R 20

Technical Data.

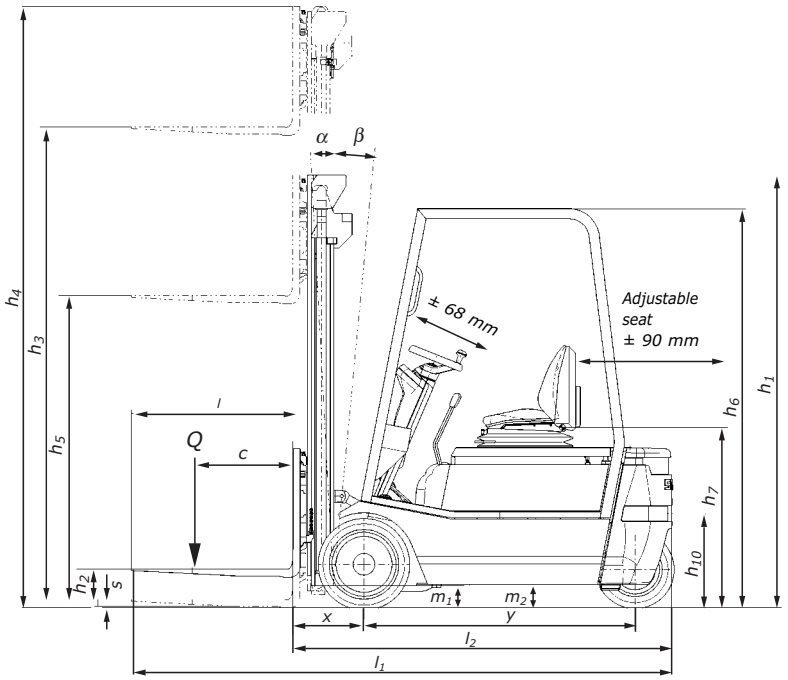
Electric Forklift Trucks
Models R 20-15 I/R 20-16 I/R 20-18 I.

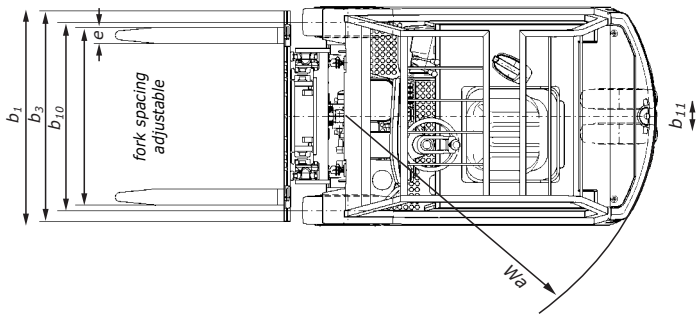
STILL
Making the right moves.

R 20 Electric Forklift Trucks.

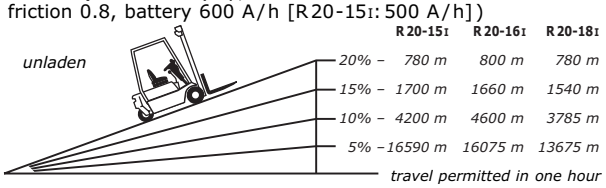
In accordance with VDI guidelines 2198, this specification applies to the standard model only.
Alternative tyres, mast types, ancillary equipment, etc. could result in different values.

