R 20

Technical Data.

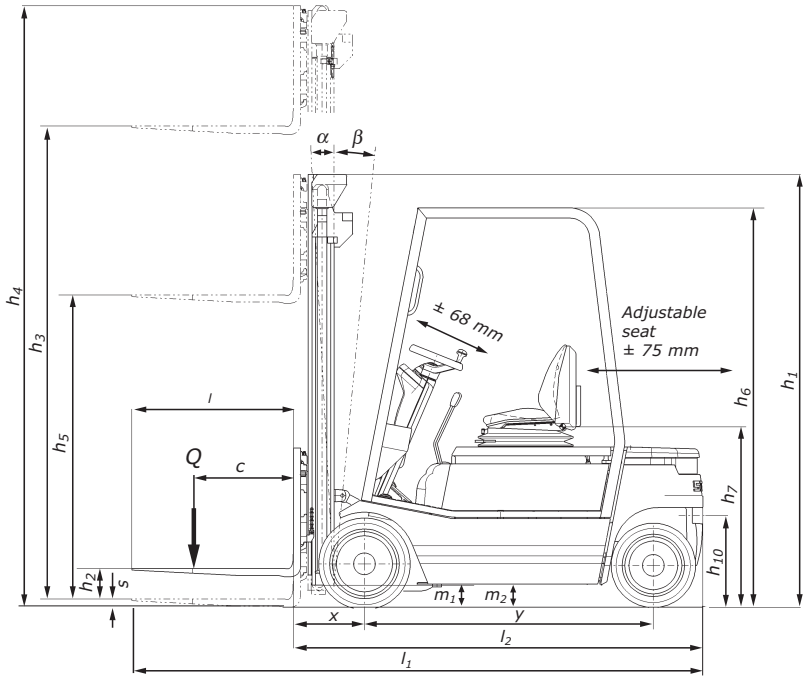
Electric Forklift Trucks
Models R 20-16 PI/R 20-20 PI.

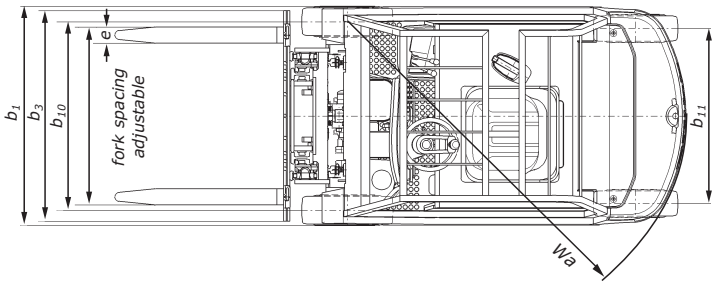
STILL
Making the right moves.

R 20 Electric Forklift Trucks.

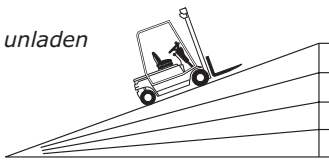
In accordance with VDI guidelines 2198, this specification applies to the standard model only.
Alternative tyres, mast types, ancillary equipment, etc. could result in different values.

