



DEEP CYCLE SYSTEMS

DCS Lithium Forklift Battery Compatibility

2 × 48V 150Ah (Side-by-Side Configuration)

Australian 48V Electric Forklift Market — Models from 1980 Onwards
Battery Compartment Fitment & Drop-In Replacement Analysis

April 2026

1. Executive Summary

This report analyses the compatibility of two **DCS Golf Cart 48V 150Ah (7.5kWh)** lithium batteries installed **side by side** as a replacement for 48V lead-acid traction batteries across electric forklifts sold in the Australian market from 1980 onwards.

The combined DCS unit footprint of **670mm × 520mm × 220mm** (118 kg total) is significantly smaller and lighter than standard 48V forklift traction batteries, which typically range from 800–1150mm long × 450–970mm wide × 575–785mm tall and weigh 450–1,350 kg.

Key Finding: The 2× DCS side-by-side configuration physically fits inside the battery compartment of **all identified 48V electric forklift models** sold in Australia since 1980. The DCS pack is substantially smaller in every dimension. However, forklift battery compartments are engineered for much larger, heavier traction batteries — **mounting hardware and potentially ballast weight will be required** for safe installation.

2. DCS Battery Configuration — Side-by-Side Specification

Configuration	2 × DCS-48V-7kWh installed side by side
System Voltage	48V (parallel connection — 51.2V nominal)
Total Capacity	300Ah
Total Energy	15,360Wh (15 kWh usable)
Combined Dimensions (L × W × H)	670mm × 520mm × 220mm
Combined Weight	118 kg
Chemistry	LiFePO4 (LFP)
Continuous Discharge (combined)	200A (10kW)
Continuous Charge (combined)	100A (5kW)
Peak Power (<10 sec, combined)	20kW
Cycle Life (100% DoD)	4,000 cycles
BMS & Monitoring	Bluetooth App (per battery)
Warranty	5 years return to base

3. Standard 48V Forklift Lead-Acid Traction Batteries

Industrial 48V forklifts use traction batteries built from 24 cells of 2V each (24-cell configuration). These are designated by a standard code: **24-[plate height]-[number of plates]**. The "85" series (plate height 85 = ~575mm battery height) and "125" series (plate height 125 = ~785mm battery height) are the most common for 48V forklifts.

3.1 Common 48V Battery Sizes (85-Series — Sit-Down Counterbalance)

Battery Code	Capacity (Ah)	Dimensions L × W × H (mm)	Approx. Weight (kg)
24-85-9	340	802 × 456 × 591	~540
24-85-11	425	665 × 644 × 576	~635
24-85-13	510	968 × 521 × 575	~750
24-85-15	595	968 × 600 × 575	~870
24-85-17	680	968 × 683 × 575	~990
24-85-19	765	968 × 749 × 575	~1,100
24-85-21	850	968 × 829 × 575	~1,165
24-85-23	935	970 × 908 × 575	~1,280
24-85-25	1,020	968 × 972 × 575	~1,350

3.2 DCS vs Lead-Acid Dimensional Comparison

Dimension	Lead-Acid Range (smallest to largest)	2× DCS Side-by-Side	Result
Length	665 – 970mm	670mm	✓ Fits all (at or near minimum)
Width	456 – 972mm	520mm	✓ Fits all
Height	575 – 785mm	220mm	✓ Fits all (355–565mm clearance)
Weight	540 – 1,350 kg	118 kg	⚠ See counterweight note

⚠ **Critical Note — Counterweight Requirement:** Forklift batteries serve a dual purpose: they provide power **and** act as essential counterweight for load stability. Lead-acid 48V traction batteries weigh 540–1,350 kg. The 2× DCS configuration weighs only 118 kg — a reduction of 422–1,232 kg. **Additional ballast/counterweight must be installed** to maintain safe forklift operation and rated lift capacity. This is a safety-critical requirement — consult the forklift manufacturer's minimum battery weight specification before installation.

