

MS series

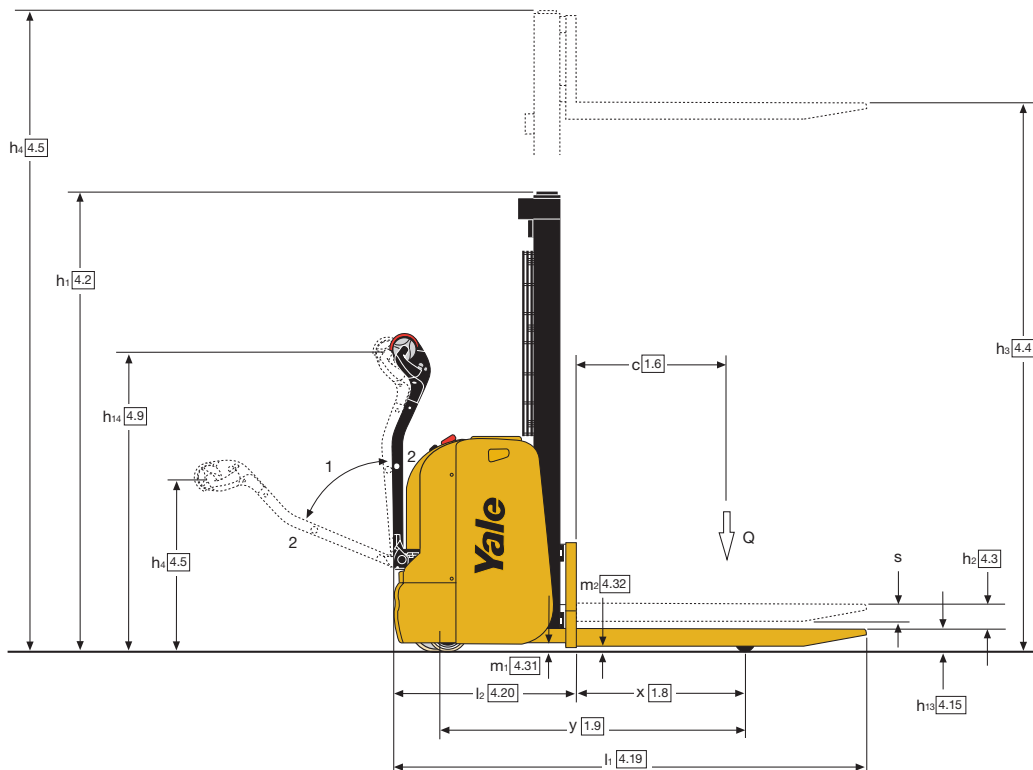
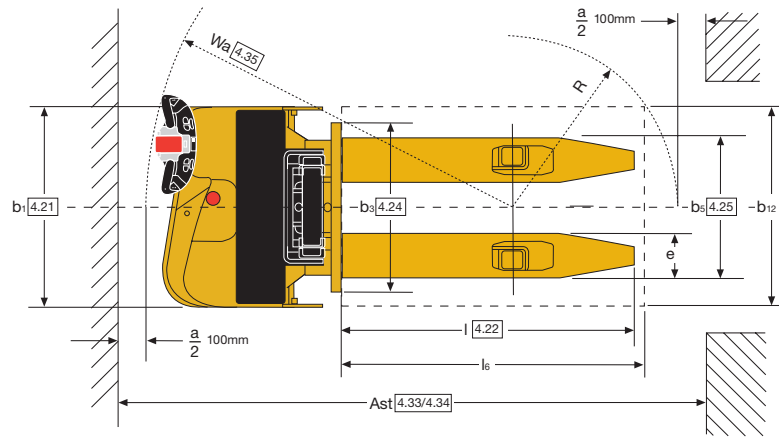
Pedestrian high lift stacker

1,000kg / 1,200kg / 1,400kg / 1,600kg

- Combi MOSFET AC and DC control
- AC drive motor
- Dual lift/lower controls on tiller head
- Panorama mast
- Low mounted tiller arm



Truck Dimensions - MS10E



Mast details - 1 stage FFL, type "C" 103

Model	h_3 (mm)	h_2 (mm)	$h_1^{(1)}$ (mm)	$h_4^{(1)}$ (mm)	Weight ⁽²⁾ (kg)
MS10E	1260	-	1820	1820	226
	1360	-	1920	1830	230
	1460	-	2020	1930	234
	1560	-	2120	2030	238
	1760	-	2320	2130	246

⁽¹⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

Excluded: forks, accessories.

