

OPTION AND SPECIFICATION MANUAL

**NSR12N2, NSR16N2, NSR20N2
NSR12N2I, NSR16N2I, NSR20N2I
NSR16N2S, NSR20N2S, NSR12N2TF**



The order portal is leading and decides whether options can be added to trucks and if combinations of options are possible. This manual is a quick reference and for information purposes only.

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1 Introduction

This Option and Specification Manual is a sales tool, which is primarily intended to help, and partly also inspire, in creating application solution proposals, as well as to offer valid configurations and specifications.

For full details on the usage of individual features and functions, always refer to the corresponding Operation and Maintenance Manual (also known as 'Instruction Handbook'). This handbook is also always available in an English language version under the same heading/folder where this manual is located on your Dealer Support Site (DSS).

NOTE: Considering the extensive scope of information, it is advisable to view this manual in electronic format and use the free text search (CTRL + F) to be able to find all the dependencies (footnotes).

For example, with keyword 'speed', you can find information in, for example, Technical specifications, Standard configuration, and several of the option chapters.

2 Technical specifications

2.1 NSR12N2(I), NSR16N2(I), NSR20N2(I)

1 CHARACTERISTICS				NSR12N2	NSR16N2	NSR20N2	NSR12N2I	NSR16N2I	NSR20N2I	
1.1	Manufacturer			Cat Lift Trucks	Cat Lift Trucks	Cat Lift Trucks	Cat Lift Trucks	Cat Lift Trucks	Cat Lift Trucks	
1.2	Manufacturer's model designation			NSR12N2	NSR16N2	NSR20N2	NSR12N2I	NSR16N2I	NSR20N2I	
1.3	Power source (battery, diesel, LP gas, petrol)			Battery	Battery	Battery	Battery	Battery	Battery	
1.4	Operator type			Stand-in	Stand-in	Stand-in	Stand-in	Stand-in	Stand-in	
1.5	Load capacity	[kg]	Q	1,250	1,600	2,000	1,250	1,600	2,000	
1.6	Load center distance	[mm]	c	600	600	600	600	600	600	
1.8	Load wheel axle to fork face (forks lowered)	[mm]	x	800	800	800	800	800	800	
1.9	Wheelbase	[mm]	y ¹	1,422	1,496	1,545	1,501	1,541	1,600	
2 WEIGHT										
2.1a	Truck weight with load, with maximum battery weight	[kg]	1 2	2,682	3,356	4,018	2,875	3,505	4,184	
2.1b	Truck weight without load, with maximum battery weight	[kg]	1 2	1,432	1,756	2,018	1,625	1,905	2,184	
2.2	Axle loadings with nominal load & maximum battery weight, drive / load side	[kg]	1 2	1,127 / 1,555	1,389 / 1,967	1,613 / 2,405	1,263 / 1,613	1,494 / 2,012	1,729 / 2,455	
2.3	Axle loadings without load & with maximum battery weight, drive / load side	[kg]	1 2	1,002 / 430	1,229 / 527	1,413 / 605	1,138 / 488	1,334 / 572	1,529 / 655	
3 WHEELS AND TYRES										
3.1	Tyres, drive / load side (Vul = Vulkollan, Trac = Tractothan, SG = Super Grip)			Vul/Vul	Vul/Vul	Vul/Vul	Vul/Vul	Vul/Vul	Vul/Vul	
3.2	Tyre dimensions, drive side	[mm]		250 x 105	250 x 105	250 x 105	250 x 105	250 x 105	250 x 105	

¹ Dimensions vary depending on the battery carriage and mast type.

² Reference value using the standard alternative mast and chassis, highest lift height, and maximum battery weight (465 Ah battery (400 kg) for JN chassis).

				NSR12N2	NSR16N2	NSR20N2	NSR12N2I	NSR16N2I	NSR20N2I	
3.3	Tyre dimensions, load side	[mm]		85 x 70	85 x 70	85 x 70	85 x 70	85 x 70	85 x 70	
3.4	Castor wheel dimensions (diameter x width)	[mm]		150 x 55	150 x 55	150 x 55	150 x 55	150 x 55	150 x 55	
3.5	Number of wheels, load / drive side (x = driven)			4 / 1x + 2 ³	4 / 1x + 2 ³	4 / 1x + 2 ³	4 / 1x + 2 ³	4 / 1x + 2 ³	4 / 1x + 2 ³	
3.6	Track width (center of tyres), drive side	[mm]	b10	662	662	662	662	662	662	
3.7	Track width (center of tyres), load side	[mm]	b11	402	402	392	390	390	375	
4 DIMENSIONS										
4.2a	Height with mast lowered	[mm]	h1	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	
4.2b	Height	[mm]	h1	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	
4.3	Free lift	[mm]	h2	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	
4.4	Lift height	[mm]	h3	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	
4.5	Height with mast extended	[mm]	h4	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5	
4.6	Initial lift	[mm]	h5	—	—	—	110	110	110	
4.7	Height to top of overhead guard	[mm]	h6	2,310	2,310	2,310	2,310	2,310	2,310	
4.8	Seat or stand height	[mm]	h7	230	230	230	230	230	230	
4.10	Height of support legs	[mm]	h8	82	80	83	87	87	87	
4.15	Fork height, fully lowered	[mm]	h13	89	89	90	93	93	93	
4.19	Overall length with forks	[mm]	l1 ⁴	1,995	2,069	2,118	2,073	2,113	2,173	
4.20	Length to fork face	[mm]	l2 ⁴	825	899	948	903	943	1,003	
4.21	Overall width	[mm]	b1	940	940	940	940	940	940	
4.22	Fork dimensions (thickness, width, length)	[mm]	s/e/l	70 / 180 / 1,170	70 / 180 / 1,170	70 / 195 / 1,170	70 / 180 / 1,170	70 / 180 / 1,170	70 / 195 / 1,170	

³ Tandem load wheels and twin assembly castor wheels.

⁴ Dimensions vary depending on the battery carriage and mast type.

				NSR12N2	NSR16N2	NSR20N2	NSR12N2I	NSR16N2I	NSR20N2I	
4.25	Outside width over forks (minimum / maximum)	[mm]	b5	570	570	570	570	570	570	
4.32	Ground clearance at center of wheelbase, (forks lowered)	[mm]	m2	32	25	23	20	20	20	
4.34	Working aisle width (Ast) with 800 x 1200 mm pallets, load lengthwise	[mm]	Ast ^{5 6}	2,409	2,481	2,527	2,486	2,525	2,556	
4.35	Turning radius	[mm]	Wa ⁵	1,643	1,716	1,761	1,720	1,759	1,790	
5 PERFORMANCE										
5.1	Travel speed, with / without load	[km/h]		10 / 10	10 / 10	9 / 9	9 / 9	9 / 9	9 / 9	
5.1.1	Travel speed, with / without load, backwards	[km/h]		8 / 8	8 / 8	8 / 8	8 / 8	8 / 8	8 / 8	
5.2	Lifting speed, with / without load [Heavy duty option ⁷]	[m/s]	⁵	0.19 / 0.38 [N/A]	0.16 / 0.32 [0.23 / 0.53]	0.12 / 0.22 [0.19 / 0.37]	0.19 / 0.38 [N/A]	0.16 / 0.32 [0.23 / 0.53]	0.12 / 0.22 [0.19 / 0.37]	
5.3	Lowering speed, with / without load [Heavy duty option ⁷]	[m/s]	⁵	0.53 / 0.41 [N/A]	0.43 / 0.41 [0.55 / 0.50]	0.33 / 0.31 [0.50 / 0.42]	0.53 / 0.41 [N/A]	0.43 / 0.41 [0.55 / 0.50]	0.33 / 0.31 [0.50 / 0.42]	
5.8	Maximum gradeability, with / without load	[%]	⁵	9.0 / 9.0	10.2 / 17.4	5.9 / 5.9	9.4 / 17.5	10.2 / 17.4	7.1 / 9.7	
5.9	Acceleration time (over 10 m), with / without load	[s]		6.0 / 5.3	6.9 / 5.9	7 / 6	6.0 / 5.3	6.9 / 5.9	7 / 6	
5.10	Service brake type (mechanical / hydraulic / electric / pneumatic)			Electric	Electric	Electric	Electric	Electric	Electric	
6 ELECTRIC MOTORS										
6.1	Drive motor capacity (60 min. short duty)	[kW]		2.7	2.7	2.7	2.7	2.7	2.7	
6.2	Lift motor output at 15% duty factor [Heavy duty option ⁷]	[kW]		4.0	4.0 [8.0]	4.0 [8.0]	4.0	4.0 [8.0]	4.0 [8.0]	
6.3	Battery according to DIN 43531/35/36, A, B, C, no			DIN cells	DIN cells	DIN cells	DIN cells	DIN cells	DIN cells	
6.4	Battery voltage/capacity at 5-hour discharge	[V/Ah]		24 / 375-775	24 / 375-775	24 / 375-775	24 / 375-775	24 / 375-775	24 / 375-775	
6.5	Battery weight	[kg]		330-610	330-610	330-610	330-610	330-610	330-610	

⁵ Varies depending on the battery carriage and mast type.

⁶ Ast dimensions available in Sections 2.1.1 and 2.1.2.

Ast formulas:

$$Ast = Wa + R + a$$

Ast = full case/definition of min. stacking/working aisle width requirement

Wa = Turning radius

a = Safety clearance = 2 x 100 mm

$$R = \sqrt{((l6-x)^2 + (b12/2)^2)}$$

l6 = load length

b12 = load width

⁷ With the Lift motor 8.0 kW option (LFT/MTR80). The improvement with the Heavy duty option is approx. 30-60 %.

				NSR12N2	NSR16N2	NSR20N2	NSR12N2I	NSR16N2I	NSR20N2I
6.6a	Energy consumption according to EN16796 ⁸	[kWh/h]	⁹	0.87	0.87	0.87	0.87	0.87	0.87
MISCELLANEOUS									
8.1	Type of drive control			AC	AC	AC	AC	AC	AC
10.7	Noise level at operator's ear	[dB (A)]		< 70	< 70	< 70	< 70	< 70	< 70

2.1.1 Extra Ast dimensions, VDI2198 ¹⁰ (4.34a) for NSR12N2(I), NSR16N2(I) and NSR20N2(I)

Basic capacity, kg		1250	1600		2000	
Chassis / Battery carriage		Junior / BC 465	Junior / BC 465	Senior / BC 775	Junior / BC 465	Senior / BC 775
Mast type	Initial lift					
Duplex	No	2,409	N/A	N/A	N/A	N/A
Duplex with free lift	No	2,409	2,481	2,583	2,527	2,631
Triplex with free lift	No	N/A	2,481	2,583	2,527	2,631
Duplex	Yes	2,486	N/A	N/A	N/A	N/A
Duplex with free lift	Yes	2,486	2,525	2,626	2,556	2,684
Triplex with free lift	Yes	N/A	2,525	2,626	2,556	2,684

2.1.2 Extra Ast dimensions, Ast3 ¹¹ (4.34b) for NSR12N2(I), NSR16N2(I) and NSR20N2(I)

Basic capacity, kg		1250	1600		2000	
Chassis / Battery carriage		Junior / BC 465	Junior / BC 465	Senior / BC 775	Junior / BC 465	Senior / BC 775
Mast type	Initial lift					
Duplex	No	2,243	N/A	N/A	N/A	N/A
Duplex with free lift	No	2,243	2,316	2,417	2,361	2,465
Triplex with free lift	No	N/A	2,316	2,417	2,361	2,465

⁸ The standard EN 16796 energy consumption test cycle is used to produce a reference value which does typically not reflect any normal operation/application, why a real use case typically gives a lower value, more rarely, but sometimes even a higher value.

⁹ This is the reference value for NSR16N2I, the actual value varies according to model, configuration and actual usage pattern.

¹⁰ Ast = Wa + R + a. The Ast VDI 2198 standard definition stipulates a full and sharp 90 degree turn/rotation inside the aisle before moving in to the racking/pallet, and with a total play of 200 mm.

¹¹ Ast3 = Wa+16-x+a. The Ast3 is a legacy Ast measure based on practical experience, with a simultaneous turn and drive/move during the stacking cycle, and that works well with e.g. Euro pallets.

Basic capacity, kg		1250	1600		2000	
Chassis / Battery carriage		Junior / BC 465	Junior / BC 465	Senior / BC 775	Junior / BC 465	Senior / BC 775
Mast type	Initial lift					
Duplex	Yes	2,320	N/A	N/A	N/A	N/A
Duplex with free lift	Yes	2,320	2,359	2,460	2,390	2,518
Triplex with free lift	Yes	N/A	2,359	2,460	2,390	2,518

2.2 NSR16N2S, NSR20N2S, NSR12N2TF

1 CHARACTERISTICS				NSR16N2S	NSR20N2S	NSR12N2TF
1.1	Manufacturer			Cat Lift Trucks	Cat Lift Trucks	Cat Lift Trucks
1.2	Manufacturer's model designation			NSR16N2S, wide straddle	NSR20N2S, wide straddle	NSR12N2TF, telescopic forks
1.3	Power source (battery, diesel, LP gas, petrol)			Battery	Battery	Battery
1.4	Operator type			Stand-in	Stand-in	Stand-in
1.5	Load capacity	[kg]	Q	1,600	2,000	1,200
1.6	Load center distance	[mm]	c	400 - 600	400 - 600	400 - 600
1.8	Load wheel axle to fork face (forks lowered)	[mm]	x	600 / 800	600 / 800	714 (314 - 864)
1.9	Wheelbase	[mm]	y ¹²	$\sum 736 + x^{13}$	$\sum 776 + x^{13}$	$\sum 826 + x^{13}$
2 WEIGHT						
2.1a	Truck weight with load, with maximum battery weight	[kg]	^{12 14}	3,205	3,967	3,268
2.1b	Truck weight without load, with maximum battery weight	[kg]	^{12 14}	1,605	1,967	2,068
2.2	Axle loadings with nominal load, drive / load side, max.	[kg]	¹²	1,284 / 1,922	1,577 / 2,390	1,468 / 1,800
2.3	Axle loadings without load, drive / load side, max.	[kg]	¹²	1,124 / 482	1,377 / 590	1,448 / 620

¹² Dimensions vary depending on the battery carriage and mast type.

¹³ x = Straddle length (wheel axle to fork face)

¹⁴ Reference value using the standard mast and standard alternative chassis, highest lift height, and maximum battery weight (465 Ah battery (400 kg) for JN chassis).

				NSR16N2S	NSR20N2S	NSR12N2TF
3 WHEELS AND TYRES						
3.1	Tyres, drive / load side (Vul = Vulkollan, Trac = Tractothan, SG = Super Grip)			Vul/Vul	Vul/Vul	Vul/Vul
3.2	Tyre dimensions, drive side	[mm]		Ø250x105	Ø250x105	Ø250x105
3.3	Tyre dimensions, load side	[mm]		Ø85x70 (Tandem) Ø150x55 (Single)	Ø85x70 (Tandem)	Ø85x70 (Tandem) Ø150x55 (Single)
3.4	Castor wheel dimensions (diameter x width)	[mm]		Ø150x55	Ø150x55	Ø150x55
3.5	Number of wheels, load / drive side (x = driven)			4 / 1x + 2 ¹⁵	4 / 1x + 2 ¹⁵	4 / 1x + 2 ¹⁵
3.6	Track width (center of tyres), drive side	[mm]	b10	651 ± 11	651 ± 11	651 ± 11
3.7	Track width (center of tyres), load side	[mm]	b11	985 / 1,185 (tandem) 955 / 1,155 (single)	985 / 1,185 (tandem)	880 / 1,080 (tandem) 850 / 1,050 (single)
4 DIMENSIONS						
4.2a	Height with mast lowered	[mm]	h1	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5
4.3	Free lift	[mm]	h2	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5
4.4	Lift height	[mm]	h3	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5
4.5	Height with mast extended	[mm]	h4	See mast table in Chapter 5	See mast table in Chapter 5	See mast table in Chapter 5
4.7	Height to top of overhead guard	[mm]	h6	2,310 (2,150 / 2,460)	2,310 (2,150 / 2,460)	2,310 (2,150 / 2,460)
4.8	Seat or stand height	[mm]	h7	230	230	230
4.10	Height of support legs	[mm]	h8	92 (with tandem wheels) (110 with single wheels)	92 (with tandem wheels)	(92 with tandem wheels) 110 (with single wheels)
4.15	Fork height, fully lowered	[mm]	h13	55	55	65
4.19	Overall length with forks ¹⁶	[mm]	l1 ¹⁷	2,089	2,129	2,229
4.20	Length to fork face	[mm]	l2 ¹⁷	939	979	1,029

¹⁵ Tandem load wheels and twin assembly castor wheels.