Characteristics	1.1	Manufacturer		STILL	STILL
	1.2	Manufacturer's model designation		R 20-16 PI	R 20-20 PI
	1.3	Power supply – electric, diesel, petrol, gas, mains electric		electric	electric
	1.4	Type of control – hand, pedestrian, stand-on, rider seated		rider seated	rider seated
	1.5	Carrying capacity/load	Q (kg)	1600	2000
	1.6	Load centre	c (mm)	500	500
	1.8	Load distance	x (mm)	355	365
	1.9	Wheelbase	y (mm)	1425	1530
Weight	2.1	Weight	kg	2905	3120
	2.2	Axle loadings laden front	kg	3970	4580
	2.2.1	Axle loadings laden rear	kg	535	490
	2.3	Axle loadings unladen front	kg	1380	1540
	2.3.1	Axle loadings unladen rear	kg	1525	1580
Wheels, tyres	3.1	Tyres – rubber (V), superelastic (SE), pneumatic (L), polyurethane (PE)		SE/L	SE
	3.2	Tyre size – front		18 x 7-8 (16 PR)	200/50-10
	3.3	Tyre size – rear		16 x 6-8 (14 PR)	16 x 6-8
	3.5	Wheels – number front (x = drive wheel)		2x	2x
	3.5.1	Wheels – number rear (x = drive wheel)		2	2
	3.6	Track width – front	b_{10} (mm)	932	942
	3.7	Track width – rear	b_{11} (mm)	865	865
Dimensions	4.1	Tilt angle, mast/fork carriage forwards	degrees	3	3
	4.1.1	Tilt angle, mast/fork carriage backwards	degrees	7	7
	4.2	Closed height	h_1 (mm)	2260	2260
	4.3	Free lift	h_2 (mm)	150	150
	4.4	Lift height	h_3 (mm)	3430	3350
	4.5	Height, mast raised	h_4 (mm)	4080	4000
	4.7	Height to top of overhead guard (cabin)	h_6 (mm)	1960	1960
	4.8	Seat height	h_7 (mm)	892	892
	4.12	Coupling height	h_{10} (mm)	460	460
	4.19	Overall length	l_1 (mm)	2825	2940
	4.20	Length to front face of forks	l_2 (mm)	2025	2140
	4.21	Overall width	b_1 (mm)	1080/1115	1148
	4.22	Fork thickness	s (mm)	40	40
	4.22.1	Fork width	e (mm)	80	80
	4.22.2	Fork length	l (mm)	800	800
	4.23	Fork carriage to DIN 15173 – class / form A or B		ISO II B	ISO II B
	4.24	Fork carriage width	b_3 (mm)	980	1040
	4.31	Ground clearance beneath mast, laden	m_1 (mm)	91	100
	4.32	Ground clearance at centre of wheelbase	m_2 (mm)	110	110
	4.33	Aisle width for pallets 1000 x 1200 wide	A_{st} (mm)	3400	3507
	4.34	Aisle width for pallets 800 x 1200 long	A_{st} (mm)	3595	3702
	4.35	Outer turning radius	W_a (mm)	1839	1936
	4.36	Inner turning radius	b_{13} (mm)	–	–
Performance	5.1	Speed laden	km/h	16	16
	5.1.1	Speed unladen	km/h	16	16
	5.2	Lift speed laden	m/s	0.43	0.39
	5.2.1	Lift speed unladen	m/s	0.6	0.6
	5.3	Lowering speed laden	m/s	0.6	0.6
	5.3.1	Lowering speed unladen	m/s	0.47	0.47
	5.5	Rated drawbar pull laden	N	1995	1900
	5.5.1	Rated drawbar pull unladen	N	2190	2090
	5.6	Max. drawbar pull laden	N	10430	10360
	5.6.1	Max. drawbar pull unladen	N	7700	7630
	5.7	Gradeability laden	%	6	5
	5.7.1	Gradeability unladen	%	10	7.1
	5.8	Max. gradeability laden	%	19	16.5
	5.8.1	Max. gradeability unladen	%	28	24.5
	5.9	Acceleration time laden	s	4.5	4.7
	5.9.1	Acceleration time unladen	s	4.1	4
	5.10	Brakes		mech.	mech.
Motors	6.1	Drive motor hourly capacity	kW	2 x 4	2 x 4
	6.2	Hoist motor capacity at 15% duty factor	kW	9	9
	6.3	Battery equipment to DIN 43531/35/36 A, B, C, no		DIN 43531 A	DIN 43531 A
	6.4	Battery voltage	U (V)	48	48
	6.4.1	Battery capacity	K 5 (Ah)	575 (500–625)	690 (600–750)
	6.5	Battery weight	kg	856	1013
	6.6	Energy consumption according to VDI cycle	kWh/h		
Other	8.1	Drive control		Stilltronic-Impuls	Stilltronic-Impuls
	8.2	Operating pressure for attachments	bar	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



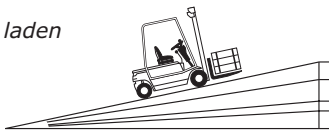


Gradient performance (dry, concrete surface = coefficient of friction 0.8, battery 600 A/h)



		R 20-16 Pi	R 20-20 Pi
unladen			
20% –		*800 m*	*730 m*
15% –	*once per hour*	*1660 m*	*1400 m*
10% –		*4600 m*	*3300 m*
5% –		*16075 m*	*13000 m*

Example (with 2000 kg load): 9 % gradient, 10 m distance. This gradient is negotiable 128 times per hour.



		R 20-16 Pi	R 20-20 Pi
laden			
12% –	*once*	*680 m*	*680 m*
9% –	*per*	*1450 m*	*1280 m*
5% –	*hour*	*5550 m*	*4050 m*
3% –		*13285 m*	*9450 m*

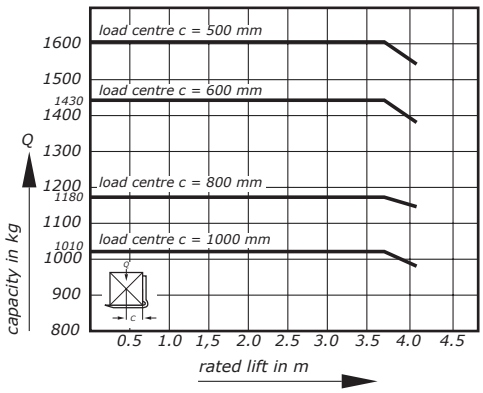
Mast types.

