INTERNATIONAL CAPACITORS

POLIMET POWER FACTOR CORRECTION CAPACITORS

Capacitor Selection

When applying static correction to induction motors, it is important not to over correct the motor. The best method of static correction is to select the correction based on the magnetizing current of the motor. The capacitive current should be no more than 80% of the magnetizing current. If you do not know the magnetizing current, you can measure the open shaft current of the motor which is essentially equal to the magnetizing current.

Use the magnetizing (open shaft) current to select the correction from table 1.

example. Motor KW = 18KW. Magnetizing current = 13 Amps
From table, power factor correction = 7.2 KVAR.

With static correction, it is best to undersize rather than oversize.

If the magnetizing current is not known, and the open shaft current can not be measured, use table 2. This should be the last resort and can be much too low, especially with submersible pumps.

Table 3 give the KW multiplier to calculate the amount of correction required to go from the existing power factor $\text{Cos}(\phi)_1$ to the required power factor $\text{Cos}(\phi)_2$.

Table 1

Capacitor (KVAR) Selection by Magnetizing Current I_m (open shaft current)

I_m	0	1	2	3	4	5	6	7	8	9
0	0.0	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0
10	5.5	6.1	6.7	7.2	7.8	8.3	8.9	9.4	10.0	10.5
20	11.1	11.6	12.2	12.7	13.3	13.9	14.4	15.0	15.5	16.1
30	16.6	17.2	17.7	18.3	18.8	19.4	20.0	20.5	21.1	21.6
40	22.2	22.7	23.3	23.8	24.4	24.9	25.5	26.1	26.6	27.2
50	27.7	28.3	28.8	29.4	29.9	30.5	31.0	31.6	32.1	32.7
60	33.3	33.8	34.4	34.9	35.5	36.0	36.6	37.1	37.7	38.2
70	38.8	39.4	39.9	40.5	41.0	41.6	42.1	42.7	43.2	43.8
80	44.3	44.9	45.4	46.0	46.6	47.1	47.7	48.2	48.8	49.3
90	49.9	50.4	51.0	51.5	52.1	52.7	53.2	53.8	54.3	54.9
100	55.4	56.0	56.5	57.1	57.6	58.2	58.8	59.3	59.9	60.4
110	61.0	61.5	62.1	62.6	63.2	63.7	64.3	64.8	65.4	66.0
120	66.5	67.1	67.6	68.2	68.7	69.3	69.8	70.4	70.9	71.5
130	72.1	72.6	73.2	73.7	74.3	74.8	75.4	75.9	76.5	77.0
140	77.6	78.2	78.7	79.3	79.8	80.4	80.9	81.5	82.0	82.6
150	83.1	83.7	84.2	84.8	85.4	85.9	86.5	87.0	87.6	88.1
160	88.7	89.2	89.8	90.3	90.9	91.5	92.0	92.6	93.1	93.7
170	94.2	94.8	95.3	95.9	96.4	97.0	97.5	98.1	98.7	99.2
180	99.8	100.3	100.9	101.4	102.0	102.5	103.1	103.6	104.2	104.8
190	105.3	105.9	106.4	107.0	107.5	108.1	108.6	109.2	109.7	110.3
200	110.9	111.4	112.0	112.5	113.1	113.6	114.2	114.7	115.3	115.8
210	116.4	116.9	117.5	118.1	118.6	119.2	119.7	120.3	120.8	121.4
220	121.9	122.5	123.0	123.6	124.2	124.7	125.3	125.8	126.4	126.9
230	127.5	128.0	128.6	129.1	129.7	130.3	130.8	131.4	131.9	132.5
240	133.0	133.6	134.1	134.7	135.2	135.8	136.3	136.9	137.5	138.0
250	138.6	139.1	139.7	140.2	140.8	141.3	141.9	142.4	143.0	143.6

