

Narada

stored energy solutions for a demanding world

Narada HELiON™ NPFC series 48V LiFePO₄ battery modules are ideally suited for telecom base station, OSP, and renewable energy applications.

NPFC series offer long cycle life, small size, reduced weight, and simplified installation as 19"/23" rack mountable modules.

NPFC chemistry makes it one of the safest technologies, suitable for high and low temperature operation and capable of 1C and higher discharge rates.

HELiON
LI-ION ENERGY



Technical Features:

- Simple installation and load/charge system integration (Pos/Neg termination)
- Advanced intelligent lithium battery management technology
- Energy transfer patented technology provides high cell utilization efficiency for prolong system operational life.
- Configuration flexibility, support parallel connection expansion up to 16 modules

BMS - Alarming

- System monitoring of voltage, current, temperature of cells and module. Built in protection against; over-current on discharge and recharge, over-temperature, low temperature, low and high voltage, and short circuit.
- BMS maintenance and service communication via RS232 or RS485
- 2 levels of remote alarming through dry contacts

Compliance

UL1642, Standard for Lithium Batteries

UL2054, Standard for Household and Commercial Batteries

EN 61000-6-1:2007, Electromagnetic compatibility (EMC)

EN 61000-6-3:2007+A1:2011, Electromagnetic compatibility (EMC)

IEC 62133:2012, Battery Safety Testing

UL1973, Standard for -cells

NEBS Level 1 Certified GR-1089 / GR-63

UN3800

NPFC-Series Li-Ion LiFePO₄

Chemistry Comparison

| Feature | Narada NPFC LiFePO ₄ | LiCoO ₂ | Li(NiCoMn) ₁ O ₂ | LiMn ₂ O ₄ |
|---|------------------------------------|--------------------|--|----------------------------------|
| Crystal structure | Olivine | layer | layer | spinel |
| Theoretical Specific Capacity/mAh·g ⁻¹ | 170 | 274 | 278 | 148 |
| Practical Specific Capacity/mAh·g ⁻¹ | 130~150 | 140~155 | 130~220 | 90~120 |
| Working voltage range/V | 2.5~3.8 | 3.0~4.3 | 3.0~4.35 | 3.5~4.3 |
| Platform voltage/V | 3.2~3.3 | 3.6~3.7 | 3.6~3.7 | 3.7~3.8 |
| Cycle life/times | >1000 | >1000 | >500 | >300 |
| Safety performance | best | poor | better | good |
| Price | average | high | higher | low |
| High temperature performance | good | average | average | bad |
| Toxicity/Environmentally friendly | nontoxic | Poisonous Co | Poisonous Co | nontoxic |

Dimensions and Specifications

| Model No. | V | Ah 8hr to 42V 25C | Ah 1hr to 42V 25C | Max Discharge Current (A) | Width | | Depth | | Height | | Rack Units | Weight | | Terminal |
|--------------|----|-------------------------|-------------------------|---------------------------------|-------|-------|-------|-------|--------|-------|---------------|--------|--------|----------|
| | | | | | (mm) | (in.) | (mm) | (in.) | (mm) | (in.) | | (kg) | (lbs.) | |
| 48NPFC10 | 48 | 9.95 | 9.5 | 10 | 442 | 17.41 | 245 | 9.65 | 44 | 1.74 | 1U | 7 | 15.4 | 10mm /M4 |
| 48NPFC10-2C | 48 | 9.95 | 9.5 | 20 | 442 | 17.41 | 245 | 9.65 | 44 | 1.74 | 1U | 7 | 15.4 | 10mm /M4 |
| 48NPFC20 | 48 | 19.9 | 19.0 | 20 | 442 | 17.41 | 245 | 9.65 | 88 | 3.47 | 2U | 13 | 28.7 | 10mm /M4 |
| 48NPFC20-2C | 48 | 19.9 | 19.0 | 40 | 442 | 17.41 | 245 | 9.65 | 88 | 3.47 | 2U | 13 | 28.7 | 10mm /M4 |
| 48NPFC50 | 48 | 49.7 | 47.5 | 50 | 442 | 17.41 | 390 | 15.36 | 133 | 5.24 | 3U | 32 | 70.6 | 13mm/M6 |
| 48NPFC80 | 48 | 79.7 | 76.0 | 80 | 442 | 17.41 | 400 | 15.75 | 221 | 8.71 | 5U | 37 | 81.6 | 13mm/M6 |
| 48NPFC100-23 | 48 | 99.4 | 95.0 | 100 | 530 | 20.87 | 400 | 15.75 | 132.5 | 5.22 | 3U | 45 | 99.2 | M6 |
| 48NPFC100 | 48 | 99.4 | 95.0 | 100 | 442.5 | 17.42 | 400 | 15.75 | 225.0 | 8.86 | 5U | 45 | 99.2 | M6 |