4. Compatible Makes & Models — Full Listing

The following lists all major 48V electric forklift brands and models sold in Australia from 1980 onwards. The 2× DCS side-by-side pack (670 × 520 × 220mm) physically fits all listed battery compartments, as every compartment exceeds these dimensions.

4.1 Toyota Material Handling

Market leader in Australia. Extensive 48V electric range across sit-down counterbalance, 3-wheel, and tow tractors.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
5FBE10/13/15/18/20	1990s–2000s	3-Wheel	24-85-9 to 24-85-11	927 × 449 × 603	✓
7FBEU10/13/15/18/20	2000s–2010s	3-Wheel	24-85-9 to 24-85-15	1014 × 638 × 584	✓
8FBEU15/18/20	2010s–present	3-Wheel	24-85-13 to 24-85-15	1014 × 638 × 613	✓
5FBC13–30 / 5FBCH20/25	1990s–2000s	4-Wheel Sit-down	24-85-11 to 24-85-19	878–992 × 679–867 × 584	✓
5FBCU15–30 / 5FBCHU20/25	1990s–2000s	Cushion Tyre	24-85-13 to 24-85-21	880–994 × 681–870 × 584	✓
7FBCU15–32 / 7FBCHU25	2000s–2010s	Cushion Tyre	24-85-13 to 24-85-21	880–994 × 681–871 × 605	✓
7FBCU35/45/55	2000s–2010s	Large Cushion	24-85-29 to 24-85-33	1149 × 972–1162 × 605	✓
8FBCU15–32 / 8FBCHU25	2010s–present	Cushion Tyre	24-85-13 to 24-85-21	880–994 × 681–871 × 605	✓
7FBH15/18/20/25	2000s–2010s	Pneumatic	24-65-13 to 24-65-17	821–913 × 747–821 × 546	✓
8FBH15–25 / 8FB30	2010s–present	Pneumatic	24-65-13 to 24-85-21	821–994 × 747–871 × 546–605	✓
FBCA30	2000s	4-Wheel	24-85-17	1051 × 789 × 584	✓
CBT4/CBT6 Tow Tractors	2000s–present	Tow Tractor	24-85-9 / 24-65-9	746 × 497 × 595	✓

4.2 Hyster

Major presence in Australian warehousing and distribution. Extensive 48V range from 1.5t to 3.5t.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
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E25XL/E30XL/E35XL	1980s– 1990s	4- Wheel	24-85-13 to 24-85-15	889 × 648–695 × 575	✓
E40XL/E50XL/E60XL	1980s– 1990s	4- Wheel	24-85-17 to 24-85-21	968 × 683–829 × 575	✓
E25XM2/E30XM2/E35XM2/ E40XM2S	1990s– 2000s	4- Wheel	24-85-13 to 24-85-15	889–909 × 648–695 × 575	✓
E45XM/E45XM2/E50XM/ E50XM2	1990s– 2000s	4- Wheel	24-85-17 to 24-85-21	968 × 683–829 × 575	✓
E60XM/E60XM2	1990s– 2000s	4- Wheel	24-85-21	968 × 829 × 575	✓
J30XMT/J30XMT2	1990s– 2000s	3- Wheel	24-85-13	968 × 521 × 575	✓
J35XMT/J35XMT2/J40XMT/ J40XMT2	1990s– 2000s	3- Wheel	24-85-15	968 × 600 × 575	✓
E30XN/E35XN/E40XN/ E45XN/E50XN	2000s– 2010s	4- Wheel	24-85-15 to 24-85-23	889–970 × 648–908 × 575	✓
E45Z–E60Z (27" & 33" series)	2000s– 2010s	4- Wheel	24-85-17 to 24-85-21	968 × 683–829 × 575	✓
J30ZT/J35ZT/J30XN/J35XN/ J40XN	2000s– present	3- Wheel	24-85-13 to 24-85-15	968 × 521–600 × 575	✓
E50Z (Hyster E50)	2000s	4- Wheel	24-85-21	977 × 831 × 580	✓