¹⁶ Fork length = 1,150 for wide straddle models, 1,200 for telescopic forks.

¹⁷ Dimensions vary depending on the battery carriage and mast type.

				NSR16N2S	NSR20N2S	NSR12N2TF
4.21	Overall width	[mm]	b1	1,115 / 1,315 (with tandem wheels) (1,055 / 1,255 with single wheels)	1,115 / 1,315 (with tandem wheels) (single wheels not available)	(1,010 / 1,210 with tandem wheels) 950 / 1,150 (with single wheels)
4.22	Fork dimensions, standard (thickness, width, length)	[mm]	s/e/l	40 / 100 / 1,150	40 / 100 / 1,150	57 / 169 / 1,200
4.23	Fork carriage to ISO 2328, class / form A, B			2 / A	2 / A	3 / A
4.25	Outside width over forks (minimum / maximum)	[mm]	b5	316 / 773	316 / 773	377 / 834
4.26	Width between wheel arms	[mm]	b4	855 / 1,055	855 / 1,055	750 / 950
4.28	Reach travel	[mm]	l4	—	—	850 (450 - 1,000)
4.32	Ground clearance at center of wheelbase, (forks lowered)	[mm]	m2	35 (tandem) 40 (single)	35 (tandem)	35 (tandem) 40 (single)
4.33	Working aisle width (Ast) with 1000 x 1200 mm pallets, load crosswise	[mm]	Ast ^{18 19}	2,481 ²⁰	2,520 ²⁰	2,623 ²¹
4.34	Working aisle width (Ast) with 800 x 1200 mm pallets, load lengthwise	[mm]	Ast ^{18 19}	2,481 ²⁰	2,520 ²⁰	2,587 ²¹
4.35	Turning radius	[mm]	Wa ¹⁸	1,560 ²⁰ 1,754 ²²	1,599 ²⁰ 1,793 ²²	1,758 ²¹ 1,905 ²³
4.37	Length of chassis ²⁴	[mm]	l7 ¹⁸	—	—	1,853 (tandem) 1,848 (single)
5 PERFORMANCE						
5.1	Travel speed, with / without load	[km/h]	25	8 / 8	8 / 8	8 / 8
5.1.1	Travel speed, with / without load, backwards	[km/h]	25	8 / 8	8 / 8	8 / 8

¹⁸ Varies depending on the battery carriage and mast type.

¹⁹ Ast dimensions available in Sections 2.2.1 and 2.2.2.

Ast formulas:

$$Ast = Wa + R + a$$

Ast = full case/definition of min. stacking/working aisle width requirement

Wa = Turning radius

a = Safety clearance = 2 x 100 mm

$$R = \sqrt{((l6-x)^2 + (b12/2)^2)}$$

l6 = load length

b12 = load width

²⁰ x=600

²¹ x=714, l=1,200

²² x=800

²³ x=864, l=1,350

²⁴ $\sum l2+x+110 / 105$ (tandem / single wheels), x=straddle length, 714 mm

²⁵ The speed is reduced to 5 km/h when the lift height exceeds:

1,520 mm (NSR16N2S)

1,440 mm (NSR20N2S)

1,180 mm (NSR12N2TF)

				NSR16N2S	NSR20N2S	NSR12N2TF
5.2	Lifting speed, with / without load [Heavy duty option ²⁶]	[m/s]	²⁷	0.15 / 0.30 [0.24 / 0.40]	0.12 / 0.22 [0.19 / 0.37]	0.15 / 0.26 [²⁸]
5.3	Lowering speed, with / without load [Heavy duty option ²⁶]	[m/s]	²⁷	0.35 / 0.27 [0.45 / 0.30]	0.33 / 0.31 [0.50 / 0.42]	0.38 / 0.38 [²⁸]
5.8	Maximum gradeability, with / without load	[%]	²⁷	7.8 / 7.8	7.6 / 7.6	7.8 / 7.8
5.9	Acceleration time (over 10 m), with / without load	[s]	²⁷	7.0 / 6.0	7.5 / 6.5	6.5 / 5.5
5.10	Service brake type (mechanical / hydraulic / electric / pneumatic)			Electric	Electric	Electric
6 ELECTRIC MOTORS						
6.1	Drive motor capacity (60 min. short duty)	[kW]		2.7	2.7	2.7
6.2	Lift motor output at 15% duty factor [Heavy duty option ²⁶]	[kW]		4.0 [8.0]	4.0 [8.0]	4.0 [8.0]
6.3	Battery according to DIN 43531/35/36, A, B, C, no			DIN-cells	DIN-cells	DIN-cells
6.4	Battery voltage/capacity at 5-hour discharge	[V/Ah]		24 / 375-775	24 / 375-775	24 / 375-775
6.5	Battery weight	[kg]		330-610	330-610	330-610
6.6a	Energy consumption according to EN16796 ²⁹	[kWh/h]	³⁰	0.87	0.87	0.87
MISCELLANEOUS						
8.1	Type of drive control			AC	AC	AC
10.7	Noise level at operator's ear	[dB (A)]		<70	<70	<70

²⁶ With the Lift motor 8.0 kW option (LFT/MTR80).

²⁷ Varies depending on the battery carriage and mast type.

²⁸ Not yet sufficiently tested to be reported specifically, but will expectedly align close to the results of the 2.0-ton wide straddle model (NSR20N2S).

²⁹ The standard EN 16796 energy consumption test cycle is used to produce a reference value which does typically not reflect any normal operation/application, why a real use case typically gives a lower value, more rarely, but sometimes even a higher value.

³⁰ This is the reference value for NSR16N2I, the actual value varies according to model, configuration and actual usage pattern.

2.2.1 Extra Ast dimensions, VDI2198³¹ (4.33a/4.34a) for NSR16N2S, NSR20N2S and NSR12N2TF

Model and Mast Type	NSR16N2S / 160WTFV				NSR20N2S / 200WDTFV				NSR12N2TF / 120WDTFV-TF			
	JN / BC 465		SN / BC 775		JN / BC 465		SN / BC 775		JN / BC 465		SN / BC 775	
Chassis / Battery Carriage												
1.8 Load distance, axle centre to fork face (x, mm)	600	800	600	800	600	800	600	800	714	864	714	864
VDI 2198 - Aisle width (Ast, mm)												
4.33a) Ast for pallets 1000x1200 (l6xb12) - crossways	2,481	2,586	2,582	2,688	2,520	2,625	2,621	2,727	2,623	2,720	2,725	2,821
4.34a) Ast for pallets 800x1200 (b12xl6) - lengthways	2,481	2,520	2,582	2,622	2,520	2,559	2,621	2,661	2,587	2,627	2,689	2,728

2.2.2 Extra Ast dimensions, Ast3³² (4.33b/4.34b) for NSR16N2S, NSR20N2S and NSR12N2TF

Model and Mast Type	NSR16N2S / 160WTFV				NSR20N2S / 200WDTFV				NSR12N2TF / 120WDTFV-TF			
	JN / BC 465		SN / BC 775		JN / BC 465		SN / BC 775		JN / BC 465		SN / BC 775	
Chassis / Battery Carriage												
1.8 Load distance, axle centre to fork face (x, mm)	600	800	600	800	600	800	600	800	714	864	714	864
Ast3 - Aisle width (Ast3, mm)												
4.33b) Ast3 for pallets 1000x1200 (l6xb12) - crossways	2,160	2,154	2,261	2,256	2,199	2,193	2,300	2,295	2,244	2,241	2,346	2,342
4.34b) Ast3 for pallets 800x1200 (b12xl6) - lengthways	2,360	2,354	2,461	2,456	2,399	2,393	2,500	2,495	2,444	2,441	2,546	2,542

³¹ Ast = Wa + R + a. The Ast VDI 2198 standard definition stipulates a full and sharp 90 degree turn/rotation inside the aisle before moving in to the racking/pallet, and with a total play of 200 mm.

³² Ast3 = Wa+l6-x+a. The Ast3 is a legacy Ast measure based on practical experience, with a simultaneous turn and drive/move during the stacking cycle, and that works well with e.g. Euro pallets.

3 Standard configuration

3.1 NSR12N2(I), NSR16N2(I), NSR20N2(I)

	Notes		NSR12N2, NSR12N2I	NSR16N2, NSR16N2I	NSR20N2, NSR20N2I
Nominal capacity		[kg]	1,250	1,600	2,000
Voltage		[V]	24		
Maximum battery capacity		[Ah]	465 - 775		
Chassis (JN = Junior (BC 465), SN = Senior (BC 775))			JN	JN (standard alternative) / SN	JN (standard alternative) / SN
Standard mast (TV = Duplex with clear view mast, TFV = Duplex with full free lift, DTFV = Triplex with full free lift)		[mm]	TV (standard alternative) / TFV	TFV (standard alternative) / DTFV	TFV (standard alternative) / DTFV
Standard lift height		[mm]	3,290	TFV 3,600 / DTFV 4,800	TFV 3,600 / DTFV 4,800
Standard fork length (l/x/b5 ³³)	³⁴	[mm]	1,170 / 800 / 570		
AST VDI 2198 (Load length 1,200 mm)		[mm]	2,409	2,481 / 2,583 (JN / SN)	2,527 / 2,631 (JN / SN)
Mast width		[mm]	684	750	786
Fork carriage width		[mm]	670	730	780
Drive speed with/without load (forks leading)		[km/h]	8		
Drive speed with/without load (forks trailing)		[km/h]	10	9	
Truck length (JN/SN)		[mm]	1,995	2,069 / 2,173 (JN / SN)	2,118 / 2,222 (JN / SN)
Weight without battery	³⁵	[kg]	990 / 1,000 (TV/TFV)	1,100 / 1,150 (TFV / DTFV, JN) 1,125 / 1,175 (TFV / DTFV, SN)	1,250 / 1,450 (TFV / DTFV, JN) 1,275 / 1,475 (TFV / DTFV, SN)
Truck width		[mm]	940		

³³ l = Fork length, x = Straddle length (wheel axle to fork face), b5 = Width across forks

³⁴ Other combinations are available as Option or CSM design. See separate information about fork combinations of l/x in Chapter 9.

³⁵ Additional weight for: Stabilizers=80 kg; Initial lift=160 kg.

	Notes		NSR12N2, NSR12N2I	NSR16N2, NSR16N2I	NSR20N2, NSR20N2I
Truck width with Optional side stabilizers		[mm]	—	940 / 940 (DTFV, JN / SN)	942 / 942 (DTFV, JN / SN)
Height of overhead guard		h6 [mm]	2,310		

As a standard, the truck is supplied with:

Standard display incl. hour meter and battery indicator	Drive motor 2.7 kW AC
Key switch entry	Lift motor: 4.0 kW DC lift motor (S3=15%)
Electric power steering with flexi steering wheel, adjustable in height	Drive wheel: Vulkollan®
Speed regulated lifting and proportional valve for lowering	Load wheel: tandem Vulkollan
Adjustable armrest	Junior (BC 465, standard alternative) or Senior (BC 775) chassis
Storage compartment under armrest	Plastic battery rollers in Junior (BC 465) chassis, steel rollers in Senior (BC 775) chassis
Fingertip controls for lifting/lowering	Initial lift (NSR12/16/20N2I)
Automatic cornering control for safe handling	Battery connector: REMA 160
Chill store design down to -10 °C, with grease nipples in mast and rust protected axles	Speed reduction to 5 km/h when H>1,700 mm
	Overhead guard

3.2 NSR16N2S, NSR20N2S

	Notes		NSR16N2S	NSR20N2S
Nominal capacity		[kg]	1,600	2,000
Voltage		[V]	24	
Maximum battery capacity		[Ah]	465 - 775	
Chassis (JN = Junior (BC 465), SN = Senior (BC 775))			JN (standard alternative) / SN	JN (standard alternative) / SN
Standard mast (TV = Duplex with clear view mast, TFV = Duplex with full free lift, DTFV = Triplex with full free lift)		[mm]	TFV	DTFV

	Notes		NSR16N2S	NSR20N2S
Standard lift height		[mm]	3,600	4,800
Standard fork length (l/x ³⁶)	³⁷	[mm]	1,150 / 800	
Standard width across forks		b5 [mm]	316 - 773	
Standard width between straddles		[mm]	855	
AST VDI 2198 (Load length 1,200 mm, load lengthwise, x=800)		[mm]	2,520 (JN) 2,622 (SN)	2,559 (JN) 2,661 (SN)
Mast width		[mm]	750	786
Fork carriage width		[mm]	840	
Drive speed with/without load (forks leading)		[km/h]	8	
Drive speed with/without load (forks trailing)		[km/h]	8	
Truck length (JN/SN)		l1 [mm]	2,089	2,129
Weight without battery		[kg]	1,094	1,389
Truck width		[mm]	1,115 / 1,315 (with tandem wheels) 1,055 / 1,255 (with single wheels)	1,115 / 1,315
Height of overhead guard		h6 [mm]	2,310	

As a standard, the truck is supplied with:

Standard display incl. hour meter and battery indicator	Wide straddle legs (support legs)
Key switch entry	Drive motor 2.7 kW AC
Electric power steering with flexi steering wheel, adjustable in height as well as horizontally according to the operating position	Lift motor: 4.0 kW DC lift motor (S3=15%)
Speed regulated lifting and proportional valve for lowering	Drive wheel: Vulkollan®
Adjustable armrest	Load wheel: tandem Vulkollan, single available as an alternative for NSR16N2S
Storage compartment under armrest	Junior (BC 465, standard alternative) or Senior (BC 775) chassis
Fingertip controls for lifting/lowering	Plastic battery rollers in Junior (BC 465) chassis, steel rollers in Senior (BC 775) chassis

³⁶ l = Fork length, x = Straddle length (wheel axle to fork face)

³⁷ Other combinations are available as Option or CSM design. See separate information about fork combinations of l/x in Chapter 9.