Mast details - 2 stage LFL, type "C" 103

Model	h_3 (mm)	h_2 (mm)	$h_1^{(1)}$ (mm)	$h_4^{(1)}$ (mm)	Weight ⁽²⁾ (kg)
MS10E	2660	100	1838	3118	-
	2860	100	1938	3318	302
	3060	100	2038	3518	308
	3260	100	2138	3718	316
	3460	100	2238	3918	314

⁽¹⁾ With free lift of 100 mm.

⁽²⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

Excluded: forks, accessories.

Mast details - 1 stage FFL, type "C" 103

Model	h ₃ (mm)	h ₂ (mm)	h ₁ ⁽¹⁾ (mm)	h ₄ ⁽¹⁾ (mm)	Weight ⁽²⁾ (kg)
MS10	1260	1260	1820	1820	226
	1360	1360	1920	1920	230
MS12	1460	1460	2020	2020	234
	1560	1560	2120	2120	238
	1760	1760	2320	2320	246

⁽¹⁾ With load backrest for carriage h₄ + 528 mm.

⁽²⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

Excluded: forks, accessories.

Mast details - 2 stage LFL, type "C" 103

Model	h ₃ (mm)	h ₂ (mm)	h ₁ ⁽¹⁾ (mm)	h ₄ ⁽²⁾ (mm)	Weight ⁽⁴⁾ (kg)
MS10	2830	100	1870	3383	346
	3030	100	1970	3583	354
	3230	100	2070	3783	364
MS12	3430	100	2170	3983	374
	3830	100	2370	4383	394
	4230 ⁽³⁾	100	2570	4783	410

⁽¹⁾ With free lift of 100 mm.

⁽³⁾ Not available for MS10.

Excluded: forks, accessories.

⁽²⁾ With load backrest for carriage h₄ + 533 mm.

⁽⁴⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

Mast details - 2 stage LFL, "J" profile

Model	h ₃ (mm)	h ₂ (mm)	h ₁ ⁽¹⁾ (mm)	h ₄ ⁽²⁾ (mm)	Weight ⁽³⁾ (kg)
MS14	2768	100	1877	3331	406
	2968	100	1977	3531	418
MS14IL	3168	100	2077	3731	428
MS16	3368	100	2177	3931	442
MS16IL	3768	100	2377	4331	466
	4168	100	2577	4731	490

⁽¹⁾ With free lift of 100 mm.

⁽³⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

Excluded: forks, accessories.

⁽²⁾ With load backrest for carriage h₄ + 533 mm.

Mast details - 2 stage FFL, "J" profile

Model	h ₃ (mm)	h ₂ (mm)	h ₁ (mm)	h ₄ ⁽¹⁾ (mm)	Weight ⁽³⁾ (kg)
MS10	2603	1260	1820	3174	405
	2803	1360	1920	3374	416
MS12	3003	1460	2020	3574	426
MS14	3203	1560	2120	3774	436
MS14IL	3403	1660	2220	3974	446
MS16	3603	1760	2320	4174	456
MS16IL	4003 ⁽²⁾	1960	2520	4574	476

⁽¹⁾ With load backrest for carriage h₄ + 520 mm.

⁽³⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

Excluded: forks, accessories.

⁽²⁾ Not available for MS10.

Mast details - 3 stage FFL, "J" profile

Model	h ₃ (mm)	h ₂ (mm)	h ₁ (mm)	h ₄ ⁽¹⁾ (mm)	Weight ⁽⁵⁾ (kg)
MS12	4027	1260	1827	4594	510
	4327	1360	1927	4894	530
MS14	4627 ^{(2) (4)}	1460	2027	5194	550
MS14IL	4797 ^{(2) (3)}	1560	2127	5364	562
MS16	5097 ^{(2) (3)}	1660	2227	5664	586
MS16IL	5397 ^{(2) (3)}	1760	2327	5964	606

⁽¹⁾ With load backrest for carriage h₄ + 520 mm.

⁽⁴⁾ Not available for MS14IL.