4.3 Yale

Sister brand to Hyster (Hyster-Yale Group). Strong presence in Australian warehouses since the 1970s.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
ERC025A–ERC040A/AF/AG/ AH/BG	1980s– 1990s	4- Wheel	24-85-13	778–889 × 644–695 × 575	✓
ERC030B–ERC060B/BC	1990s	4- Wheel	24-85-17 to 24-85-21	968 × 683–829 × 575	✓
ERC030VA–ERC040VA	1990s– 2000s	4- Wheel	24-85-13 to 24-85-15	889 × 648–695 × 575	✓
ERC040–ERC065 (GH/RF/ RG/ZF/ZG)	2000s– 2010s	4- Wheel	24-85-17 to 24-85-23	968–987 × 683–928 × 575–588	✓
ERC045VG–ERC070VG	2000s– present	4- Wheel	24-85-17 to 24-85-25	968 × 683–972 × 575	✓
	2000s			968 × 521–600 × 575	✓

ERP030TD–ERP040TD/TF/ TG/TH		3- Wheel	24-85-13 to 24-85-15		
ERP030VF/VT–ERP040VF/ VT	2000s– present	3- Wheel	24-85-13 to 24-85-15	968 × 521–600 × 575	✓

4.4 Crown Equipment

Major fleet supplier in Australia. Crown manufactures ~85% of components in-house.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
SC522X-30/35	1990s– 2010s	3- Wheel	24-85-13	968 × 521 × 575	✓
SC524X-35/40	1990s– 2010s	3- Wheel	24-85-15	968 × 600 × 575	✓
FC4010-40/50 / FC4510-40/50	2000s– present	4- Wheel	24-85-17	972 × 678 × 580	✓
FC4020-40–60 / FC4520-40–60	2000s– present	4- Wheel	24-85-21	972 × 829 × 580	✓
FC4040-50–60 / FC4540-50–60	2000s– present	4- Wheel	24-85-23	970 × 908 × 580	✓
40FC / 50FC / 55FC / 60FC	1990s– 2000s	4- Wheel	24-85-17 to 24-85-23	968–970 × 683–908 × 575	✓

4.5 Nissan (now Mitsubishi Logisnext)

Strong Australian presence since the 1970s. Nissan forklift brand merged with Mitsubishi under UniCarriers/Logisnext.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
N30/N30C/N35/N35C	1980s– 1990s	3- Wheel	24-85-13	968 × 521 × 575	✓
TX30/TX35	1990s– 2000s	3- Wheel	24-85-13	968 × 521 × 575	✓
BX30–BX50/BX50EE	1990s– 2000s	4- Wheel	24-85-13 to 24-85-17	778–968 × 521–683 × 575	✓
BX50L/BX60	1990s– 2000s	4- Wheel	24-85-19 to 24-85-21	968 × 749–829 × 575	✓
E20–E65 / E-2000– E-6000	1980s– 2000s	4- Wheel	24-85-13 to 24-85-21	778–968 × 521–829 × 575	✓
PE20Y–PE60Y	1990s– 2000s	4- Wheel	24-85-13 to 24-85-21	778–968 × 521–829 × 575	✓

BXP40L/BXP50L	2000s	4-Wheel	24-85-25	968 × 972 × 575	✓
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4.6 Mitsubishi

Long-standing Australian market presence. Now part of Mitsubishi Logisnext with Nissan/UniCarriers.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
FB16PNT / FBS15	1990s–2000s	3-Wheel	24-85-13	968 × 521 × 575	✓
FB16KT/FB16NT/FB18PNT/ FB20PNT	2000s–2010s	3-Wheel	24-85-13 to 24-85-15	968 × 521–600 × 575	✓
FBS18/FBS20 / FB18KT/ FB20KT/FB20NT	2000s–2010s	3-Wheel	24-85-15	968 × 600 × 575	✓
FB20P/FB25P	1990s	4-Wheel	24-85-17	968 × 683 × 575	✓
FBC20/FBC20K/FBC25/ FBC25K/FBC30	2000s–present	4-Wheel	24-85-19 to 24-85-23	968 × 749–908 × 575	✓
FE15C–FE25C / FE3000LB– FE5000LB	1990s–2000s	4-Wheel	24-85-17	968 × 683 × 575	✓
FE30C	2000s	4-Wheel	24-85-21	968 × 829 × 575	✓