Kennzeichen	1.1	Manufacturer		STILL	STILL	STILL
	1.2	Manufacturer's model designation		R 20-15I	R 20-16I	R 20-18I
	1.3	Power supply – electric, diesel, petrol, gas, mains electric		electric	electric	electric
	1.4	Type of control – hand, pedestrian, stand-on, rider seated		rider seated	rider seated	rider seated
	1.5	Carrying capacity/load	Q (kg)	1500	1600	1800
	1.6	Load centre	c (mm)	500	500	500
	1.8	Load distance	x (mm)	350	355	355
	1.9	Wheelbase	y (mm)	1340	1445	1445
Wheels, tyres	2.1	Weight	kg	2880	2940	3124
	2.2	Axle loadings laden front	kg	3790	3965	4408
	2.2.1	Axle loadings laden rear	kg	590	575	516
	2.3	Axle loadings unladen front	kg	1390	1425	1543
	2.3.1	Axle loadings unladen rear	kg	1490	1515	1581
Wheels, tyres	3.1	Tyres – rubber (V), superelastic (SE), pneumatic (L), polyurethane (PE)		SE/L	SE/L	SE
	3.2	Tyre size – front		18 x 7-8 (16 PR)	18 x 7-8 (16 PR)	200/50-10
	3.3	Tyre size – rear		15 x 4 1/2-8 (12 PR)	15 x 4 1/2-8 (12 PR)	15 x 4 1/2-8
	3.5	Wheels – number front (x = drive wheel)		2x	2x	2x
	3.5.1	Wheels – number rear (x = drive wheel)		2	2	2
	3.6	Track width – front	b_{10} (mm)	932	932	942
	3.7	Track width – rear	b_{11} (mm)	170	170	170
Dimensions	4.1	Tilt angle, mast/fork carriage forwards	degrees	3	3	3
	4.1.1	Tilt angle, mast/fork carriage backwards	degrees	7	7	7
	4.2	Closed height	h_1 (mm)	2260	2260	2260
	4.3	Free lift	h_2 (mm)	150	150	150
	4.4	Lift height	h_3 (mm)	3430	3430	3430
	4.5	Height, mast raised	h_4 (mm)	4080	4080	4080
	4.7	Height to top of overhead guard (cabin)	h_6 (mm)	1960	1960	1960
	4.8	Seat height	h_7 (mm)	892	892	892
	4.12	Coupling height	h_{10} (mm)	460	460	460
	4.19	Overall length	l_1 (mm)	2673	2782	2782
	4.20	Length to front face of forks	l_2 (mm)	1873	1982	1982
	4.21	Overall width	b_1 (mm)	1080/1115	1080/1115	1142
	4.22	Fork thickness	s (mm)	35	40	40
	4.22.1	Fork width	e (mm)	80	80	80
	4.22.2	Fork length	l (mm)	800	800	800
	4.23	Fork carriage to DIN 15173 – class / form A or B		ISO II B	ISO II B	ISO II B
	4.24	Fork carriage width	b_3 (mm)	980	980	1040
	4.31	Ground clearance beneath mast, laden	m_1 (mm)	91	91	100
	4.32	Ground clearance at centre of wheelbase	m_2 (mm)	110	110	110
	4.33	Aisle width for pallets 1000 x 1200 wide	A_{st} (mm)	3200	3309	3309
	4.34	Aisle width for pallets 800 x 1200 long	A_{st} (mm)	3324	3433	3433
	4.35	Outer turning radius	W_a (mm)	1523	1627	1627
	4.36	Inner turning radius	b_{13} (mm)	–	–	–
Performance	5.1	Speed laden	km/h	14	16	16
	5.1.1	Speed unladen	km/h	16	16	16
	5.2	Lift speed laden	m/s	0.42	0.43	0.41
	5.2.1	Lift speed unladen	m/s	0.6	0.6	0.6
	5.3	Lowering speed laden	m/s	0.6	0.6	0.6
	5.3.1	Lowering speed unladen	m/s	0.47	0.47	0.47
	5.5	Rated drawbar pull laden	N	1995	1995	1950
	5.5.1	Rated drawbar pull unladen	N	2190	2190	2140
	5.6	Max. drawbar pull laden	N	10500	10430	10370
	5.6.1	Max. drawbar pull unladen	N	7700	7700	7630
	5.7	Gradeability laden	%	6	5.9	5.5
	5.7.1	Gradeability unladen	%	10	10	9.5
	5.8	Max. gradeability laden	%	20	19	18
	5.8.1	Max. gradeability unladen	%	28	28	28
	5.9	Acceleration time laden	s	4.4	4.5	4.6
	5.9.1	Acceleration time unladen	s	4	4.1	4.2
	5.10	Brakes		electr./mech.	electr./mech.	electr./mech.
Motors	6.1	Drive motor hourly capacity	kW	2 x 4	2 x 4	2 x 4
	6.2	Hoist motor capacity at 15% duty factor	kW	9	9	9
	6.3	Battery equipment to DIN 43531/35/36 A, B, C, no		DIN 43531 A	DIN 43531 A	DIN 43531 A
	6.4	Battery voltage	U (V)	48	48	48
	6.4.1	Battery capacity	K 5 (Ah)	575 (500–625)	690 (600–750)	690 (600–750)
	6.5	Battery weight	kg	856	1013	1013
	6.6	Energy consumption according to VDI cycle	kWh/h			
Other	8.1	Drive control		Stilltronic-SCR	Stilltronic-SCR	Stilltronic-SCR
	8.2	Operating pressure for attachments	bar	170	170	170
	8.3	Oil flow for attachments	l/min			
	8.4	Average noise peak at operator's ears	dB (A)			
	8.5	Trailer coupling, type/DIN		pin	pin	pin