Table 2

Capacitors for Static Correction Selected by KW *(last resort).*

Motor (KW)	2 pole	4 pole	6 pole	8 pole
5.5	2.2 KVAR	2.2 KVAR	3 KVAR	4 KVAR
7.5	3 KVAR	3 KVAR	3 KVAR	5 KVAR
11	4 KVAR	4 KVAR	5KVAR	6 KVAR
15	5 KVAR	5 KVAR	6 KVAR	7.5 KVAR
22	7 KVAR	7 KVAR	9 KVAR	10 KVAR
30	9 KVAR	9 KVAR	10 KVAR	12.5 KVAR
37	12.5 KVAR	12.5 KVAR	12.5 KVAR	15 KVAR
45	15 KVAR	15 KVAR	15 KVAR	17.5 KVAR
55	17.5 KVAR	17.5 KVAR	17.5 KVAR	20 KVAR
75	20 KVAR	20 KVAR	25 KVAR	27.5 KVAR
90	25 KVAR	25 KVAR	30 KVAR	30 KVAR
110	30 KVAR	30 KVAR	35 KVAR	37.5 KVAR
132	33 KVAR	33 KVAR	35 KVAR	42 KVAR
160	40 KVAR	40 KVAR	40 KVAR	50 KVAR

Table 3

Capacitor Power in KVAR per KW of load to correct from $Cos(\phi)_1$ to $Cos(\phi)_2$