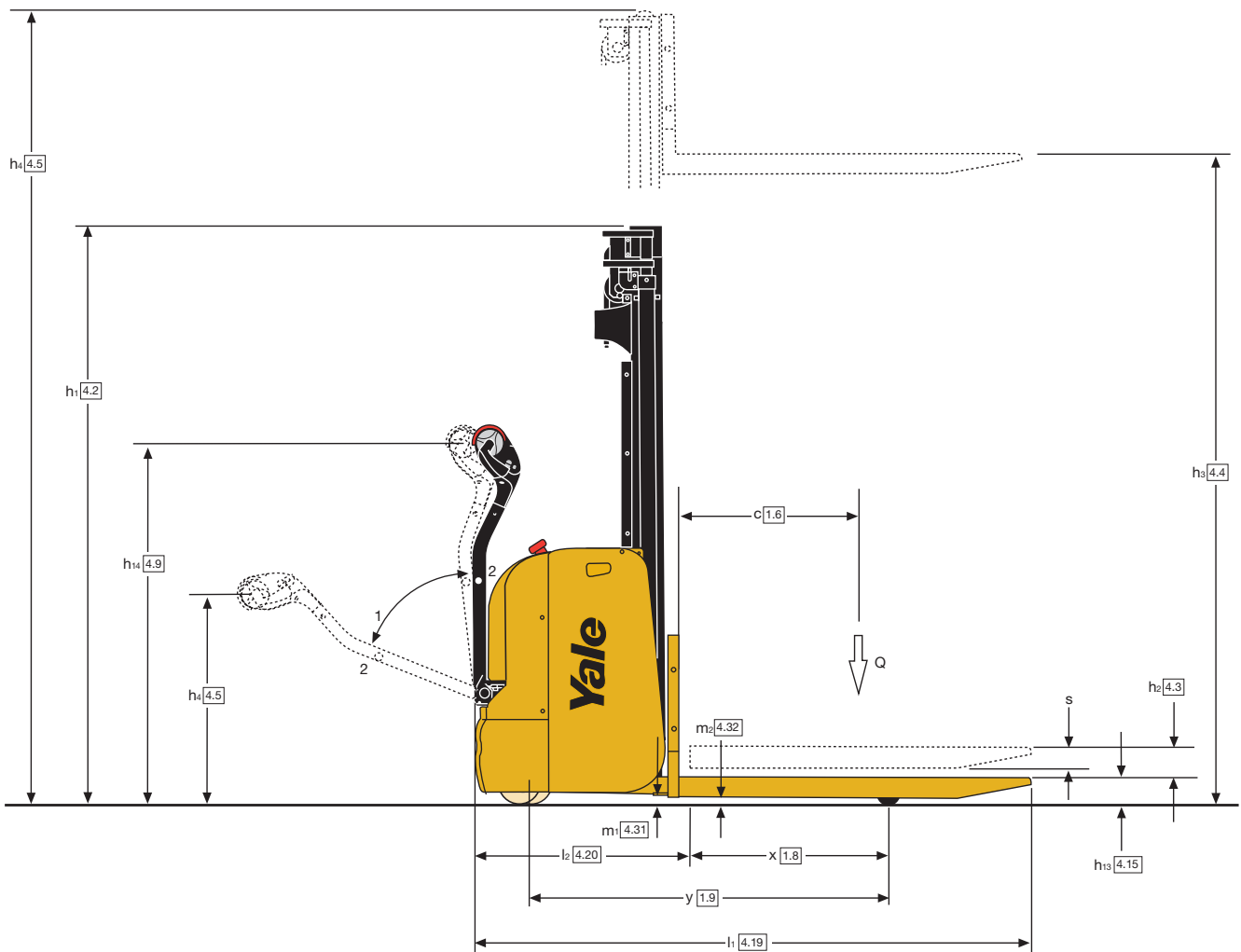
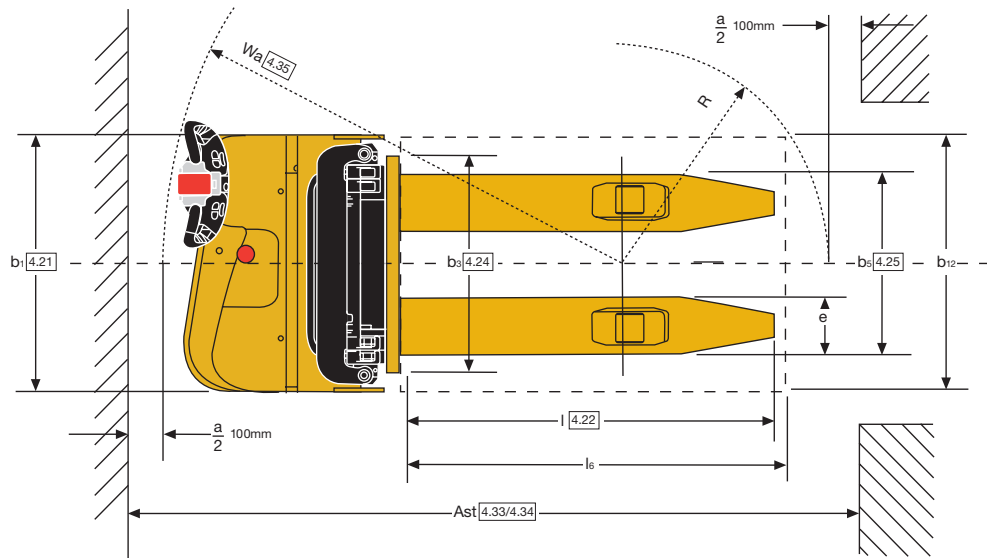
Excluded: forks, accessories.