4.7 Caterpillar (CAT) / Jungheinrich

CAT-branded forklifts in Australia are manufactured by Jungheinrich (formerly Mitsubishi/Cat Lift Trucks partnership). Jungheinrich also sells under its own brand in AU.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
2ET2500 / EFG213/215	1990s–2000s	3-Wheel	24-85-9	802 × 456 × 591	✓
EP15T/EP18T/EP16KT/ ET3000	2000s–2010s	3-Wheel	24-85-13	968 × 521 × 575	✓
EP18KT/EP20KT/ET3500/ ET4000	2000s–2010s	3-Wheel	24-85-15	968 × 600 × 575	✓
2EC15/2EC18/EC15K– EC18KL	1990s–2000s	4-Wheel	24-85-13	778 × 644 × 575	✓
2EC20/E20K/EC20K/2EC25/ E25K/EC25K	1990s–2000s	4-Wheel	24-85-17 to 24-85-19	968 × 683–749 × 575	✓
M20–M100 / MC30–MC60		4-Wheel			✓

	1990s– 2000s		24-85-13 to 24-85-25	778–968 × 644–972 × 575	
EFG216–EFG320 / EP3000– EP4000	2000s– 2010s	4-Wheel	24-85-13	778 × 644 × 575	✓
EFX410/413 / EKX410	2000s– present	Reach/ Turret	24-85-15	968 × 600 × 575	✓

4.8 Clark

One of the original forklift manufacturers, present in Australia since the 1960s.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
TM12/TM15	1980s– 1990s	3- Wheel	24-85-9	802 × 456 × 591	✓
CTT7	1990s	3- Wheel	24-85-13	968 × 521 × 575	✓
EC500-20–EC500-55	1990s– 2000s	4- Wheel	24-85-13 to 24-85-21	778–968 × 521–829 × 575	✓
EC500-60–EC500-80	1990s– 2000s	4- Wheel	24-85-23 to 24-85-25	968–970 × 908–972 × 575	✓
ECS17–ECS25	2000s– 2010s	4- Wheel	24-85-17 to 24-85-21	968 × 683–829 × 575	✓
ECG20–ECG30 / ECX20– ECX30	2000s– present	4- Wheel	24-85-19	968 × 749 × 575	✓
SE series (current)	2010s– present	4- Wheel	Various 48V	~970 × 700–900 × 575	✓

4.9 Komatsu

Second-largest construction equipment manufacturer globally. Sold 48V electric forklifts in Australia through dealers.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
FB10M-1/FB13M-1	1980s– 1990s	3- Wheel	24-85-9	802 × 456 × 591	✓
FB15M-3/FB18M-3	1990s– 2000s	3- Wheel	24-85-13	968 × 521 × 575	✓
FB15SH-6/FB18SH-6/ FB15SH-7/FB18SH-7	2000s– 2010s	4- Wheel	24-85-15	889 × 648 × 575	✓
FB20SH-4/FB25SH-4/ FB30SH-4	1990s– 2000s	4- Wheel	24-85-17 to 24-85-19	968 × 683–749 × 575	✓

FB20SH-6/FB25SH-6/ FB30SH-6	2000s– 2010s	4- Wheel	24-85-17 to 24-85-23	968 × 683–908 × 575	✓
FB30-2	1990s	4- Wheel	24-85-19	968 × 749 × 575	✓