BMS/Battery Operating Parameters

| Parameters | Units | Value |
|---|--------|-------------|
| Float charge voltage | V | 54 ±0.5 |
| Equalization charge voltage | V | NA |
| Nominal charge current | A | 0.2C |
| Charge current limitation | A | 0.5C ~ 1.0C |
| Equalization charge interval | day | NA |
| Equalization charge duration | H | NA |
| Equalization charge | A | NA |
| Condition to float charge | A | 0.05C |
| LVBD (Low voltage battery disconnect) | V | > 40.5 |
| Temperature compensation (float charge) | -mV/°C | NA |
| Temperature compensation (equalization charge) | -mV/°C | NA |

Operating Environment Limits

| | | |
|---|-----------|-----------|
| Maximum Recommended Temperature Range (°C) | Discharge | -20 ~ +60 |
| | Charge | 0 ~ +60 |
| | Storage | 0 ~ +40 |
| Recommended Temperature (°C) | Discharge | +15 ~ +35 |
| | Charge | +15 ~ +35 |
| | Storage | +15 ~ +30 |
| Humidity | 5% ~ 95% | |

| | | |
|-----------------------------------|---------------------------|---------|
| Over Temperature Protection | High temp. - charge | 70±3°C |
| | Recover temp. - charge | 60±3°C |
| | High temp. - discharge | 70±3°C |
| | Recover temp. - discharge | 60±3°C |
| | Low temp. - charge | 0±3°C |
| | Recover temp. - charge | 5±3°C |
| | Low temp. - discharge | -10±3°C |
| | Recover temp. - discharge | 0±3°C |



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Constant Current Discharge Rates @25C in Hours (Amps)

| 48NPFC10 | | | | | | | | | | | -2C |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------------|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | 0.5 | |
| 46.5V | 1.0 | 1.2 | 1.9 | 2.4 | 2.6 | 3.5 | 4.2 | 5.2 | 6.9 | 13.3 | |
| 45.0V | 1.0 | 1.2 | 2.0 | 2.4 | 2.7 | 3.8 | 4.7 | 6.6 | 8.8 | 16.9 | |
| 44.1V | 1.0 | 1.2 | 2.0 | 2.5 | 2.8 | 3.9 | 4.8 | 6.8 | 9.0 | 17.4 | |
| 43.5V | 1.0 | 1.2 | 2.0 | 2.5 | 2.8 | 3.9 | 4.9 | 7.0 | 9.3 | 17.9 | |
| 42.0V | 1.0 | 1.3 | 2.0 | 2.5 | 2.8 | 4.0 | 4.9 | 7.1 | 9.5 | 18.3 | |
| 40.5V | 1.0 | 1.4 | 2.0 | 2.5 | 2.8 | 4.0 | 5.0 | 7.2 | 9.7 | 18.6 | |

| 48NPFC20 | | | | | | | | | | | -2C |
|-----------------|-----|-----|-----|-----|-----|-----|------|------|------|------|------------|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | 0.5 | |
| 46.5V | 1.9 | 2.4 | 3.8 | 4.8 | 5.3 | 7.1 | 8.4 | 10.3 | 13.8 | 24.9 | |
| 45.0V | 2.0 | 2.4 | 3.9 | 4.9 | 5.5 | 7.7 | 9.4 | 13.2 | 17.6 | 33.2 | |
| 44.1V | 2.0 | 2.5 | 3.9 | 4.9 | 5.6 | 7.8 | 9.6 | 13.5 | 18.1 | 34.2 | |
| 43.5V | 2.0 | 2.5 | 4.0 | 5.0 | 5.6 | 7.8 | 9.7 | 13.9 | 18.6 | 35.1 | |
| 42.0V | 2.0 | 2.5 | 4.0 | 5.0 | 5.6 | 7.9 | 9.9 | 14.3 | 19.0 | 36.7 | |
| 40.5V | 2.0 | 2.5 | 4.0 | 5.0 | 5.7 | 8.0 | 10.0 | 14.5 | 19.3 | 37.2 | |