Automatic cornering control for safe handling

Battery connector: REMA 160

Chill store design down to -10 °C, with grease nipples in mast and rust protected axles

Speed reduction to 5 km/h when H > 1,520 mm for NSR16N2S, or 1,440 mm for NSR20N2S

Overhead guard

3.3 NSR12N2TF

	Notes		NSR12N2TF
Nominal capacity		[kg]	1,200
Voltage		[V]	24
Maximum battery capacity		[Ah]	465 - 775
Chassis (JN = Junior (BC 465), SN = Senior (BC 775))			JN (standard alternative) / SN
Standard mast (TV = Duplex with clear view mast, TFV = Duplex with full free lift, DTFV = Triplex with full free lift)		[mm]	DTFV
Standard lift height		[mm]	4,800
Standard fork length		[mm]	1,200
Standard straddle length	³⁸	[mm]	714
Standard width across forks		[mm]	578
Standard width between straddles		[mm]	750 / 950 (standard alternative)
AST VDI 2198 (Load length 1,200 mm, load lengthwise, x=714)		[mm]	2,587 (JN) 2,689 (SN)
Mast width		[mm]	786
Fork carriage width		[mm]	820
Drive speed with/without load (forks leading)		[km/h]	8
Drive speed with/without load (forks trailing)		[km/h]	8
Truck length (JN/SN)		[mm]	2,229
Weight without battery		[kg]	1,522

³⁸ Straddle length (x) = fork length (l) - 486 mm

	Notes		NSR12N2TF
Truck width		[mm]	1,010 / 1,210 (tandem) 950 / 1,150 (single)
Height of overhead guard		h6 [mm]	2,310

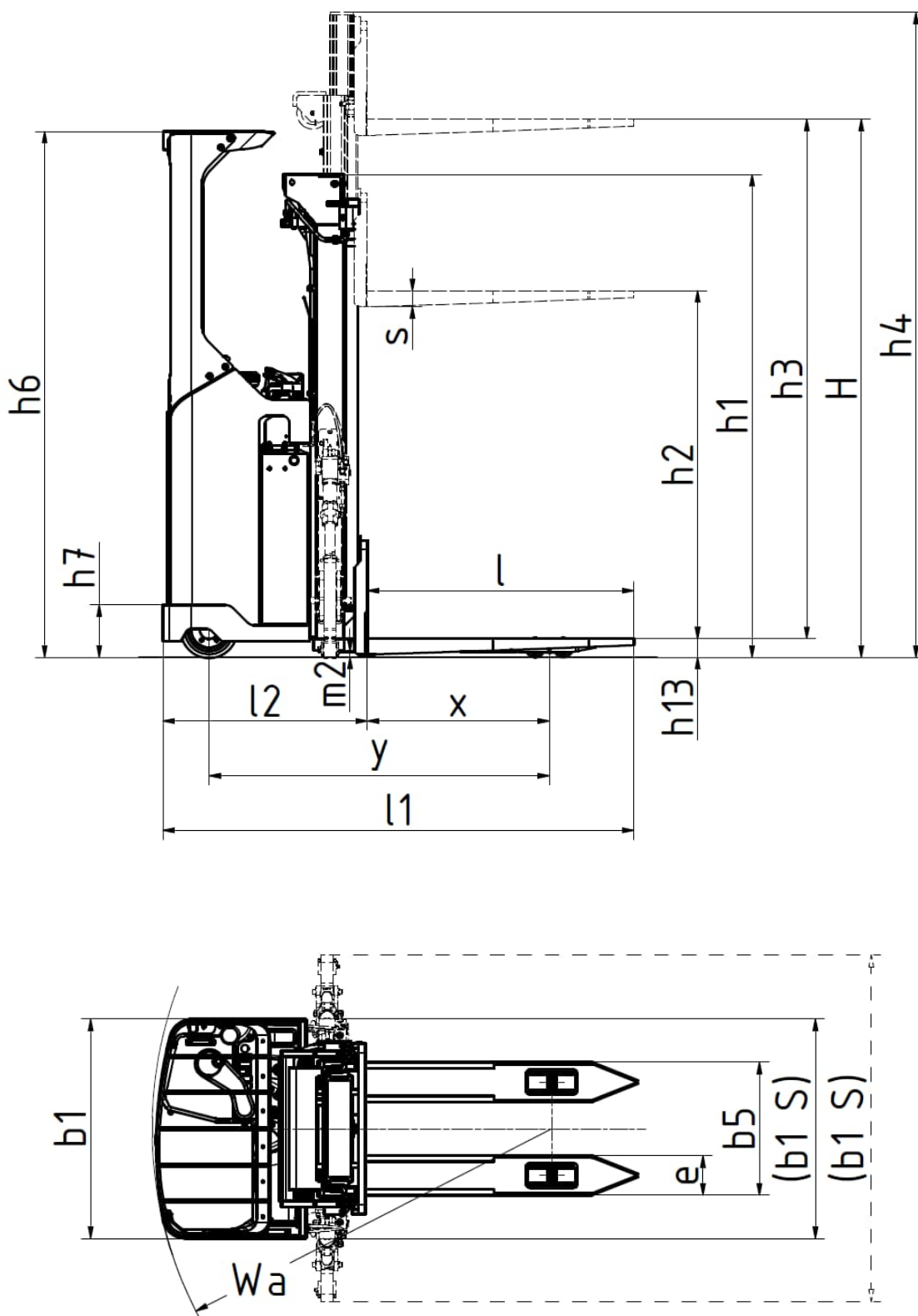
As a standard, the truck is supplied with:

Standard display incl. hour meter and battery indicator	Speed-regulated telescopic forks (KOOI)
Key switch entry	Drive motor 2.7 kW AC
Electric power steering with flexi steering wheel, adjustable in height as well as horizontally according to the operating position	Lift motor: 4.0 kW DC lift motor (S3=15%)
Speed regulated lifting and proportional valve for lowering	Drive wheel: Vulkollan®
Adjustable armrest	Load wheel: single (standard alternative) or tandem Vulkollan
Storage compartment under armrest	Junior (BC 465, standard alternative) or Senior (BC 775) chassis
Fingertip controls for lifting/lowering	Plastic battery rollers in Junior (BC 465) chassis, steel rollers in Senior (BC 775) chassis
Automatic cornering control for safe handling	Battery connector: REMA 160
Chill store design down to -10 °C, with grease nipples in mast and rust protected axles	Speed reduction to 5 km/h when H > 1,180 mm
	Overhead guard

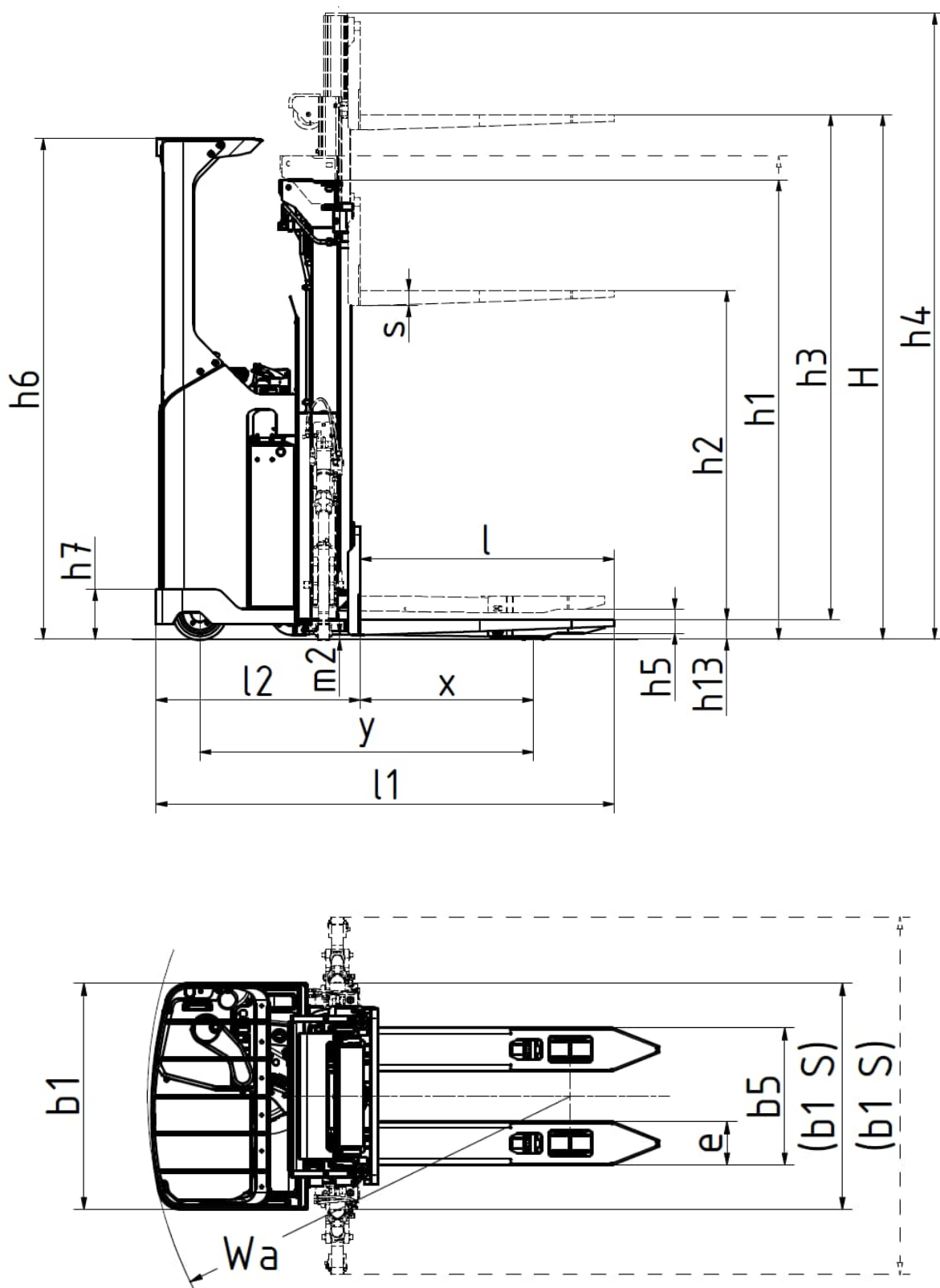
4 Technical drawings

Wa	Turning radius	h1	Height with mast lowered
e	Fork width	h2	Free lift
s	Fork thickness	h3	Lift stroke
l	Fork length	h4	Height of mast extended
b1	Overall width	h5	Initial lift
b1 S	Width with stabilizers retracted/extracted	h6	Height of overhead guard
b1 Min	Minimum width	h7	Seat or stand height
b4	Width between straddles	h8	Height of wheel arms (support legs)
b5	Width across forks	h13	Lowered fork height
l1	Overall length with fork	H	Lift height (h3+h13)
l2	Length to fork face	m2	Ground clearance, centre of wheelbase
l4	Reach travel	x	Load distance, axle to fork face
l7	Length of chassis	y	Wheelbase

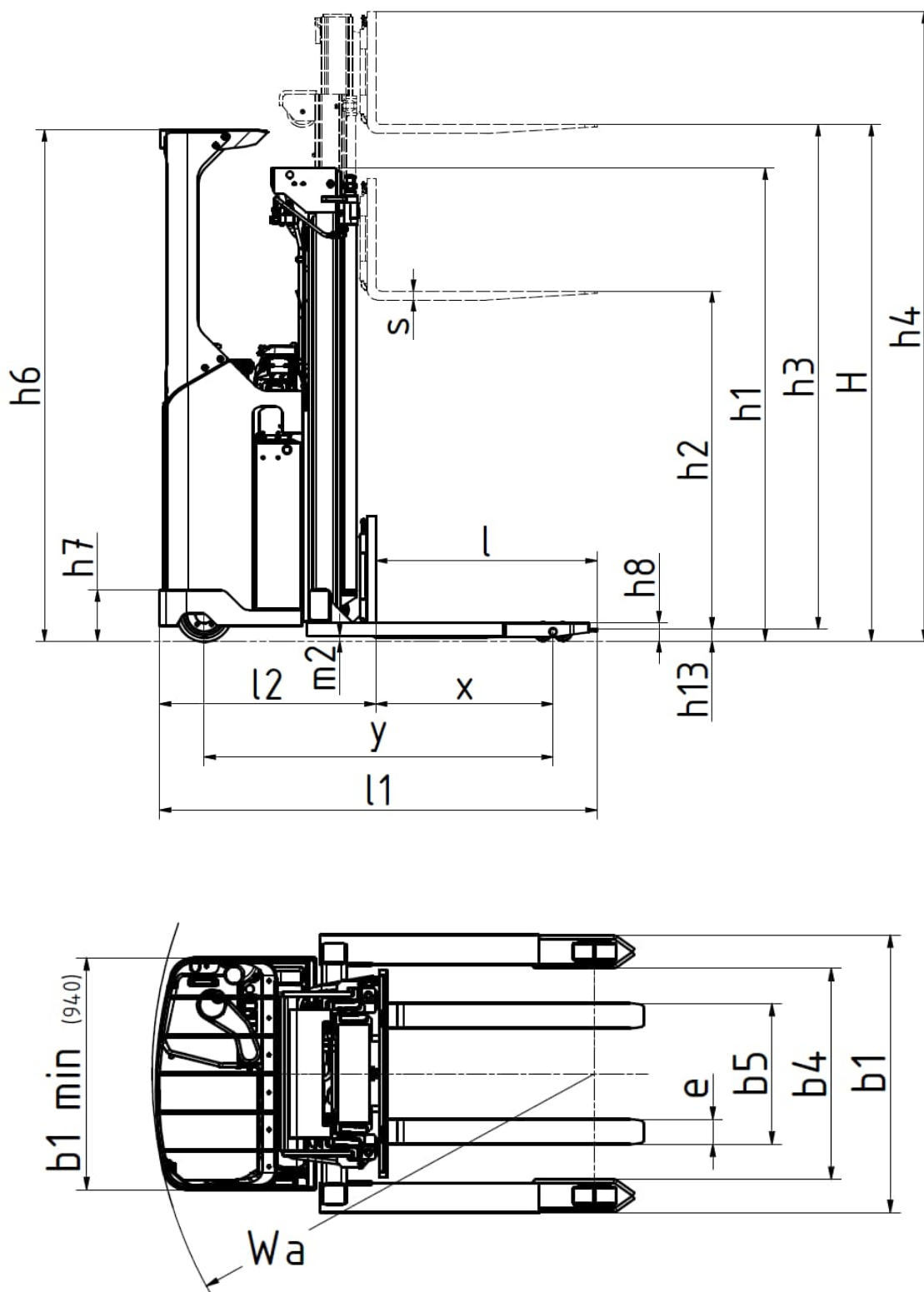
4.1 Technical drawings for NSR12N2, NSR16N2 and NSR20N2



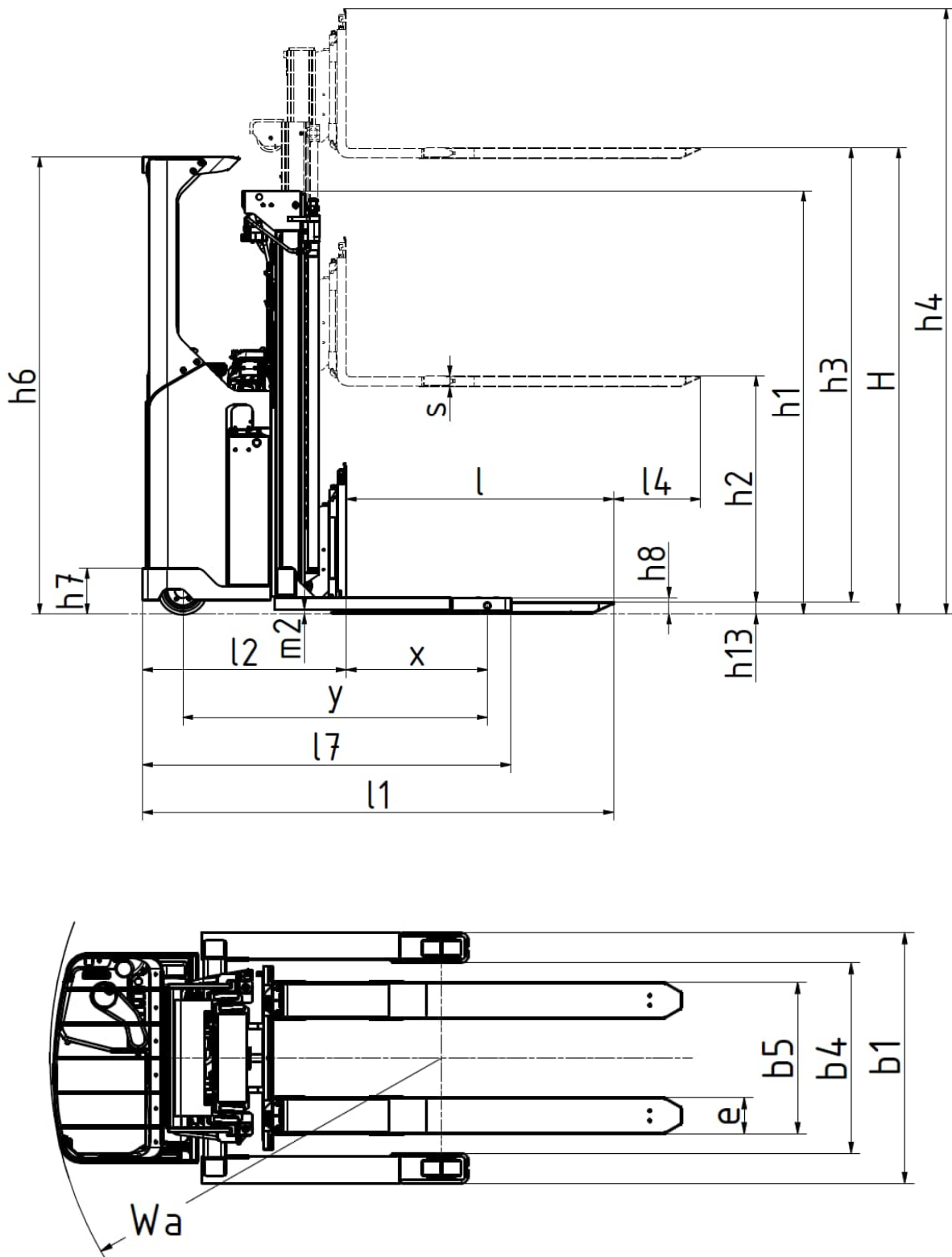
4.2 Technical drawings for NSR12N2I, NSR16N2I and NSR20N2I



4.3 Technical drawings for NSR16N2S and NSR20N2S



4.4 Technical drawings for NSR12N2TF



5 Mast charts

TV	Duplex with clear view mast (DS)
TFV	Duplex with clear view and full free lift (DEV)
DTFV	Triplex with clear view and full free lift (TREV)
h3+h13	Lifting height (floor to top of fork)
h1	Lowered mast height (aka closed mast height)
h4	Raised mast height
h2+h13	Full free lift

5.1 NSR12N2(I)

Mast type		h3+h13	h1 ³⁹	h4 ³⁹	h2+h13 ⁴⁰
Narrow	CODE	[mm]	[mm]	[mm]	[mm]
Duplex with clear view mast (TV)	TV329	3,290	2,157	3,720	159 (h2=70)
	TV359	3,590	2,307	4,020	159 (h2=70)
	TV419	4,190	2,607	4,620	159 (h2=70)
Duplex with full free lift (TFV)	TFV329	3,290	2,157	3,720	1,726
	TFV359	3,590	2,307	4,020	1,876
	TFV419	4,190	2,607	4,620	2,176

Other lift heights are CSM (TVXXX-CSM, TFVXXX-CSM).

