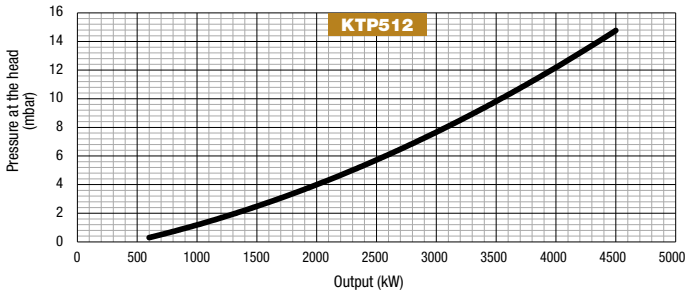
KTP TYPE

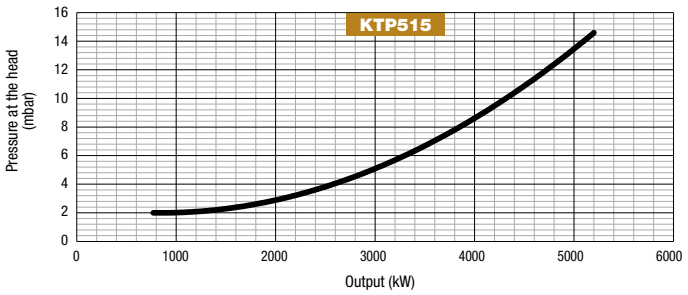

KTP90
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500
Output (kW)

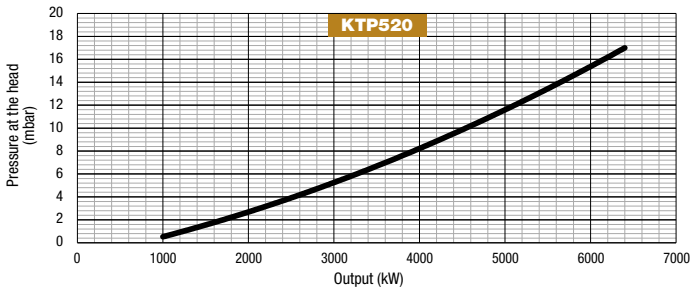

KTP91
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000
Output (kW)

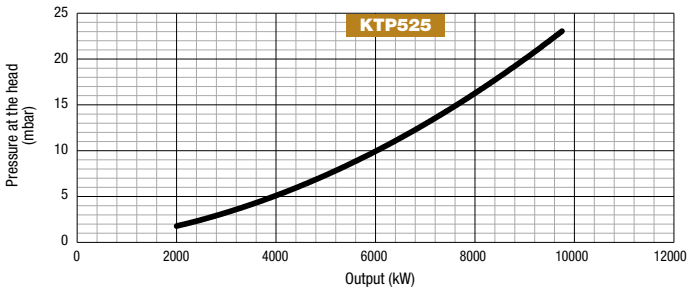

KTP92
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000 3500
Output (kW)


KTP93
Pressure at the head (mbar)
0 5 10 15 20 25 30
0 500 1000 1500 2000 2500 3000 3500 4000 4500
Output (kW)


KTP512
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Output (kW)

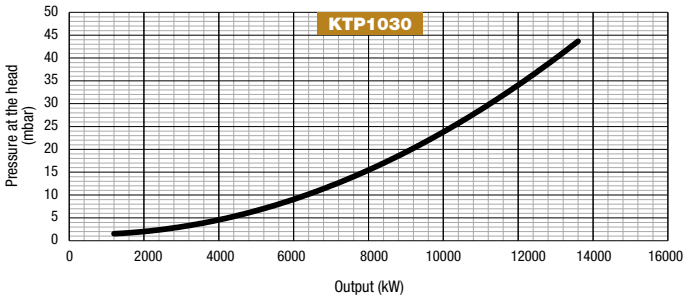

KTP515
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 1000 2000 3000 4000 5000 6000
Output (kW)

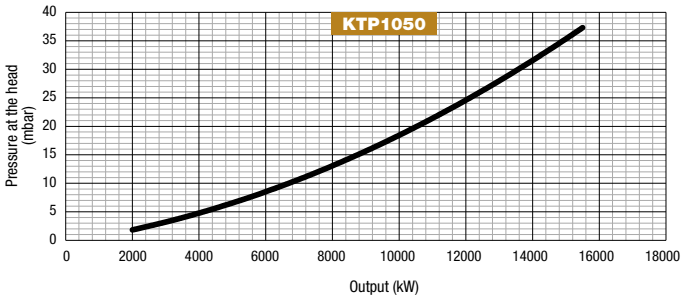

KTP520
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16 18 20
0 1000 2000 3000 4000 5000 6000 7000
Output (kW)

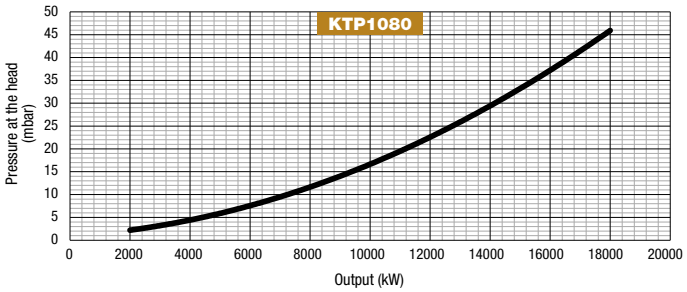

KTP525
Pressure at the head (mbar)
0 5 10 15 20 25
0 2000 4000 6000 8000 10000 12000
Output (kW)

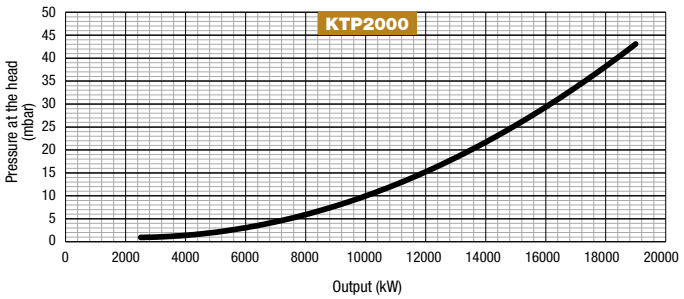
AIR PRESSURE AT THE BURNER HEAD

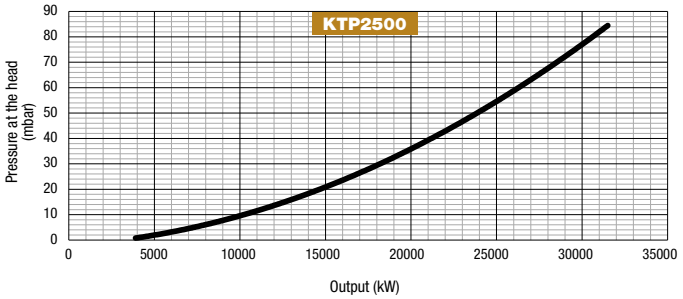
KTPY TYPE

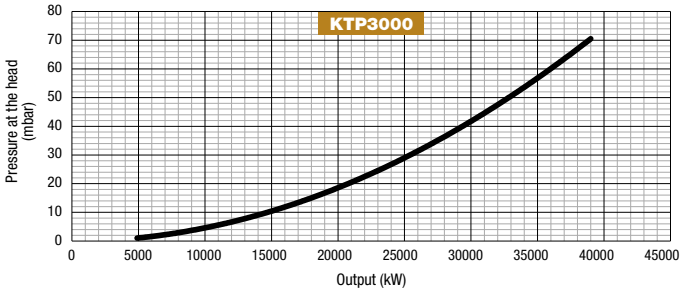




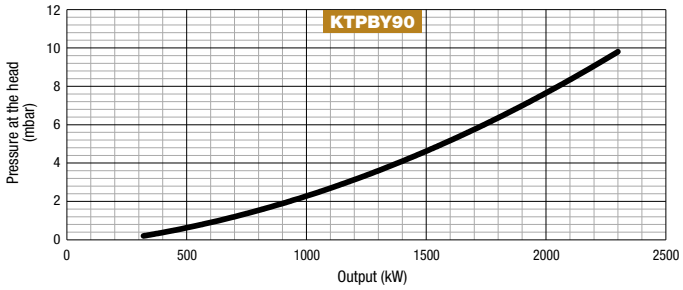


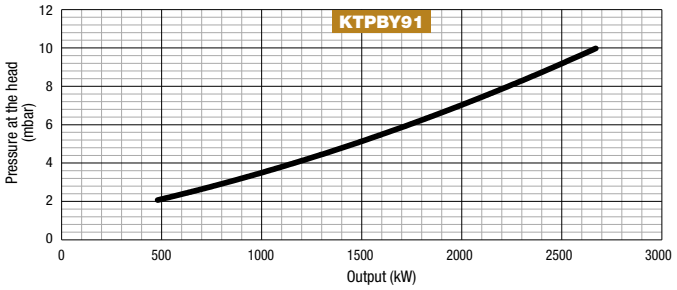


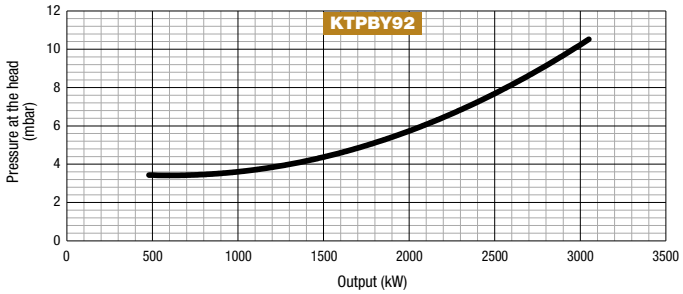


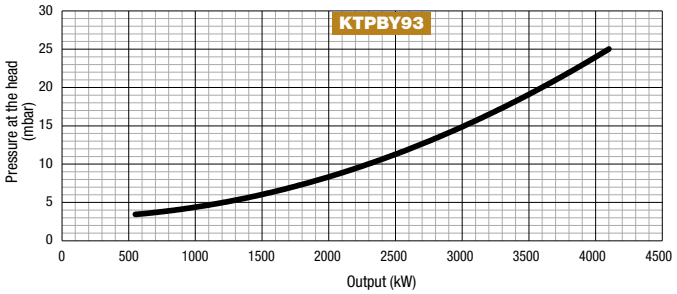


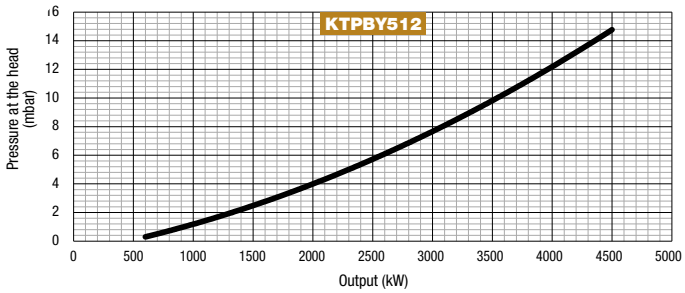
KTPBY TYPE

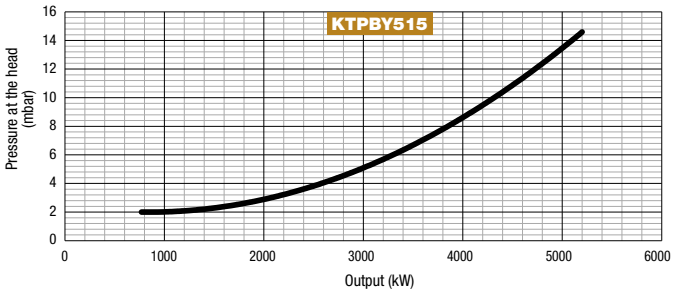

KTPBY90
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500
Output (kW)

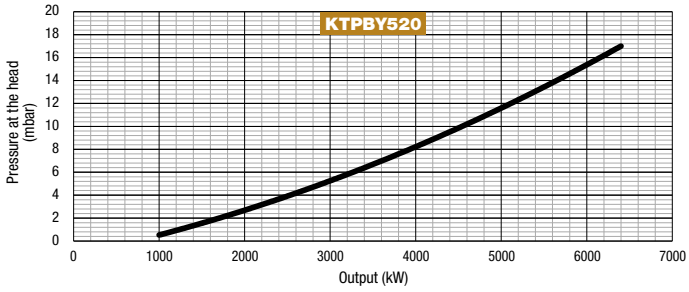

KTPBY91
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000
Output (kW)

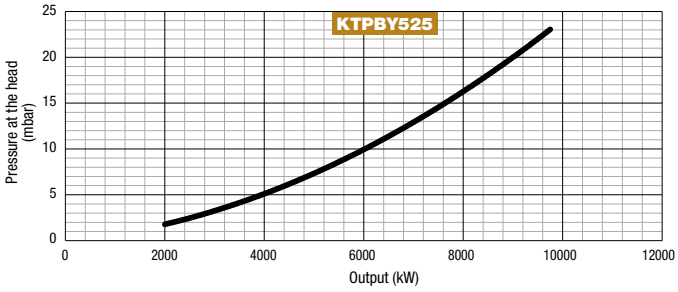

KTPBY92
Pressure at the head (mbar)
0 2 4 6 8 10 12
0 500 1000 1500 2000 2500 3000 3500
Output (kW)


KTPBY93
Pressure at the head (mbar)
0 5 10 15 20 25 30
0 500 1000 1500 2000 2500 3000 3500 4000 4500
Output (kW)


KTPBY512
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Output (kW)