| 48NPFC50 | | | | | | | | | | |
|-----------------|-----|-----|------|------|------|------|------|------|------|--|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | |
| 46.5V | 4.8 | 6.0 | 9.5 | 11.1 | 11.9 | 17.8 | 21.0 | 27.7 | 34.4 | |
| 45.0V | 4.9 | 6.1 | 9.7 | 11.3 | 12.1 | 19.1 | 23.5 | 33.7 | 43.9 | |
| 44.1V | 4.9 | 6.1 | 9.8 | 11.5 | 12.3 | 19.4 | 23.9 | 34.6 | 45.2 | |
| 43.5V | 5.0 | 6.2 | 9.9 | 11.6 | 12.4 | 19.6 | 24.3 | 35.4 | 46.4 | |
| 42.0V | 5.0 | 6.2 | 9.9 | 11.6 | 12.4 | 19.8 | 24.6 | 36.1 | 47.5 | |
| 40.5V | 5.0 | 6.3 | 10.0 | 11.7 | 12.5 | 20.0 | 24.9 | 36.6 | 48.2 | |

| 48NPFC80 | | | | | | | | | | |
|-----------------|-----|------|------|------|------|------|------|------|------|--|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | |
| 46.5V | 7.6 | 9.5 | 15.2 | 17.7 | 19.0 | 28.2 | 33.5 | 44.3 | 55.1 | |
| 45.0V | 7.6 | 9.8 | 15.5 | 18.1 | 19.4 | 30.6 | 37.6 | 53.9 | 70.2 | |
| 44.1V | 7.7 | 9.8 | 15.7 | 18.3 | 19.7 | 31.0 | 38.3 | 55.3 | 72.2 | |
| 43.5V | 7.9 | 9.9 | 15.8 | 18.5 | 19.9 | 31.3 | 38.9 | 56.6 | 74.3 | |
| 42.0V | 7.9 | 10.0 | 15.9 | 18.6 | 19.9 | 31.7 | 39.4 | 57.7 | 76.0 | |
| 40.5V | 8.0 | 10.0 | 16.0 | 18.7 | 20.0 | 32.0 | 39.8 | 58.5 | 77.1 | |

| 48NPFC100 | | | | | | | | | | |
|------------------|------|------|------|------|------|------|------|------|------|--|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | |
| 46.5V | 9.6 | 12.0 | 19.0 | 22.2 | 23.8 | 35.6 | 42.0 | 55.4 | 68.8 | |
| 45.0V | 9.8 | 12.2 | 19.4 | 22.6 | 24.2 | 38.2 | 47.0 | 67.4 | 87.8 | |
| 44.1V | 9.8 | 12.2 | 19.6 | 23.0 | 24.6 | 38.8 | 47.8 | 69.2 | 90.4 | |
| 43.5V | 10.0 | 12.4 | 19.8 | 23.2 | 24.8 | 39.2 | 48.6 | 70.8 | 92.8 | |
| 42.0V | 10.0 | 12.4 | 19.8 | 23.2 | 24.8 | 39.6 | 49.2 | 72.2 | 95.0 | |
| 40.5V | 10.0 | 12.6 | 20.0 | 23.4 | 25.0 | 40.0 | 49.8 | 73.2 | 96.4 | |