³⁹ Add 5 mm for models with initial lift.

⁴⁰ Add 4 mm for models with initial lift.

5.2 NSR16N2(I)

Mast type		h3+h13	h1 ⁴¹	h4 ⁴²	h2+h13 ⁴³
Narrow	CODE	[mm]	[mm]	[mm]	[mm]
Duplex with full free lift (TFV)	TFV360	3,600	2,350	4,105	1,849
	TFV420	4,200	2,650	4,705	2,149
	TFV450	4,500	2,800	5,005	2,299
	TFVXXX	3,600-4,500	—	—	—
Triplex with full free lift (DTFV)	DTFV480	4,800	2,150	5,332	1,669
	DTFV540	5,400	2,350	5,932	1,869
	DTFV570	5,700	2,450	6,232	1,969
	DTFV630	6,300	2,650	6,832	2,169
	DTFV700	7,000 ⁴⁴	2,883	7,532	2,402
	DTFVXXX	4,800-7,000 ⁴⁴	—	—	—

Other lift heights are CSM (TFVXXX-CSM, DTFVXXX-CSM).

⁴¹ Add 5 mm for models with initial lift.

⁴² Add 7 mm for models with initial lift.

⁴³ Add 4 mm for models with initial lift.

⁴⁴ Lift height over 6,300 mm requires Senior chassis (BC775) with lead-acid battery, or Junior chassis (BC465) with Li-ion 370 Ah battery (min weight 460 kg).

5.3 NSR20N2(I)

Mast type		h3+h13	h1 ⁴⁵	h4	h2+h13 ⁴⁶
Narrow	CODE	[mm]	[mm]	[mm]	[mm]
Duplex with full free lift (TFV)	TFV360	3,600	2,350	4,108 ⁴⁵	1,850
	TFV420	4,200	2,650	4,708 ⁴⁵	2,150
	TFV450	4,500	2,800	5,008 ⁴⁵	2,300
	TFVXXX	3,600-4,500	—	—	—
Triplex with full free lift (DTFV)	DTFV480	4,800	2,150	5,335 ⁴⁷	1,670
	DTFV540	5,400	2,350	5,935 ⁴⁷	1,870
	DTFV570	5,700	2,450	6,235 ⁴⁷	1,970
	DTFV630	6,300	2,650	6,835 ⁴⁷	2,170
	DTFV700	7,000 ⁴⁸	2,883	7,535 ⁴⁷	2,403
	DTFVXXX	4,800-7,000 ⁴⁸	—	—	—

Other lift heights are CSM (TFVXXX-CSM, DTFVXXX-CSM).

5.4 NSR16N2S

Mast type		h3+h13	h1	h4	h2+h13
Wide	CODE	[mm]	[mm]	[mm]	[mm]
Duplex with full free lift (TFV)	TFV360	3,600	2,350	4,110	1,815
	TFV420	4,200	2,650	4,710	2,115
	TFV450	4,500	2,800	5,010	2,265
	TFVXXX	3,600-4,500	—	—	—

Other lift heights are CSM (TFVXXX-CSM).

⁴⁵ Add 5 mm for models with initial lift.

⁴⁶ Add 3 mm for models with initial lift.

⁴⁷ Add 4 mm for models with initial lift.

⁴⁸ Lift height over 6,300 mm requires Senior chassis (BC775) with lead-acid battery, or Junior chassis (BC465) with Li-ion 370 Ah battery (min weight 460 kg).

5.5 NSR20N2S

Mast type		h3+h13	h1	h4	h2+h13
Wide	CODE	[mm]	[mm]	[mm]	[mm]
Triplex with full free lift (DTFV)	DTFV480	4,800	2,150	5,335	1,635
	DTFV540	5,400	2,350	5,935	1,835
	DTFV570	5,700	2,450	6,235	1,935
	DTFV630	6,300	2,650	6,835	2,135
	DTFV700	7,000 ⁴⁹	2,883	7,535	2,368
	DTFVXXX	4,800-7,000 ⁴⁹	—	—	—

Other lift heights are CSM (DTFVXXX-CSM).

5.6 NSR12N2TF

Mast type		h3+h13	h1	h4	h2+h13
Wide TF	CODE	[mm]	[mm]	[mm]	[mm]
Triplex with full free lift (DTFV) Telescopic forks	DTFV480	4,800	2,150	5,750	1,225
	DTFV540	5,400	2,350	6,350	1,425
	DTFV570	5,700	2,450	6,650	1,525
	DTFV630	6,300	2,650	7,250	1,725
	DTFVXXX	4,800-6,300	—	—	—

Other lift heights are CSM (DTFVXXX-CSM).

⁴⁹ Lift height over 6,300 mm requires Senior chassis (BC775) with lead-acid battery, or Junior chassis (BC465) with Li-ion 370 Ah battery (min weight 460 kg).

6 Load deration

6.1 NSR12N2(I)

Chassis		NSR12N2(I), LC = 400-600 mm	
Mast type		Junior (BC 465)	
		TV	TFV
H (h3+h13) [mm]	h1 [mm]	Std Capacity [kg]	Std Capacity [kg]
(2,990)		1,250	1,250
3,290	2,157	1,150	1,150
3,590	2,307	1,000	1,000
4,190	2,607	800	800

() = Non-standard mast, only to show capacity.
 LC = Load center

Load deration on request when LC > 600 mm.

6.2 NSR16N2(I), NSR20N2(I)

Minimum lift height H (h3+h13):

NSR16N2(I) TFV =3,600 mm

NSR20N2(I) DTFV =4,800 mm

Lower lift height is special design.

Calculations for optional lift heights between standard:

Model	Mast type	Mast height (h1) ⁵⁰	Lift height (h3+h13)	Free lift (h2)
NSR16N2(I), NSR20N2(I)	TFV	H/2+550 mm	2 (h1-550) mm	h1-590 mm
	DTFV	H/3+550 mm	3 (h1-550) mm	h1-570 mm

For example, to adapt a mast to get the maximum lift height with a restricted doorway height, you can start from h1 and calculate backwards. However, you must always take into consideration if there are other restrictions in addition. For example, on machines with OHG, the h6 measurement can be critical/decisive. Raised support legs are very important to think about, and even the load may of course stick up higher.

If we need a mast for a truck to pass a 2.0 m high doorway, we can use the formula in the middle of the table. In that case, a truck with fixed support legs should not have an h1 dimension greater than 1,950 mm.

Example with models with no initial lift (H = h3+h13):

TFV: $2 \times (1,950 - 550) = 2,800$, i.e. H=2,800 mm

DTFV: $3 \times (1,950 - 550) = 4,200$, i.e. H=4,200 mm

The mast comes through the door opening, but with an h6 of 2,283 mm, no model variant with OHG may pass.

Example with initial lift models (H = h3+h13):

Initial lift down:

TFV I: $2 \times (1,950 - 5 - 550) = 2,790$, i.e. H=2,790 mm

DTFV I: $3 \times (1,950 - 5 - 550) = 4,185$, i.e. H=4,185 mm

NOTE: Risky and not recommended to rely on the support legs always being down.

Initial lift up:

TFV I: $2 \times (1,950 - 110 - 550) = 2,580$, i.e. H=2,580 mm

DTFV I: $3 \times (1,950 - 110 - 550) = 3,870$, i.e. H=3,870 mm

⁵⁰ h1/H/h4 increases by 110 mm when straddle legs in upper position, and 5 mm in lower position.

6.2.1 Load deration Q (kg), TFV mast

Load deration based on load evenly spread along the forks.

Lift height H (h3+h13) [mm]	Lowered mast height h1 [mm] ⁵¹	NSR16N2(I) with TFV mast, LC = 400-600 mm		NSR20N2(I) with TFV mast, LC = 400-600 mm	
		Junior (BC465) with lead-acid battery or 222/296 Ah li-ion battery	Junior (BC465) with 370 Ah li-ion battery ⁵² , or Senior (BC 775) with lead-acid battery	Junior (BC465) with lead-acid battery or 222/296 Ah li-ion battery	Junior (BC465) with 370 Ah li-ion battery ⁵² , or Senior (BC 775) with lead-acid battery
		Std Capacity [kg]	Std Capacity [kg]	Std Capacity [kg]	Std Capacity [kg]
(2,500)		1,600	1,600	2,000	2,000
(2,800)				1,850	
(2,900)				1,400	1,600
(3,100)		1,400			
(3,200)		1,200	1,350	1,400	1,500
3,600	2,350			950	1,150
4,200	2,650	850	1,000	1,000	1,175
4,500	2,800				

() = Non-standard mast, only to show capacity.

LC = Load center

Calculating residual capacities depending on load center, TFV mast

Residual capacities depending on load center, TFV mast			
Load center [mm]	400-600	601-700	701-800
Capacity ratio	100%	85%	75%
Example: NSR20N2 Senior, TFV mast, H=4,500 Std	1,175 kg	990 kg ⁵³	880 kg ⁵³

Load deration on request when LC > 800 mm.

⁵¹ With initial lift, add 5 mm.

⁵² 370 Ah lithium-ion battery is ballasted to the same min. weight as a lead-acid battery for Senior BC775 (460 kg).

⁵³ If applied round-down to the nearest 10 kg.

6.2.2 Load deration Q (kg), DTFV mast

Load deration based on load evenly spread along the forks.

Lift height H (h3+h13) [mm]	Lowered mast height h1 [mm] ⁵⁵	NSR16N2(I) with DTFV mast, LC = 400-600 mm				NSR20N2(I) with DTFV mast, LC = 400-600 mm			
		Junior (BC465) with lead-acid battery or 222/296 Ah li-ion battery		Junior (BC465) with 370 Ah li-ion battery ⁵⁴ or Senior (BC 775) with lead-acid battery		Junior (BC465) with lead-acid battery or 222/296 Ah li-ion battery		Junior (BC465) with 370 Ah li-ion battery ⁵⁴ , or Senior (BC 775) with lead-acid battery	
		Std Capacity [kg]	Stabilizers Capacity [kg]	Std Capacity [kg]	Stabilizers Capacity [kg]	Std Capacity [kg]	Stabilizers Capacity [kg]	Std Capacity [kg]	Stabilizers Capacity [kg]
(2,800)		1,600	1,600	1,600	1,600	2,000	2,000	2,000	2,000
(3,200)						1,800			
(3,600)		1,400		1,650					
(4,350)		1,050		1,300					
4,800	2,150	850	1,500	1,050		1,100		1,200	
(5,250)		700	1,300	800	1,400	950	1,850	1,050	
5,400	2,350					900		1,800	1,000
5,700	2,450	600	1,200	700	1,300	800	1,650	900	1,850
6,300	2,650	450	1,000	550	1,000	600	1,250	700	1,500
7,000	2,883			400	650			450	1,000

() = Non-standard mast, only to show capacity.

LC = Load center.

Stabilizers are optional, available only in combination with DTFV mast.

Calculating residual capacities depending on load center, DTFV mast

Residual capacities depending on load center, DTFV mast			
Load center [mm]	400-600	601-700	701-800
Capacity ratio	100%	85%	75%
Example: NSR16N2 Junior, DTFV mast, H=5,400 Std	700 kg	590 kg ⁵⁶	520 kg ⁵⁶

Load deration on request when LC > 800 mm.

⁵⁴ 370 Ah lithium-ion battery is ballasted to the same min. weight as a lead-acid battery for Senior BC775 (460 kg).

⁵⁵ With initial lift, add 5 mm.

⁵⁶ If applied round-down to the nearest 10 kg.

6.3 NSR16N2S and NSR20N2S

h3+h13 [mm]		NSR16N2S		NSR20N2S	
		JN / BC 465	SN / BC 775	JN / BC 465	SN / BC 775 ⁵⁷
		LC 400-600 mm			
TFV	3,600	1,600	1,600		
	(4,000)	1,600	1,600		
	4,200	1,500	1,550		
	4,500	1,300	1,350		
DTFV	(4,350)			2,000	2,000
	4,800			1,600	1,700
	5,250			1,350	1,450
	5,400			1,250	1,350
	5,700			1,100	1,200
	6,300			800	900
	6,750				700
	7,000				600

() = Non-standard mast, only to show capacity.
LC = Load center

⁵⁷ Load deration valid also for JN chassis with a 370 Ah lithium-ion battery.

6.4 NSR12N2TF

Fork length l, mm		NSR12N2TF with JN (BC 465) or SN (BC 775) chassis							
		800		1,000		1,200		1,350	
		Single	Double	Single	Double	Single	Double	Single	Double
h3+h13 [mm]		LC 400	LC 400	LC 500	LC 550	LC 600	LC 650	LC 600	LC 750
DTFV	(3,600)	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
	(4,000)	1,000	1,000	1,200	1,200	1,200	1,200	1,200	1,000
	(4,300)	800	800	1,200	1,000	1,200	1,000	1,200	800
	4,800	800	800	1,000	800	1,000	800	1,000	800
	5,400	500	500	800	500	800	500	800	500
	5,700	500	500	500	500	500	500	500	500
	6,300	400	400	400	400	400	400	400	400

() = Non-standard mast, only to show capacity.
LC = Load center

6.4.1 Telescopic fork lengths

Fork position	Fully retracted	Extension stroke *	Fully extended
Fork lengths l, mm	800	450	1,250
	1,000	650	1,650
	1,200	850	2,050
	1,350	1,000	2,350

* Telescopic fork overlap is 350 mm

7 Initial lift parameters and double pallet handling (NSR12N2I, NSR16N2I and NSR20N2I)

Standard specification, initial lift models

NOTE: Not in combination with increased drive speed (SPEED/I).

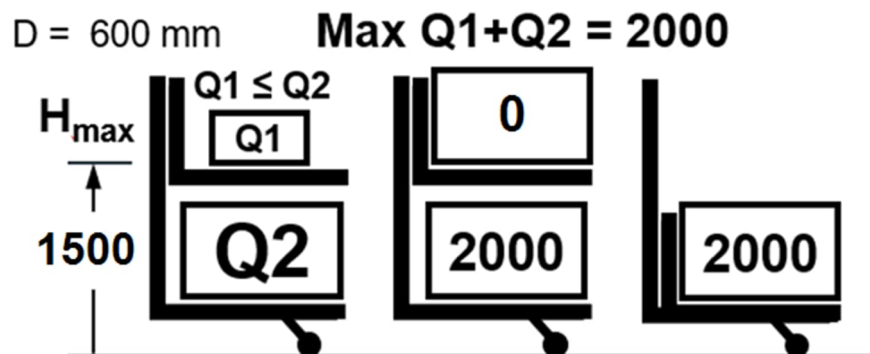
h1/H/h4 increases by 110 mm when straddle legs in upper position and 5 mm in lower position.

Mast type	Chassis	NSR12N2I		NSR16N2I				NSR20N2I			
		TV	TFV	TFV		DTFV		TFV		DTFV	
		Junior (BC 465)	Junior (BC 465)	Senior (BC 775)	Junior (BC 465)	Senior (BC 775)	Junior (BC 465)	Senior (BC 775)	Junior (BC 465)	Senior (BC 775)	
Ast	[mm]	2,486	2,525	2,626	2,525	2,626	2,556	2,684	2,556	2,684	
I / x / b5 ⁵⁸	[mm]	1,170 / 800 / 570									
h13	[mm]	93 (90-93)									

Double pallet handling

In addition to the load deration tables in Chapter 6, the specification below applies for double pallet handling with initial lift.