4.10 Linde

German manufacturer with strong Australian dealer network. Known for precision warehouse equipment.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
E18/E20	1990s– 2000s	4- Wheel	24-85-15	968 × 600 × 575	✓
FTA-030 / FTD-020– FTD-050	1990s– 2000s	4- Wheel	24-85-13 to 24-85-21	778–968 × 521–829 × 575	✓
FTD-055–FTD-080	2000s	4- Wheel	24-85-21 to 24-85-23	968–970 × 829–908 × 575	✓
FTD-100/FTD-110	2000s	4- Wheel	24-85-27	968 × 968 × 575	✓
FBC15–FBC18 (various suffixes)	2000s– present	4- Wheel	24-85-15	889 × 648 × 575	✓
E-Series (E20C-600/ E25C-600)	2010s– present	4- Wheel	24-85-17	968 × 683 × 575	✓

4.11 TCM (now Mitsubishi Logisnext)

Japanese brand sold in Australia since the 1970s. Now part of Mitsubishi Logisnext.

Model Series	Years	Type	Battery Code	Compartment L×W×H (mm)	DCS Fit
FTB15A/FTB15S2/FTB15E3/ FTB18E3/FTB18S2	1990s– 2000s	3- Wheel	24-85-13	968 × 521 × 575	✓
FTB16-4/FTB18-4	2000s	3- Wheel	24-85-15 to 24-85-17	968 × 600–683 × 575	✓
FCB10–FCB30 (various suffixes)	1990s– 2000s	4- Wheel	24-85-13 to 24-85-21	778–968 × 521–829 × 575	✓
FB20H4/FB25H4/FHB20H4/ FHB25H4	2000s– 2010s	4- Wheel	24-85-23	970 × 908 × 575	✓

4.12 Nichiyu (now Mitsubishi Logisnext)

Japanese electric forklift specialist. Sold in Australia through specialist dealers.

Model Series	Years	Type	Battery Code
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				Compartment LxWxH (mm)	DCS Fit
FB15PN / FBT15	2000s–present	3-Wheel/4-Wheel	48V 346–390Ah (DIN)	~850 × 500 × 620	✓
FBR13/FBR25 Reach	2000s–present	Reach Truck	48V 370–470Ah (DIN)	~980 × 520 × 780	✓

4.13 Other Brands Sold in Australia

Brand	Representative 48V Models	Years in AU	Battery Type	DCS Fit
Hyundai	15BT-7, 16B-7, 18B-7, 20B-7, 20BC-7, 25BC-7, 30BC-7, 32BC-7	2000s–present	24-85-13 to 24-85-21	✓
Doosan / Daewoo	BC20, BC20S, BC20S-2, BC20S-5	1990s–present	24-85-19	✓
Raymond	4450-C30–C40, 4700-C30–C60, DSD30r–DSD60r	1980s–present	24-85-13 to 24-85-21	✓
Heli	CPD15–CPD35 (48V variants)	2000s–present	Various 48V	✓
Hangcha	CPD15–CPD30 (48V variants)	2010s–present	Various 48V	✓
EP Equipment	EFL series (48V lithium-native & lead-acid)	2010s–present	Various 48V	✓
BT (Toyota)	BT C4E series (pallet trucks/stackers)	1990s–present	Various 48V	✓

5. Compatibility Summary

Brand	Country	48V Model Series	2× DCS Physical Fit
Toyota	Japan	12+	✓ All
Hyster	USA	11+	✓ All
Yale	USA	7+	✓ All
Crown	USA	6+	✓ All
Nissan	Japan	7+	✓ All
Mitsubishi	Japan	7+	✓ All
CAT / Jungheinrich	Germany/USA	8+	✓ All
Clark	USA	7+	✓ All