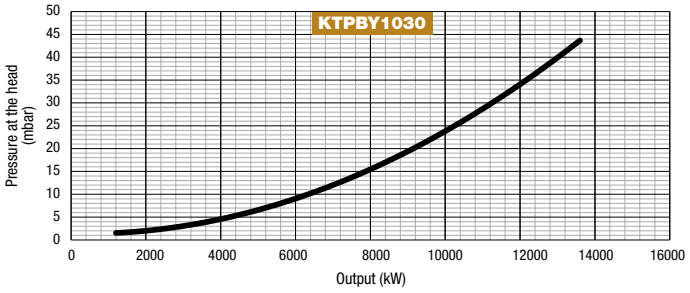

KTPBY515
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16
0 1000 2000 3000 4000 5000 6000
Output (kW)

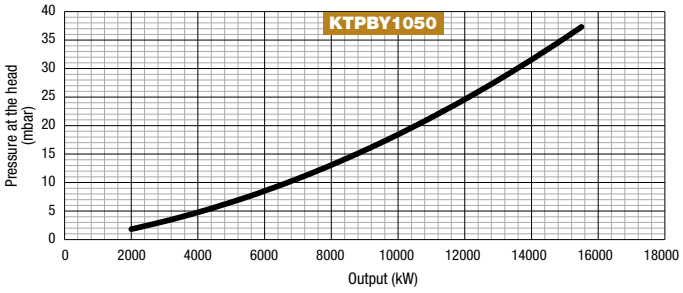

KTPBY520
Pressure at the head (mbar)
0 2 4 6 8 10 12 14 16 18 20
0 1000 2000 3000 4000 5000 6000 7000
Output (kW)

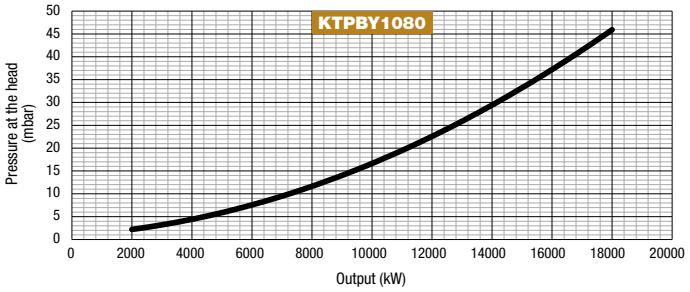

KTPBY525
Pressure at the head (mbar)
0 5 10 15 20 25
0 2000 4000 6000 8000 10000 12000
Output (kW)

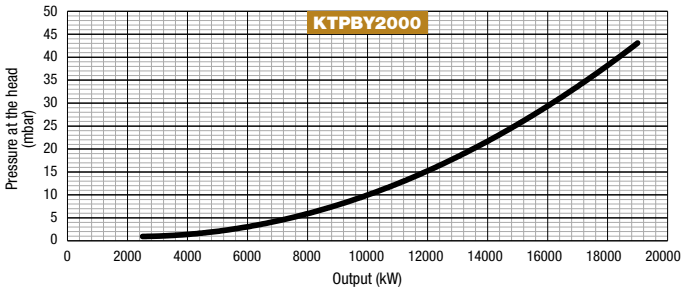
AIR PRESSURE AT THE BURNER HEAD

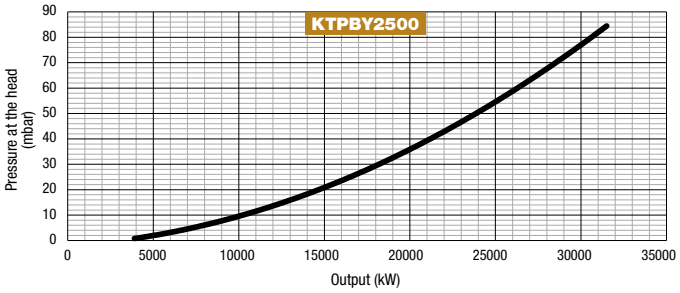
KTPBY TYPE

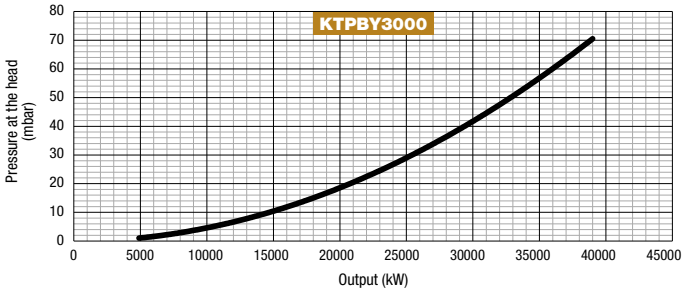




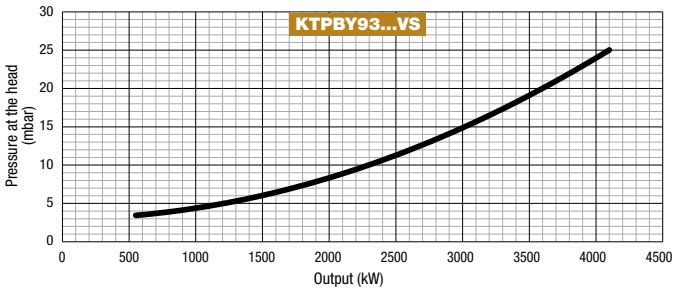


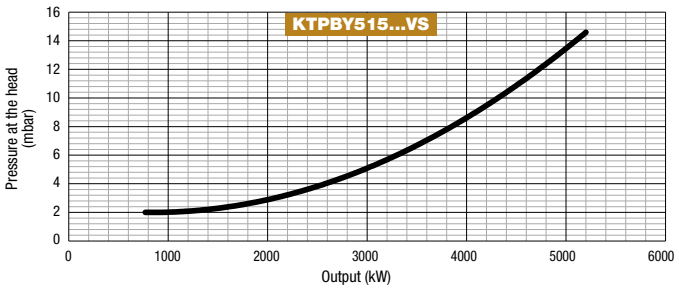


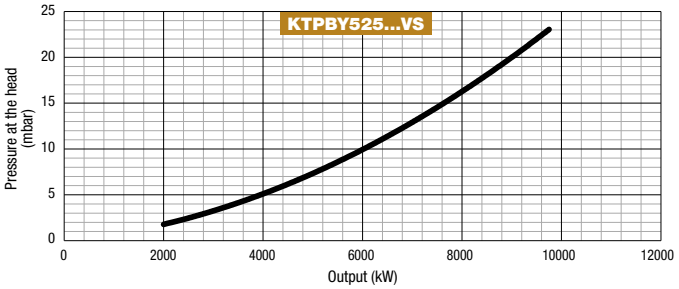


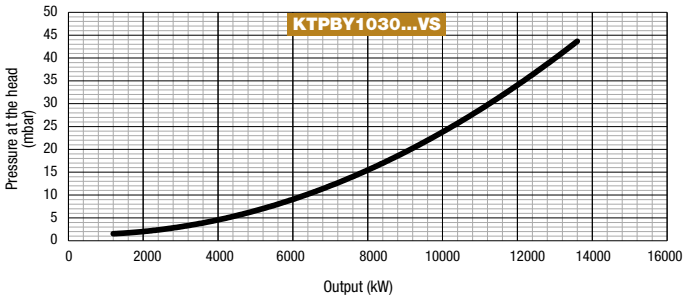


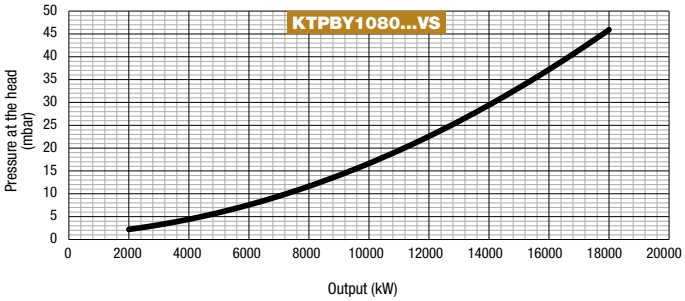
KTPBY...VS TYPE











SULFUR OXIDES EMISSIONS

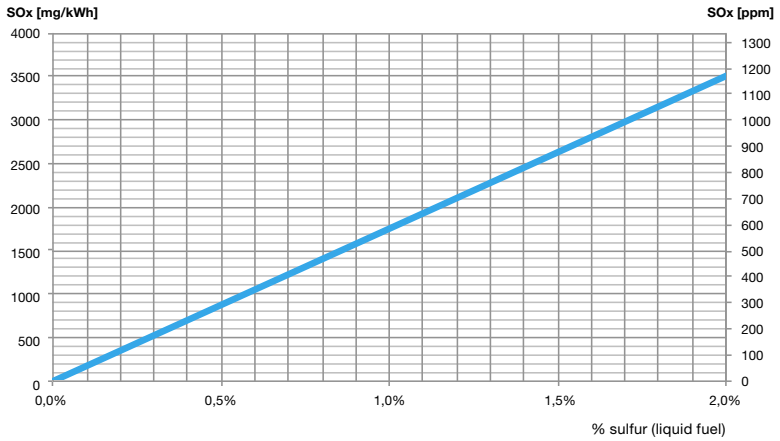
The polluting emissions of sulphur oxides (SO_x) mainly include sulphur dioxide (SO_2) and trioxide (SO_3). These chemicals are particularly aggressive and dangerous, both for the environment and human health.
However, sulphur oxides represent a separate case from CO and NO_x since their production during hydrocarbons combustion does not depend on the burner, nor on the boiler, but only on the quantity of sulphur already present in the fuel upstream of the process.
On one hand, higher quality gaseous fuels (like methane or LPG), include insignificant amounts of sulphur, and the use of these fuels minimizes hazardous emissions. On the other hand, the problem is evident in liquid fuels especially crude oil and heavy fuel oil, whose composition always includes a certain amount of sulphur as it will inevitably be oxidized in the combustion chamber and will produce SO_x.
It is possible to estimate the quantity of SO_x produced with the diagram on this page, or with the following procedure.
Given the quantity of sulphur present in the fuel expressed as a percentage by mass, just multiply this value by a numerical factor: 1.750.
The resulting number represents the emissions of SO_x at the chimney, expressed in mg/kWh.

Example 1
Given a fuel that contains 0,5 % sulphur, SO_x emissions will be equal to
0,5 x 1.750 = 875 mg/kWh

On the contrary, once the SO_x emission limit is known for a given thermal plant, it is possible to calculate the maximum allowable sulphur concentration in the fuel, dividing by the same coefficient above.

Example 2
Let's assume that emission limit required by project specifications is 300 mg/kWh SO_x.
The maximum percentage of sulphur in the fuel can be 300: 1.750 = 0,17
The numerical result represents directly the percentage in mass: 0,17 %.

If the fuel oil contains a higher fraction of sulphur, the required limit will be exceeded, regardless of burner or boiler selection!

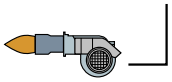


Reference conditions
Heavy fuel oil with net heating value Hi = 9.800 kcal/kg
Residual oxygen at the chimney O_2 = 3 % (λ = 1,15)

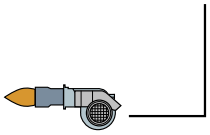
CIB UNIGAS burners can be operated with a wide range of liquid and gaseous fuels. The first two letters in the burner model indicate the type or types of fuel/s used:

Example TP... TLX... TG... TN... TPBY... HTP... HTLX... KTP... KTPBY...

Type:



Model: M- . XX. X . XX



The main fuels are:

Gases	Letter for model selection
natural gas	M
LPG	L
biogas	B
synthetic gas/town gas	C

Liquid	Letter for model selection
light diesel oil (LDO)	G
biodiesel	A
kerosene, arctic diesel, gas condensate	K
petroleum and heavy oil with a maximum viscosity of 89 cSt at 50 °C	P
heavy oil with a maximum viscosity of 59 cSt at 80 °C (example: M40)	D
heavy oil with a maximum viscosity of 1500 cSt at 50 °C (example: M100 and higher)	H

To select a dual-fuel burner, simply enter the appropriate letters in the model.
In the case of single-fuel burners, there is no second letter and a dash is written instead.

Example 1
Dual fuel burner type HTP93A model MG.MD.S.GB.A.1.65 firing with natural gas (M) and light oil (G).
If you want to choose the same burner but for LPG and light oil, replace the letter M (natural gas) with L (LPG).
Then the burner will still be type HTP93A, but the model will change to LG.MD.S.GB.A.1.65

Example 2
Requires a TG90 model G-.PR.S.GB.A with kerosene fuel (K) instead of light oil (G).
The burner type remains unchanged TG90; only the model K-.PR.S.GB.A will change

TYPES OF FUEL

GAS BURNERS
Gas burners can be operated with different gas types, burner regulation and valves. Combustion head and other components may vary depending on the selected type of fuel. When ordering, it is necessary to specify the selected fuel; check the price list for the extra charge of the required variants.

Attention: if the customer needs to modify an existing burner because he wants to convert it to a different fuel, this operation might require substantial modifications to the components of the burner, not to mention a new adjustment of the combustion.
In such cases, it is advisable to contact our sales network, which will provide assistance in selecting a solution that meets client's requests.

LPG
LPG is a mixture of hydrocarbons, consisting mainly of propane and butane. It is stored in liquid form, it is supplied to the burner through an evaporator, which supplies the liquefied gas to the burner in gaseous form. Given its high calorific value, these burners usually require a lower inlet pressure than for natural gas, and because of this with LPG a smaller diameter gas valve is possible although the outputs of natural gas and LPG burners are identical. Read the instructions to familiarise yourself with details.

Biogas
Biogas consists of a mixture of different types of gases (mainly Natural gas) from the fermentation of organic animal and vegetable waste products. It is characterised by the fact that its calorific value is lower than that of natural gas, which means that, on an equal output, a higher gas pressure and larger gas valves diameter are required. In case of very low calorific value gas, biogas can be mixed with natural gas or other hydrocarbons in order to increase the calorific value.
Very often biogas undergoes a dehydration process due to the water vapour content. In addition, biogas contains sulphur compounds which form an acidic condensate at a certain humidity and temperature. As there is a certain risk of damage to the critical safety components such as valves, regulators, and other gas appliances, manufacturers are not willing to take the risk and set limit values for the gas mixtures (e.g. total absence of H_2S and similar compounds). It is necessary to pay special attention to the selection of valves, gaskets and leakage control units. In addition, the biogas composition must be kept as constant as possible in order to ensure the correct quantity of combustion air, and for the safety of combustion.