⁽²⁾ Not available for MS12.

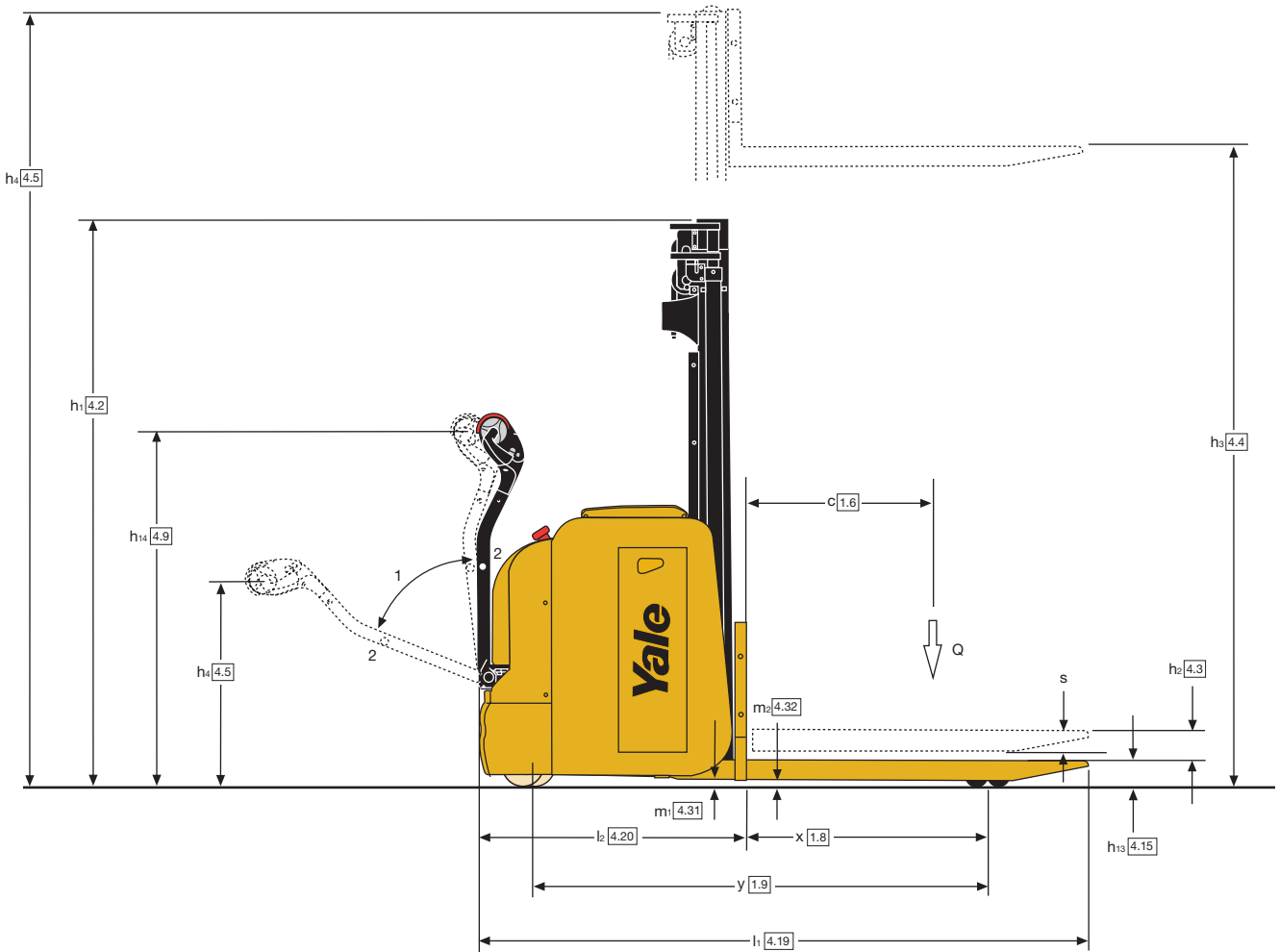
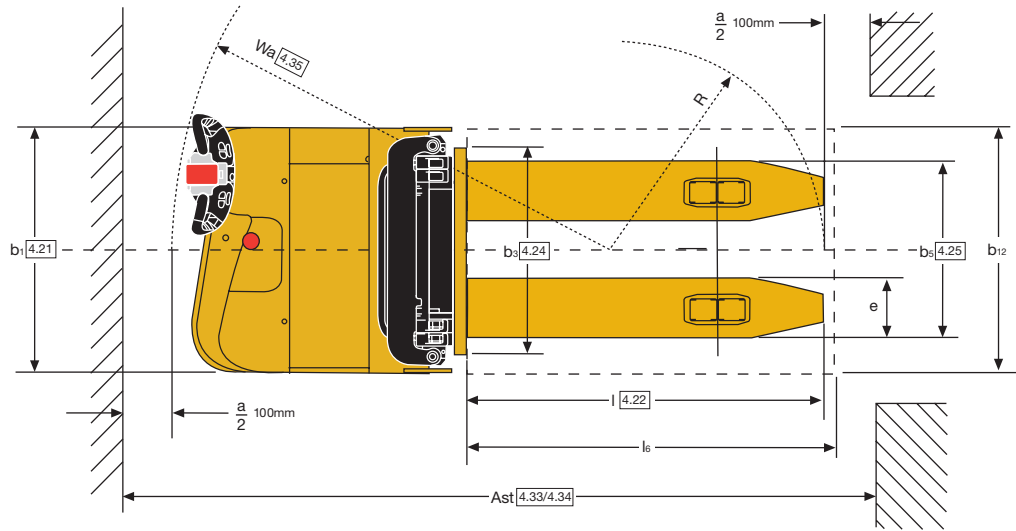
⁽⁵⁾ All weights are: mast structures (weldment, cylinders, chain, pulley) + oil.

