

Modelling Australian HOn3½

This paper was prepared by Peter Knife, and was presented at the Second Australian Narrow Gauge Convention, held at Blackheath in 1998.

Right: Yaninee station yard on Peter's under-construction model of Minnipa (Eyre Peninsula, S.A.). This yard uses Shinohara track, and a number of kitbashed and scratch-built wagons are present.



Introduction

Australia over the years has seen many thousands of miles of 3'6" (1067mm) gauge railways constructed, from Queensland to Tasmania and Western Australia. The combination of HO scale and 12mm gauge track is an ideal combination for modelling these prototypes.

12mm gauge has been around for many years in TT scale (representing standard gauge in a scale of 1:120), but in the last decade or so has come into its own as an established representation of 3'6" gauge in HO scale. Much early support came from Europe, where 12mm gauge is used to represent metre gauge track in HO scale. The European terminology for this combination is HOM, and for our purposes HOM and HOn3½ are interchangeable.

There is considerable scope for the modelling of Australian 3'6" gauge prototypes. In Queensland, Western Australia, Tasmania and the Northern Territory, 3'6" is or was the predominant 'main line' gauge, while South Australia had extensive networks of 3'6", 4'8½" and 5'3" gauges. Even New South Wales and Victoria had small representations. In addition to the government systems, all states had at least one private 3'6" line, with many of these being major operations such as the Western Australian timber lines, BHP's Whyalla lines in South Australia, Tasmania's Emu Bay Railway, New South Wales' Silverton Tramway and Victoria's Fyansford Cement line.

HOn3½ in Australia is becoming increasingly popular with those modellers wishing to represent one or more of these government networks, or one of the multitude of private lines.

Many Australian items which are available in HO scale (such as structures, detail items, etc) can be used in modelling narrow gauge, but the purpose of this presentation is to highlight the modelling of 3'6" in particular, so such 'gauge independent' items are not discussed here.

Model scales and gauges in Australia

While this presentation is a discussion of HOn3½, mention should be made of the various modelling representations of 3'6" which have been traditionally adopted in Australia.

South Australian modellers have historically tended to use HOn3 (10.5mm) gauge, partly because of the early availability of HOn3 track and wheels but primarily because the combination of 10.5mm (HOn3) and 16.5mm (HO) gauges gives a better visual representation of SAR dual gauge (3'6" and 5'3") track. Both gauges are technically undersize, but the relative spacing of the rails is good and for those wishing to model both gauges, it represents an acceptable compromise. HOn3½ is gaining wider acceptance in South Australia of late, and of course for pure 3'6" layouts or for combinations of 3'6" and 4'8½", 12mm gauge is very accurate.

Tasmanian modellers have in the past used OO scale on 16.5mm track, but again HOn3½ is gaining in popularity.

In Western Australia, Sn3½ is the predominant scale, and this is reflected in the absence from the market of any HOn3½ rolling stock of WAGR prototypes.

Queensland has been a stronghold of HOn3½, and while Sn3½ modelling is growing rapidly, HOn3½ remains the most popular scale.

Table 1 shows how some of these combinations relate to the gauge represented.

HOn3½ (HOM) Track

Shinohara HOn3½ track has been the most popular brand in 12mm gauge for several years, but the recent arrival of the new Peco Streamline range may see this change. The Bemo and Pilz HOM ranges offer specialised items which are not available from the other two suppliers.

Table 1 - Scale and Gauge Relativity

Scale	Model gauge	Prototype gauge	Model scales to	Variance
HOn3½	12 mm	3'6" (1067 mm)	3'5" (1044 mm)	-2%
HOn3	10.5 mm	3'6" (1067 mm)	3'0" (914 mm)	-14%
HO	16.5 mm	4'8½" (1435 mm)	4'8½" (1435 mm)	-
HO	16.5 mm	5'3" (1600 mm)	4'8½" (1435 mm)	-10%
HO	18.82 mm (EM)	5'3" (1600 mm)	5'4½" (1637 mm)	+2%
HOM	12 mm	3'3" (1000 mm)	3'5" (1044 mm)	+4%