Syngas
Syngas is a mixture obtained usually from the gasification of coal or biomass. It may contain, in varying proportions, hydrogen (H_2), carbon monoxide (CO), carbon dioxide (CO_2) and others.
If syngas is used as fuel, fuel analyses must be submitted together with other technical specifications of the plant.
Depending on the syngas components content, special modifications may be necessary to valves, since syngas can cause corrosion and contains water. In addition, since its heating value is lower than that of standard natural gas, a considerably higher inlet pressure will be required to produce the same output. In any case, we recommend that you contact our technical experts to check correct selection of the burner.

Synthetic Natural Gas (SNG)
Synthetic natural gas is a substitute for conventional natural gas and should not be confused with it although their names looks very similar, because they are actually two completely different things.
The substitute for natural gas (SNG) is produced in such a way that it results in the same number of Wobbe as natural gas (approx. 55 MJ/m^3), which means that it is interchangeable with natural natural gas.
For example, it is possible to take a 44 % / 56 % mixture of air and butane, or a mixture of air and propane in proportions of 32 % / 68 % - in both cases the Wobbe number will be 54,76 MJ/m^3, so it is possible to use a burner with the very same valves and supply pressure as for natural gas.
However, in this case, it is also recommended that a fuel analyses is submitted for preliminar check before the selection is made.
Note that synthetic natural gas should also not be confused with liquefied natural gas, LNG.

In order to facilitate the selection of the optimum configuration, it is advisable to send the fuel analysis to our TECHNOLOGY INFORMATIONS. The following basic parameters require clarification:
- Gas or mixture composition
- Density under standard conditions
- Lower heating value
- Alternatively Wobbe Index.

And, of course, the available inlet pressure at customer's site!
Note: it must be remembered that in case of gases with a very low calorific value, it is possible to correct this parameter by mixing it with natural gas, propane or other hydrocarbons.

LIGHT OIL BURNERS

Light oil burners can basically also be used for other liquid fuels such as, biodiesel, kerosene and arctic diesel fuel. However fuels such as kerosene, arctic diesel and gas condensate have a technological impact in the application of standard burners. Above all they have a low viscosity, a feature that affects the flow characteristics of pumps and nozzles; the customer must specify the type of fuel he wants to use before ordering. Furthermore, kerosene and gas condensate have a low lubricity value, so that the surfaces of the moving parts are subject to friction and abrasion. The lubricating film formed by the fuel is of great importance in order to reduce the friction between the gears, and Therefore, to guarantee the longevity of the pump. Normally the standard recommends a lubricating capacity of not more than 460 µm at 60 °C.
This parameter can be corrected by using additives or by mixing the fuel with light oil.

Biodiesel, vegetable oils or animal fats

These oils are agricultural products of different origins (like rapeseed oil).
These oils may contain impurities (husks, fibres) and must therefore be carefully filtered. In general, diesel burners are usually also suitable for biodiesel, but under the condition that the characteristics such as viscosity, density and calorific value are identical.
Particular attention must be paid to the acidity value of the fuel, which depends on the amount of fatty acids present in the organic raw material. Normally, the acidity value should be below 15 mg KOH/g, as standard recommends.

Heating oil

A very common and relatively cheap fuel, with intermediate characteristics between light oil fuel and light heavy oil. Compared to light oil, it has a higher viscosity and may contain a higher percentage of sulphur.
Generally, it can be used with light oil burners, where the viscosity of heating oil is less than 8 cSt at 20°C.
Furthermore, the heating oil must be supplied to the burner at a temperature of at least + 10 °C.
If the viscosity is higher, it is advisable to use an oil burner (see the following paragraph).
A similar choice is made if the fuel cannot be heated before it is supplied to the burner: pay attention to winter conditions.

HEAVY OIL BURNERS

Heavy oils are used in a wide range of applications, e.g. in oil extraction and refinery plants.

Heavy oil is relatively cheap compared to other refined hydrocarbons, however it requires a number of treatments before it can be pumped and burnt in traditional boiler plant. Correct operation of a burner depends entirely on the availability of the following devices and the execution of the operations described below.

- fuel sedimentation tank: the main tank is separated by pumps and filters from the service tank a circular fuel supply line to the burners. This way the fuel is separated from impurities, clay, water and possible paraffin.
- cascade filtration system: one filter is not enough, due to the number and different sizes of impurities present in the fuel oil.

The typical example is a cascade of filters connected in series, with filter cells of 1 mm, 500 µm, 250 µm,125 µm; a cascade filtration system is not sufficient.

Filter cells of 1 mm, 500 µm, 250 µm, 125 µm; the filters must be cleaned frequently. In many cases, the filters must also be heated with additional resistors; in case of higher metal contents (e.g. in used oil), additional electromagnetic filters should be used.

- Heavy oil preheating: increased viscosity is a technological limitation for pumping stations. The heavy oil must be heated to a temperature sufficient to lower the viscosity to the limits of its delivery capability in order to be supplied to pumps. Normally, crude oil and light heavy oil (bunker fuel oil) are heated to a temperature of 40÷60 °C. In comparison, heavy fuel oils such as M100, must be reheated to 80÷100 °C before being supplied to the burner. Preheating may be achieved by means of heat exchangers or directly in the tank, using steam, hot water, electric heaters or other means.
- Heating cable bundling: all components of the fuel oil supply system should be bundled with heating cable thermally insulated, to ensure fast heating of oil, even after a long period of stand-by time; otherwise the pump will be subjected to start-up stress and switching on the burner will be very difficult or even impossible. Similarly, filters, valves, regulators must be equipped with auxiliary electric resistors and thermostats.
  Heavy oil should, as far as possible, be free from water, which can damage pumps, and from paraffin which clogs the burner nozzles. It is advisable to suck heavy oil avoiding contact with the bottom of the tank where all dirt is accumulated.
- It is also necessary to avoid to overheat the fuel, mainly to avoid boiling it. The formation of gas bubbles in the piping system may cause damage to the pumps (cavitation) and may lead to a loss of flame, to a sudden stop of the motor and heavy oil system, followed by sudden shut-down of the burner. Another negative effect of overheating is coking of the fuel. At high temperature, asphaltenes (one of the many hydrocarbons contained in crude oil) react with paraffins to form hard agglomerates which deposit on the surface of the heat exchanger, causing possible hazardous conditions.
- Fuel supply pressure: the pump delivered with the burner must be powered at the minimum pressure defined by the manufacturer. It determines the allowable load loss, the length and diameter of the pipes and position of the tank. Find the NPSHR values in the operating instruction manual supplied along with the pumps.
  If the fuel oil is handled properly, the fuel oil pump can operate reliably and efficiently for many years. So it is advisable to rely on the experience of qualified specialists, who are able to design the fuel supply system according to the rules of good technique.

Also, in the case of oil burners, at the ordering stage, it is recommended to provide fuel analyses to our Technical Department. This applies especially to crude oil and other heavy fuels with variable composition. The main parameters that need to be clarified are:
- the composition of the liquid fuel or mixture
- kinematic viscosity
- density under standard conditions
- calorific value
- acidity (vegetable oils)
- lubricity (paraffin, gas condensate)

And, of course, pressure and temperature at the fuel supply of the customer plant!

Oil

Crude oil can be classified as follows.
Crude oil: A natural liquid fossil mixture of hydrocarbons with a wide physical and chemical composition, for the production of liquid fuels (gasoline, paraffin, diesel fuel, fuel oil), lubricating oils, bitumen and coke.
Marketable oil: oil prepared for delivery to consumers in accordance with the requirements of applicable normative and technical documents adopted in due course.
There is a significant difference in the use of these varieties of oils because many of the substances in the crude oil are aggressive. If they are present in significant quantities, then they interfere with the proper operation of the burner and may cause damage to the system.

FUEL ATOMISATION

Liquid fuels are burnt by atomising them into microscopic droplets using nozzles.
The droplets quickly evaporate in the combustion chamber and the steam feeds the flame. Atomisation can take place by means of high-pressure mechanical nozzles (as on light oil or commercial heavy oil burners), or by pneumatic nozzles working at medium pressure, in case of very heavy liquid fuels. Pneumatic atomisation of fuel occurs due to the pressure of the atomisation means (compressed air, and/or steam) which is injected directly into the fuel oil stream and atomizes it to form an air-fuel mixture.
This choice during the project phase, allows for maximum flexibility in the use of all types of fuels whether in case of heavy fuel oil (M40, M100), crude oil, heating oil, bunker oil (F5, F12) or other liquid fuels. CIB UNIGAS burners provide the right degree of atomization, necessary for a complete and efficient combustion. Burners with pneumatic atomisation fuel are distinguished by the letter “H“ in the model name, and are obligatory when the client chooses such high viscosity fuels burners (more than 1500 cSt at 50 °C), or highly polluted oils (e.g. used oil).
It is recommended to use steam for fuel atomisation. If the customer prefers to use compressed air, see recommendations for compressor selection (page 231).

Please note that:
CIB UNIGAS does not provide any warranty for burners and components in the event that fuels do not comply with the specifications required by the standards. The use of substandard fuels may cause long-term damage to the burner and the whole system, thus reducing the equipment lifetime.

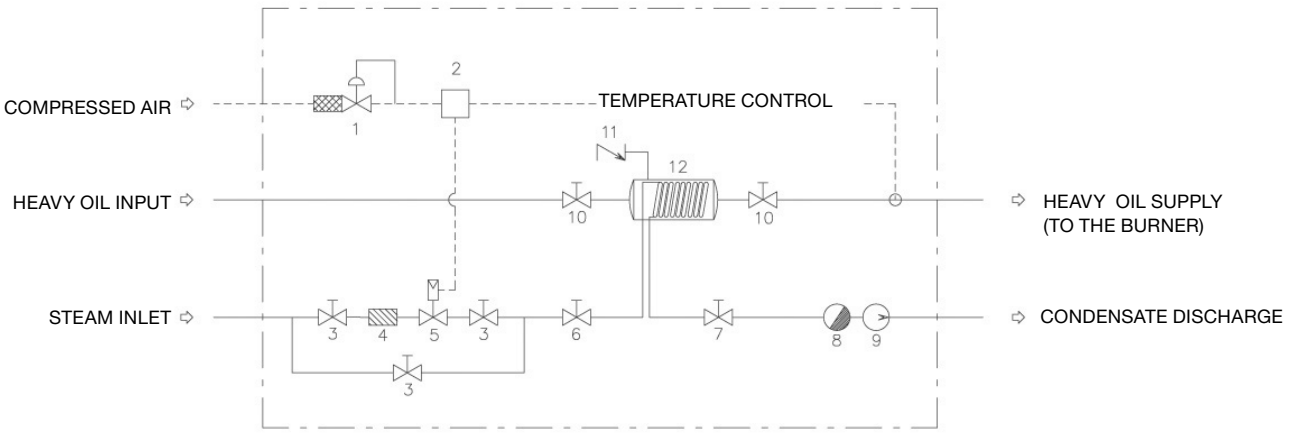
HEAVY OIL HEATING

The TN, KTP, TPBY and KTPBY burner series are designed for heavy oil that can be used both as the main fuel, and as a reserve fuel.
The heavy oil must be supplied to the burner at a temperature sufficient for atomisation at the nozzle (example: 120÷130 °C). The higher the viscosity of the fuel, the higher will be the temperature required for heavy oil.
In a modern boiler room there is usually a service heavy oil tank, which is supplied by a low pressure fuel circuit (aka "ring"). In this circuit the heavy oil is maintained at a minimum temperature required for the discharge (example: 80°C).
This means that the heavy oil must be heated up before it reaches the burner.
The standard delivery of the burner does not include a fuel preheating station, but it is available as an optional.
The standard heavy oil heating station includes a heavy oil/ steam heat exchanger mounted on a a separate frame. As an alternative to steam, diathermic oil can also be used.
If the required oil flow rate is too high, several heat exchangers can be connected in parallel in order to create the required heat. For example, it is possible to supply two or more burners with just one heavy oil pre-heating station.