			Telescopic				Full free lift				Triple	
			from	to	from	to	from	to	from	to	from	to
R 20-16 Pi	Lift height	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
	Length	l_2 mm	2025				2025				2045	
	Lost load centre	x mm	355				355				375	
	Working aisle width Pallets 1000 x 1200 wide | 800 x 1200 long	A_{st} mm	3400		3595		3400		3595		3420	3615
R 20-20 Pi	Lift height	h_3 mm	2550 - 3350		3450 - 5350		2670 - 3570		3670 - 4370		3865 - 8065	
	Closed mast height	h_1 mm	1860 - 2260		2310 - 3260		1860 - 2310		2360 - 2710		1860 - 3260	
	Raised mast height	h_4 mm	3200 - 4000		4100 - 6000		3320 - 4220		4320 - 5020		4530 - 8730	
	Free lift	h_2/h_5 mm	150				1230 - 1680		1730 - 2080		1230 - 2630	
	Angle of tilt	α | β ∢ °	3	7	3	9	3	7	3	9	3	5
	Length	l_2 mm	2140				2140				2162	
	Lost load centre	x mm	365				365				387	
	Working aisle width Pallets 1000 x 1200 wide | 800 x 1200 long	A_{st} mm	3507		3702		3507		3702		3528	3724

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

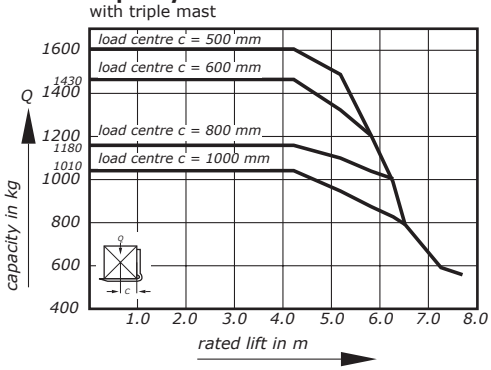
Capacity Chart R 20-16 PI

Tele HiLo mast



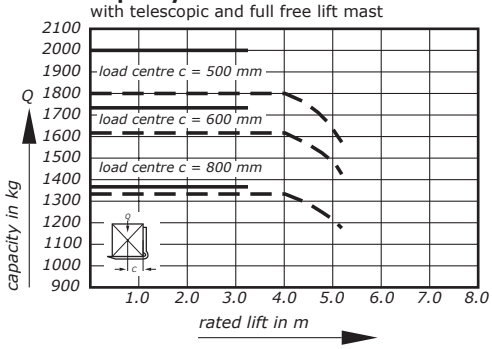
Capacity Chart R 20-16 PI

with triple mast



Capacity Chart R 20-20 PI

with telescopic and full free lift mast

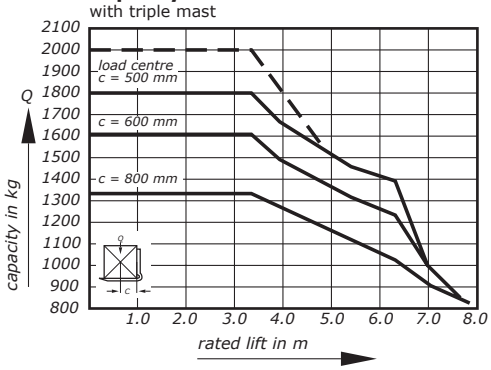


Tele up to 2240 mm

Tele/full free lift from 2290 mm

Capacity Chart R 20-20 PI

with triple mast



up to closed height of 2190 mm

over closed height of 2240 mm

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Models R 20-16 PI/R 20-20 PI.

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 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

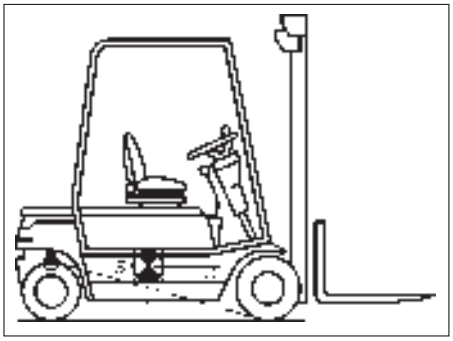
The fork carriage, completely redesigned for this truck, gives a clear view onto the load being picked up thanks to its optimised profiles. Hydraulic hoses for attachments are run in the dead visibility area of the mast sections – with no hose reels – for wear-free operation.

Steering.

- The steering operates on the hydrostatic principle with a priority valve.
- The pump operates "on demand", for optimal energy economy.
- Extremely safe and reliable in operation due to the fully encapsulated steering system, which is protected against dirt and damp.
- With its articulating steer axle, the R 20 is suitable for use on uneven surfaces. As a genuine 4 wheel truck it absorbs road shocks particularly well.

Hydraulics.

- The speed of the enclosed 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.

High levels of stability mean that the R 20 can traverse corners at relatively high speeds in safety. This contributes to greater throughput.

Stability is achieved by virtue of the high position of the steer axle articulation point. This means that the centrifugal force has less effect because of the short length of its lever arm from the tipping line.

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 20-16 PI/20PI – e 2.5 3/04 td Subject to technical modifications.

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