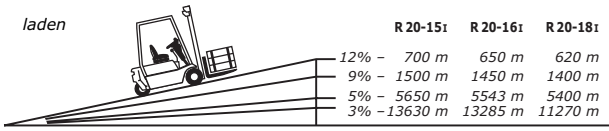
Gradient performance (dry, concrete surface = coefficient of friction 0.8, battery 600 A/h [R 20-15I: 500 A/h])



	R 20-15I	R 20-16I	R 20-18I
20% –	780 m	800 m	780 m
15% –	1700 m	1660 m	1540 m
10% –	4200 m	4600 m	3785 m
5% –	16590 m	16075 m	13675 m

travel permitted in one hour

Example (R 20-16I with 1600 kg load): 9 % gradient, 10 m distance. This gradient is negotiable 145 times per hour.



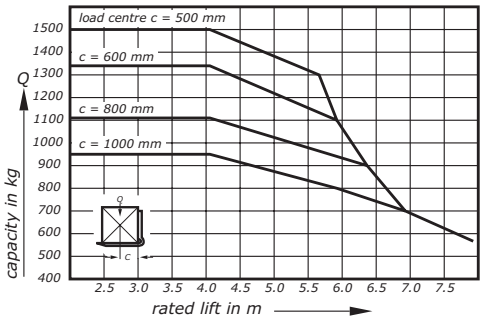
	R 20-15I	R 20-16I	R 20-18I
12% –	700 m	650 m	620 m
9% –	1500 m	1450 m	1400 m
5% –	5650 m	5543 m	5400 m
3% –	13630 m	13285 m	11270 m

Mast Types.

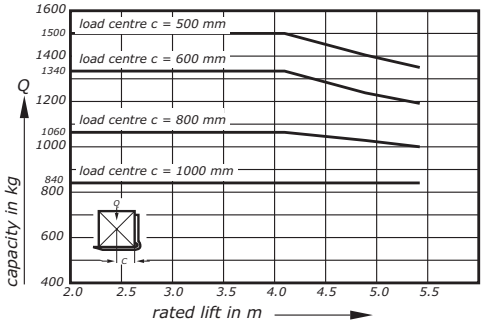
			Telescopic				Full free lift				Triple	
			from	to	from	to	from	to	from	to	from	to
R 20-/15I/16I	Rated lift	h_3 mm	2630	3530	3630	5430	2775	3575	3675	4075	4020	8020
	Closed mast height	h_1 mm	1860	2310	2360	3260	1860	2260	2310	2510	1860	3260
	Raised mast height	h_4 mm	3280	4180	4280	6080	3425	4225	4325	4725	4670	8670
	Free lift	h_2/h_5 mm	150				1230	1630	1680	1880	1230	2630
	Angle of tilt	α | β ∢ °	3	7	3	9	3	7	3	9	3	5
R 20-15I	Length	l_2 mm	1873				1873				1893	
	Lost load centre	x mm	350				350				370	
	Aisle width Pallets 1000 x 1200 wide | 800 x 1200 long	A_{st} mm	3200		3324		3200		3324		3218	3343
R20-16 I	Length	l_2 mm	1982				1982				2002	
	Lost load centre	x mm	355				355				375	
	Aisle width Pallets 1000 x 1200 wide | 800 x 1200 long	A_{st} mm	3309		3433		3309		3433		3327	3452
R20-18I	Rated lift	h_3 mm	2630	3530	3630	5430	2675	3475	3575	3975	3870	5665 8065
	Closed mast height	h_1 mm	1860	2310	2360	3260	1860	2260	2310	2510	1860	3260 2460 3260
	Raised mast height	h_4 mm	3288	4180	4280	6080	3343	4143	4243	4643	4670	6170 6330 8730
	Free lift	h_2/h_5 mm	150				1212	1612	1662	1862	1212	1712 1830 2630
	Angle of tilt	α | β ∢ °	3	7	3	9	3	7	3	9	3 5	3 5
	Length	l_2 mm	1982				1982				2002	2014
	Lost load centre	x mm	355				355				375	387
	Aisle width Pallets 1000 x 1200 wide | 800 x 1200 long	A_{st} mm	3309		3433		3309		3433		3327 3452	3338 3463

The models depicted in this brochure may contain special parts or attachments which are not supplied as standard.