Example: Heavy oil heating station

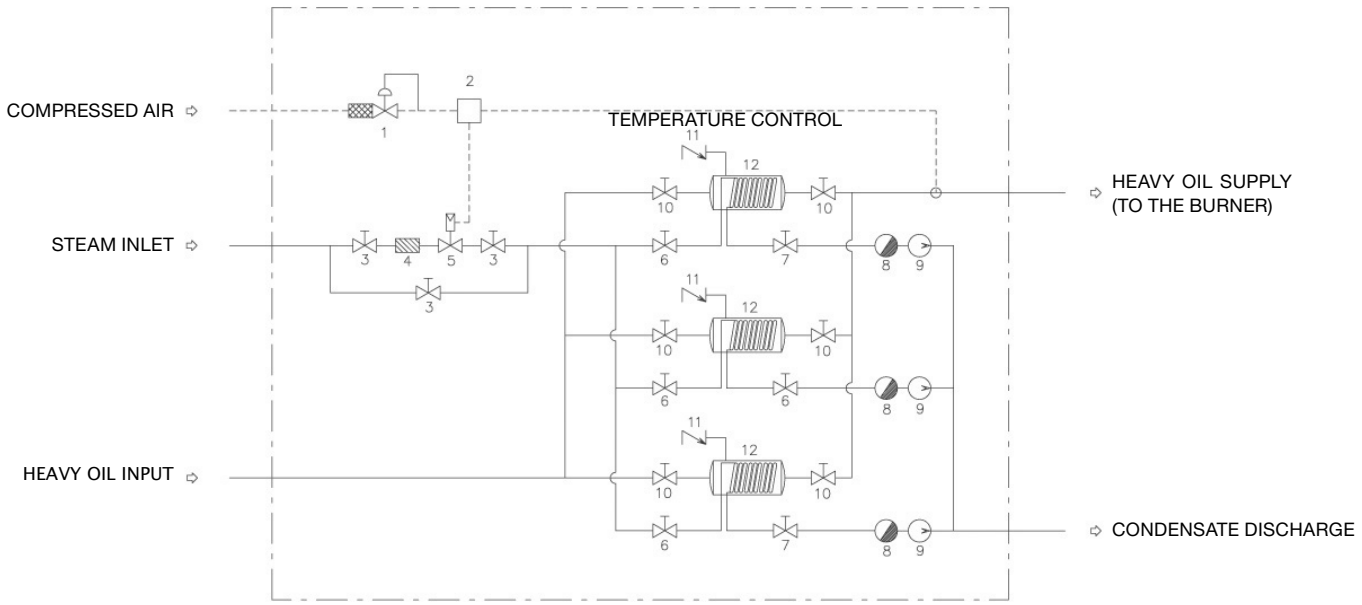
To order a complete heavy oil heating station, it is necessary to specify:
1. Type of fuel to be heated (example: heavy oil M100)
2. The flow rate to be heated (or which and how many burners are to be powered, example: TBY1040 - 2 pcs.)
3. Input oil temperature and pressure (example: 80° C, 5 bar)
4. Heating means used (example: steam) and its characteristics (temperature, pressure, available flow rate).

Fig. 01 - Heavy oil preheating station (example with one heat exchanger)



COMPONENTS ASSEMBLED ON A FREESTANDING FRAME

Fig. 02 - Heavy oil preheating station (example with 3 parallel heat exchangers)



LEGEND					
1		Air regulator	7		Ball valve (steam)
2		Thermostat	8		Condensation chamber
3		Manual ball valve	9		Flow indicator
4		Filter (steam)	10		Manual ball valve
5		Metering valve (steam)	11		Anti-vacuum valve
6		Manual ball valve	12		Tank - heat exchanger (fuel oil/steam)

Heavy oil components, flanged; steam components: PN16

Application of electric heaters for heavy oil heating

It is possible to assemble a heavy oil preheating station equipped with electric heaters by integrating or replacing the steam heat exchanger.

Attention: in this case the electrical power required is typically very high!

For comparison, let's take a fuel oil flow rate of 4000 kg/h, the required thermal step is 50 °C: under these conditions, the minimum power requirement is 120 kW. Larger size burners require, proportionally, higher outputs. Therefore, in case the customer decides to incorporate a fuel heating station with electrical heaters into the project, we recommend to evaluate this solution in cooperation with the technical department of CIB UNIGAS.

We will help you to choose the configuration that meets your needs.

HEAVY OIL HEATING

In addition to the exchangers shown on the previous pages, it is possible to provide fuel storage tanks.
The heavy storage tanks can also be equipped with water coils, steam coils or electrical heaters.
These tanks are designed for low pressure ring heavy oil circuits.

The light oil burners are equipped with a lance with nozzle. The nozzle operates with mechanical atomisation of fuel at high pressure (25 bar). Delivery includes filter, pump, regulator, safety valves, minimum pressure switch, pressure gauge.
The pump can be driven by a fan motor or a separate motor, depending on the burner models. In addition, separate connection hoses are available. See hydraulic diagrams.
The light oil fuel must be supplied to the burner at a pressure of 1÷2 bar and a temperature not lower than 5 °C.
The burner can be supplied from a tank in a straight line or from a low pressure fuel ring (which is preferable when several burners are working in one boiler room).
Attention: the low pressure fuel ring is not included in the standard delivery of the burner, but it is available as optional (see page 247).

Fig. 01 - Light oil fuel feeding diagram: example for TG, HTP, HTLX series single-head burners (< 3 MW)

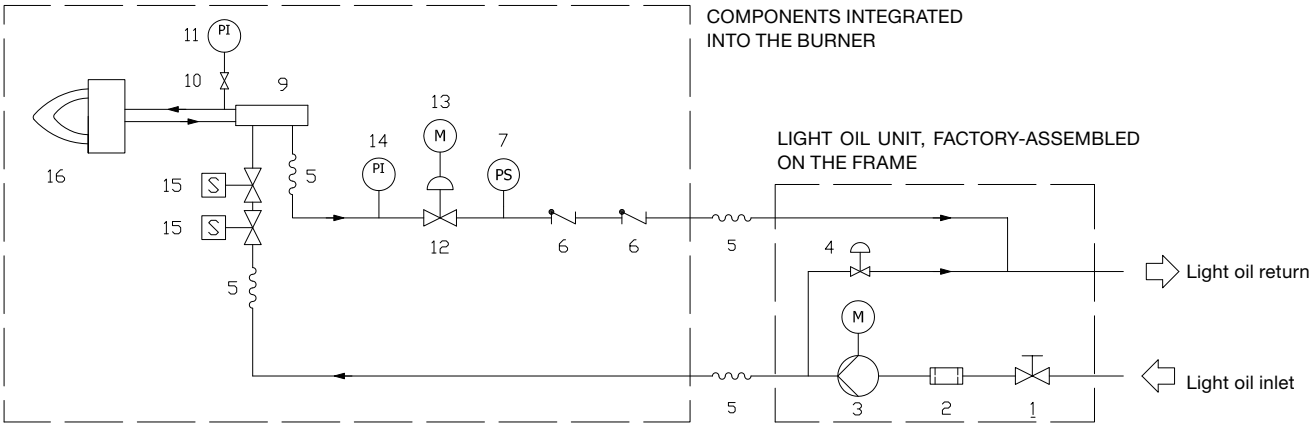
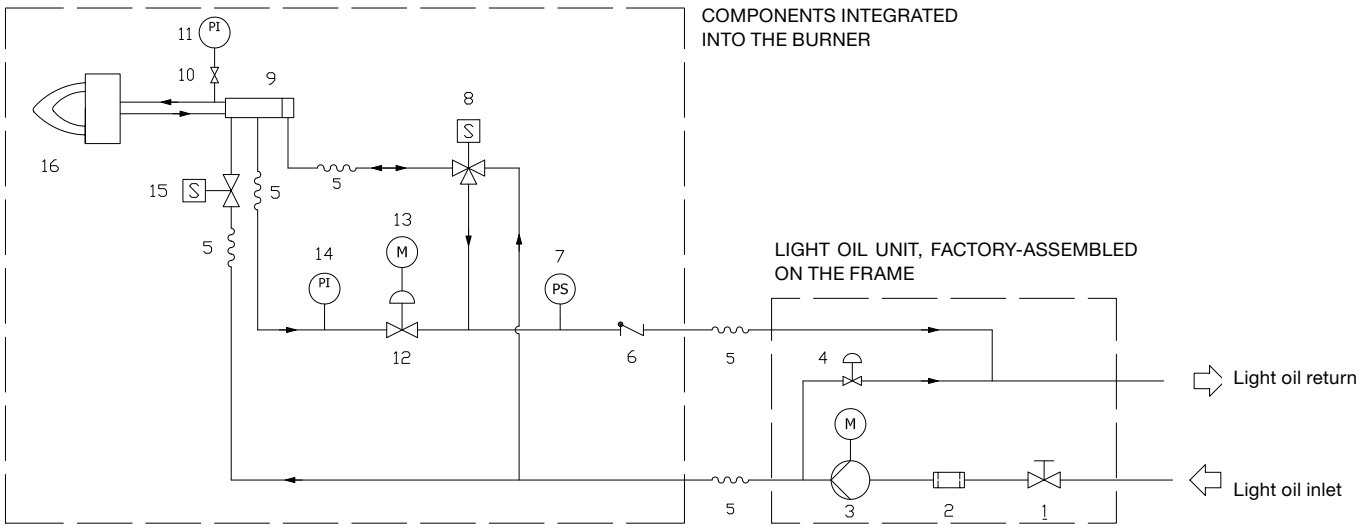


Fig. 02 - Light oil fuel feeding diagram: example for TG, HTP, HTLX series single-head burners (≥ 3 MW)



LEGEND

1	Manual ball valve	7	Maximum pressure switch	13	Servomotor
2	Light oil filter	8	3-way valve	14	Manometer
3	Pump and motor	9	Burner	15	Electrovalve
4	Pressure regulator	10	Manometer ball valve (option)	16	Combustion head
5	Hose	11	Manometer (option)		
6	Check valve	12	Flow regulator		

Fig. 01 - Light oil unit of TG, HTP VS series (output < 3 MW)

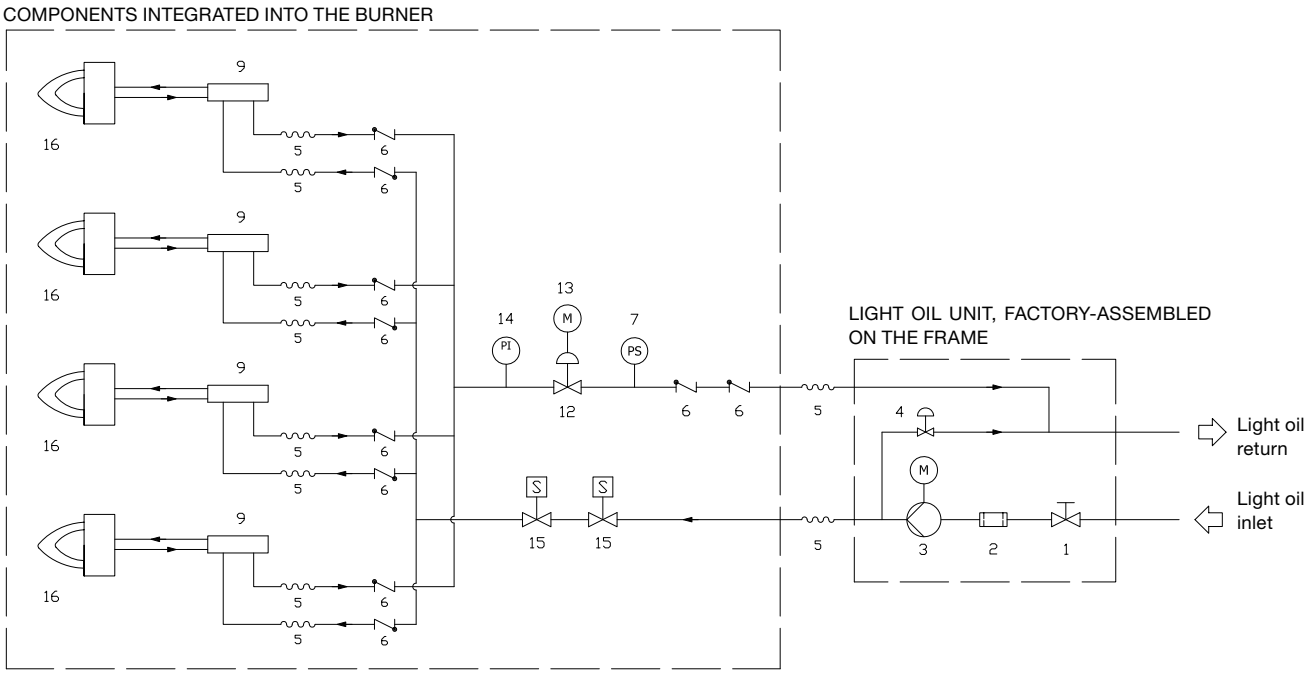
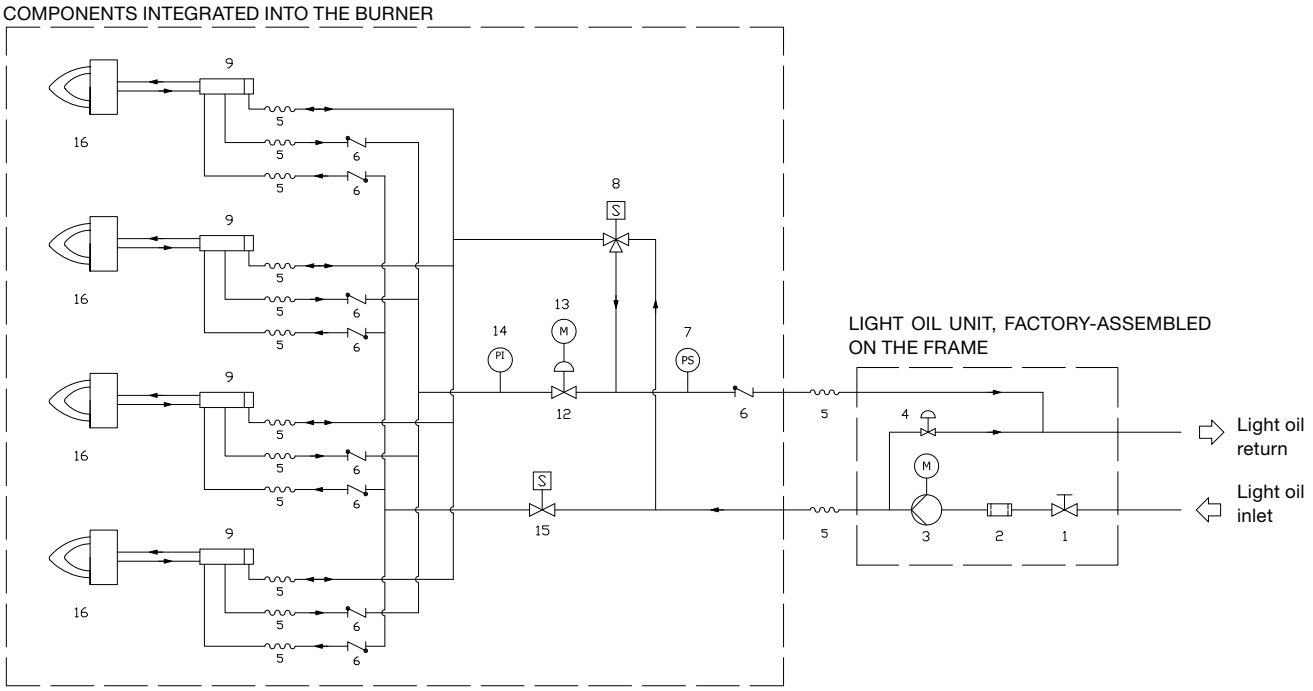