	$Cos(\phi)_2$												
$Cos(\phi)_1$	**0.80**	**0.86**	**0.90**	**0.91**	**0.92**	**0.93**	**0.94**	**0.95**	**0.96**	**0.97**	**0.98**	**0.99**	**1.00**
0.45	1.230	1.384	1.501	1.532	1.561	1.592	1.626	1.659	1.695	1.737	1.784	1.846	1.988
0.46	1.179	1.330	1.446	1.473	1.502	1.533	1.557	1.600	1.636	1.677	1.725	1.786	1.929
0.47	1.130	1.278	1.397	1.425	1.454	1.485	1.519	1.532	1.588	1.629	1.677	1.758	1.881
0.48	1.076	1.228	1.343	1.370	1.400	1.430	1.464	1.497	1.534	1.575	1.623	1.684	1.826
0.49	1.030	1.179	1.297	1.326	1.355	1.386	1.420	1.453	1.489	1.530	1.578	1.639	1.782
0.50	0.982	1.132	1.248	1.276	1.303	1.337	1.369	1.403	1.441	1.481	1.529	1.590	1.732
0.51	0.936	1.087	1.202	1.230	1.257	1.291	1.323	1.357	1.395	1.435	1.483	1.544	1.686
0.52	0.894	1.043	1.160	1.188	1.215	1.249	1.281	1.315	1.353	1.393	1.441	1.502	1.644
0.53	0.850	1.000	1.116	1.144	1.171	1.205	1.237	1.271	1.309	1.349	1.397	1458	1.600
0.54	0.809	0.959	1.075	1.103	1.130	1.164	1.196	1.230	1.268	1.308	1.356	1.417	1.559
0.55	0.769	0.918	1.035	1.063	1.090	1.124	1.156	1.190	1.228	1.268	1.316	1.377	1.519
0.56	0.730	0.879	0.996	1.024	1.051	1.085	1.117	1.151	1.189	1.229	1.277	1.338	1.480
0.57	0.692	0.841	0.958	0.986	1.013	1.047	1.079	1.113	1.151	1.191	1.239	1.300	1.442
0.58	0.665	0.805	0.921	0.949	0.976	1.010	1.042	1.076	1.114	1.154	1.202	1.263	1.405
0.59	0.618	0.768	0.884	0.912	0.939	0.973	1.005	1.039	1.077	1.117	1.165	1.226	1.368
0.60	0.584	0.733	0.849	0.878	0.905	0.939	0.971	1.005	1.043	1.083	1.131	1.192	1.334
0.61	0.549	0.699	0.815	0.843	0.870	0.904	0.936	0.970	1.008	1.048	1.096	1.157	1.299
0.62	0.515	0.665	0.781	0.809	0.836	0.870	0.902	0.936	0.974	1.014	1.062	1.123	1.265
0.63	0.483	0.633	0.749	0.777	0.804	0.838	0.870	0.904	0.942	0.982	1.030	1.091	1.233
0.64	0.450	0.601	0.716	0.744	0.771	0.805	0.837	0.871	0.909	0.949	0.997	1.058	1.200
0.65	0.419	0.569	0.685	0.713	0.740	0.774	0.806	0.840	0.878	0.918	0.966	1.007	1.169
0.66	0.388	0.538	0.654	0.682	0.709	0.743	0.775	0.809	0.847	0.887	0.935	0.996	1.138
0.67	0.358	0.508	0.624	0.652	0.679	0.713	0.745	0.779	0.817	0.857	0.905	0.966	1.108
0.68	0.329	0.478	0.595	0.623	0.650	0.684	0.716	0.750	0.788	0.828	0.876	0.937	1.079
0.69	0.299	0.449	0.565	0.593	0.620	0.654	0.686	0.720	0.758	0.798	0.840	0.907	1.049
0.70	0.270	0.420	0.536	0.564	0.591	0.625	0.657	0.691	0.729	0.0769	0.811	0.878	1.020
0.71	0.242	0.392	0.508	0.536	0.563	0.597	0.629	0.663	0.701	0.741	0.783	0.850	0.992
0.72	0.213	0.364	0.479	0.507	0.534	0.568	0.600	0.634	0.672	0.712	0.754	0.821	0.963
0.73	0.186	0.336	0.452	0.480	0.507	0.541	0.573	0.607	0.645	0.685	0.727	0.794	0.936
0.74	0.159	0.309	0.425	0.453	0.480	0.514	0.546	0.580	0.618	0.658	0.700	0.767	0.909
0.75	0.132	0.282	0.398	0.426	0.453	0.487	0.519	0.553	0.591	0.631	0.673	0.740	0.882
0.76	0.105	0.255	0.371	0.399	0.426	0.460	0.492	0.526	0.564	0.604	0.652	0.713	0.855
0.77	0.079	0.229	0.345	0.373	0.400	0.434	0.466	0.500	0.538	0.578	0.620	0.687	0.829
0.78	0.053	0.202	0.319	0.347	0.374	0.408	0.440	0.474	0.512	0.552	0.594	0.661	0.803
0.79	0.026	0.176	0.292	0.320	0.347	0.381	0.413	0.447	0.485	0.525	0.567	0.634	0.776
0.80	—	0.150	0.266	0.294	0.321	0.355	0.387	0.421	0.459	0.499	0.541	0.608	0.750
0.81	—	0.124	0.240	0.268	0.295	0.329	0.361	0.395	0.433	0.473	0.515	0.582	0.724
0.82	—	0.098	0.214	0.242	0.269	0.303	0.335	0.369	0.407	0.447	0.489	0.556	0.698
0.83	—	0.072	0.188	0.216	0.243	0.277	0.309	0.343	0.381	0.421	0.463	0.530	0.672
0.84	—	0.046	0.162	0.190	0.217	0.251	0.283	0.317	0.355	0.395	0.437	0.504	0.645
0.85	—	0.020	0.136	0.164	0.191	0.225	0.257	0.291	0.329	0.369	0.417	0.478	0.620
0.86	—	—	0.109	0.140	0.167	0.198	0.230	0.264	0.301	0.343	0.390	0.450	0.593
0.87	—	—	0.083	0.114	0.141	0.172	0.204	0.238	0.275	0.317	0.364	0.424	0.567
0.88	—	—	0.054	0.085	0.112	0.143	0.175	0.209	0.246	0.288	0.335	0.395	0.538
0.89	—	—	0.028	0.059	0.086	0.117	0.149	0.183	0.230	0.262	0.309	0.369	0.512
0.90	—	—	—	0.030	0.058	0.089	0.121	0.155	0.192	0.234	0.281	0.341	0.484
0.91	—	—	—	—	0.030	0.060	0.093	0.127	0.164	0.205	0.253	0.313	0.456
0.92	—	—	—	—	—	0.031	0.063	0.097	0.134	0.175	0.223	0.284	0.425
0.93	—	—	—	—	—	—	0.032	0.067	0.104	0.145	0.192	0.253	0.395
0.94	—	—	—	—	—	—	—	0.034	0.071	0.112	0.160	0.220	0.363
0.95	—	—	—	—	—	—	—	—	0.037	0.078	0.126	0.186	0.329
0.96	—	—	—	—	—	—	—	—	—	0.041	0.089	0.149	0.292
0.97	—	—	—	—	—	—	—	—	—	—	0.048	0.108	0.251
0.98	—	—	—	—	—	—	—	—	—	—	—	0.061	0.203
0.99	—	—	—	—	—	—	—	—	—	—	—	—	0.142