Constant Power Discharge Rates @25C in Hours (Watts)

| 48NPFC10 | | | | | | | | | | | -2C |
|-----------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|------------|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | 0.5 | |
| 46.5V | 49.0 | 60.0 | 96 | 122 | 135 | 131 | 220 | 283 | 387 | 529 | |
| 45.0V | 49.9 | 61.4 | 98 | 125 | 138 | 136 | 233 | 307 | 445 | 647 | |
| 44.1V | 50.2 | 61.8 | 99 | 126 | 139 | 137 | 236 | 310 | 453 | 662 | |
| 43.5V | 50.5 | 62.1 | 99 | 127 | 140 | 138 | 238 | 312 | 459 | 675 | |
| 42.0V | 50.9 | 62.5 | 100 | 128 | 141 | 139 | 240 | 317 | 467 | 687 | |
| 40.5V | 51.1 | 62.9 | 101 | 128 | 142 | 140 | 242 | 320 | 470 | 689 | |

| 48NPFC20 | | | | | | | | | | | -2C |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------------|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | 0.5h | |
| 46.5V | 98 | 120 | 192 | 244 | 270 | 262 | 440 | 566 | 774 | 1058 | |
| 45.0V | 100 | 123 | 196 | 250 | 277 | 273 | 467 | 614 | 891 | 1294 | |
| 44.1V | 101 | 124 | 198 | 252 | 279 | 275 | 472 | 619 | 906 | 1324 | |
| 43.5V | 101 | 124 | 199 | 253 | 280 | 276 | 477 | 624 | 918 | 1349 | |
| 42.0V | 102 | 125 | 200 | 255 | 282 | 279 | 480 | 635 | 934 | 1373 | |
| 40.5V | 102 | 126 | 201 | 256 | 284 | 280 | 484 | 640 | 939 | 1377 | |

| 48NPFC50 | | | | | | | | | | |
|-----------------|-----|-----|-----|-----|-----|-----|------|------|------|--|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | |
| 46.5V | 245 | 300 | 480 | 610 | 675 | 655 | 1100 | 1414 | 1934 | |
| 45.0V | 250 | 307 | 491 | 625 | 692 | 682 | 1167 | 1534 | 2227 | |
| 44.1V | 251 | 309 | 494 | 629 | 696 | 686 | 1181 | 1549 | 2264 | |
| 43.5V | 252 | 311 | 497 | 633 | 700 | 690 | 1192 | 1561 | 2294 | |
| 42.0V | 254 | 313 | 500 | 637 | 706 | 697 | 1200 | 1587 | 2334 | |
| 40.5V | 255 | 314 | 503 | 640 | 709 | 701 | 1209 | 1601 | 2348 | |

| 48NPFC80 | | | | | | | | | | |
|-----------------|-----|-----|-----|------|------|------|------|------|------|--|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | |
| 46.5V | 392 | 480 | 768 | 976 | 1079 | 1049 | 1761 | 2262 | 3094 | |
| 45.0V | 399 | 491 | 785 | 1000 | 1107 | 1091 | 1867 | 2454 | 3564 | |
| 44.1V | 402 | 494 | 791 | 1007 | 1114 | 1098 | 1889 | 2478 | 3623 | |
| 43.5V | 404 | 497 | 795 | 1012 | 1120 | 1104 | 1907 | 2497 | 3671 | |
| 42.0V | 407 | 500 | 800 | 1020 | 1130 | 1116 | 1921 | 2540 | 3735 | |
| 40.5V | 409 | 503 | 805 | 1024 | 1134 | 1122 | 1934 | 2561 | 3756 | |

| 48NPFC100 | | | | | | | | | | |
|------------------|-----|-----|------|------|------|------|------|------|------|--|
| End | 10 | 8 | 5 | 4 | 3.5 | 2.5 | 2 | 1.5 | 1 | |
| 46.5V | 490 | 600 | 960 | 1220 | 1350 | 1310 | 2200 | 2828 | 3868 | |
| 45.0V | 500 | 614 | 982 | 1250 | 1384 | 1364 | 2334 | 3068 | 4454 | |
| 44.1V | 502 | 618 | 988 | 1258 | 1392 | 1372 | 2362 | 3098 | 4528 | |
| 43.5V | 504 | 622 | 994 | 1266 | 1400 | 1380 | 2384 | 3122 | 4588 | |
| 42.0V | 508 | 626 | 1000 | 1274 | 1412 | 1394 | 2400 | 3174 | 4668 | |
| 40.5V | 510 | 628 | 1006 | 1280 | 1418 | 1402 | 2418 | 3202 | 4696 | |

NPFC-Series Li-Ion LiFePO₄