Fig. 02 - Light oil unit of TG, HTP VS series (output ≥ 3 MW)

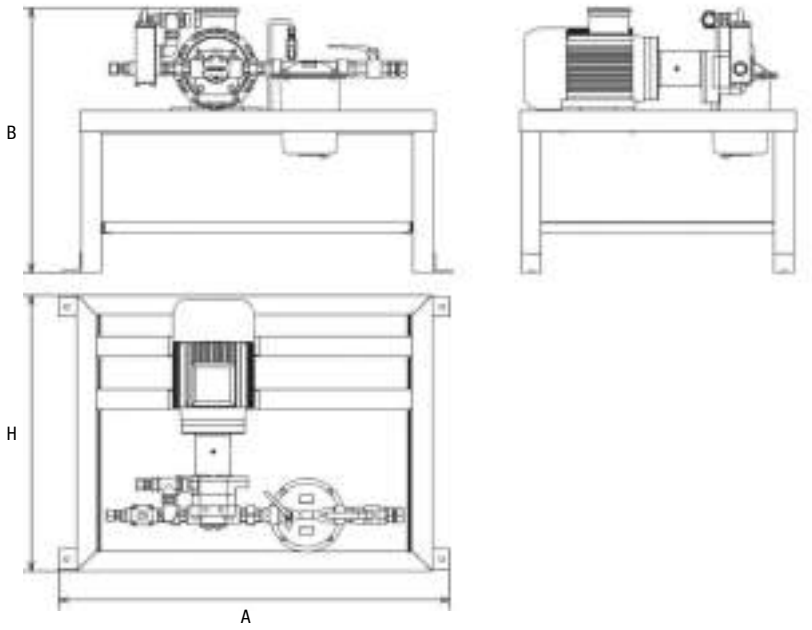


LEGEND

1 Manual ball valve
2 Light oil filter
3 Pump and motor
4 Flow regulator
5 Hose
6 Check valve
7 Maximum pressure switch
8 3-way valve
9 Burner
10 Manometer with manual ball valve (option)
11 Manometer (option)
12 Pressure regulator
13 Servomotor
14 Manometer
15 Solenoid valve
16 Combustion head

Note: on some models the flow control valve can be integrated into the pump housing.

LIGHT OIL UNIT - Maximum dimensions of pump and fuel group



Burner size	Pump motor	A	H	B
up to 520	< 4 kW	790 mm	600 mm	620 mm
from 525	≥ 4 kW	990 mm	700 mm	670 mm

CIB Unigas light oil burners are also suitable for fuels that are not widely used, such as: arctic diesel, paraffin, gas condensate, biodiesel. However the characteristics of unconventional fossils fuels are very different, and therefore a technical evaluation must be carried out to assess their suitability.
In order to select a special burner suitable to your requirements, it is advisable to provide a fuel analysis.

HEAVY OIL BURNERS

Heavy oil burners are divided into two main categories.

TN, KTP series
These models are equipped with a lance and by-pass nozzle. The nozzle works with mechanical spraying at high pressure (25 bar). Delivery includes filter, pump, regulator, valves, thermostats.
One or two fuel preheater tanks, fitted with electrical resistors, can be found aboard the burner.
The pump may be driven by an impellor motor or a separate motor, depending on burner model. In addition, two connection hoses are available separately.
Please find below hydraulic diagrams.

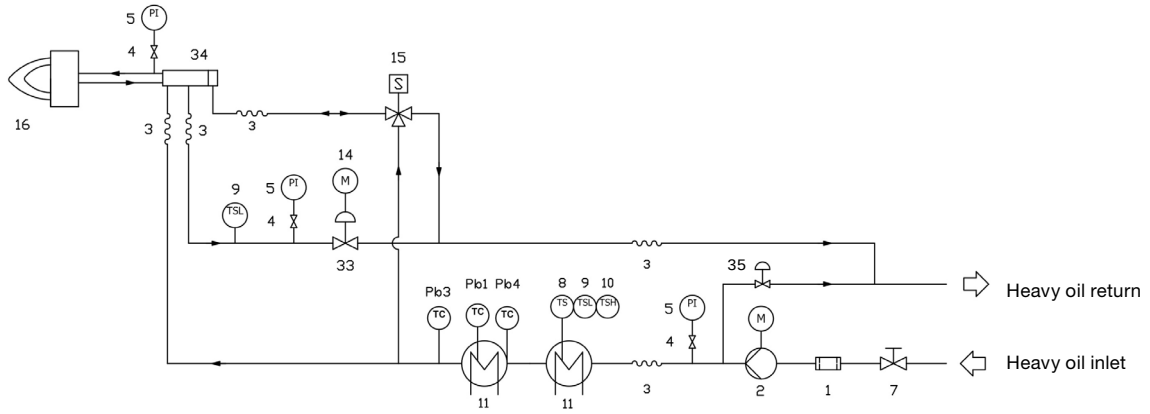
TPBY, KTPBY series
These models are equipped with a lance and pneumatic spraying nozzle.
Atomisation is carried out with compressed air or steam.
The delivery includes pressure relief valves, regulator and heavy oil pre-heaters
In addition, a compressed air circuit is also available (steam versions on request). Also included filter and hose connections for burner.
Note: the pressure pump (10 bar) connected to the electric motor is included
only on request. See price list for details.
Note: a compressor is not included in the delivery of the burners.
For selection of a suitable compressor, see page 231.

The heavy oil must be supplied to the burner at 1÷2 bar.
The minimum temperature at the pump depends on the viscosity of the liquid fuel: for example in case of fuel oil M100, a supply temperature of 80÷100 °C is recommended, while temperature may be lowered in the case of crude oil.
The burner can be supplied directly from the tank in a straight line or through a low-pressure fuel ring (preferable when several burners are operating within the same boiler room).
Attention: a ring fuel circuit for multiple burners is not included as standard in the burner delivery,
but can be ordered separately (see page 247).

Pumps for TPBY, KTPBY pneumatic atomised burners

Burner size	Pump	Flow	Motor (power)	Motor (speed)	Connections dimensions	Max. Pressure (outlet)	Max Pressure (inlet)	Item number
90-91	KF-10.BCB	500 l/h	0,37 kW	1500 rpm	DN25	10 bar	2 bar	2590606
92-93-510-512	KF-15.BCB	800 l/h	0,55 kW	1500 rpm	DN25	10 bar	2 bar	2590612
515-520-525	KF-20.BCB	1100 l/h	0,55 kW	1500 rpm	DN25	10 bar	2 bar	2590610
1025-1030-1040-2050	KF-32.BCB	1800 l/h	1,10 kW	1500 rpm	DN32	10 bar	2 bar	2590613
2060-2080	KF-42.BCB	2400 l/h	1,10 kW	1500 rpm	DN32	10 bar	2 bar	2590615

Fig. 01 - Scheme for heavy fuel oil: example with TN, KTP series single-head burners



LEGEND

1		Oil filter	18		Electro-valve
2		Pump and motor	19		Minimal pressure switch
3		Heavy oil hose	20		Check valve
4		Manometer ball valve (option)	21		Flow regulator
5		Manometer (option)	22		Manometer ball valve
6		Safety valve	23		Manometer
7		Manual ball valve	24		Hose
8		Safety thermostat	25		Hand-operated steam tap (optional)
9		Minimal temperature thermostat	26		Steam filter (optional)
10		Maximum thermostat	27		Minimum pressure switch (Option)
11		Heating tank	28		Condensation separator (Option)
12		Pneumatic valve	29		Pneumatic valve (optional)
13		Flow regulator	30		Nonreturn valve (Option)
14		Servomotor	31		Condensate drain (Option)
15		3-way valve	32		Flow indicator (Option)
16		Combustion head	33		Pressure regulator
Pb		Temperature sensor (1, 3, 4)	34		Burner
17		Stabilisation filter	35		Pressure regulator

All oil components are flanged; all steam components are designed for PN16 pressure.
On customer's request it is possible to supply a pump mounted on a separate frame with a junction box and a collecting tray for
On customer's request we can deliver a pump mounted on a separate frame and equipped with a junction box and a collecting tray for heavy oil.

BURNERS WITH FREE-STANDING HEAVY OIL

Burners with separate heavy oil (series TPBY, KTPBY) are equipped with lance and nozzle for pneumatic atomization of fuel. Atomisation of fuel is carried out with compressed air or alternatively with steam (optional).
Delivery includes valves and fuel preheating tanks integrated into the burner, compressed air circuit, low pressure pump connected to an electric motor, filter and regulator. Pump, filter and hoses connected to the burner are delivered separately.
Refer to C.01÷04 for the complete diagram of the components included in the delivery.
Heavy fuel oil must be supplied to the burner at 1÷4 bar; the minimum temperature of pump depends on the viscosity of heavy fuel oil: e.g. in case of heavy fuel oil M100 oil, for example, a temperature of 80÷100 °C is recommended, while temperature may be lowered in the case of crude oil.
The burner can be supplied from a tank directly or by a return flow circuit (preferably when several burners are in operation in the same boiler room).
Attention: A ring fuel circuit for several burners is not included in the standard delivery of the burner, but can be ordered separately (see page 247).

Fig. 01 - Heavy oil unit for TPBY, KTPBY series, single-head burners (output < 10 MW)

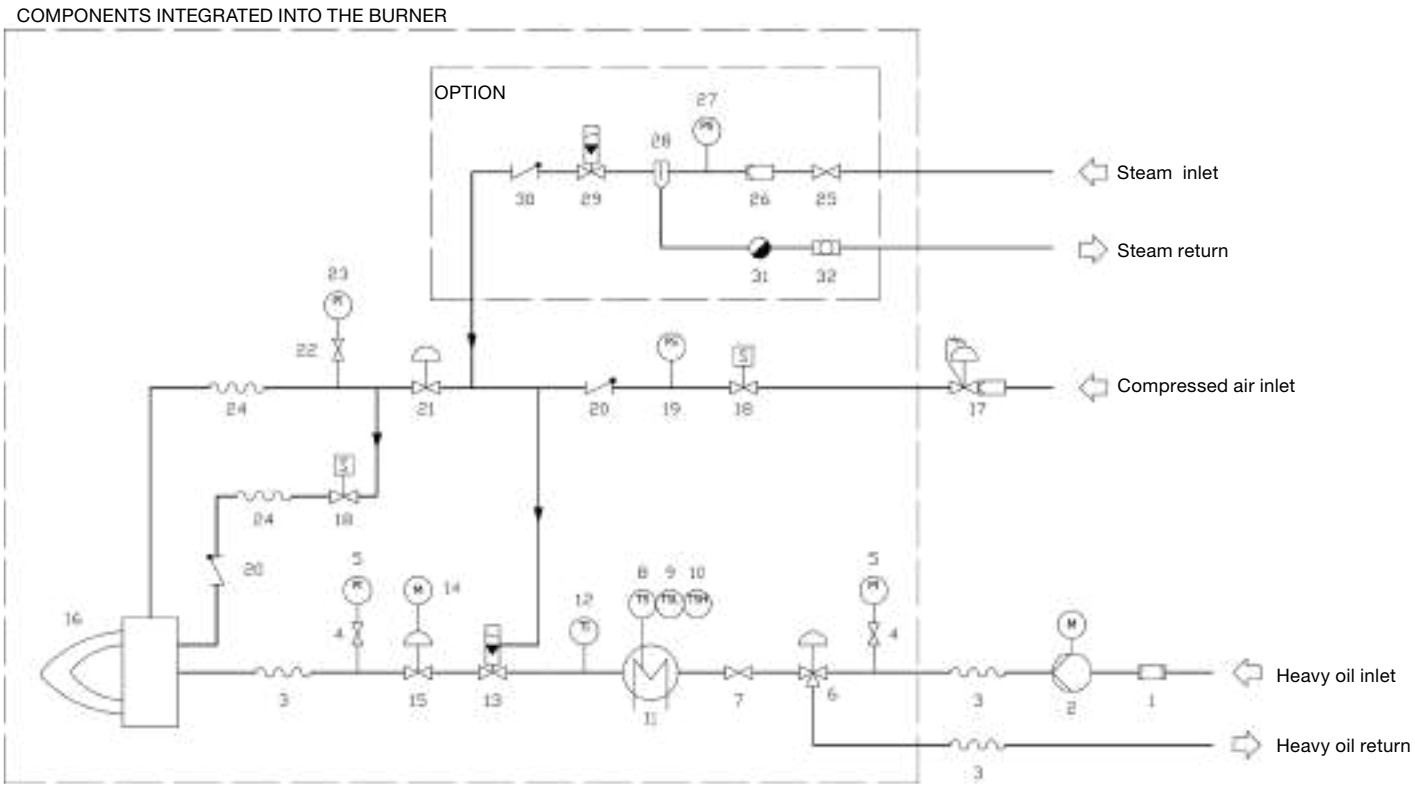


Fig. 02 - Heavy oil for TPBY, KTPBY VS series burners (output < 10 MW)