⁽³⁾ Not available for MS14, MS14IL, MS16IL.

Truck Dimensions - MS10 - MS16



Truck Dimensions - MS14IL - MS16IL



VDI 2198 – General Specifications

Distinguishing mark	1.1	Manufacturer (abbreviation)		Yale	Yale	Yale
	1.2	Manufacturer's type designation		MS10E AC	MS10 AC	MS12 AC
	1.3	Drive: electric (battery or mains), diesel, petrol, fuel gas		Electric (battery)	Electric (battery)	Electric (battery)
	1.4	Operator type: hand, pedestrian, standing, seated, order-picker		Pedestrian	Pedestrian	Pedestrian
	1.5	Rated capacity/rated load	Q (t)	1.0	1.0	1.2
	1.6	Load centre distance	c (mm)	600	600	600
	1.8	Load distance, centre of drive axle to fork	x (mm)	677 ^(A)	714	744 ⁽¹⁾
	1.9	Wheelbase	y (mm)	1225	1225	1315
	Weights	2.1	Service weight ⁽¹³⁾	kg	776	880 ⁽¹⁵⁾
2.2		Axle loading, laden front/rear	kg	672 / 1104	660 / 1220	740/1420
2.3		Axle loading, unladen front/rear	kg	548 / 230	610 / 270	670/290
Tyres/chassis	3.1	Tyres: polyurethane, tophane, Vulkollan [®] , front/rear ⁽⁵⁾		Polyurethane	Polyurethane / Polyurethane	Polyurethane / Polyurethane
	3.2	Tyre size, front	ø (mm)	230 x 75	230 x 75	230 x 75
	3.3	Tyre size, rear	ø (mm)	85 x 74	85 x 100	85 x 100
	3.4	Additional wheels (dimensions)	ø (mm)	150 x 54	150 x 54	150 x 54
	3.5	Wheels, number front/rear (x = driven wheels)		1x+1/2	1x + 1/2	1x + 1/2
	3.6	Tread, front	b ₁₀ (mm)	514	514	514
	3.7	Tread, rear	b ₁₁ (mm)	420	398	398
Dimensions	4.2	Height, mast lowered	h ₁ (mm)	2139	See table	See table
	4.3	Free lift	h ₂ (mm)	100	See table	See table
	4.4	Lift	h ₃ (mm)	3260	See table	See table
	4.5	Height, mast extended	h ₄ (mm)	3719	See table	See table
	4.6	Initial lift	h ₅ (mm)	-	-	-
	4.9	Height drawbar in driving position min./max.	h ₁₄ (mm)	696 / 1197	695 / 1196	695 / 1196
	4.10	Height of wheel arms	h ₈ (mm)	85	-	-
	4.15	Height, lowered	h ₁₃ (mm)	85	90	90
	4.19	Overall length	l ₁ (mm)	1892 ⁽⁶⁾	1858	1915 ⁽⁶⁾
	4.20	Length to face of forks	l ₂ (mm)	732 ⁽⁶⁾	695	755 ⁽⁶⁾
	4.21	Overall width	b ₁ /b ₂ (mm)	800	800	800
	4.22	Fork dimensions DIN ISO 2331	s/e/l (mm)	65 / 180 / 1160	65 / 180 / 1160	65 / 180 / 1160
	4.24	Fork-carriage width	b ₃ (mm)	675	675	675
	4.25	Distance between fork-arms	b ₅ (mm)	570	570	570
	4.31	Ground clearance, laden, below mast	m ₁ (mm)	30	30	30
4.32	Ground clearance, center of wheelbase	m ₂ (mm)	20	30	30	
4.34.1	Aisle width for pallets 1000mm x 1200mm crossways	A _{st} (mm)	2342 ^(C)	2326	2398 ⁽⁶⁾	
4.34.2	Aisle width for pallets 800mm x 1200mm lengthwise	A _{st} (mm)	2319 ^(C)	2290	2353 ⁽⁶⁾	
4.35	Turning radius	Wa (mm)	1460	1460	1546	
Performance data	5.1	Travel speed, laden/unladen	km/h	5.6 / 6.0	5.5 / 6.0	5.5 / 6.0
	5.2	Lift speed, laden/unladen	m/s	0.10 / 0.20	0.13 / 0.18	0.12 / 0.18 ⁽¹²⁾
	5.3	Lowering speed, laden/unladen	m/s	0.20 / 0.25	0.3 / 0.25	0.3 / 0.25
	5.8	Max. gradeability, laden/unladen	%	8 / 10	7 / 10	7 / 10
	5.10	Service brake		Electromagnetic	Electromagnetic	Electromagnetic
Electric-engine	6.1	Drive motor S2 60 minute rating	kW	1	1.2	1.2
	6.2	Lift motor, S3 15% rating ⁽¹⁴⁾	kW	2	2	2
	6.3	Battery according to DIN 43531/35/36 A,B,C, no		no	no	43535 B
	6.4	Battery voltage/nominal capacity K5	(V) / (Ah)	24V / 150Ah	24V / 200Ah ⁽¹⁵⁾	24V / 250Ah ⁽¹⁶⁾
	6.5	Battery weight ⁽¹³⁾	kg	144	185	212
	6.6	Energy consumption according to VDI cycle	kWh/h at no. of cycles	-	1,0	1.1
8.1	Type of drive unit		MOSFET ~ AC	MOSFET ~ AC	MOSFET ~ AC	
10.7	Average noise level at the operator's ear according to EN	dB (A)	65	< 70	< 70	