Table 2 - Available Track

Item	Shinohara	Bemo	Bemo Code 70	Peco	Pilz
Rail height	Code 70		Code 70	Code 75	Code 80
Sleepers (actual)					
• length	24.5 mm	22.6 mm	23.5 mm	25.0 mm	21.3 mm
• width	2.7 mm		2.7 mm	3.0 mm	2.7 mm
• height	1.5 mm	1.8 mm	1.5 mm	1.6 mm	2.0 mm
• spacing	8.0 mm	6.9 mm	7.0 mm	7.6 mm	6.7 mm
Sleepers (scale)					
• length	7' 0"	6' 6"	6' 9"	7' 2"	6' 1"
• width	9"	<?>	9"	10"	9"
• height	5"	6"	5"	5"	7"
• spacing	2' 3"	2' 0"	2' 0"	2' 2"	1' 11"
Sleepers (typical)	SAR				
• length	6'6"				
• width	8"				
• height	4.5"				
• spacing	1'9" - 2'6"				
Flexible track	900 mm	500 mm	1000 mm	900 mm	680 mm
Standard points					
• #4 (12 deg)	...	Yes	Yes	Yes	Yes
• #6 (9.5 deg)	Yes	Yes	Yes	...	...
Curved points	...	Yes	Yes	...	...
Diamond crossing	...	Yes (12 deg)	Yes (12 deg)	Yes	Yes
Double slip	...	Yes (12 deg)	Yes (12 deg)	...	...
HO/HOm dual gauge					
• 3-rail track	...	...	...	...	Yes
• points	...	...	...	...	Yes *
• side-to-side	...	...	...	...	Yes
• diverging	...	...	...	...	Yes
Other items	...	• Sectional track • Scissors crossover	Sectional track	...	...

* Pilz dual-gauge points are narrow gauge straight and diverging, standard gauge straight only.

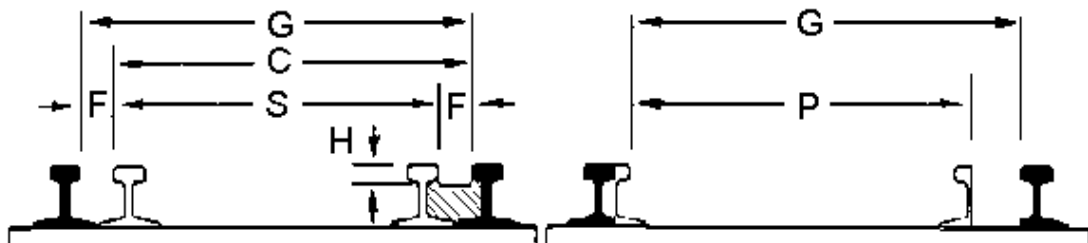
Table 2 gives some relevant comparisons between the various types of track available.

The NMRA Trackwork Standard (S-3) for TT gauge track also provides a useful standard for HOn3½ track. With acknowledgement to the NMRA, the details in the standard (and some comparative dimensions for some of the available products) are shown below.

All dimensions in the table are in millimetres. The values shown for the various products are sample

measurements taken from a limited number of components, so are representative only.

Modellers should be aware that the flange clearances of the new Peco track are a little tighter than Shinohara (but still within the NMRA standard), and some earlier HOn3½ wheels may require that the flangeways be filed out slightly. The wheelsets currently on the market do not have the problem.



Dimension	NMRA S-3	Shinohara	Peco	Bemo code 70	Pilz
G - track gauge	12.0 (min) 12.3 (max)	12.3 (aver)	12.0	12.4 (aver)	12.1
C - check gauge	11.1 (min)				
S - span	10.3 (max)	10.1	10.3		
F - flangeway	0.91 (max)	1.0 (min) 1.2 (max)	0.9	1.0 (min) 1.2 (max)	
H - flange clearance	0.66 (min)				
P - point spread	10.9 (max)				

Locomotives

Very few steam outline HOn3½ locomotives are available. Queensland Railways modellers are served by Colonial Model Railways (BB18¼ and DD17) and The Turntable (C17 and PB15), with Chivers Finelines due to release an AC16 in May.