COMPONENTS INTEGRATED INTO THE BURNER

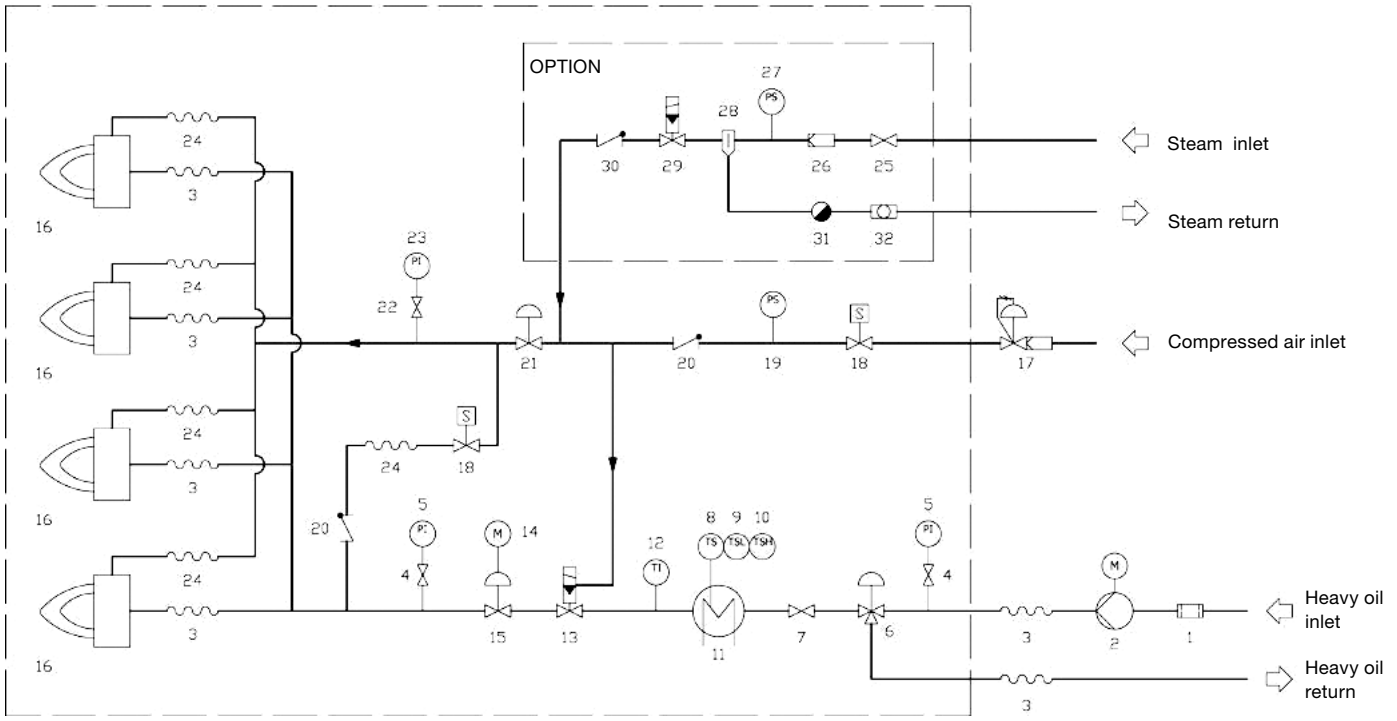


Fig. 03 - Heavy oil for TPBY, KTPBY series burners, single-head burners (output ≥ 10 MW)

COMPONENTS INTEGRATED INTO THE BURNER

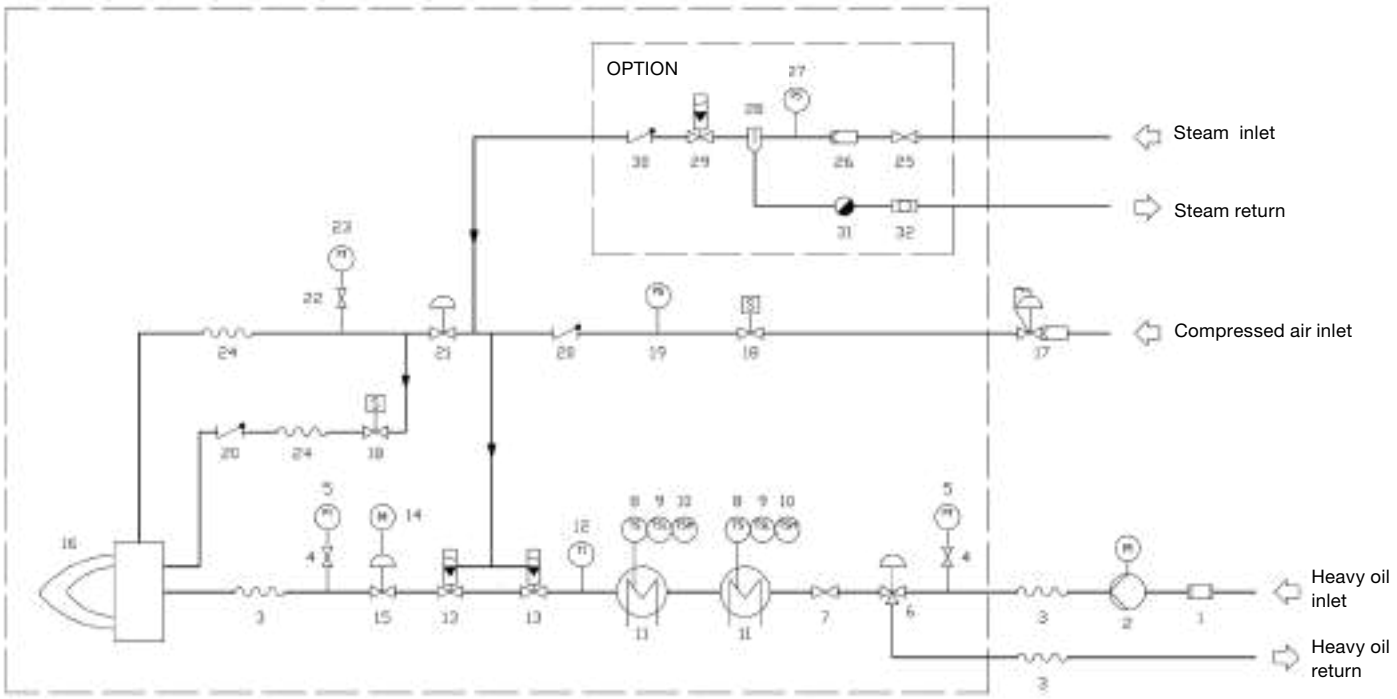
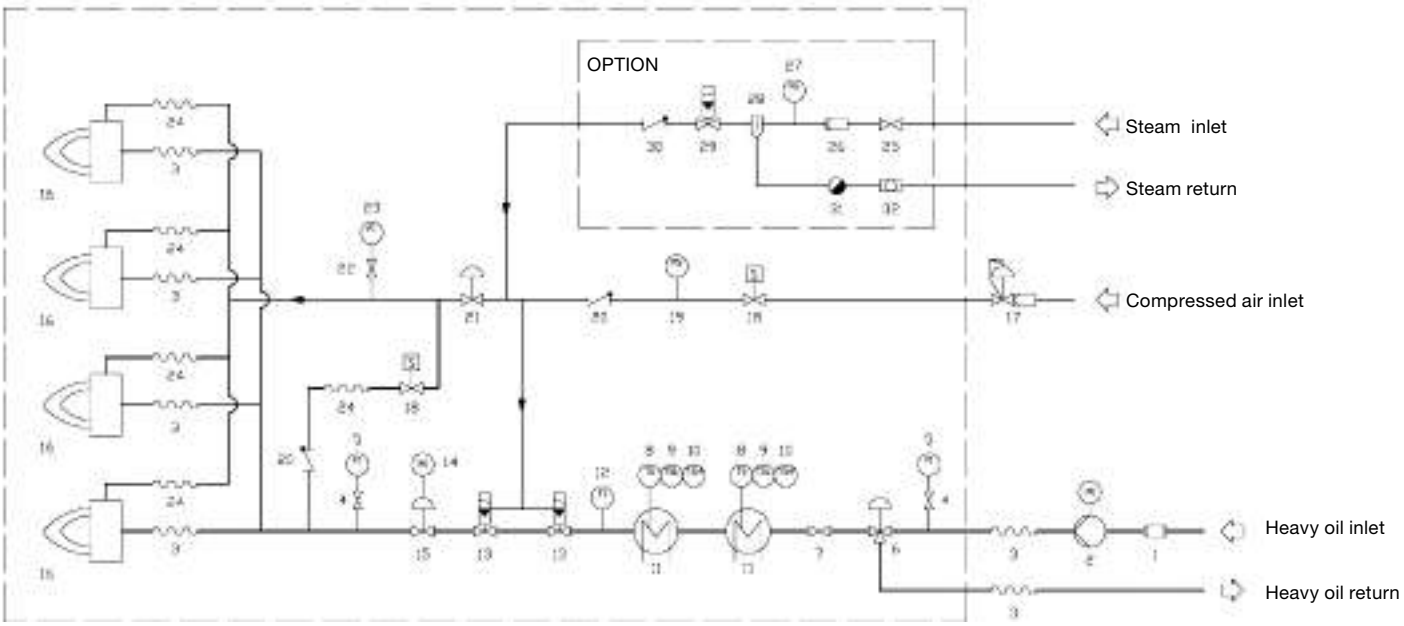


Fig. 04 - Heavy oil for TPBY, KTPBY VS series burners (output ≥ 10 MW)

COMPONENTS INTEGRATED INTO THE BURNER



LEGEND					
1	Oil filter	12	Thermometer	23	Manometer
2	Pump and motor	13	Pneumatic valve	24	Hose
3	Fuel oil hose	14	Servo actuator	25	Hand-operated steam tap (optional)
4	Manometer holder cock	15	Flow regulator	26	Steam filter (optional)
5	Manometer	16	Combustion head	27	Minimum pressure switch (Option)
6	Safety valve	17	Stabiliser filter	28	Condensation separator (Option)
7	Manual cock	18	Electro-valve	29	Pneumatic valve (optional)
8	Safety thermostat	19	Minimal pressure switch	30	Nonreturn valve (Option)
9	Minimal temperature thermostat	20	Check valve	31	Condensate drain (Option)
10	Maximum temperature thermostat	21	Flow regulator	32	Flow indicator (Option)
11	Heating tank	22	Manometer holder-cock		

If oil components are flanged; all steam components are designed for PN16 pressure.
Upon customer's request it is possible to supply a pump mounted on a separate frame equipped with a junction box and a collecting tray for fuel oil.
Attention: the compressor is not included in the burner delivery.

See page 231 for selection of a suitable compressor.
To order a burner with pneumatic atomization of fuel by means of steam, it is necessary to add an extra charge to the price of the standard burner.

The standard scope of supply of oil burners include two flexible low-pressure hoses, filter, (supplied separately), pump, nozzle and combustion head, flow pressure regulator and
shut-off valves.
The pressure gauges and other accessories can be ordered separately upon customer's request.
This table includes all burner configurations according to burner type, size and fuel.
Pressure pump unit (configurations):
1. Fuel pump
2. Pump integrated into the burner, connected to the motor (Suntec)
3. Motor and pump supplied separately - optional (Kral)
4. Group consisting of motor and pump mounted on a separate frame (Suntec)
More detailed information can be found in the operating instruction manual.

Series	Fuel	Filter	Configuration of oil pump and pump unit configuration			Tanks-heaters fuel oil heaters	Hoses low pressure	
			1	2	3			
								
Burners with mechanical atomisation								
TG 90 - 500 - 1000 - 2000 - 3000	Light oil	■	■		●		■	●
HTP HTLX TECNOPRESS 90 - 500 - 1000 - 2000 - 3000	Natural gas/Light oil	■	■		●		■	●
Burners with mechanical atomisation								
TN 90 - 500 - 1000 - 2000 - 3000	Heavy oil	■	■		●	■	■	●
KTP 90 - 500 - 1000 - 2000 - 3000	Natural gas/ Heavy oil	■				■	■	■
Burners with pneumatic atomisation								
TPBY	Heavy oil	■		■		■	■	
KTPBY	Natural gas/ Heavy oil	■		■		■	■	
							pressure max. 10 bar	pressure max. 30 bar

■ = what is supplied with the burner
● = equipment as requested by the customer

LOW PRESSURE OIL HANDLING UNITS WITH SERVICE TANK

Very often, for a correct light and heavy oil burners operation, it is necessary to prepare an additional fuel supply line.
In this case, rather than sucking the fuel from the tank through separate pipes suitable to each individual burner, a low-pressure supply circuit (normally 1 ÷ 2 bar) must be created.
Two of the most common fuel oil configurations are simplified in the following diagrams.