^(A) With 1 stage mast +37 mm

^(B) Values are referred to a truck equipped with lowest mast and minimum battery provided in price list

^(C) With 1 stage mast +29 mm

⁽¹⁾ With 3 stage mast -50mm

⁽²⁾ With 3 stage mast -18mm

⁽³⁾ With 3 stage mast +175kg

⁽⁴⁾ With 3 stage mast +115kg

⁽⁵⁾ Multicomponent available

⁽⁶⁾ With 3 stage mast +50mm

⁽⁷⁾ With 3 stage mast +18mm

⁽⁸⁾ With 3 stage mast +22mm

⁽⁹⁾ With 3 stage mast +38mm

⁽¹⁰⁾ With 3 stage mast +8mm

⁽¹¹⁾ With 3 stage mast +14mm

⁽¹²⁾ With 3 stage mast 0.10 / 0.18

⁽¹³⁾ These values may vary of +/- 5%

⁽¹⁴⁾ Value referred to S3 16%

⁽¹⁵⁾ Available battery 150Ah. With battery 150Ah service weight -41kg

⁽¹⁶⁾ Available battery 210Ah

⁽¹⁷⁾ Available battery 300/315Ah. With battery 300Ah service weight -55kg

Yale	Yale	Yale	Yale	Yale	1.1	Distinguishing mark
MS14 AC	MS14 AC	MS16 AC	MS14IL AC	MS16IL AC	1.2	
Electric (battery)	Electric (battery)	Electric (battery)	Electric (battery)	Electric (battery)	1.3	
Pedestrian	Pedestrian	Pedestrian	Pedestrian	Pedestrian	1.4	
1.4	1.4	1.6	1.4	1.6	1.5	
600	600	600	600	600	1.6	
713 ⁽²⁾	713 ⁽²⁾	713 ⁽²⁾	815 ⁽²⁾	815 ⁽²⁾	1.8	
1315	1385	1385	1549	1549	1.9	
1000 ^{(4) (16)}	1120 ^{(4) (17)}	1120 ^{(4) (18)}	1200 ^{(4) (19)}	1200 ^{(4) (19)}	2.1	
570 / 1830	810 / 1710	875 / 1845	900 / 1700	950 / 1850	2.2	Weights
695 / 305	760 / 360	760 / 360	800 / 400	800 / 400	2.3	
Polyurethane / Polyurethane	Polyurethane / Polyurethane	Polyurethane / Polyurethane	Polyurethane / Polyurethane	Polyurethane / Polyurethane	3.1	
230 x 75	230 x 75	230 x 75	230 x 75	230 x 75	3.2	
85 x 70	85 x 70	85 x 70	85 x 70	85 x 70	3.3	
150 x 54	150 x 54	150 x 54	150 x 54	150 x 54	3.4	
1x + 1/4	1x+1/4	1x+1/4	1x+1/4	1x+1/4	3.5	
514	514	514	514	514	3.6	
398	398	398	377	377	3.7	
See table	See table	See table	See table	See table	4.2	
See table	See table	See table	See table	See table	4.3	
See table	See table	See table	See table	See table	4.4	
See table	See table	See table	See table	See table	4.5	
-	-	-	130	130	4.6	
695 / 1196	695 / 1196	695 / 1196	695 / 1196	695 / 1196	4.9	
-	-	-	-	-	4.10	
90	90	90	90	90	4.15	
1945 ⁽⁷⁾	2015 ⁽⁷⁾	2015 ⁽⁷⁾	2079 ⁽⁷⁾	2079 ⁽⁷⁾	4.19	
785 ⁽⁷⁾	855 ⁽⁷⁾	855 ⁽⁷⁾	918 ⁽⁷⁾	918 ⁽⁷⁾	4.20	
800	800	800	860	860	4.21	
65 / 180 / 1160	65 / 180 / 1160	65 / 180 / 1160	65 / 180 / 1160	65 / 180 / 1160	4.22	
675	675	675	675	675	4.24	
