

Index

- active filter 156–9, 160–61
- AHU-air handling unit 95–101, 103–106, 342–3
- amorphous 24, 28, 34, 39, 47–8, 50–52, 60, 212, 214, 227
- ampacity 9, 19
- ancillary services 170, 179–81, 184–5
- applicators 320–21
- auxiliary losses 23–4, 43

- backup storage energy supply 170
- balancing 131, 143–4, 157, 172, 178, 181, 247, 252, 290, 398
- ballasts 232–5, 237–9, 240–42, 245–7, 250, 252, 255, 257, 261, 365
- batteries 6, 99, 105, 171–2, 175, 263, 266, 277–8, 363–4
- blade server 360–61
- building automation 71, 81, 111, 113–14, 124
- buildings 2–4, 6, 46, 71, 77, 82, 113–16, 119, 121–2, 124, 184, 186–7, 189, 230, 232, 234, 244, 248, 251, 261–2, 335, 338–44, 348–9, 353–5, 367

- capacitive heating 320–22, 324
- capacitor 12, 125, 131–2, 134, 138, 150, 152–6, 171–2, 187–8, 240, 256, 266, 277–9, 285, 290–91, 293, 307, 316, 320, 331, 373–81, 387–96, 398
- CHP 7, 163–4, 168–70, 178, 180, 368–9

- classification standards 199, 201
- CO₂ emissions 1, 229–31, 233, 265, 299–300, 302, 329
- cogeneration 2, 168–73, 186–7
- cold-rolled 47–8, 51
- compact fluorescent lamps 25, 233, 237–8, 243, 250, 261
- compensation 88, 101, 103, 117, 132, 143–4, 160–61, 170, 181, 185, 187, 251, 267, 333, 373–6, 378–86, 389, 391–3, 396, 398
- compressed air 171
- conduction 10, 221, 266, 275–6, 280, 295, 302–3, 306, 309, 318, 328, 383, 393
- conductor resistance 12, 18, 215
- control and management systems 71
- consolidation 362
- convection 10–11, 221, 295, 302–3, 308–9, 312, 327, 332, 344
- COP-coefficient of performance 336–7
- copper rotor 193, 215–16, 228
- core material 28, 39, 42, 46–7, 50–52, 64, 210, 211–12, 214, 217–18
- cross-sectional area 15–16, 18–19, 24, 49, 226
- current rating 12, 16, 19

- data center 360, 370
- daylighting 251–2, 260, 262, 349
- DCIE 360
- DCS 76–7, 85