Fig. 01 - Example of a ring circuit for heavy fuel oil burners with mechanical atomization

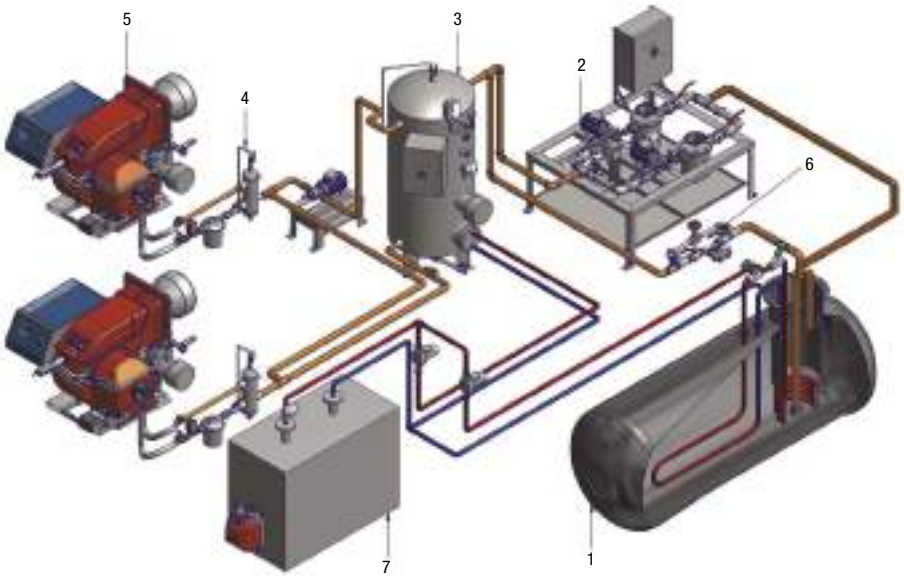
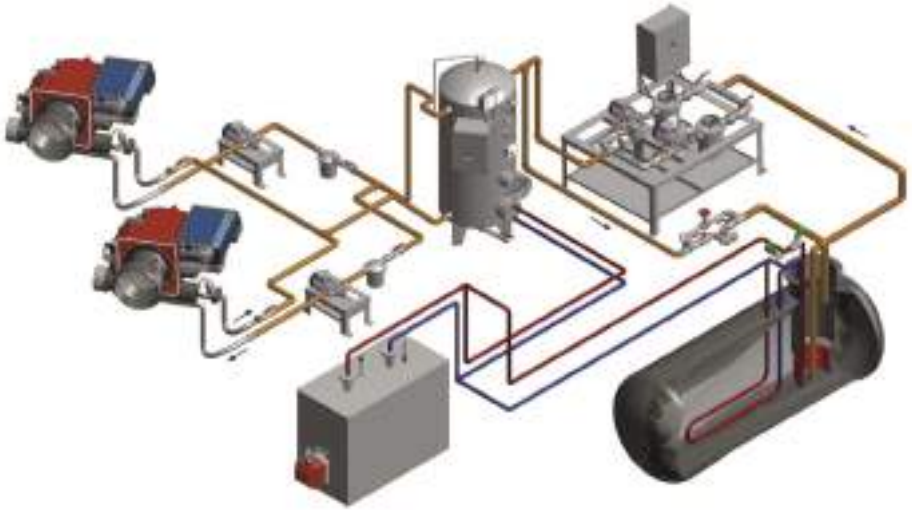


Fig. 02 - Example of a ring circuit for heavy fuel oil burners with pneumatical atomization



Below is a description, as an example, of some available solutions for oil preheating fuel supply to the burner.
The daily storage service tank (no. 1 in the figure) is heated by a service boiler (no. 7) with a steam or hot water boiler. The target is to keep the heavy fuel oil liquid enough to keep the necessary pressure inside the ring circuit.
The capacity of the service tank (no. 3) provides, if necessary, an additional temperature difference before supplying the oil to the burner (no. 5). The burners themselves are supplied through degassing tanks (no. 4), which separate the gas which forms in the heated oil.
On the back, below item no. 6, there's a pressure regulator.
CIB UNGAS can supply, upon request, pumping units for light and heavy fuel oil, pressure regulators and degassing tanks.

FLAME CONTROL SENSORS

In order to ensure a safe ignition, the technical regulations require that all burners are provided with a flame detection sensor. The sensor sends a signal to the electronic flame control unit and if it fails, the control box immediately shut-off the valves, and stop burner operation. This is necessary to prevent unburned fuel from entering the combustion chamber, with possible risk of explosion.
Flame control sensors used on industrial burners fall into two main categories:
- Sensors that detect the intensity of gas ionisation. The flame is nothing more than a partially ionised gas, so by means of a potential difference it is possible to measure the intensity of ionisation using an electrode.
- Sensors measure electromagnetic radiation striking them, i.e. the photons produced by chemical reactions during the combustion process.

These sensors can be subdivided into models which detect flames in the infrared, visible or ultraviolet spectrum. In this category of sensors there are conventional photoelectric cells and sensors with photoresistors.
Photoresistors and photocells are semiconductor electronic components. The difference between them is in the way they detect the presence of a flame:
- A photocell uses the photoelectric effect to generate a current. The current signal is amplified and then read out by the electronic flame control unit of the burner. This is an active sensor type.
- The photoresistor is a component whose electrical resistance is inversely proportional to the amount of light striking it. In other words, its value in ohms (Ω), due to the effect of photoconductivity, decreases as the intensity of the incident light increases. At a constant voltage, the current flowing through the sensor is proportional to the intensity of the light source. It is a passive sensor.

The use of a flame control sensor of one type or another depends mainly on the geometric shape of the combustion head and the characteristics of the flame it monitors (its temperature and brightness), because, depending on the type of fuel used, the flame will be either more or less bright in certain ranges of the electromagnetic frequency spectrum.
Albeit to a lesser extent, the combustion chamber can also influence the choice of flame control sensor. For example, if the combustion chamber is made of refractory bricks, it can emit a false flame signal in the infrared spectrum, in this case, instead of the infrared sensor, you can choose either an ultraviolet sensor or an ionisation sensor.
The standard CIB UNIGAS burners are equipped with the sensors shown in the following table:

BURNERS	FUEL TYPES	FLAME CONTROL SENSORS		
		electrode ionisation	photocell	photoresistor
TECNOPRESS - 90 - 500	Natural gas	•	○	
1000 - 2000 - N	Natural gas	•	•	
C, E Series	Natural gas	•	Δ	
90 - 500 - 1000 - 2000	Natural gas		•	
90 - 500 - 1000 - 2000 - 3000	Dual fuel gas/light oil or combined gas/heavy oil		•	
C, E Series	Dual fuel gas/light oil		•	
TECNOPRESS - 90 - 500 - 1000 - 2000 - 3000	Light oil or heavy oil		Δ	•

Legend
- • Series burners
- ○ Available on request
- Δ Models with LMV5x

Models with ignition burner and photocell: see pag. 152

SEPARATE ELECTRICAL PANELS FOR BURNERS

Standard burners are provided with integrated electrical panels which include all electronic automation and all necessary components for a correct and reliable operation.

Alternative solutions to the integrated control panel are available upon request:
- Wall mounted control panel according to customers' specifications.
- Floor standing electrical panel; it has its base, and it is provided with a tilting panel.
- Large electrical panel with base plate (Closet type); this type of panel allows to mount an inverter or other necessary electronical equipment.

All electrical panels are provided with a door lock.

Floor standing

	Maximum dimensions		
Electrical panel type	width [mm]	depth [mm	height [mm]
Floor standing	600 - 1000	500	1000
Closet type	600	400	2000
Wall mounted	400 - 600	200 - 300	600 - 700

Protection degree of self-supporting switchboards: IP55 (or higher upon request)

Closet type

The dimensions indicated are valid for the configurations widely used in boiler rooms.
Based on the specifications of the heating system, it is possible to produce electrical panels of different sizes, or to prepare a common one to serve many burners.

Note: If you select the option "control cabinet type", you need to specify the cable entry position (cable entry from the bottom or top of the electrical panel housing).

Note: Some combinations have restrictions on the passage of signals from and to the outside to electronical equipment. To order a special electrical cabinet, the length of the electrical connections between the panel and the burner must be ascertained in advance.

For burners with a special configuration, please ask our Technical Department.

Wall mounted

COMPRESSORS FOR BURNERS WITH PNEUMATIC ATOMISATION

- Consider the data on the table here below as a guide to select a suitable compressor in case air is to be used for the atomisation of heavy fuel oil.
- The compressor can be supplied separately from the burner, compressors are out of our standard scope of supply.
- The air parameters are taken at standard conditions (temperature 15 °C and pressure 1.013 mbar).

If steam is used to atomise fuels, the pressure and flow rate are identical to that of compressed air. The steam must be dry saturated. Steam pressure must never exceed 12 bar (190 °C).

Attention: burners with separate fans, with pneumatic atomisation of fuel are by default designed for the use with compressed air. In case an alternative configuration (e.g. with steam) is needed, it is necessary to add an extra charge to burner price.

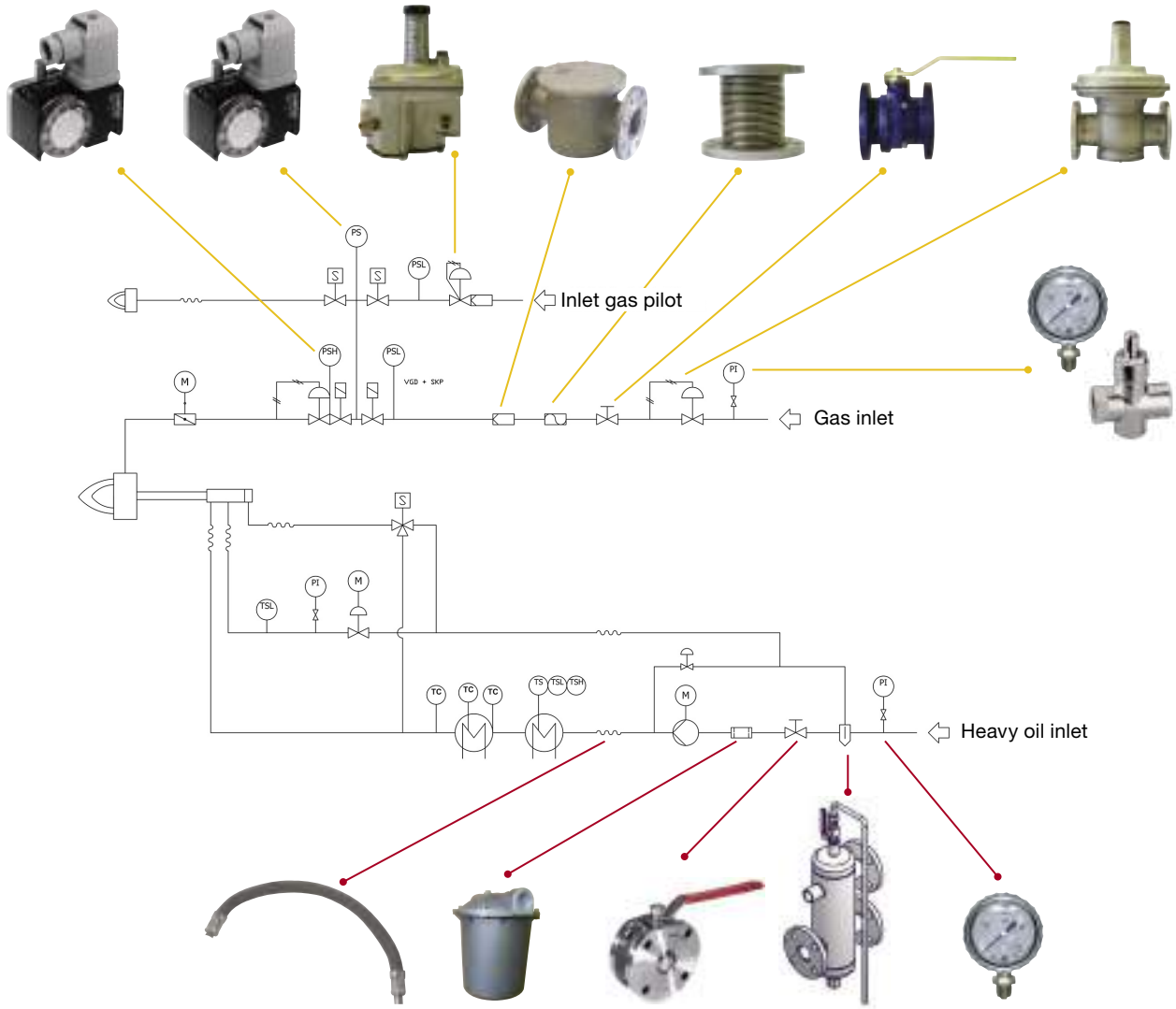
Burner type	Power	Air/steam flow rate		Pressure
	[kW]	[kg/h]	[St l/s]	[bar]
TPBY90	2.000	21,5	4,8	6÷8
TPBY91	2.500	26,9	6,0	6÷8
TPBY92	3.000	32,3	7,2	6÷8
TPBY93	3.700	39,8	8,9	6÷8
TPBY510	5.000	53,8	12,0	6÷8
TPBY515	6.000	64,5	14,3	6÷8
TPBY520	7.000	75,3	16,7	6÷8
TPBY525	9.750	104,7	23,3	6÷8
TPBY1030	13.300	142,9	31,7	6÷8
TPBY1050	15.500	166,6	37,0	6÷8
TPBY1080	19.000	204,2	45,4	6÷8
TPBY2000	22.000	236,4	52,3	8÷10
TPBY2500	27.000	290,1	64,5	8÷10
TPBY3000	39.000	419,1	93,1	8÷10
TPBY93 …VS	3.700	37,8	8,9	6÷8
TPBY515 …VS	6.000	64,5	14,3	6÷8
TPBY525 …VS	9.750	104,7	23,3	6÷8
TPBY1030 …VS	13.300	142,9	31,7	6÷8
TPBY1080 …VS	19.000	204,2	45,4	6÷8

COMPRESSORS FOR BURNERS WITH PNEUMATIC ATOMISATION

Burner type	Power	Air/steam flow rate		Pressure
	[kW]	[kg/h]	[St l/s]	[bar]
KTPBY90	2.300	24,7	5,5	6÷8
KTPBY91	2.670	28,6	6,3	6÷8
KTPBY92	3.050	32,7	7,2	6÷8
KTPBY93	4.100	44,0	9,7	6÷8
KTPBY512	4.500	48,3	10,7	6÷8
KTPBY515	5.200	55,8	12,4	6÷8
KTPBY520	6.400	68,7	15,2	6÷8
KTPBY525	9.750	104,7	23,3	6÷8
KTPBY1030	13.300	142,9	31,7	6÷8
KTPBY1050	15.500	166,6	37,0	6÷8
KTPBY1080	19.000	204,2	45,4	6÷8
KTPBY2000	22.000	236,4	52,3	8÷10
KTPBY2500	27.000	290,1	64,5	8÷10
KTPBY3000	39.000	419,1	93,1	8÷10
KTPBY93 …VS	3.023	32,4	7,2	6÷8
KTPBY515 …VS	4.900	52,6	11,7	6÷8
KTPBY525 …VS	7.600	81,6	18,1	6÷8
KTPBY1030 …VS	12.100	130,0	28,9	6÷8
KTPBY1080 …VS	19.000	204,2	45,4	6÷8

Accessories for gas, light oil or heavy fuel oil can be ordered together with the burners (see from pag. 236 to 244).
These accessories include:
- Modulation probe
- Spacer parts for fitring head
- Counter-flanges
- Leakage control
- Max. gas pressure switches
- Gas pressure regulators
- Regulators with filter for burner pilot
- Manual gas ball valve (screwed or flanged)
- Anti-vibration joint (screwed or flanged)
- Gas filters (up to 2 or 6 bar pressure)
- Gas pressure gauges
- Manual light oil ball valve for heating oil (screwed or flanged)
- Reinforced hoses for light oil, fuel oil
- Filters for light oil, fuel oil (screwed or flanged)
- Manometers for light oil, fuel oil
- Manometer holders for gauges
- Manometers-pressure gauges
- Heating cables (self-regulating) for fuel oil piping

To order accessories use the price list.