The range of diesel outline locomotives is better served, with body kits available for many Queensland Railways and Commonwealth Railways classes from suppliers such as Black Diamond Models, Far North Hobbies, Ian Lindsay Models and Hanovale Model Castings. Mechanisms from Model Meks and Main West Models are available to suit most of these bodies also. The Powerline model of the South Australian Railways 830 class (with a suitable HOn3½ mechanism) is ideal for both SAR and Tasmanian (AN era) models, and for Tasmanian modellers the QR 1300 and 2350 classes also meets the needs of the AN era.

Rolling Stock

The range of items available in HOn3½ varies significantly from system to system. Modellers of the Queensland Railways are well catered for, while those of the South Australian Railways have a moderate range of choices. Other prototypes have minimal or non-existent choices.

The appendix lists all models currently on the market (to the best of my knowledge), including specific 3'6" vehicles, some simple kitbash adaptations and some more extensive or creative adaptations.

The Queensland Railways market is catered for by several kit manufacturers - Black Diamond Models, Far North Hobbies, Hanovale Model Castings, Ian Lindsay Models, Scaleways and Three Foot Six Models. Between them, a large range of passenger and goods stock is offered.

The 3'6" systems of the South Australian Railways and the Commonwealth Railways have always been closely related. The CR Central Australian and North Australian lines were both originally SAR lines, and CR took over much early SAR rolling stock. During World War II, the Commonwealth Land Transport Board was responsible for the construction of several types of vehicles which were used by both the CR and the SAR. In later years, interchange of rolling stock was a routine occurrence. In recent years, the CR (and its' successor, AN) transferred many broad and standard gauge vehicles to 3'6".

For modellers of these systems, many of the 5'3" gauge body kits from Broad Gauge Bodies (and a few VR kits from Steam Era Models) can be adapted for 3'6" prototypes, while RTR Models SA also supply a number of 3'6" kits for both SAR and CR vehicles. A

number of CR vehicles were obtained from the QR or were based on QR designs, so several of the Hanovale Model Castings kits can be used also.

Much rebuilding and adaptation of passenger cars, in particular, took place on the old SAR, and the same can be done with several of the available kits.

Modellers of the Tasmanian Government Railways have a few items available from WD Models.

Those wishing to model the Western Australian Government Railways will either need good scratchbuilding skills, or should choose a different scale!

Running gear

Modellers wishing to put together their own diesel mechanisms should refer to the article by Ian Storrie in Issue 3 of Branchline Modeller magazine. This article describes a technique for adapting the power bogies from the AR Kits 45/600 class to HOn3½ gauge.

The Bemo range of HOn locomotives is also a potential source of mechanisms. For example, I have motorized a South Australian Brill railcar using a cut down Bemo 4-wheel shunting tractor mechanism, with excellent results.

Wheelsets for HOn3½ vehicles have been available in Australia for some time, including RP25-110 disc and spoked wheels in various diameters. More recently, Steam Era Models have entered the market with a range of RP25-88 wheels. Bemo wheels have also been available for many years. Table 3 lists some typical dimensions of some commonly-available wheelsets.

A further source of supply for 12 mm gauge equipment is the Three Millimetre Society in the U.K. While aimed at TT scale modellers, many of the items available through this Society are suitable for HOn3½ use.

A number of bogies are available. These are primarily QR style, but can be used for the other systems as well. The 'Bettendorf' style is universal, and the QR 'archbar' can be used (in some cases with end brake hangers removed) for many classes of SAR and CR wagons.

HOn3½ bogies are available from the following suppliers:

Far North Hobbies

- QR TGV bogies
- QR plate frame bogies
- QR 4'9" Bettendorf bogies
- QR 4' archbar bogies
- QR Sunshine Express bogies

Table 3 - Wheelset dimensions

Wheelset	Wheel thickness	Axle length	Back-to-back
SEM RP25-88	2.5 mm	19.5 mm	10.3 - 10.4 mm
North Yard RP25-110	3.0 mm	21.0 mm	10.2 mm
K&M RP25-110	3.0 mm	21.0 mm	10.1 - 10.3 mm
Bemo	2.5 mm	18.3 mm	10.3 mm

The Turntable

- QR archbar bogies
- QR 'Lander bogies
- QR plate frame bogies
- QR Grovers bogie (4-wheel stock)
- 2BP type bogies
- 2CL type bogies
- Commonwealth bogies

Three Foot Six Models

- QR Sunshine Express bogies
- QR 'Lander bogies
- QR modern freight bogies
- QR 'QR1' freight bogies
- QR 4' archbar bogies

A popular technique which many modellers use to produce HOn3½ bogies is to cut the centre of the bolster from an HO gauge bogie, then fit a new bolster made from a rectangular or channel section. The length of the new bolster is dependent on the axle length of the wheelsets to be used. This can be done easily with common bogies from suppliers such as AR Kits and Roundhouse, but the technique is also useful in cases such as adapting a South Australian BGB 'Long Tom' coach kit from 5'3" to 3'6", where the supplied sideframes can be used for the 3'6" bogies.