Possible combinations for double pallet handling Q (kg)



D = Load center

⁵⁸ I = Fork length, x = Straddle length (wheel axle to fork face), b5 = Width across forks

8 Batteries

- Standard
- Option
- Not available

8.1 Option availability

Chassis		Battery 24 V type		Battery capacity		Battery compartment			
Junior BC 465	Senior BC 775	Lead-Acid	Li-ION	Container no	[Ah]	Plastic rollers	Steel rollers	Fixed	Cell type
•	—	•	—	180446	465	•	○	—	DIN
—	•	—	•	—	222 - 370	—	—	•	Prismatic NMC
—	•	•	—	180447	560 - 775	—	•	—	DIN

For large batteries or frequent battery change we recommend steel rollers.
Height of battery roller bed 145 mm.

8.1.1 Lead-acid batteries

Battery	Capacity [Ah]	Option code	Battery container /drawing	Chassis / Battery carriage	Cell type (BS=British Standard)
Exide Classic 24V	465	BW24D465E	180446	Junior BC 465	DIN
	625	BW24D625E	180447	Senior BC 775	
	775	BW24D775E			
Midac 24V	465	BW24D465M	180446	Junior BC 465	DIN
	620	BW24D620M ⁵⁹	180447	Senior BC 775	
	775	BW24D775M ⁵⁹			

⁵⁹ Not available for NSR12N2 and NSR12N2I.

Battery	Capacity [Ah]	Option code	Battery container /drawing	Chassis / Battery carriage	Cell type (BS=British Standard)
Hawker Perfect	465	BW24D465A	180446	Junior BC 465	DIN
	625 ⁶⁰	BW24D625A	180447	Senior BC 775	
	775 ⁶⁰	BW24D775A			
Hawker Water Less	375	BW24W375A	180446	Junior BC 465	DIN
	465	BW24W465A			
	575	BW24W575A	180447	Senior BC 775	
	625 ⁶⁰	BW24W625A			
	775 ⁶⁰	BW24W775A			

8.1.2 Li-ion batteries

Battery	Capacity [Ah]	Option code	Battery container /drawing	Chassis / Battery carriage	Cell type (BS=British Standard)
Li-ion (Li-Pro)^{61 62}	222	BL24D222T	-	Junior BC 465	Prismatic NMC
	296	BL24D296T			
	370	BL24D370T			

8.1.3 Lead-acid chargers

Charger	Option code
Sharp IU1a, High Frequency, Constant Current, 1-phase, 230V	24 V / 45 A ⁶²
	24 V / 60 A ⁶²
	24 V / 80 A
	24 V / 100 A

⁶⁰ Not available for NSR12N2 and NSR12N2I.

⁶¹ Not in combination with Cold store modification (MODCS).

⁶² Not available for Senior (BC775) chassis.

Charger		Option code
Sharp IU1a, HighFrequency, Constant Current, 3-phase, 400V	24 V / 130 A	CHSHF130E
ACCESS IU1a, High Frequency, Constant Current, 1-phase, 230V	24 V / 60 A ⁶³	CHAHF60E
	24 V / 80 A	CHAHF80E
	24 V / 100 A	CHAHF100E
Hawker Life IQ Modular Water Less TC1, 1-phase, 230V	24 V / 30 A ⁶³	CHWIQ30A
	24 V / 35 A ⁶³	CHWIQ35A
	24 V / 50 A ⁶³	CHWIQ50A
	24 V / 70 A	CHWIQ70A
	24 V / 95 A	CHWIQ95A
	24 V / 110 A	CHWIQ110A

8.1.4 Li-ion chargers

Charger		Option code
Li-ion	24 V / 100 A ⁶³	CH24/100T
	24 V / 200 A ⁶³	CH24/200T

8.1.5 Battery options

Battery	Battery option	Option code
Exide Classic	Water Fill Plug 24V, Classic	BQFS24E
	Aqua Level	AQLVL
	Battery acid circulation 24V Exide	BACI24E
Midac	Battery Quick Fill System	BQFS24M
	E-lytelevel indicator	ELYLVL
	Battery acid circulation 24V Midac	BACI24M

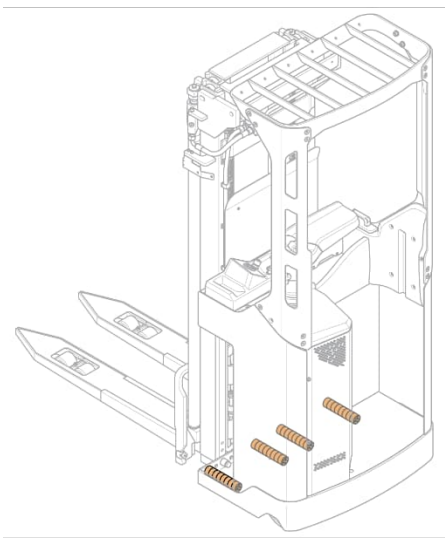
⁶³ Not available for Senior (BC775) chassis.

Battery	Battery option	Option code
Hawker Perfect / Hawker Waterless	Aquamatic BFS	BQFS24A
	Airmatic acid circulation on battery	BACI24A

8.1.6 Charger equipment

Charger equipment		Option code
Li-Ion charger equipment	Easy access charge arm ⁶⁴	EASY/ACCES
For Hawker Waterless	Acid Circulation Charger Side ⁶⁴	CHACI24A

8.2 Option descriptions

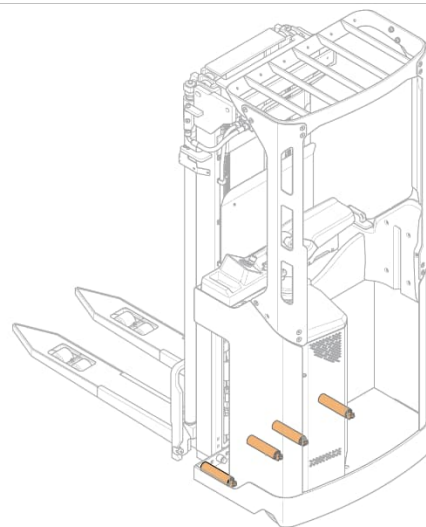
PLASTIC BATTERY ROLLERS	PBATT/ROLL
<p>Plastic rollers, standard in the Junior (BC465) model.</p> <p>NOTE: For large batteries or frequent battery change we recommend steel rollers.</p>	

⁶⁴ Not available for Senior (BC775) chassis.

STEEL BATT ROLLERS WITH BEARINGS

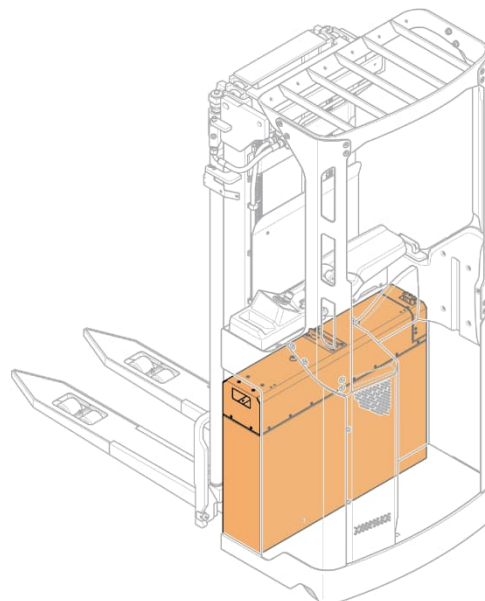
STD SBATT/ROL

Steel rollers for easy and quick battery change.
Steel rollers are standard on the Senior (BC775)
model and optional on the Junior (BC465) model.



LI-ION BATTERY

NOTE: Only Junior (BC 465) size.
Capacity 222 Ah, 296 Ah and 370 Ah.
Battery 370 Ah (ballasted to 460 kg) makes it
possible to get Senior capacity for Load deration
in a Junior-sized truck.
NOTE: Not in combination with Cold store
modification (MODCS).



EASY ACCESS CHARGE ARM	EASY/ACCES
<p>Charger equipment for li-ion batteries. The charge arm is attached to the wall.</p> <p>NOTE: Only for li-ion batteries. Not available for Senior (BC775) chassis.</p>	

9 Fork and straddle options

- Standard
- Option
- Not available

9.1 NSR12N2, NSR16N2, NSR20N2

OPTION	Notes	CODE	NSR12N2	NSR16N2	NSR20N2
Narrow straddle model		NARR/STR	•	•	•
Fork & Straddle Length 1170/800 mm	⁶⁵	L1170S800	• ⁶⁶	•	•
Fork, Straddle Variable Length	⁶⁷	LXXX/SLXX	—	○	○
Fork Width 570 mm	⁶⁵	F/W570	• ⁶⁸	•	•
Variable Fork Width	⁶⁹	F/WXXX	—	○	○

Other fork lengths than 800–1,600 mm are CSM (LXXX/SLXX-CSM).

Other fork widths than 550–660 mm are CSM (F/WXXX-CSM).

9.1.1 Fork/straddle combinations (NSR16N2 and NSR20N2)

COMBINATIONS OF L/X	LXX/SLXX
<p>Combinations of l/x ⁷⁰ with l between 801-1,600 mm are possible as option (only on 1,600 kg and 2,000 kg models)</p> <p>l-x = 370 mm (l ≥ 900 mm)</p> <p>l-x = 300 mm (l < 900 mm)</p> <p>Other combinations of l/x are special design.</p>	

⁶⁵ Standard alternative, included if nothing else specified in the order.

⁶⁶ Other combinations available as CSM only (LXXX/SLXX-CSM).

⁶⁷ Fork length 800–1,600 mm. State the length in the order. See section 9.1.1 for available combinations of l/x. Other lengths than 800–1,600 mm, request as CSM only.

⁶⁸ Other combinations available as CSM only (F/WXXX-CSM).

⁶⁹ Fork width 550–660 mm. State the width in the order. Other fork width than 550–660 mm, request as CSM only.

⁷⁰ l = Fork length, x = Straddle length (wheel axle to fork face)

9.2 NSR12N2I, NSR16N2I, NSR20N2I

OPTION	Notes	CODE	NSR12N2I	NSR16N2I	NSR20N2I
Narrow Straddle Model & Initial Lift		NARR/STR/I	•	•	•
Fork & Straddle Length 1170/800 mm (fork width 570 mm)	⁷¹	L1170S800L	•	•	•

9.3 NSR16N2S, NSR20N2S

OPTION	Notes	CODE	NSR16N2S	NSR20N2S
Wide straddle model			•	•
Fork length 1150 mm	⁷²	L1150	•	•
Fork length 1000 mm		L1000	○	○
Fork length 800 mm		L800	○	○
Variable fork length	⁷³	LXXX	○	○
Straddle length 800 mm	⁷²	SL800	•	•
Straddle length 600 mm		SL600	○	○
Width over forks 316 mm / 468 mm / 621 mm / 773 mm	⁷⁴	F/MW773	•	•
Width between straddles 855 mm (EU standard)	⁷²	S/W855	•	•
Width between straddles 1055 mm (UK standard)		S/W1055	○	○

Other fork lengths than 800–1,400 are CSM (LXXX-CSM).

Other straddle lengths than 600 mm or 800 mm are CSM (SLXXX-CSM).

Other width over forks than 316 mm, 468 mm, 621 mm, and 773 mm is CSM (F/WXXX-CSM).

Other width between straddles than 855 mm or 1,055 mm is CSM (S/WXXX-CSM).

⁷¹ Standard alternative. Other combinations available as CSM only (LXXX/SLFWXX-CSM).

⁷² Standard alternative, included if nothing else specified in the order.

⁷³ Fork length 800–1,400 mm. State the length in the order. Other lengths than 800–1,400 mm, request as CSM only.

⁷⁴ Four user-selectable widths: 316 mm (standard alternative), 468 mm, 621 mm, and 773 mm.

9.4 NSR12N2TF

OPTION	Notes	CODE	NSR12N2TF
Telescopic fork model			•
Fork length 800 mm		L800	○
Fork length 1000 mm		L1000	○
Fork length 1200 mm	⁷⁵	L1200	•
Fork length 1350 mm		L1350	○
Fork width 578 mm	⁷⁵		•
Fork width 688 mm			○
Fork width 842 mm			○
Straddle length = fork length - 486 mm	⁷⁶	SLL1-486	•
Width between straddles 950 mm	⁷⁵	S/W950	•
Width between straddles 750 mm	⁷⁷	S/W750	○

Other fork lengths than 800 mm, 1,000 mm, 1,200 mm, or 1,350 mm are CSM (LXXX-CSM).

Other fork widths than 578 mm, 688 mm, or 842 mm are CSM (F/WXXX-CSM).

Other straddle length than fork length (l) - 486 mm is CSM (SLXXX-CSM).

Other width between straddles than 950 mm or 750 mm is CSM (S/WXXX-CSM).

⁷⁵ Standard alternative, included if nothing else specified in the order.

⁷⁶ Straddle length (x) = fork length (l) - 486 mm. For other lengths, request as CSM only.

⁷⁷ Narrower only to support putting pallets away close enough to the racking pillars, to fit more pallets tighter per each racking beam section (while e.g. EUR pallets will in this case have to be picked up using the telescoping reach in front of the straddles).

10 Carriage options

•	Standard
○	Option
—	Not available
CSM	Available as CSM only

10.1 Option availability

See Option descriptions for details.

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Hydraulic side stabilizers	78 79 80 81	HSS	—	—	○	○	○	○	—	—	—
Hydraulic side stabilizers - dual load ratings	79 80 81 82	HSS/DL	—	—	○	○	○	○	—	—	—
Load backrest		BACKREST	○	○	○	○	○	○	○	○	CSM

⁷⁸ See Section 10.3 Side stabilizers (HSS).

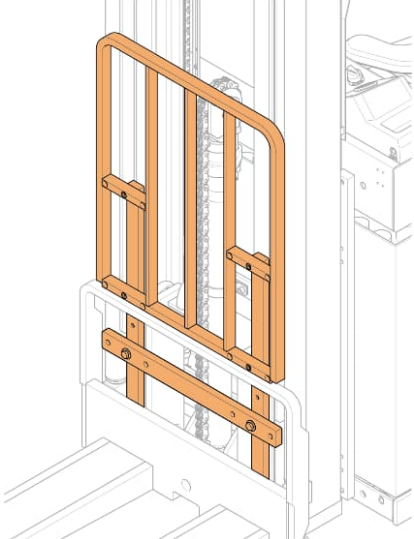
⁷⁹ Only available on DTFV mast.

⁸⁰ Only in combination with Multi function display (MULTI DISPLAY).

⁸¹ Not in combination with Wide straddle or Telescopic forks models.

⁸² See Section 10.4 Side stabilizers - dual load ratings (HSS/DL).

10.2 Option descriptions

LOAD BACKREST	BACKREST
<p>Load backrest height 1,200 mm from top of fork. NOTE: Available for NSR12N2TF as CSM only.</p>	

10.3 Side stabilizers (HSS)

NOTE: Only available on DTFV mast.

NOTE: Only in combination with Multi function display (MULTI DISPLAY).

NOTE: Stabilizers increase the truck width (Std width = 940 mm).

When lifting with the stabilizers not fully extended, the lift stops at the height shown in the table below. A red stabilizer symbol on the display indicates that it is necessary to extend the stabilizers to be able to lift higher.

When the stabilizers are fully extended it is possible to lift to the maximum lift height.

Type	Stabilizer position	Width b1 S [mm]	Fork height for stabilizers to be extended for extra stability and capacity
NSR16N2 DTFV	Retracted	940	Junior (BC 465) 3,200 mm
	Extended	1,488	Senior (BC 775) 3,600 mm
NSR16N2I DTFV	Retracted	954	Junior (BC 465) 3,200 mm
	Extended	1,504	Senior (BC 775) 3,600 mm
NSR20N2 DTFV	Retracted	942	Junior (BC 465) 2,800 mm
	Extended	1,493	Senior (BC 775) 3,200 mm
NSR20N2I DTFV	Retracted	1,030	Junior (BC 465) 2,800 mm
	Extended	1,581	Senior (BC 775) 3,200 mm

To enhance efficient load handling operations, it is possible to simultaneously lift the main lift and extend the stabilizers, and to simultaneously lower the main lift and retract the stabilizers.