570	570	570	572	572	4.25	
30	30	30	30 + 130	30 + 130	4.31	
30	30	30	30 + 130	30 + 130	4.32	
2422 ⁽¹⁰⁾	2488 ⁽¹⁰⁾	2488 ⁽¹⁰⁾	2598 ⁽¹⁰⁾	2598 ⁽¹⁰⁾	4.34.1	
2377 ⁽¹¹⁾	2443 ⁽¹¹⁾	2443 ⁽¹¹⁾	2528 ⁽¹¹⁾	2528 ⁽¹¹⁾	4.34.2	
1546	1612	1612	1770	1770	4.35	
5.5 / 6.0	5.5 / 6.0	5.5 / 6.0	5.0 / 5.0	5.0 / 5.0	5.1	
0.15 / 0.22	0.15 / 0.22	0.15 / 0.22	0.15 / 0.22	0.15 / 0.22	5.2	
0.3 / 0.25	0.3 / 0.25	0.3 / 0.25	0.3 / 0.25	0.3 / 0.25	5.3	
7 / 10	7 / 10	7 / 10	7 / 10	7 / 10	5.8	
Electromagnetic	Electromagnetic	Electromagnetic	Electromagnetic	Electromagnetic	5.10	Performance data
1.2	1.2	1.2	1.2	1.2	6.1	
3	3	3	3	3	6.2	
43535 B	43535 B	43535 B	NO	NO	6.3	
24V / 250Ah ⁽¹⁶⁾	24V / 375Ah ⁽¹⁷⁾	24V / 375Ah ⁽¹⁸⁾	24V / 375Ah ⁽¹⁹⁾	24V / 375Ah ⁽¹⁹⁾	6.4	
212	288	288	291	291	6.5	
1.3	1.3	1.4	1.3	1.4	6.6	
MOSFET ~ AC	MOSFET ~ AC	MOSFET ~ AC	MOSFET ~ AC	MOSFET ~ AC	8.1	
< 70	< 70	< 70	< 70	< 70	10.7	

⁽¹⁸⁾ Available battery 315Ah

⁽¹⁹⁾ Available battery 315Ah. With battery 315Ah service weight -11kg

All values are nominal values and they are subject to tolerances. For further information, please contact the manufacturer. Yale products might be subject to change without notice.

Lift trucks illustrated may feature optional equipment. Values may vary with alternative configurations.

MS series

Models: MS10E, MS10, MS12, MS14, MS14IL, MS16, MS16IL



Tiller head and controls

The tiller head is designed for operator comfort and features an ergonomic shaped handle with angled grips and integral hand guard. Large, low effort, butterfly buttons control the direction of travel and speed as well as the electromagnetic brake. All controls are accessible without the operators hand being removed from the handle.

Lift and lower buttons are conveniently located on the tiller head and can be readily accessed for left or right hand use. The travel direction inverter button is designed for maximum angle of contact with the operator's body. When activated, the direction of travel is automatically reversed and the truck comes to a stop. The horn is located on top of the tiller head and can be actuated by the thumb or fore finger. The creep speed control allows all functions of the truck to be operated with the tiller arm in the vertical position when operated at reduced speed for manoeuvring in tight confines.