Replacement bolsters for these bogie conversions are available from Ian Lindsay Models and The Turntable.

Couplers

Some modellers choose to use the Kadee HOn3 coupler for HOn3½, because of its smaller size than standard Kadees. Many, however (myself included) use Kadee HO couplers because of the range of mounting types available, and their strength. In particular, the Kadee 30-series includes a number of styles with underset mounting which adapt easily to the low floor height found on many early 3'6" vehicles.

Conclusion

I hope that I have opened the way for modellers who may have hesitated in the past, to consider modelling Australian 3'6" prototypes in HOn3½. As can be seen from the listings, there are quite extensive resources and materials available, and it is now possible to build a Queensland or South Australian narrow gauge layout without having to 'scratchbuild everything'. And with such a tempting array of prototypes to choose from, why not?

Acknowledgements and Disclaimer

Assistance in the preparation of this document was received from a number of sources, and grateful acknowledgement is due to the people behind these organizations: AMRM; Colonial Model Railways; Far North Hobbies; Ian Lindsay Models; Model Meks; Orient Express; RTR Models SA; The Turntable; Three Foot Six Models; WD Models.

I have no affiliation with any of the suppliers, and cannot accept any responsibility for errors or omissions

from the tabulations. However the information presented is as complete as I can determine at the time of preparation. If I have omitted any items which should have been included, then please accept my apologies.

Supplementary Notes - January 2007

Since these notes were prepared (early 1998), some changes have taken place in the Australian marketplace. Some of the listed suppliers are no longer with us, although their products can occasionally be picked up.

Two changes must be noted though - K&M produce brass mechanisms for the SAR 830, and a new manufacturer (Hollywood Foundry) has a range of power mechanisms suitable for a wide range of narrow gauge motive power (including railcars).

Appendix - Rolling Stock (R-T-R and Kits) Adaptable for Australian HOn3½

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
Black Diamond Models							
QR 1250 diesel		1250					
QR 1400 diesel		1400					BHP DE
QR 1450 diesel	New mechanism - Bo-Bo	1450					
QR 1460 diesel		1460					
QR 2350 diesel		2350			ZB (AN era)		
QR stainless steel subn set		SX / SXV					
Broad Gauge Bodies							
SAR Brill Model 75 (5'3")	New power unit, narrow trailing bogie		Brill railcar				
SAR Brill trailer (5'3")	Narrow bogies, optional window mods		Brill trailer Per-way camp van				
SAR Long Tom coach (5'3")	Narrow bogies		Long Tom coach				
	Window mods		300,400 series coaches "Morambro" sleeper Crew relay/ brake vans				
	Shorten body, new bogies		Short Tom coach (later style)	Ex-SAR coach			
SAR C cattle wagon (5'3")			CN	NCA			
SAR CF cattle wagon (5'3")	Narrow axleguards		CFN				
	Remove roof, cut down sides		CCF				
SAR DW louvre van (5'3")	Shorten body		VCW VW	NLA			
SAR DWF louvre van (5'3")			VFN				
SAR R refrig van (5'3")	New ends		RN				
SAR RX refrig van (5'3")	Shorten sides; new ends		RCN	NF			
SAR SE explosives			SE				
SAR SO ore wagon (5'3")	Narrow bogies		OMN				
SAR BH horsebox (5'3")	Replace bogies		NH				
CR HRD relay van (s.g)	Narrow bogies			NHRD			