- dielectric heating 297–8, 300, 302, 318–19, 321, 328–9, 332–4
- direct heating methods 295, 302
- direct resistance heating 298, 300, 302–8, 317, 327, 330, 333
- discount rate 17, 42, 378
- distributed energy resources 166, 186–7, 292
- distributed generation 165, 168, 184, 186–7
- distribution transformers 21–3, 32–5, 37, 41–5, 50–51, 53–5, 60–62
- DSTATCOM 184, 396, 398
- economic current range 18
- economic sizing 16
- eddy current losses 12, 24, 26, 28, 49, 53, 195, 211, 213–14, 226
- efficiency maps 207
- efficiency measurement standards 200
- electric arc furnaces 129, 149, 154, 325–6
- electrical drives 263, 266
- electroheating technologies 295, 297–9, 302
- electromagnetic disturbances 125, 165, 184, 255, 330
- EMCS-energy management control system 352
- EN 15232 113–16, 121–2, 124
- energy consumption in lighting systems 230
- energy efficiency 1–9, 21, 32–3, 35, 37, 61, 69, 71, 112, 114–15, 125, 128–9, 149, 162, 165–6, 168, 184, 189–91, 194, 226–7, 229–32, 234, 237, 240–46, 251–2, 254, 258, 260–63, 265, 276, 280, 283, 292, 295, 297, 308, 312, 315–18, 326–8, 330, 332–6, 338, 347–8, 352, 355, 357–8, 360, 362–4, 366, 369, 371
- energy efficiency in lighting systems 231
- energy efficiency policies 2–3, 8
- energy management 2, 4, 7–8, 111, 113, 119, 170–71, 180–81, 183–4, 186, 240, 261–2, 333, 348, 352, 355, 361
- energy management systems 7, 240
- energy optimal control 274, 276, 291
- energy performance of building 113–14, 124, 234, 354
- energy related products directive 23, 37
- energy storage 166, 170–73, 180–83, 186–8, 263, 279, 293
- energy use indicator 7
- epact 200
- extra losses 23, 25, 29, 46, 198
- facility infrastructure 363
- fixed capacitors (FC) 393
- flicker 133–5, 137, 144, 157, 162–3, 181, 237–8, 240, 244, 251, 326, 333, 398
- flywheel 171, 263, 364
- free cooling 101–3, 117, 339, 348, 366–8
- fuel cell 166–8, 171, 173, 180, 228, 263, 369
- grain oriented 47–8, 51, 212
- grid coupling transformers 21
- heat transfer 9–11, 47, 87–9, 90–91, 95, 298, 303, 305, 322, 327, 330, 332–3, 335–6, 338, 345–6
- heat losses 330–31, 333, 349–50
- heating systems 295–9, 302–4, 310, 320, 325, 328–32, 344
- high intensity discharge lamps 238, 253, 255–6
- high pressure sodium lamps 239, 256–7
- high-efficiency motors 212, 222
- high-pressure mercury gas discharge lamps 238
- HVAC 82–3, 90, 109–10, 115, 117–18, 263, 266, 269, 308, 335–6, 342–8, 351–4, 357, 360, 364–8
- hybrid filter 156, 159–60
- hybrid systems 295
- hydrogen storage 171
- hysteresis losses 23–5, 211–13, 225
- IAQ-indoor air quality 73, 339
- IEC 60034-2 197, 204–7
- IEC 60034-30 199–200
- IEC 60076 power transformers 27, 32–3
- IED-integrated energy design 353
- IEEE 112, 204–7
- IEQ-indoor environmental quality 338, 348
- incandescent lamps 128, 137, 162, 229, 234–5, 237, 242–4, 246, 248, 253, 262

- indices of the distortion state 147
- indirect heating methods 295
- indirect resistance heating 300, 303–5, 327
- indoor lighting systems 242
- induction heating 300, 314–18, 331, 333
- induction lamps 239
- induction motor 125, 137, 189–90, 192–4, 197–9, 201, 203–5, 207–11, 214–24, 227–8, 265–8, 272, 276, 283, 285–6, 291, 293, 380
- infrared heating 310, 313, 327–8, 330, 333
- iron loss 23, 27, 46, 52, 191–2, 194–6, 201, 211, 213–14, 220, 223, 225, 227–8, 274, 276
- IT infrastructure 360
- joule loss 9–10, 16–17, 47, 149, 191–2, 195, 201, 203, 209, 214–15, 221
- life cycle costing 23, 34, 40, 44, 46
- lighting controls 231, 233, 247–8, 255–6
- lighting guidelines 233
- linear fluorescent lamps 233, 235, 250
- load factor 19, 30, 46, 67–8
- load leveling 170–71, 180–81
- load losses 24–5, 28, 30, 33, 35, 41, 43–8, 53–4, 56, 63, 101, 192–5, 201–7, 216–17
- long-term flicker severity index 134
- loss reduction 35–6, 47–8, 53, 166, 220, 223, 374, 377, 379, 385
- losses 9–10, 12, 15–17, 19, 22–9, 30–31, 33–7, 39–49, 50–57, 63–4, 67–9, 73, 75–6, 123, 125, 128, 131, 140–42, 149, 150–53, 165–6, 172–8, 180, 186, 190–98, 201–17, 220–28, 240–41, 245–6, 254–5, 260, 264–6, 274–6, 278–9, 280, 283, 286, 290, 300, 302, 303, 306, 308, 309, 317, 327, 330–33, 346–9, 350, 352, 364, 371–9, 381–6, 392–3, 396–8
- luminaries 230, 233–4, 241, 246, 250, 254
- MEPS (Minimum Energy Performance Standards) 22, 32–5, 37–9, 60–62, 64, 66, 200, 215, 224
- metal halide lamps 238, 253, 255–6
- microgrids 165
- micro-turbines 166, 168
- microwave heating 300, 318, 322–4, 329, 332
- mitigation methods 130, 138, 143, 153
- motor control 195, 274, 285
- motor efficiency 189, 190–92, 195–9, 201, 207–9, 215, 218–20, 224, 227–8
- motor losses and efficiency 197
- multilevel converters 265, 288, 290–92
- nema premium 200, 292
- neodymium iron boron (NdFeB) 217–19, 223
- net present value ratio 378–9
- no-load losses 23–5, 29–30, 33–5, 41–4, 46, 48, 50–51, 53, 56, 63–4, 203
- ohmic losses 221, 225, 193
- outdoor lighting systems 252, 254–5
- parallel resonance 153, 387–8, 390
- passive filter 155–7, 160–61, 381
- passive methods 335, 348
- peak shaving 166, 171, 180, 182
- permanent magnet synchronous motor 190, 207, 217, 223–4, 227–8, 265, 292
- PMV-predicted mean vote 340–41
- pollution source 148
- power electronic interface 184
- power electronics 125, 168, 172, 199, 227, 258, 263–5, 279, 280, 285, 292–3, 296, 329, 333, 335, 352
- power factor 25, 55, 67, 125, 137, 153–5, 185, 198, 209, 238, 240, 257, 275–6, 278, 307–309, 315, 317–18, 331, 333, 371–3, 376, 380–82, 384–6, 391
- power losses 25, 46, 128, 131, 140–42, 149, 151, 165, 172, 175–8, 240, 255, 260, 346, 371–2, 374, 376–7, 382–4, 393, 396
- power quality 125, 127, 129, 156, 162–3, 165–6, 171, 180–81, 183–4, 186–7, 193, 196, 198, 201, 250, 255, 260, 262, 291–2, 326, 333, 352, 354, 369, 373, 396, 398