COUNTERFLANGE SELECTION

The length of burner firing head is selected according to the rules laid down by the boiler manufacturers. For each boiler model, the designer recommends the precise firing head length (or min/max range) to adapt it to the thickness of the front wall or geometric shape of the combustion space.
In the absence of such indications, recommendations for good technique can be followed based on experience.
- Boilers with reverse combustion chamber (2 pass boilers): it is recommended to use a head of sufficient length to fit inside the combustion chamber by 50÷100 mm from the flue gas reversing chamber (class 3 low NO_x burners: 150÷200 mm).
- 3-pass boilers: it is recommended to use a head of sufficient length to fit 50÷100 mm inside the combustion chamber (class 3 low NO_x burners: 150÷200 mm).
- ovens and especially short combustion chambers with refractory lining: it is advisable to use a head that fits inside the combustion chamber with a blast tube entering the combustion chamber by no more than 20÷100 mm.

For non-standard heat generators or combustion chambers, CIB UNIGAS is always ready to examine equipment specifications in order to find a solution to satisfy any Customer's request.

Note: in rare cases where the available firing head length do not meet the required dimensions, it is possible to manufacture mid-length firing head to customer's specifications, or to fit a spacer between the burner flange and the boiler/furnace front.
Details about spacers can be found in the price list and catalogue for burners and accessories.

Regarding the execution of the hole on the front wall of the boiler, the catalogue tables indicate the diameters of the holes (H) and the position of the stud holes for fixing the burners.
In some cases, the diameter of the head (G) is wider than the diameter of the recommended hole (H). In these cases the following steps can be taken:
- Boilers or heat generators with a front door that opens: it is possible to make an opening hole with a reduced diameter, and then fit the head from the inside. Or, alternatively, drill a larger diameter hole, but then insert a counter flange.
- For boilers and heat generators that do not have an opening front door, the use of counter flange is mandatory.

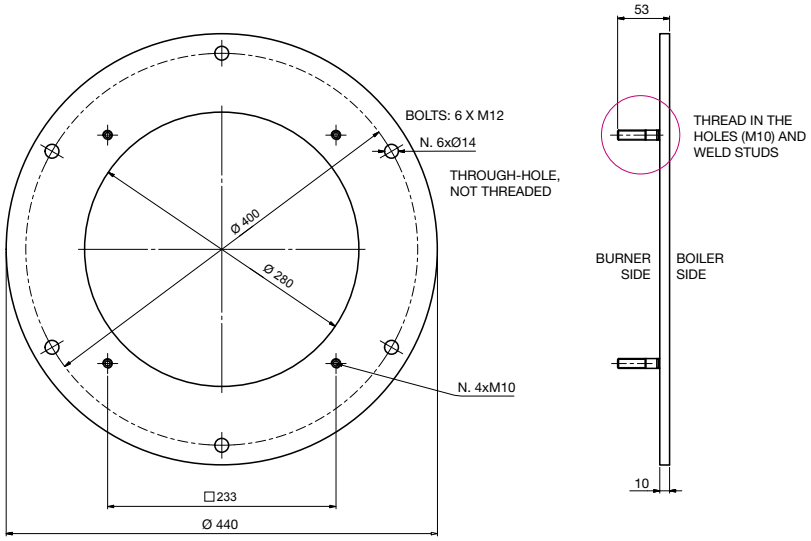
The firing head for which the specified procedure is required are annotated in the dimension tables. If a counter flange is needed, the customer can have one taylor made, or use one of the drawings provided on the following pages. Upon request the counter flange can be included in the scope of supply.
Attention: the real length of the firing head should be reduced by approx. 25 mm to reckon for the thickness of the counter-flange and gasket.

* Ask our technical department for more information.

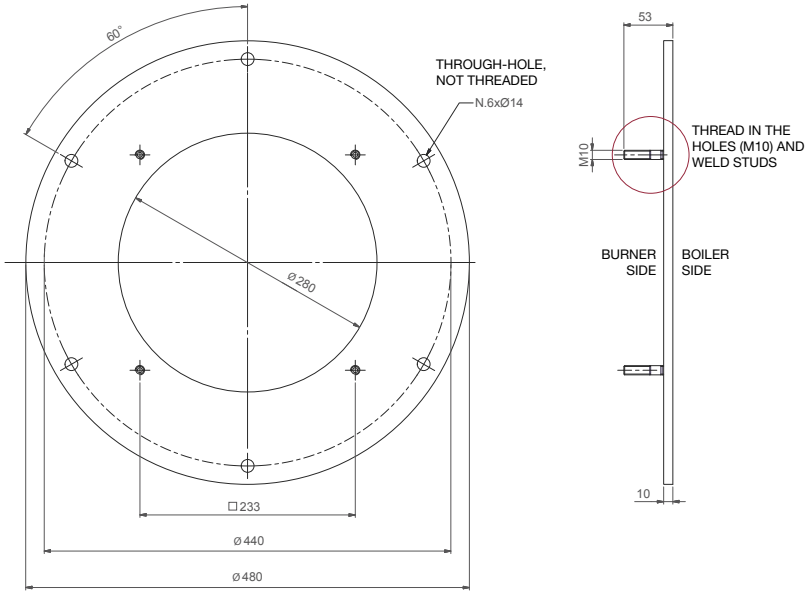
Series	Item number
HTP120A	24300BL
TECNOPRESS (HTP165A - HTP205A)	24300DF
NOVANTA	24300V2
CINQUECENTO	24300Z6
MILLE	24300N7
DUEMILA	(*)

(*) Inquire at the technical department of the branch responsible for your distributor.

PART NUMBER 24300BL

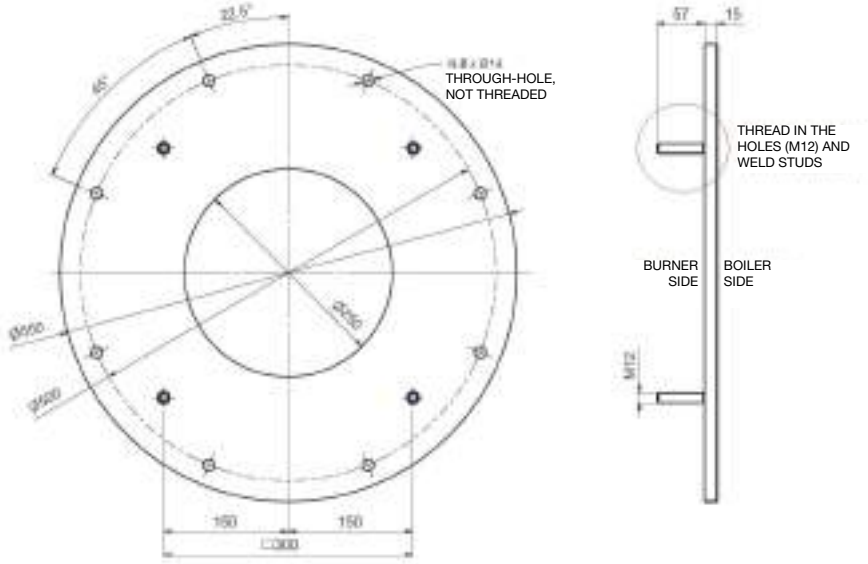


PART NUMBER 24300DF



COUNTERFLANGE SELECTION

PART NUMBER 24300V2



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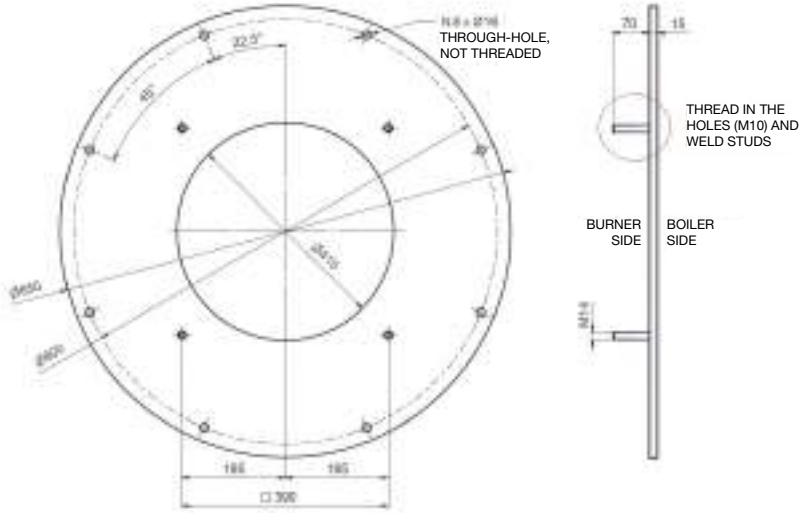
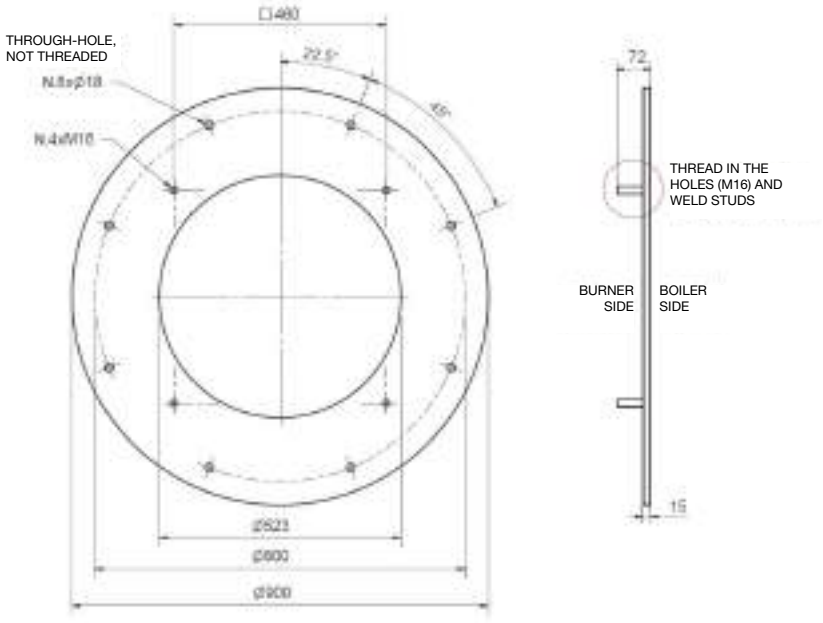


PART NUMBER 24300N7



FREQUENCY INVERTER FOR BURNERS ELECTRONICALLY CONTROLLED

Burners with electronic control and a separate fan can be supplied with a motor directly actuated or, as an alternative, indirectly actuated, i.e. via frequency inverter (Variable Speed Drive, VSD).
In order to choose a burner equipped with a frequency inverter with electronic control: EI or EK; then choose the frequency inverter, based on capacity of the fan motor (see tables on this page).
For example: VSD for a 55 kW motor.

Terms of delivery (2 options)
The frequency inverter is supplied separately, it is not factory installed in the control cabinet.
- The frequency inverter is supplied separately from the burner, with IP55 protection, equipped with a metal plate for fastening to the wall of the boiler room.
- Braking resistors are delivered separately (IP65)
- Electromagnetic filter (EMC) class A1/B, suitable for shielded cable lengths up to 20 m.

Frequency inverter already built into the inside of the electrical cabinet
- IP20 frequency inverter built into the burner control cabinet (protection class IP55) protection class IP55)
- Braking resistors (degree of protection IP65)
- EMC filter, class A1/B, suitable for shielded cables up to 20 m long
- In this configuration the cost of the frequency inverter also includes the difference cost of a larger panel enclosure; refer to page 230 for data sheet electrical panels.

FREQUENCY INVERTERS SUPPLIED SEPARATELY FROM THE BURNER	Motor power, kW
VSD	3,0
VSD	4,0
VSD	5,5
VSD	7,5
VSD	9,2 / 11,0
VSD	15,0
VSD	18,5
VSD	22,0
VSD	30,0
VSD	37,0
VSD	45,0
VSD	55,0
VSD	75,0
VSD	90,0
VSD	110,0
VSD	132,0
VSD	160,0

Note: Packaging is included in the delivery (the packages are blank wooden crates, suitable for truck transport).
Power supply to frequency converters: 400 V AC 3N 50 Hz.
Shielded cable is not included in the delivery. If the cable that connects the frequency Inverter to the fan motor must be longer than 20 m, please advise when ordering and require a higher EMC filter class.

Warning: Burners in EB, ED, EI, EK, EG, EP ER, LG, LR configuration can only be operated via a frequency inverter otherwise they will not work.
However, it is possible to purchase a burner that is set to work with the frequency inverter, but configured at the same time to work without it by means of delta/star start-up.
In this case the customer can decide whether or not to use a frequency inverter at a later stage, on the basis of the system requirements.