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
Chivers Finelines							
QR Beyer-Garratt (imminent)		Beyer-Garratt	400				
	Close approximation						
QR ALG van		ALG					
QR FG/FCW wagon		FG/FCW					
Colonial Model Railways							
QR BB18-1/4 4-6-2		BB18-1/4					
QR DD17 4-6-4T		DD17					
Far North Hobbies							
QR DH diesel		DH					
The following are available as bodies only or with mechanism							
CR NJ diesel			NJ (ANR)	NJ			
QR 1150 diesel		1150					
QR 1170 diesel		1170					
QR 1200 diesel		1200					
QR 1300 diesel		1300					
QR 1502 diesel		1502					
QR 1620 diesel		1620					
QR 1720 diesel		1720					
QR 2170 diesel		2170					
QR 2000 railmotor (body only)		2000					
QR Sunshine cars set							
QR TGV brake		TGV					
QR 24' brake		Brake					
QR C / CLF		C / CLF					
QR CMIS insulated		CMIS					
QR GMN nitrogen		GMN					
QR GMR		GMR					
QR QLX / QSC		QLX / QSC					
QR Roadtrailer		Roadtrailer					
QR VMO molasses		VMO					

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
Hanovale Model Castings							
QR 1200 diesel		1200					
QR 1300 diesel		1300				ZC (AN era)	
QR 1720 diesel		1720					
QR 2170 diesel		2170					
QR BUV coach		BUV					
QR BU coach		BU					
QR MAS sleeper		MAS					
QR MBC baggage		MBC					
QR MBL coach		MBL					
QR MCC club bar		MCC					
QR MDC diner		MDC					
QR MPC power car		MPC					
QR MPC/C power car		MPC/C					
QR A van		A					
QR ABG van		ABG					
QR ALG van		ALG					
QR ALY van		ALY					
QR BBV compo brake		BBV					
QR BC baggage		BC					
QR C van		C					
QR CB brake van		CB					
QR CH van		CH					
QR CHB brake van		CHB					
QR CJ van		CJ					
QR CJF van		CJF					
QR CLC van		CLC					
QR CMI insul		CMI					
QR CMIS insul		CMIS					
QR Camp		Camp					
QR DM / DMP cars		DM / DMP					
QR EC open		EC					
QR F open		F					
QR FFC cement		FFC					
QR FGW water tank		FGW					

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
QR FJC cement		FJC					
QR FW water tank		FW					
QR GV brake		GV					
QR H open		H					
QR HB open brake		HB					
QR HJ open		HJ					
QR HJS open		HJS					
QR HJC cement		HJC					
QR IC livestock		IC					
QR K livestock		K		NC			
QR KB livestock brake		KB		NCY			
QR KKB livestock drover brake		KKB					
QR KL livestock		KL					
QR LSR shunters runner		LSR					
QR MTW flat		MTW					
QR OLE / OLX fuel tank		OLE / OLX					
QR PCW water tank		PCW					
QR PWH pineapples		PWH					
QR S flat		S					
QR SW water tank		SW					
QR T ballast		T					
QR TGV brake		TGV					
QR UR open		UR					
QR UW water tank		UW					
QR V coal		V					
QR VB coal open brake		VB					
QR VJM coal		VJM					
QR VO coal		VO					
QR VR coal		VR					
QR VT ballast		VT					
QR WR rails		WR					
QR WW water tank		WW					
Ian Lindsay Models							
QR 1300 diesel		1300				ZC (AN era)	
QR 2170 diesel		2170					
QR RM55		RM55					

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
QR PL trailer		PL					
QR ALY van		ALY					
QR BBV brake		BBV					
QR BRMP tautliner		BRMP					
QR CLC van		CLC					
QR CO wagon		CO					
QR CW camp van		CW					
QR CLV compo brake		CLV					
QR CL coach		CL					
QR FJS wagon		FJS					
QR HO / HOF open		HO / HOF					
QR PYC flat		PYC					
QR QLX van		QLX					
QR QSC tautliner		QSC					
QR R refrigerated van		R					
QR TGVH brake		TGVH					
QR UHJ open		UHJ					

Lima

SAR 8300 brakevan (5'3")	Narrow bogies	ENVA (ANR)
	Very extensive rebuild	CGN

MDC / Roundhouse

50' end-platform coach	Several variations	Per-way camp vans (ex 5'3" Centenary cars)
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Model Meks (mechanisms only, to fit to bodies of classes shown)