- power transformers 21–3, 27, 32, 33, 37, 39, 43, 47–9, 51–2, 54, 59–60, 66, 125, 332, 380
- PPD-percentage of people dissatisfied 340–41
- PUE 360
- pulse width modulation 257, 285, 292
- pumped hydro 171
- PV system 171

- radiation 9–11, 13–14, 19, 101, 221, 234, 295, 297, 302–3, 305, 308–10, 312–14, 322, 325, 332, 349–51
- radio-frequency heating 319–21, 324, 332
- reactive power 25, 46, 126–7, 131, 138, 144, 155, 157, 160, 175–7, 184–5, 371–87, 389–98
- redesign 182, 217, 232, 245
- renewable energy systems 353–4
- renewable sources 72, 183–4, 338, 348
- retrofit 3–4, 232, 237, 244–8, 255–6, 258, 367

- scada 76–7, 82–6, 124, 352
- semiconductor material 280
- short-term flicker severity index 134
- SMES 2–3, 171–2, 263
- solid state lighting 239
- standardisation 8
- STATCOM 144, 184, 263, 380, 391, 393, 396–8
- stray load loss 191–5, 201–7, 216–17, 227
- stray magnetic flux 47
- supercapacitor 171–2, 266, 277–9, 293
- switched reluctance motor 207, 222–3

- symmetrical components 139, 141
- synchronous condenser 391

- THD computation 27–8, 147, 150, 238, 250, 255, 283, 290, 387, 389–90
- thermal comfort 336, 338–42, 350–51, 354–5
- thyristor controlled reactor (TCR) 144, 380, 391, 393–7
- thyristor controlled transformer (TCT) 396
- thyristor switched capacitor (TSC) 380, 391, 393–4, 396–7
- transmission and distribution (T&D) losses 22

- unbalance 25, 28–9, 46, 126, 138–44, 151, 162–3, 181, 184, 197–8, 201, 216, 227, 255, 330–31
- unbalance factor 139, 143, 198
- UPS 25, 28–9, 135–6, 172–5, 359, 363–4, 369

- var compensation 382, 384–5, 389, 391
- variable speed drives 25, 152, 190, 207, 227, 265–6, 333, 366
- ventilation 15, 77, 95, 98–9, 110, 116–17, 119, 121, 269, 310, 314, 320, 335, 337, 339–43, 345, 347–51, 353, 355
- VFC-variable frequency converters 352
- virtualization 362–3, 367
- voltage and current distortion 145
- voltage control 130, 181, 184, 250
- voltage deviation 127–9, 130, 278
- voltage fluctuations 132–5, 137–8, 144, 157, 162, 393