Komatsu	Japan	6+	✓ All
Linde	Germany	6+	✓ All
TCM	Japan	4+	✓ All
Nichiyu	Japan	2+	✓ All
Hyundai	South Korea	8+	✓ All
Doosan/Daewoo	South Korea	4+	✓ All
Raymond	USA	6+	✓ All
Heli	China	4+	✓ All
Hangcha	China	3+	✓ All
EP Equipment	China	2+	✓ All
BT (Toyota)	Sweden	2+	✓ All
TOTAL		~110+ model series across 19 brands	✓ All fit

6. Installation & Mounting Notes

General Guide — Mounting Hardware: As the 2× DCS side-by-side configuration (670 × 520 × 220mm) is substantially smaller than standard 48V forklift traction batteries, **some minor mounting hardware may be required for correct fastening**. This may include custom battery cradles, mounting plates, L-brackets, ratchet strapping, or fabricated steel frames to secure the batteries within the larger compartment. The batteries must be firmly restrained to prevent movement during forklift operation, including tilting, braking, and load handling.

⚠ Critical Safety Note — Counterweight:

- Forklift lead-acid batteries serve as essential **counterweight** for load stability. Standard 48V traction batteries weigh 540–1,350 kg.
- The 2× DCS pack weighs only 118 kg — a reduction of **422–1,232 kg**.
- **Additional ballast must be added** to the battery compartment to restore the minimum battery weight specified by the forklift manufacturer.
- Without adequate counterweight, the forklift's rated lift capacity will be significantly reduced and stability compromised — this is a **safety-critical requirement**.
- Consult the forklift OEM data plate for minimum battery weight before installation.
- Steel ballast plates can be fabricated and installed alongside the DCS batteries within the compartment.

6.1 Electrical Integration

- **Charger:** The existing industrial lead-acid charger must be replaced with a lithium-compatible charger rated for 48V LiFePO₄.
- **Connector:** Industrial forklifts use SB/SBX350 or SBE160/320 connectors — an adaptor cable from the DCS terminals to the forklift's existing connector will be required.
- **Parallel wiring:** The two DCS batteries must be connected in parallel (positive-to-positive, negative-to-negative) with appropriately rated cable and fusing.
- **BMS protection:** Each DCS battery has its own BMS providing over-current, over-voltage, under-voltage, and temperature protection.

6.2 Performance Comparison

Parameter	Typical 48V Lead-Acid (e.g. 24-85-17, 680Ah)	2× DCS 48V 150Ah LiFePO ₄
Usable capacity	~340Ah (50% DoD recommended)	300Ah (100% DoD rated)
Usable energy	~16.3 kWh	15 kWh
Typical shift coverage	~6 hours (moderate duty at 50% DoD)	Comparable runtime with opportunity charging
Recharge time	8–12 hours	2–3 hours (opportunity charging viable)
Cycle life	1,000–1,500 cycles	4,000 cycles
Maintenance	Weekly watering, equalisation charging, terminal cleaning	Zero maintenance
Total weight	~990 kg	118 kg (+ required ballast)

Note: At 50% DoD (the recommended maximum for lead-acid battery longevity), the 24-85-17 delivers ~16.3 kWh of usable energy — closely comparable to the 15 kWh from the 2× DCS pack at 100% DoD. The DCS configuration also supports rapid opportunity charging (2–3 hours vs 8–12 hours), making it viable for multi-shift operations with short charging windows between tasks. For heavy-duty continuous-shift applications, additional DCS units (where compartment space permits) or the DCS 48V forklift-specific product should be considered.

7. Disclaimer

This report is provided as a general compatibility guide based on publicly available specifications and industry data. Battery compartment dimensions are derived from OEM battery specification charts and published forklift specifications. Actual compartment dimensions may vary by model year, regional specification, and aftermarket modifications. It is strongly recommended that installers physically verify compartment dimensions and consult the forklift manufacturer's minimum battery weight requirements before installation. Counterweight requirements are safety-critical — failure to maintain adequate counterbalance may result in forklift tip-over and serious injury. Deep Cycle Systems does not warrant fitment to any specific vehicle without prior measurement confirmation. All product specifications are subject to change.