Examples:

Power of the load	200KW	210KW
Initial Power Factor [$Cos(\phi)_1$]	0.60	0.59
Desired Power Factor [$Cos(\phi)_2$]	0.90	0.90
Required Power Factor Correction	200 x 0.849 = 170KVAR	210 x 0.884 = 185 KVAR

Technical Description

Self-healing capacitors with low loss metallized polypropylene dielectric. Capacitors mounted in cylindrical aluminium cans with M12 stud for fixing and earthing and fitted internally with discharge resistors. Connection is made through Faston terminals (POLT version) or by terminal block (POLB version). These capacitors are specially suitable for the individual compensation of small inductive loads such as induction motors. These capacitors should not be used for compensation of electronic loads such as VSDs.
The use of detuning reactors should restricted to capacitors specifically designed for this purpose.

Technical Characteristics

Frequency	50 Hz
Dielectric	Polypropylene
Discharge Resistors	Fitted
Dielectric Losses	< 0.2 W/KVAR
Total Losses	< 0.4 W/KVAR
Max overvoltage	1.1 Un
Max overcurrent	1.3 In
Power tolerance	-5/=10%
Temperature Range	-40 / +50 ^{o}C
Insulation level	3 KV
Connection Terminal	Terminal Block (POLB version) Double Faston (POLT version)
Maximum torque for stud	12 Nm
Standards	IEC 831-1, IEC 70/70A, BS 1650, VDE 560, EN 60831

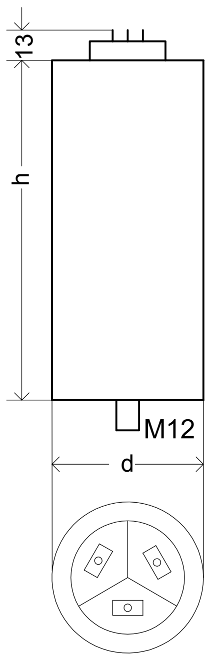
POLT Version

Code	KVAR	Un	In	Dimensions d x h (mm)	Weight (kg)
POLT40010	1.0	400	1.4	50 x 158	0.4
POLT40015	1.5	400	2.2	50 x 158	0.4
POLT40020	2.0	400	2.9	50 x 158	0.4
POLT40025	2.5	400	3.6	50 x 195	0.5

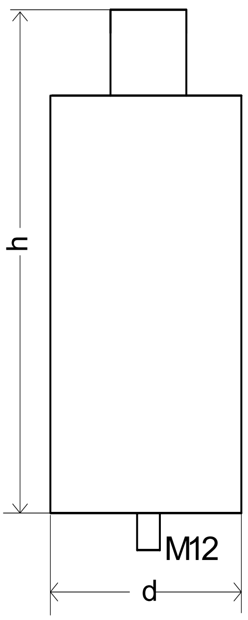
POLB Version

Code	KVAR	Un	In	Dimensions d x h (mm)	Weight (kg)
POLB40030	3.0	400	4.3	85 x 210	0.9
POLB40040	4.0	400	5.8	85 x 210	1.0
POLB40050	5.0	400	7.2	85 x 210	1.0
POLB40075	7.5	400	10.9	85 x 280	1.8
POLB40100	10.0	400	14.5	85 x 280	1.8
POLB40125	12.5	400	18.0	85 x 280	1.8
POLB40150	15.0	400	21.7	85 x 280	1.8
POLB40200	20.0	400	18.9	110 x 280	2.2
POLB40250	25.0	400	36.1	110 x 280	2.2
POLB40300	30.0	400	43.4	150 x 260	4.5

POLT Type



POLB Type



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