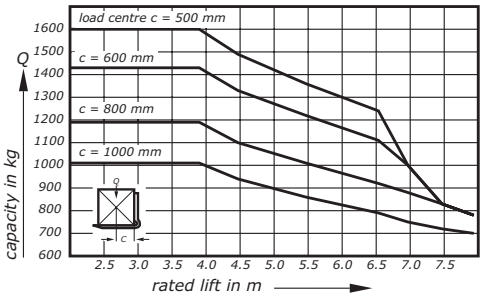
Capacity Chart R 20-15i Triple mast



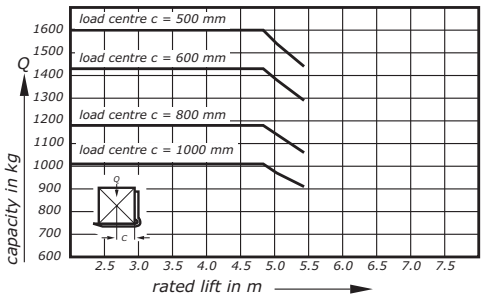
Capacity Chart R 20-15i Telescopic/Full free lift mast



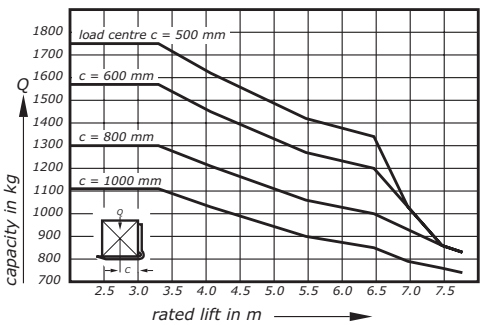
Capacity Chart R 20-16i Triple mast



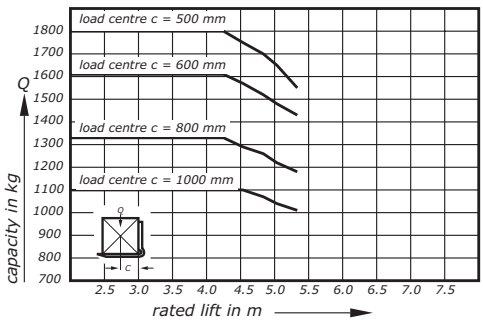
Capacity Chart R 20-16i Telescopic/Full free lift mast



Capacity Chart R 20-18i Triple mast



Capacity Chart R 20-18i Telescopic/Full free lift mast



Technical Data
Electric Forklift Trucks
Models R 20-15i/R 20-16i/R 20-18i.

Drive.

48 volt battery and dual motor front wheel drive give the R 20 high performance capability.

Two heavy duty drive motors provide powerful traction particularly on inclines and gradients.

The tractive power of the drive motors is precisely matched to the movement of the steering i.e. at a 90° steering lock both drive motors actively turn the truck into the bend. This gives more precise operation in narrow aisles and better overall manoeuvrability.

The R 20 features battery electric drive with advanced, fully encapsulated three phase technology (ASM technology). The battery provides the energy which is then modified in the converter for the ASM drive motor, giving many user benefits:

- **Economy:**

Electric drives are particularly economical for many reasons:

– Servicing costs are reduced because the ASM drive is completely maintenance free.

– Wear-free braking to a standstill is achieved through the drive system, which also holds the truck in position when at rest. Even on a gradient, the R 20 will remain stationary if the driver is not operating the drive pedal – holding the foot on the brake pedal is not necessary. This simplified mode of operation reduces driver stress levels by allowing him/her to concentrate on placing the fork tips or the load.

– Plugging is possible without tyre wear, thanks to the electric drive controller.