When stabilizers are not fully retracted the drive speed is limited to 4 km/h.

10.4 Side stabilizers - dual load ratings (HSS/DL)

The lift height is not limited depending on the status of the stabilizers. Two load deration tables are provided, one is valid when the stabilizers are fully extended and one is valid when they are retracted.

When the lift height reaches a certain height (see the table in Section 10.3) with the stabilizers not fully extended, a red stabilizer symbol on the display indicates that the truck capacity is dependent on the use of the side stabilizers.

NOTE: It is the operator's responsibility to use the stabilizers depending on the weight of the load.

To enhance efficient load handling operations, it is possible to simultaneously lift the main lift and extend the stabilizers, and to simultaneously lower the main lift and retract the stabilizers.

When stabilizers are not fully retracted the drive speed is limited to 4 km/h.

11 Drive and lift control options

- Standard
- Option
- Not available

11.1 Option availability

See Option descriptions for details.

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Lift motor 4.0 kW		D/LFT/MTR40	•	•	•	•	•	•	•	•	•
Lift motor 8.0 kW (Heavy duty)		LFT/MTR80	—	—	○	○	○	○	○	○	○
Increased drive speed 12 km/h	⁸³ ⁸⁴ ⁸⁵	SPEED/I	○	—	○	—	○	—	—	—	—
360 Degree steering	⁸⁶ ⁸⁷	ELEC/S360	○	○	○	○	○	○	○	○	○
Ergo Forks Trailing Control (EFTC)	⁸⁷ ⁸⁸ ⁸⁹	EFTC	○	○	○	○	○	○	○	○	○
Foot protection		FOOT	○	○	○	○	○	○	○	○	○
Reversed steering		REV/S	○	○	○	○	○	○	○	○	○
Key switch entry	⁹⁰	KEY SWITCH	•	•	•	•	•	•	•	•	•
Multi function display		MULTI DISPLAY	○	○	○	○	○	○	○	○	○

⁸³ See the table in Section 11.3 Increased drive speed 12 km/h (SPEED/I).

⁸⁴ Not in combination with initial lift, wide straddle, or telescopic forks.

⁸⁵ Requires option Load weight indicator (LWI).

⁸⁶ Not in combination with Ergo Forks Trailing Control (EFTC).

⁸⁷ Only in combination with option Multi function display (MULTI DISPLAY).

⁸⁸ Not in combination with Foldable seat (SEAT/FOLD) or 360 Degree steering (ELEC/S360).

⁸⁹ Includes option Foot protection (FOOT).

⁹⁰ Key switch is optional in combination with Multi function display (MULTI DISPLAY).

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Lift height indicator	91	LHI	—	—	O	O	O	O	—	O	O
Load weight indicator	92 93	LWI	O	O	O	O	O	O	O	O	O
Lift stop without restart - Duplex mast	94	LIFT/STOP	O	O	O	O	O	O	O	—	—
Lift stop with restart - Duplex mast	93 94	LIFT/STOPR	O	O	O	O	O	O	O	—	—
Lift stop without restart - Triplex mast	94 95	S/LIFT/STOP	—	—	O	O	O	O	—	O	O
Lift stop with restart - Triplex mast	94 96	S/LIFT/STOP/R	—	—	O	O	O	O	—	O	O
Level assistance system	96	LAS	—	—	O	O	O	O	—	O	O
Battery creep		BATT/CREEP	O	O	O	O	O	O	O	O	O

11.2 Option descriptions

LIFT MOTOR 8.0 KW	LFT/MTR80
<p>High performance 8.0 kW AC (heavy duty) lift motor (S3=15%), replaces the standard 4.0 kW DC motor.</p> <p>NOTE: Not available for NSR12N2 and NSR12N2I.</p>	

⁹¹ Only in combination with DTFV mast and Multi function display (MULTI DISPLAY).



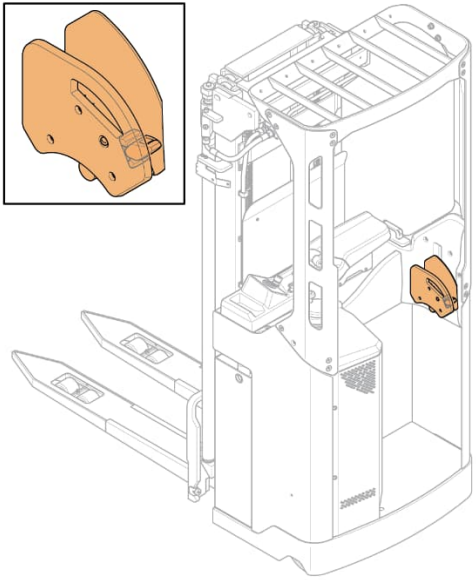
⁹² Not in combination with Cold store modification (MODCS).

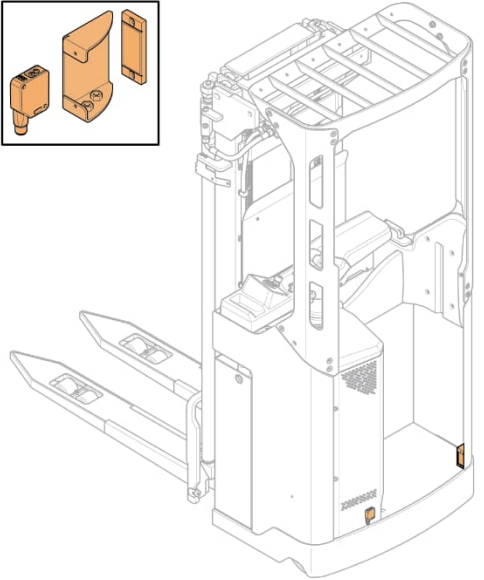
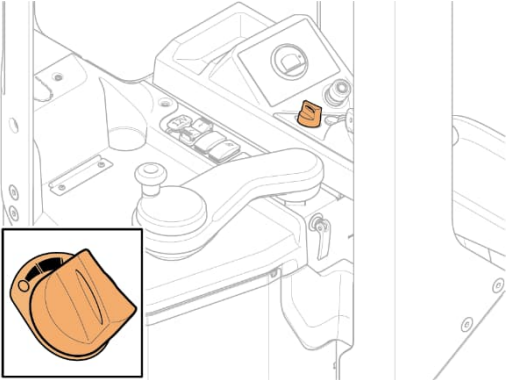
⁹³ Only in combination with Multi function display (MULTI DISPLAY).

⁹⁴ The truck can be equipped with either the 'with restart' option or the 'without restart' option, not both.

⁹⁵ Lift height indicator (LHI) required. Multi function display (MULTI DISPLAY) is not necessary for this option but it is needed if a read-out of the height is required.

⁹⁶ Only in combination with DTFV mast, Multi function display (MULTI DISPLAY) and Lift height indicator (LHI).

360 DEGREE STEERING	ELEC/S360
<p>Replaces 180° steering.</p> <p>NOTE: Not in combination with Ergo Forks Trailing Control (EFTC).</p> <p>NOTE: Only in combination with option Multi function display (MULTI DISPLAY).</p>	<p>180° steering:</p>  <p>360° steering:</p> 
ERGO FORKS TRAILING CONTROL (EFTC)	EFTC
<p>Secondary travel control for longer transports in forward direction (load trailing).</p> <p>This option also includes option Foot protection (FOOT).</p> <p>NOTE: Not in combination with Foldable seat (SEAT/FOLD) or 360 Degree steering (ELEC/S360).</p> <p>NOTE: Only in combination with option Multi function display (MULTI DISPLAY).</p>	

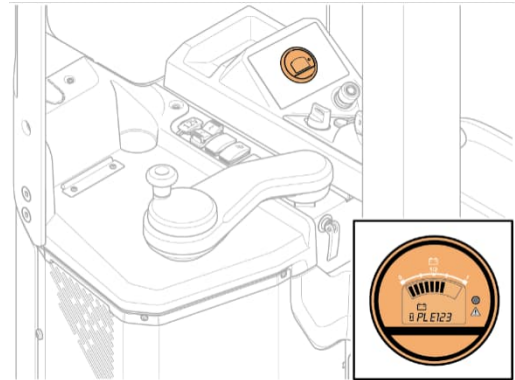
FOOT PROTECTION	FOOT
<p>Recommended safety option. Not possible to drive if the operator's foot is on the entry edge of the floor.</p> <p>If the truck is in motion and the light beam is broken, the truck will, after a short delay, brake and come to a complete stop.</p> <p>This option is included in Ergo Forks Trailing Control (EFTC).</p>	
REVERSED STEERING	REV/S
<p>IMPORTANT: This is only recommended for customers who already have trucks with reversed steering in operation in the existing fleet.</p>	
KEY SWITCH ENTRY	KEY SWITCH
<p>Included in the Standard display. When Multi function display (MULTI DISPLAY) is chosen, Key switch is not included but can be added as an option.</p>	

MULTI FUNCTION DISPLAY

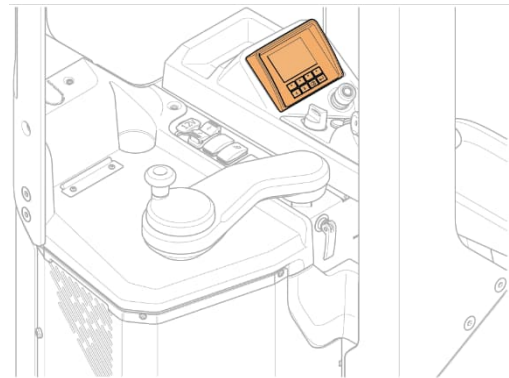
Advanced graphical display with keypad.
 Enables operator interaction with the display.
 Allows PIN code login (replaces Key switch). At delivery, 99 default PIN codes are installed. They can all be changed via TruckTool. A list of the default codes will be available on After Market Portal.
 Shows Battery Discharge Indicator (BDI) and allows selection of Performance category (Power, Eco, Easy).
 Operator instructions shown as icons and graphics.
NOTE: Option Key switch entry (KEY SWITCH) is not included but can be added as an option. Replaces the PIN code login.

MULTI DISPLAY

Standard display:



Multi function display:



LIFT HEIGHT INDICATOR

Indication on the display.
NOTE: Not included in free lift stroke.
NOTE: Only in combination with DTFV mast and Multi function display (MULTI DISPLAY).

LHI



LOAD WEIGHT INDICATOR

Weight indication on the display, indicated in kg.
On the main screen, the weight shows the total (nominal) load weight, accuracy +/- 50 kg.
On the scale screen:

- The first value indicates the net weight for the goods when tared, accuracy +/- 50 kg.
- The second value shows the accumulated net weight since the last reset.

Not active above 1.7 m lift height (H), or when driving, lifting or lowering.

NOTE: Not in combination with Cold store modification (MODCS).

NOTE: Option Multi function display (MULTI DISPLAY) required, not included.

LWI

Main screen:



Scale screen:



LIFT STOP WITHOUT RESTART – DUPLEX MAST	LIFT/STOP
LIFT STOP WITH RESTART – DUPLEX MAST	LIFT/STOPR
LIFT STOP WITHOUT RESTART – TRIPLEX MAST	S/LIFT/STOP
LIFT STOP WITH RESTART – TRIPLEX MAST	S/LIFT/STOP/R

One pre-defined lift stop included in all options. Enter the lift height ($H=h_3+h_{13}$) in the order. The levels can be selected in 100 mm intervals. If needed, the lift stop height for DTFV mast can be changed via TruckTool.

NOTE: When selecting the lift stop height, be aware that the selected lift stop height is the lift height $H = VDI h_3+h_{13}$, while the highest point of the machine when in operation can be either the mast top (h_4), the top of an additional load backrest, or the customer's pallet load height.

In combination with DTFV mast, with Multi function display (MULTI DISPLAY) and Default lift stop with restart, up to 10 different lift-stop heights can be programmed before use in the truck computer via TruckTool.

In combination with TFV mast, only 1 lift stop is possible.

The lowest possible level:

- DTFV-mast $H/3+170$ mm
- TFV-mast $H/2+200$

NOTE: The actual lift stop height (H) is reduced by approx. 110 mm for the TFV mast models, as well as for the initial lift models. The lift stop function of the TFV mast is created with a single/fixed sensor, hence being prone to larger variations in its stop height tolerance.

NOTE: Lift stop options with restart only in combination with Multi function display (MULTI DISPLAY).

NOTE: Not included in free lift stroke.

NOTE: The truck can be equipped with either the 'with restart' option or the 'without restart' option, not both.

NOTE: S/LIFT/STOP requires Lift height indicator (LHI). Multi function display (MULTI DISPLAY) is not necessary for this option but it is needed if a read-out of the height is required.

LEVEL ASSISTANCE SYSTEM LAS

The truck driver can initiate the lifting stop procedure by reducing the lift speed to less than 80 % of the max lift speed 150 mm before the programmed beam level, at the latest. A display indication will notify the driver that the automated lifting stop process started. A "double beep" indicates that the lift has stopped at the selected lift stop height.

The driver will need to keep the lift lever in position 1 ≤ 80 % lift speed. The lift function then gradually slows down the lift speed and stops the forks at the programmed height.

Bypass of programmed level(s) is done when the lift speed is > 80 % of the max lift speed.

NOTE: No levels can be programmed within free lift stroke.

The lowest possible level for lift stop: H/3+170 mm

Levels must be programmed in the truck computer before use. Up to 10 levels in each of four different zones can be programmed.

NOTE: Only in combination with DTFV mast, Multi function display (MULTI DISPLAY) and Lift height indicator (LHI).

The minimum distance between levels is 150 mm (recommended distance > 1000 mm between levels).

Levels must be programmed in the truck computer before use. Up to 10 levels in each of four different environments (user-definable zones A, B, C and D) can be programmed.

The target level can be selected separately with the function keys every time a raise command is given.

Example:
 Target level B7 selected.
 Green background indicates that the target level is reached.



BATTERY CREEP SPEED (LIMP HOME, SAFETY FUNCTION) BATT/CREEP

When the battery is at low state of charge the travel speed is limited to default 3 km/h.

DoD (depth of discharge):

- Lead-acid 15 %
- Li-ion 7 %

11.3 Increased drive speed 12 km/h (SPEED/I)

NOTE: Not in combination with initial lift, wide straddle, and telescopic forks.

NOTE: Requires option Load weight indicator (LWI).

		NSR12N2	NSR16N2		NSR20N2	
Chassis		Junior (BC 465)	Junior (BC 465)	Senior (BC 775)	Junior (BC 465)	Senior (BC 775)
Load weight	[kg]	0-1,000	0-800	0-500	0-500	0-200
Speed (load trailing)	[km/h]	12	12	12	12	12
Speed (load leading)	[km/h]	10	10	10	10	10

With loads over the load weight given in the table, the top speed is automatically reduced to standard speed to secure the braking performance and maintain safety.

12 Electrical options

- Standard
- Option
- Not available

12.1 Option availability

See Option descriptions for details.

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Floor spot red on headguard	⁹⁷ ⁹⁸	FLR/SRED/O	○	○	○	○	○	○	○	○	○
Floor spot blue on headguard	⁹⁷ ⁹⁸	FLR/SPOT/O	○	○	○	○	○	○	○	○	○
Warning light	⁹⁷	WARN/LIGHT	○	○	○	○	○	○	○	○	○
Light in cabin (interior light)	⁹⁷	INT/LIGHT	○	○	○	○	○	○	○	○	○
Working lights OHG	⁹⁷	WORK/L/O	○	○	○	○	○	○	○	○	○
Radio with USB socket	⁹⁷ ⁹⁹	RADIO/USB	○	○	○	○	○	○	○	○	○
Mast mounted camera RLED	⁹⁷ ¹⁰⁰ ¹⁰¹	M/CAM/RLED	—	—	○	○	○	○	—	○	—
Laser positioning guide	⁹⁹ ¹⁰²	LASER/POS	—	—	○	○	○	○	—	—	—
Converter 24 - 12 V		DC24/12	○	○	○	○	○	○	○	○	○

⁹⁷ Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).

⁹⁸ Either FLR/SRED/O or FLR/SPOT/O can be selected, not both.

⁹⁹ Not in combination with Cold store modification (MODCS).