Tiller arm

The tiller arm is mounted onto the drive unit. The offset position increases visibility around the mast. The low anchor point requires the minimum steering effort and the long tiller arm increases the operating clearance when working inside the truck's envelope. The tiller arm is spring assisted and returns automatically to the vertical position when released.

The tiller must be in the operating position, or the creep speed button depressed for the truck to be fully operational, including traction and mast operations.

Dashboard instrumentation

The truck's dash board features a battery discharge indicator and hour meter. The red mushroom shaped button can be pressed to stop the truck immediately in case of an emergency.

Chassis

The drive gear and main components are fully enclosed for maximum protection by the all welded chassis. The chassis is surface treated and painted with two pack epoxy paint. The compact chassis width of 800mm is standard across the

range allowing the handling of loads in tight spaces, containers or in aisle stacking applications.

Mast and Forks

2 stage clear view masts are featured on all models. For durability the mast guard is made from wire mesh. A transparent guard is available as an option. A variety of bolt-on mast types are offered depending on the model including single, two and three stage with full free lift. Rollers are permanently lubricated and sealed for maximum service life. The standard fork section is 65mm; a slim line option with a 55 mm profile is available for handling cage pallets length wise in block stacking operations.

Battery

A selection of batteries is available from 24V - 150 Ah to 24V - 375 Ah to provide a choice of power options. On the MS10E, the battery charger is built into the truck.

Wheels

Wheels are manufactured from various compounds to suit specific applications. Load wheels are contained within the chassis to avoid any impact with the load unit.

Electric motors

The MS10E features a powerful 1 kW SEM traction motor, which guarantees an excellent response to operating commands and maintains sufficient torque in various situations. Maintenance is limited; with inspection intervals recommended every 500 hours of service for a long operational life. The lift motor is a 2kW DC compound motor, which makes light work of any workload.

The MS10-16 features a 1,2kW AC drive motor, which delivers instant response to forward and reverse traction inputs and providing considerable torque. The maintenance free motor also has long inspection intervals and provides a long, low cost operational life. The 2 - 3 kW DC lift motor provides the power output to match the truck's operational requirements.

Traction - Steering Unit

The drive motor is connected directly to the helicoidal gear transmission running in an oil bath. The motor is mounted

vertically for efficient ventilation and to reduce flexing stresses to the power cables, ensuring reduced downtime.

Hydraulic unit

A heavy duty compound wound motor drives the pump. Inputs to the motor and proportional valve are received from the controller to control lifting and lowering performance. Lift/lower functions are actuated directly from the tiller head controls via the Combi MOSFET controller. The MS10 and MS12 feature on/off buttons with soft stop control. The MS14 and MS16 feature proportional control for the right side control buttons and on/off buttons with soft stop on the left side. A flow control valve regulates lowering speeds and a protection valve prevents further lowering in the event of a line break. A transparent oil reservoir allows the oil level to be easily checked.

Electronic controls

The MS10E features a Combi MOSFET controller, which regulates both the SEM traction motor and the DC lift motor. On the MS10-16, a new generation AC/DC Combi MOSFET controller is used to regulate both traction and pump operation. High energy efficiency and motor performance allows considerable hourly operational usage. Smooth progressive control is available at all times. The controller features automatic braking (reverse current braking) and regenerative braking on release of the butterfly buttons as well as anti roll-back/start-up on gradients. Using a plug-in console, the controller can be adjusted for forward and reverse travel speeds, reverse current braking, release braking, acceleration, lift and lowering speeds, ramp performance and deceleration on lifting and lowering. The operator and application performance requirements can be easily matched to ensure maximum productivity.

Options

A comprehensive range of options including:



- Selection of drive wheels
- Cold store -30°C
- Load backrest
- A4 document holder

NACCO Materials Handling Limited
trading as **Yale Europe Materials Handling**
Centennial House, Frimley Business Park,
Frimley, Surrey GU16 7SG, United Kingdom.
Tel: +44 (0) 1276 538500 Fax: +44 (0) 1276 538559
www.yale-forklifts.eu

Country of Registration: England. Company Registration Number: 02636775



Safety. This truck conforms to the current EU requirements. Specification is subject to change without notice.

Yale, VERACITOR and  are registered trademarks. "PEOPLE, PRODUCTS, PRODUCTIVITY", PREMIER, Hi-Vis, and CSS are trademarks in the United States and certain other jurisdictions. MATERIALS HANDLING CENTRAL and MATERIAL HANDLING CENTRAL are Service Marks in the United States and certain other jurisdictions.  is a Registered Copyright. © Yale Europe Materials Handling 2014. All rights reserved.

Truck shown with optional equipment

Printed in The United Kingdom (1014HG) EN
Publication part no. 258979879 Rev.09