- **Regenerative braking:**

High efficiency energy recovery of up to 10% is achieved. Releasing the drive pedal immediately causes energy to flow back in to the battery, thus reducing battery drain under all operating conditions – but particularly when plugging and braking. Thus the R 20 enjoys a longer work cycle from one battery charge. Alternatively, the use of a smaller battery may be possible.

- **Availability:**

The fully encapsulated electric drive and 3-phase technology featured on the R 20 enjoy a very high level of reliability. The absence of hydraulic or mechanical transmission greatly reduces the number of moving mechanical parts and makes the truck eminently suitable for arduous applications.

Electrics.

A digital electrical system is fitted to the R 20. The exchange of information between electrical assemblies e.g. between the drive controller and the cockpit, is achieved using the CAN bus system (Controller Area Network) – a proven and successful feature of road vehicles. The number of cables and plug connectors is reduced in comparison to the previous system and reliability is significantly increased. In addition to this it is easy to accommodate variants to the electrical equipment to suit the specific application.

Mast.

STILL clear view masts in telescopic, HiLo and triplex designs for every application:

- Telescopic:
the mast suitable for most applications. Economical mast design.
- HiLo:
for high stacking under low ceilings. Utilises the space right up to the roof.
- Triplex:
for applications with low doorways and greater stacking heights. Utilises the space right up to the roof.

- Fork carriage

The fork carriage, completely redesigned for this truck, gives a clear view onto the load being picked up thanks to its optimised profiles. Hydraulic hoses for attachments are run in the dead visibility area of the mast sections – with no hose reels – for wear-free operation.

Steering.

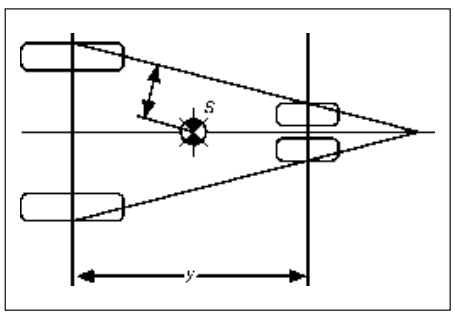
- The steering operates on the hydrostatic principle with a priority valve.
- The pump operates "on demand", for optimal energy economy.
- 90° bogie steering makes the R 20 very manoeuvrable for use in tight production areas and storage spaces.
- Extremely safe and reliable in operation due to the fully encapsulated steering system, which is protected against dirt and damp.

Hydraulics.

- The speed of the electric pump motor responds precisely to the position of the valve lever, giving power on demand. Energy is therefore saved to give longer work cycles per battery charge while operational safety is improved by virtue of more precisely controlled lift and lower functions.
- Hydraulic oil is filtered via a suction filter before entering the hydraulic circuits, reducing wear to a minimum.

Stability.

A high turn-round of goods because the R 20 can travel quickly around corners thanks to its particularly high stability.



Due to a long wheel-base and twin rear wheels, the tipping lines are spread widely apart and thus are a long way from the truck's centre of gravity. The greater this distance, the higher the stability.

Driver's compartment:

- The cockpit has an LCD display and a pre-selection facility for the driver to set the driving response characteristics. He/she can select the best acceleration, braking and travel speeds from 5 pre-set options to suit the job in hand. Other adjustments to drive parameters to suit application conditions and goods throughput can be made by simple changes to the software.
- The drive pedal* sets the speed required by the driver. The travel speed is unaffected by the influence of the load or the road surface.
- The precise and controllable driving characteristics of the R 20 allow the truck to be held on a gradient or on uneven surfaces without resorting to the hand or foot brakes.

- Roomy footwell with inclined floor plate and non-slip rubber matting.
- Automotive style hand brake to the right of the driver's seat.
- Comfortable entry and exit thanks to low step height, plus spacious footwell and angled floor plate allows stress-free relaxed working.
- Comfortable seat, adjustable to the driver's weight. Thigh support reduces overall body fatigue.
- Adjustable steering column and longitudinal seating position provide an extremely comfortable working position for any physique.

Service.

The servicing interval has been doubled from the previous 500 operating hours up to 1000. This has been made possible by improvements in design and technical quality and by reducing the number of components which require maintenance.

* available with twin pedal control if required.

R 20-15i/18i – e 3 3/04 td Subject to technical modifications.

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