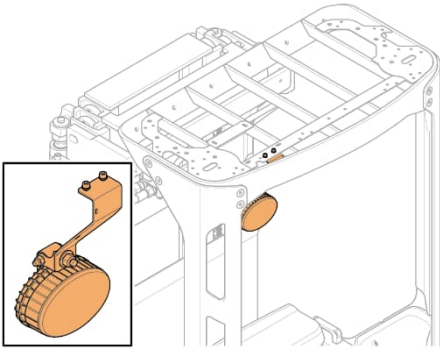
¹⁰⁰ DTFV mast only. Not in combination with telescopic forks.

¹⁰¹ Not in combination with Laser positioning guide (LASER/POS).

¹⁰² Not in combination with Mast mounted camera RLED (M/CAM/RLED).

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
12V DC Power socket		12V CONN	O	O	O	O	O	O	O	O	O
5V USB socket		USB	O	O	O	O	O	O	O	O	O
Prepared for opportunity charging	¹⁰³	OPP/CHARGE	O	O	O	O	O	O	O	O	O
Antistatic chain		AS/CHAIN	O	O	O	O	O	O	O	O	O
Drive alarm		D/ALARM	O	O	O	O	O	O	O	O	O
Automatic log off	¹⁰⁴ ¹⁰⁵	AUTOLOGOFF	O	O	O	O	O	O	O	O	O
Service alarm		SERV/ALARM	O	O	O	O	O	O	O	O	O

12.2 Option descriptions

FLOOR SPOT RED	FLR/SRED/O
<p>Activated by software in Forward direction (Forks trailing).</p> <p>The lamp is located on the overhead guard and provides a sharp red dot on the floor, approx. 4-6 m in front of the truck to warn other truck drivers and pedestrians.</p> <p>The floor spot cannot be switched off.</p> <p>Increases the overhead guard height (cables +25 mm).</p> <p>NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).</p> <p>NOTE: Either FLR/SRED/O or FLR/SPOT/O can be selected, not both.</p>	

¹⁰³ Not in combination with Li-ion battery.

¹⁰⁴ Not in combination with Key switch entry (KEY SWITCH).

¹⁰⁵ Only in combination with Multi function display (MULTI DISPLAY).

FLOOR SPOT BLUE

FLR/SPOT/O

The same technical information as for Floor spot red (FLR/SRED/O).

The Floor spot blue is now, with regards to photobiological safety, classified in the risk group 2 as per DIN EN 62471 due to the concentrated blue light emittance. A warning label must be permanently attached clearly visible and legible during normal operation, maintenance and service works.

In case the customer has no request of a specific colour, we recommend Floor spot red (FLR/SRED/O) due to safety reasons.

NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).

NOTE: Either FLR/SRED/O or FLR/SPOT/O can be selected, not both.



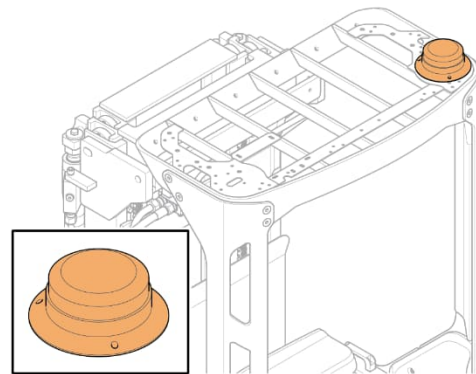
WARNING LIGHT

WARN/LIGHT

Flashes when the operator is present and operates the truck.

Increases the overhead guard height (lamp +60 mm).

NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).



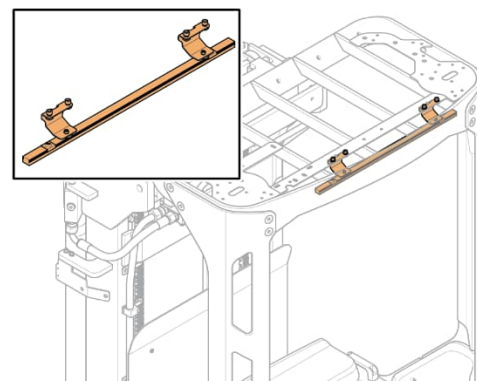
LIGHT IN CABIN (INTERIOR LIGHT)

INT/LIGHT

Light in the driver compartment.

Increases the overhead guard height (cables +25 mm).

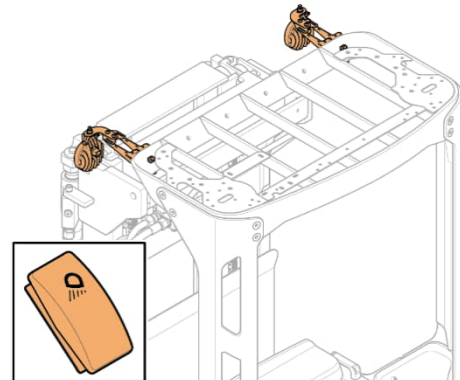
NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).



WORKING LIGHTS

2 lights 4xLEDs each mounted in the overhead guard in fork direction.
Light intensity 1,100 Lumen per lamp. IP 69 rated.
Switched on/off by a button on the dashboard.
Increases the overhead guard height (cables +25 mm).
NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).

WORK/L/O



RADIO WITH USB-PORT

Car stereo with:

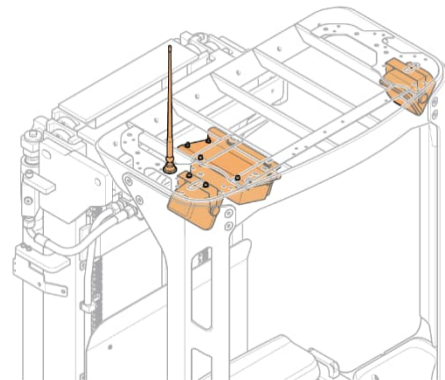
- RDS tuner
- Bluetooth
- USB and Aux-in
- Two loudspeakers

Supports:

- MIXTRAX EZ
- iPod/iPhone Direct Control
- Android

Increases the overhead guard height (foldable antenna +50 to 395 mm).
NOTE: Not in combination with Cold store modification (MODCS).
NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).

RADIO/USB



MAST MOUNTED CAMERA RLED

M/CAM/RLED

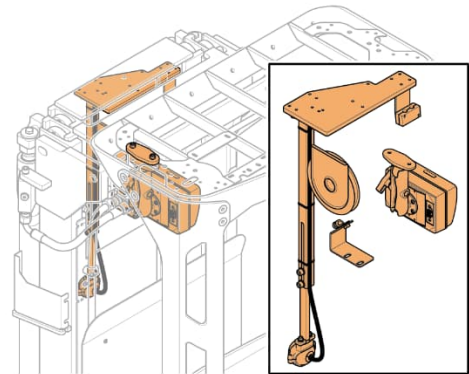
Ball camera in inner mast (only DTFV) and monitor in overhead guard.

Monitor increases the overhead guard height (fasteners +30 mm).

NOTE: Only in combination with Overhead guard prepared for options (OHG/PREP), Mesh metal on overhead guard (MESH/METAL), or Panoramic Provision roof (PAN/ROOF).

NOTE: Not in combination with Laser positioning guide (LASER/POS).

NOTE: In combination with DTFV mast only. Not in combination with telescopic forks.



LASER POSITIONING GUIDE

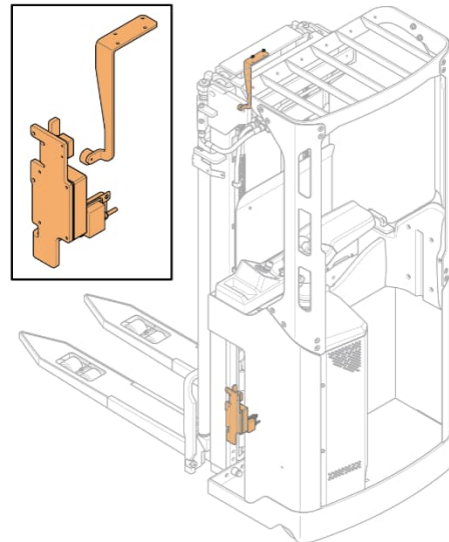
LASER/POS

Horizontal laser beam indication of the forks level along pallet racking storage beams.

Technical specifications	
Wavelength	635-640nm
Output power	6mW
Optics	90°-line optics
Laser Class	2M
Battery pack	5V 10A
Encapsulation	IP66 (dust tight and waterproof)
Operating temperature	-10°C to +40°C
Storage temperature	-10°C to +50°C
Dimensions laser unit	56 x 56mm
Dimensions battery pack	124 x 82 x 40mm (incl. bracket)
IEC 60825-1:2014	Laser Standard
IEC 50081-2 EMC	Generic Emission Standard
IEC 61000-6-2 EMC	Compatibility Standard for Industrial Environments
IEC 61000-4-4 EMC	Electrical Fast Transient/Burst Immunity Test
IEC 61000-4-2 ESD	Electrostatic Discharge Immunity Test

NOTE: Not in combination with Mast mounted camera RLED (M/CAM/RLED) and Cold store modification (MODCS).

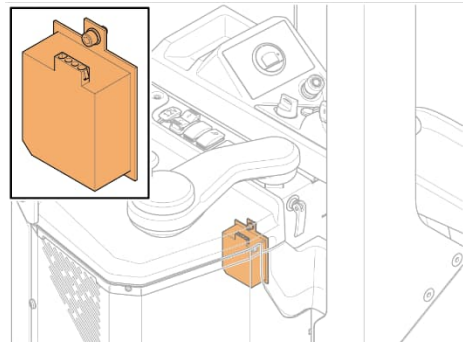
NOTE: Not in combination with wide straddle or telescopic forks.



DC24/12 CONVERTER 24 - 12 V

DC24/12

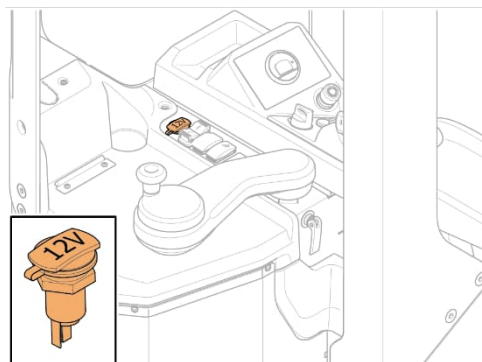
Converts 24V to 12V. Power connection to terminal on Converter.



12V DC POWER SOCKET

12V CONN

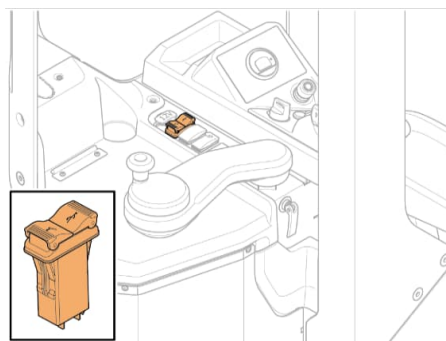
12 V/8 A power outlet on the control panel (between the dashboard and writing surface).
Converter 24V – 12V is included.



5V USB SOCKET

USB

5 V/3 A power outlet on the control panel (between the dashboard and writing surface).

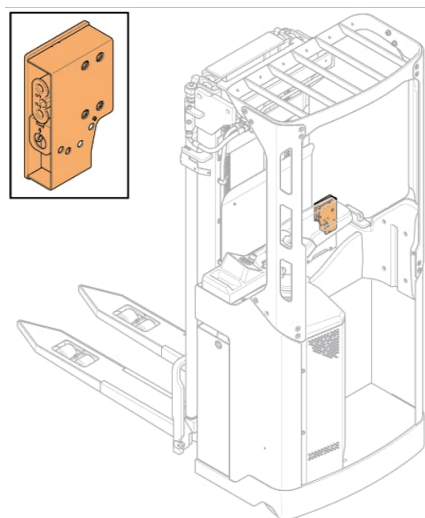


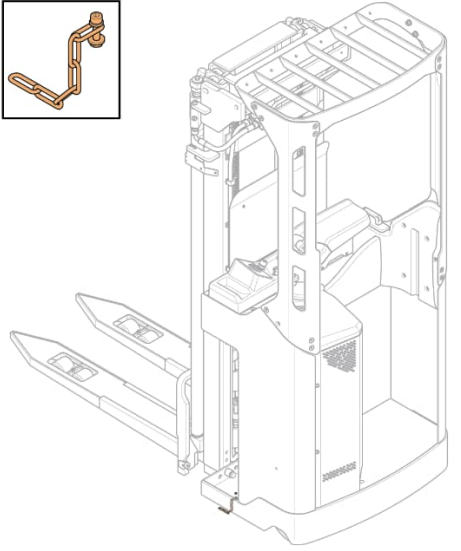
PREPARED FOR OPPORTUNITY CHARGING

OPP/CHARGE

An extra battery plug for easy access. The battery can be charged with the standard plug still connected.

NOTE: For lead-acid batteries only. Not available for li-ion batteries.



ANTISTATIC CHAIN	AS/CHAIN
<p>Chain connected to chassis hanging down and touching the floor to avoid static electricity.</p>	
DRIVE ALARM	D/ALARM
<p>An audible warning (beep sound), upon delivery activated to warn others when the truck is travelling in the load leading (LL) direction only. Re-configurable by software (TruckTool) to warn when travelling in the load leading (LL) direction, or in the load trailing direction (LT), or both.</p>	
AUTOMATIC LOG OFF	AUTOLOGOFF
<p>The truck automatically logs off when the operator has been absent for 5 minutes. Adjustable between 1-255 minutes. NOTE: Not in combination with Key switch entry (KEY SWITCH). NOTE: Option Multi function display (MULTI DISPLAY) required, not included.</p>	
SERVICE ALARM	SERV/ALARM
<p>A wrench symbol is shown on the display when service is due. Adjustable service interval in active hours or number of calendar months.</p>	

13 OHG and cabin options

- Standard
- Option
- Not available

13.1 Option availability

See Option descriptions for details.

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Overhead guard		OHG	•	•	•	•	•	•	•	•	•
Overhead guard prepared for options		OHG/PREP	○	○	○	○	○	○	○	○	○
Mesh metal on overhead guard		MESH/METAL	○	○	○	○	○	○	○	○	○
Panoramic Provision roof	¹⁰⁶	PAN/ROOF	○	○	○	○	○	○	○	○	○
Accessory rack		BAR	○	○	○	○	○	○	○	○	○
Writing desk (including RAM C holder)	¹⁰⁷	DESK	○	○	○	○	○	○	○	○	○
Accessory rack holder, RAM system size C	¹⁰⁷	RAM/C	○	○	○	○	○	○	○	○	○
Accessory rack holder, RAM system size C, 2 pcs	¹⁰⁷	RAM/C/2X	○	○	○	○	○	○	○	○	○
Accessory rack holder, RAM system size D	¹⁰⁷	RAM/D	○	○	○	○	○	○	○	○	○
PVC cover on OHG bars	¹⁰⁸	PVC/COV	○	○	○	○	○	○	○	○	○
Rear view mirror	¹⁰⁷	RVM	○	○	○	○	○	○	○	○	○
Overhead guard Decreased height		OHGXXXA	○	○	○	○	○	○	○	○	○

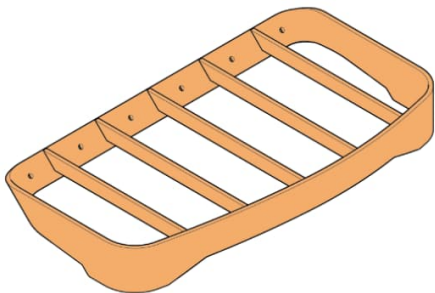
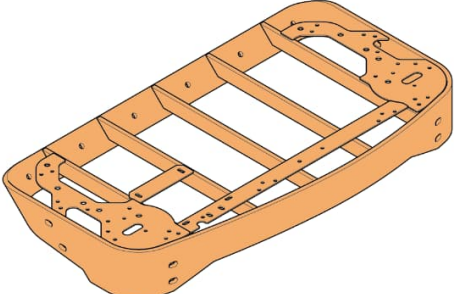
¹⁰⁶ Not in combination with Cold store modification (MODCS).

¹⁰⁷ Requires accessory rack, not included in the standard OHG.

¹⁰⁸ Requires Overhead guard prepared for options (OHG/PREP). Not in combination with standard, mesh, or Panoramic ProVision roof.