QR 1200-1225-1250-1270	1200-1225-1250-1270	
QR 1300	1300	ZC (AN era)
QR 1460-1502	1460-1502	
QR 1700-1720	1700-1720	
QR 2170-2400	2170-2400	
Special order mechanisms:		
QR 1600-1620	1600-1620	
SAR 830	830	830 (AN era)

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
CR NJ			NJ (AN era)	NJ			
Orient Express Reproductions							
SAR rolling stock available to special order							
Powerline							
SAR 830 diesel	New mechanism		830			830 (AN era)	
RTR Models SA							
Note - kits may differ considerably from scale dimensions							
SAR 4-wheel coach			4-wheel coach				
SAR Short Tom coach			Short Tom coach (early style)				
	Modify sides		Compo brakevans Passenger brakevans				
SAR coach (450 class)			450				
SAR "Light"			"Light"				
SAR "Lincoln"			"Lincoln"				
SAR "Morambro"			"Morambro"				
SAR coach (300/400 class)			300 / 400				
SAR "Wandana" (as preserved)			"Wandana"				
SAR C cattle wagon (5'3")			CN	NCA			
SAR DW louvre van (5'3")			VCV	NLA			
	Shorten body		VW				
SAR GC open			GC				
SAR OMN ore wagon			OMN				
SAR ON ore wagon			ON				STC ON
SAR SE explosives			SE				
SAR 6-wheel water tank			Water tank				
SAR W open			W				
SAR XX open			XX				
SAR Y open (3'6" version)			Y				
SAR Y open (5'3" version)	Narrow sideframes		YY				
CR NC Cattle				NC			

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
CR NGAS open				NGAS			
CR NGC open			OCN	NGC			
CR NGS open				NGS			
CR NHA brakevan				NHA			
QR VTE ballast		VTE					

Scaleways

QR DDM/P car carrier		DDM/P					
QR PCOY flat		PCOY					
QR WHE open		WHE					
QR WHO/C open		WHO/C					

Steam Era Models

VR 1/1A open wagon (5'3")	Shorten sides, alter door		YY				
VR 1/1A high side open (5'3")	None		XX				
VR U van (steel) (5'3")	Shorten sides, narrow doors		V, MFN louver vans EFN explosives van				
VR T refig van (5'3")	Shorten sides, new ends		PP refig (4-wheel)				
	Body as above, on new underframe		RPN refig (bogie)				

The Turntable

QR C17 4-8-0 (body only)		C17					
	Minor details			NM			
QR PB15 4-6-0		PB15					
QR 1270 diesel		1270					

Three Foot Six Models

QR 1800 railmotor		RM1800					
QR 1800 trailer		TP1800					
QR 1800 commissioners car		RM1800					
QR AAS Sunshine sleeper		AAS					
QR AL Sunshine coach		AL (SE)					

Vehicle	Modifications / kitbash	QGR	SAR	CR	WAGR	TGR	Other
QR AL suburban coach		AL (Sub)					
QR BC Sunshine baggage		BC					
QR BL Sunshine coach		BL (SE)					
QR BL suburban coach		BL (Sub)					
QR DC Sunshine diner		DC					
QR FBS Sunshine sleeper		FBS					
QR MMV Lander brake		MMV					
QR MV Sunshine brake		MV					
QR SX suburban coach		SX					
QR SXV suburban brake		SXV					
QR BC baggage		BC					
QR BCF furniture		BCF					
QR BLC van (original)		BLC					
QR BLC (modified)		BLC					
QR C van 26'		C					
QR C van 30'		C					
QR C van 32'		C					
QR CH covered wagon		CH					
QR CJ van		CJ					
QR CJF / CJFF van		CJF / CJFF					
QR CMIS insulated van		CMIS					
QR CMR refrigerated van		CMR					
QR CR semi-refrig van		CR					
QR CWM camp van		CWM					
QR HJC cement		HJC					
QR HJS open		HJS					
QR HO open		HO					
QR HSA open		HSA					
QR HWA open		HWA					
QR PE flat		PE					
QR PYC containers		PYC					
QR QLX (original)		QLX					
QR QLX (modified)		QLX					
QR QRPC power pack for PYC		QRPC					
QR S flat (20', 26', 30', 32' or 40' to order)		S					