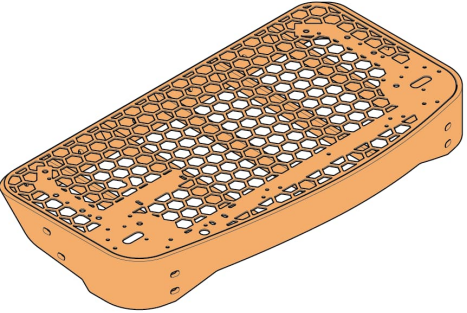
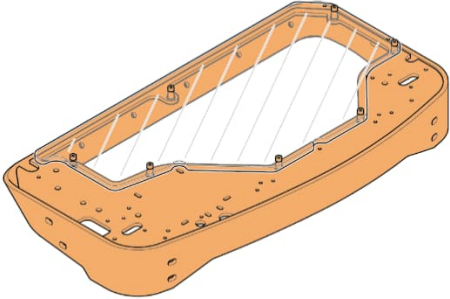
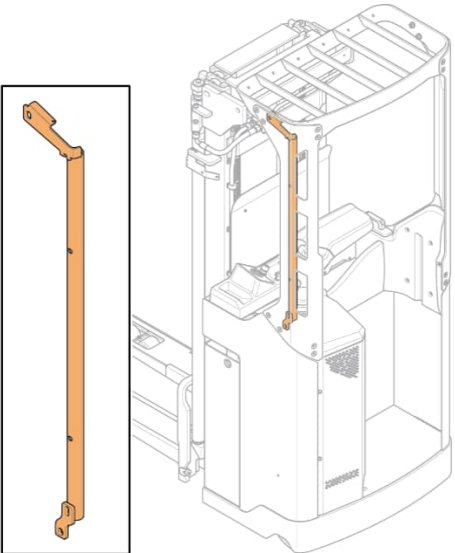
OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Overhead guard Increased height		OHGXXXB	○	○	○	○	○	○	○	○	○
Dashboard protection		D/BOARD/PROT	○	○	○	○	○	○	○	○	○
Foldable seat	¹⁰⁹	SEAT/FOLD	○	○	○	○	○	○	○	○	○
Comfort floor mat	¹¹⁰	CMFT/FLOOR	○	○	○	○	○	○	○	○	○
Other RAL-color		SP/COLOR	○	○	○	○	○	○	○	○	○

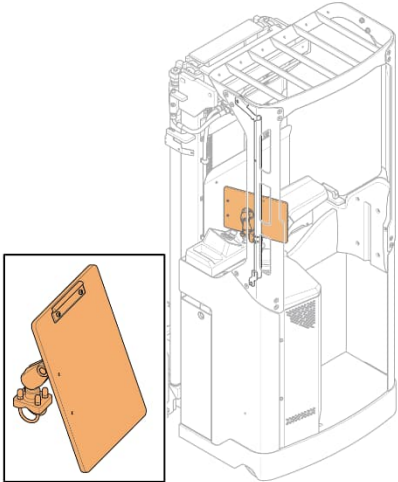
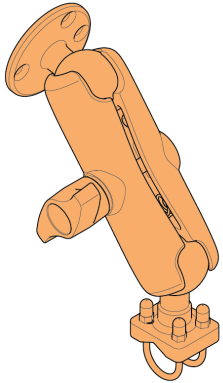
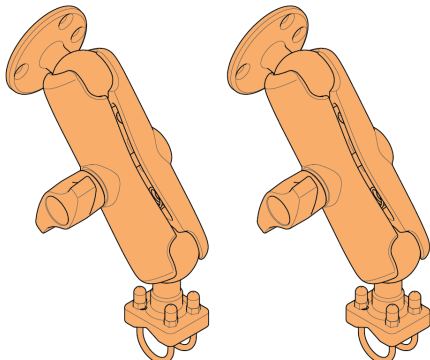
13.2 Option descriptions

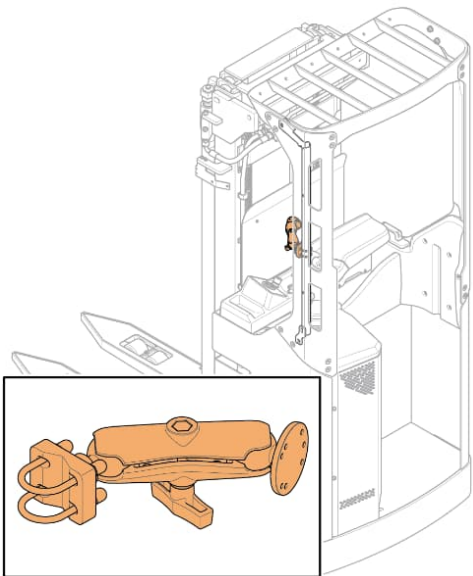
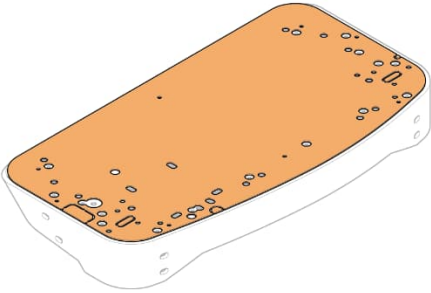
OVERHEAD GUARD	OHG
<p>Standard roof (not in combination with options on overhead guard). Standard OHG height h6=2,310 mm. The OHG includes a head cushion.</p>	
OVERHEAD GUARD PREPPED FOR OPTIONS	OHG/PREP
<p>Option roof. Prepared for options (plastic cover and lamps etc). Accessory rack included. The OHG includes a head cushion.</p>	

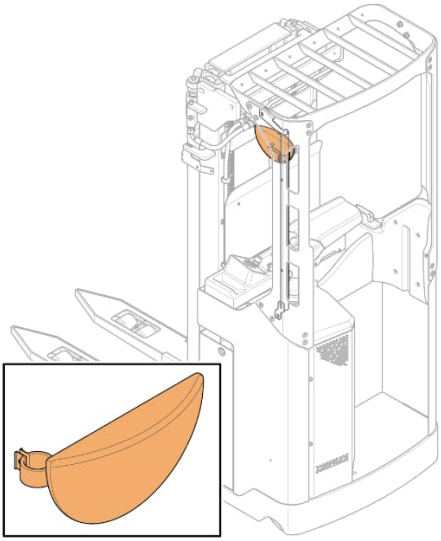
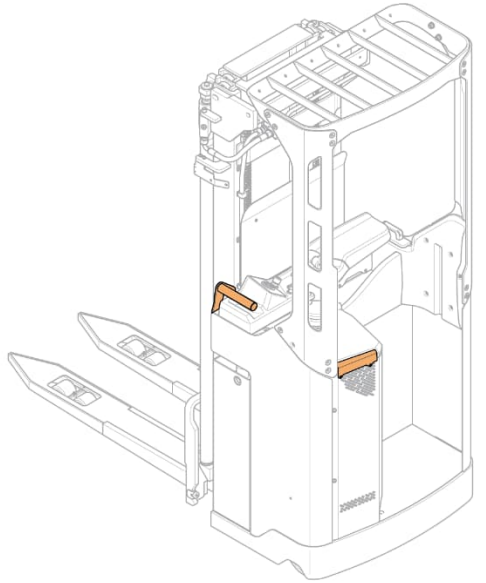
¹⁰⁹ Not in combination with Ergo Forks Trailing Control (EFTC).

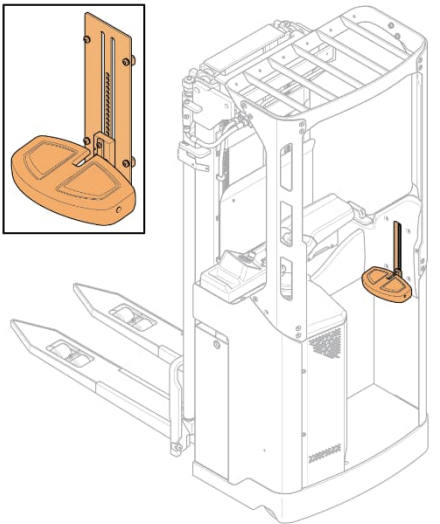
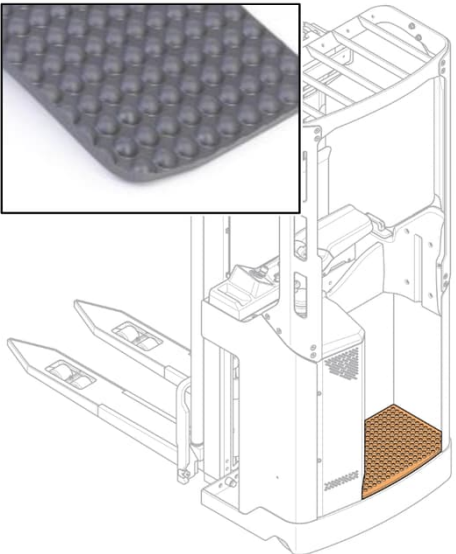
¹¹⁰ Standard included in Cold store modification (MODCS).

MESH METAL ON OVERHEAD GUARD	MESH/METAL
<p>Mesh roof. Prepared for options (lamps etc). Accessory rack included. The OHG includes a head cushion.</p>	
PANORAMIC PROVISION ROOF	PAN/ROOF
<p>Recommended safety option. Superior protection against dust and falling objects without loss of vision. Panoramic ProVision roof. Prepared for options (lamps etc). Accessory rack included. Increases the overhead guard height (plastic +10, fasteners +20 mm). The OHG includes a head cushion. NOTE: Not in combination with Cold store modification (MODCS) due to fogging.</p>	
ACCESSORY RACK	BAR
<p>Vertical accessory rack Ø 35mm. The optional accessory rack can be chosen in combination with the standard OHG (it is included with overhead guards prepared for options). NOTE: RAM holders are not included.</p>	

WRITING DESK (INCLUDING RAM C HOLDER)	DESK
<p>NOTE: Accessory rack is not included.</p> <p>NOTE: If standard OHG is chosen, requires Accessory rack.</p>	
ACCESSORY RACK HOLDER, RAM SYSTEM SIZE C	RAM/C
<p>Short holder, length 120 mm for extra equipment, load capacity 1.8 kg.</p> <p>AMPS hole pattern, measuring 30*38 mm.</p> <p>NOTE: If standard OHG is chosen, requires Accessory rack.</p>	
ACCESSORY RACK HOLDER, RAM SYSTEM SIZE C, 2 PCS	RAM/C/2X
<p>Package of 2 pcs short holder, length 120 mm for extra equipment.</p> <p>AMPS hole pattern, measuring 30*38 mm.</p> <p>NOTE: If standard OHG is chosen, requires Accessory rack.</p>	

ACCESSORY RACK HOLDER, RAM SYSTEM SIZE D	RAM/D
<p>Long holder, length 220 mm for extra equipment, load capacity 4.5 kg. AMPS hole pattern, measuring 30*38 mm. NOTE: If standard OHG is chosen, requires Accessory rack.</p>	
PVC COVER ON OVERHEAD GUARD BARS	OHG/PVC
<p>Protects the driver from small falling objects. NOTE: Requires Overhead guard prepared for options (OHG/PREP). Not in combination with standard, mesh, or Panoramic ProVision roof. NOTE: Increases the overhead guard height (plastic +3, fasteners +15 mm).</p>	

REAR VIEW MIRROR	RVM
<p>Wide angle mirror mounted on accessory rack (not included).</p> <p>NOTE: If standard OHG is chosen, requires option Accessory rack (BAR).</p>	
OVERHEAD GUARD - DECREASED HEIGHT	OHGXXXA
OVERHEAD GUARD - INCREASED HEIGHT	OHGXXXB
<p>Standard height h6=2,310 mm. Decreased height (-160 mm) h6=2,150 mm. Increased height (+150 mm) h6=2,460 mm.</p>	
DASHBOARD PROTECTION	D/BOARD/PROT
<p>A protective plate on the front side and a protective bar on the mast side of the chassis. The bar functions as a mini accessory rack. PVC curtain protection towards mast side.</p>	

FOLDABLE SEAT	SEAT/FOLD
<p>Foldable seat for support during long travel. NOTE: Not in combination with Ergo Forks Trailing Control (EFTC).</p>	
COMFORT FLOOR MAT	CMFT/FLOOR
<p>Recommended ergonomic option. Included as standard in Cold store modification (MODCS) to provide an anti-slip floor.</p>	

14 Environment

COLD STORE MODIFICATION (-30°C)	MODCS
<p>Cold store hydraulic oil. Cold store gearbox oil. Plastic finger protection replaced by steel mesh. NOTE: NSR12 with TFV mast has always plastic finger protection, not available with steel mesh. Comfort floor mat. NOTE: Not in combination with Li-ion battery, Load weight indicator (LWI), Radio with USB socket (RADIO/USB), Laser positioning guide (LASER/POS), and Panoramic Provision roof (PAN/ROOF).</p>	
Drive wheel	Tractothan® 93° shore is recommended for cold store environment.
Rust protection (Tectyl)	On the following surfaces: unpainted surfaces and black screws, load wheel and drive wheel hubs, bolts securing mast and chassis. Chain bolts.
<p>NOTE: Avoid small batteries in Cold store applications due to low operating time. Always use the largest battery capacity possible in Cold store. For lead/acid batteries, the available battery capacity is reduced by approximately 1% per degree °C below average electrolyte temperature of 30 °C. NOTE: Not in combination with Li-ion battery.</p>	

15 Wheels

•	Standard
○	Option
—	Not available

15.1 Option availability

OPTION	Notes	CODE	NSR12N2	NSR12N2I	NSR16N2	NSR16N2I	NSR20N2	NSR20N2I	NSR16N2S	NSR20N2S	NSR12N2TF
Vulkollan drive wheel		VUL/DW	•	•	•	•	•	•	•	•	•
Tractothan drive wheel		TRAC/DW	○	○	○	○	○	○	○	○	○
Super grip drive wheel		SGRIP/DW	○	○	○	○	○	○	○	○	○
Bogie (tandem) loadwheels, Vulkollan		BOG/LWS BOG/LWS/L ¹¹¹ BOG/LW/W ¹¹² STR/LOW ¹¹³	•	•	•	•	•	•	•	•	○
Single loadwheels		SINGP/LW STR/HIGH ¹¹³	—	—	—	—	—	—	○	—	•

15.2 Option descriptions

OPTION	DESCRIPTION
Vulkollan® 93° shore	<p>For drive and load wheels in all applications up to 16 km/h. The best choice for 90 % of all applications. It is especially recommended for high requirements regarding load capacity, rebound resilience, speed and durability. Therefore Vulkollan® is preferred for drive and load wheels for industrial trucks.</p>

¹¹¹ Code for initial lift models.

¹¹² Code for wide straddle models.

¹¹³ Code for the telescopic forks model.

OPTION	DESCRIPTION
<p>Tractothan® 93° shore</p>	<p>For improved traction of load and drive wheels for all applications. For vehicles for in-plant transportation on wet and soiled floors. In mixed operations (i.e. for trucks that travel from deep-freeze area to the loading zone or onto the ramp) there can be problems caused by humidity due to condensation. We recommend using Tractothan® to improve traction on these surfaces. Also to be used on smooth, highly sealed wet, dirty or partly oil-soiled surfaces.</p> <p>Advantages Advantages of Vulkollan® plus improved traction of approx. 15 %.</p> <p>Disadvantages Less resistant to wear compared to Vulkollan® 93° shore.</p>
<p>Super grip 93° shore</p>	<p>For load and drive wheels used on extremely humid, slippery and greasy floors and where there is a danger of icing. For extreme applications like the fish, meat and dairy industry.</p> <p>Advantages Significantly better traction.</p> <p>Disadvantages Abrasive effect may damage sensitive floors! Less resistant to wear compared to Vulkollan® 93° shore.</p>

15.3 Maximum wheel pressures (tandem wheels)

		NSR16N2 DTFV 6300 Battery 465 Ah	NSR16N2 DTFV 7000 Battery 775 Ah
Maximum wheel pressure with load	[Mpa]	6.1	6.2
Maximum wheel pressure without load	[Mpa]	4.1	4.4
Maximum wheel pressure with load	[kg/cm ²]	61	62
Maximum wheel pressure without load	[kg/cm ²]	41	44

For more information on this range visit:

www.catliftdealer.com

www.catlifttruck.com

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