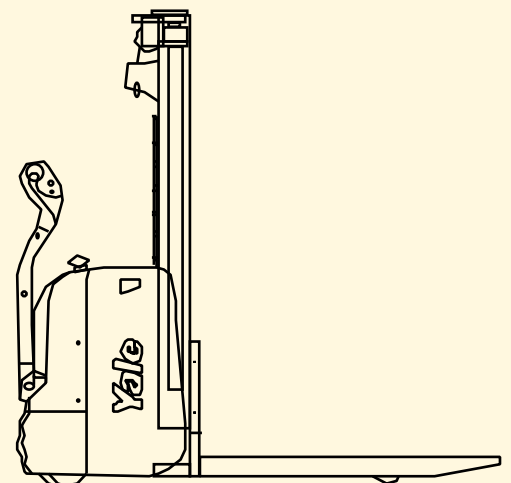


## Pedestrian Stacker

1,000kg, 1,200kg, 1,400kg and 1,600kg



- Combi MOSFET traction and pump control
- SEM drive motor
- Dual lift/lower controls on tiller head
- Panorama mast
- Low mounted tiller arm
- Initial Lift feature



## VDI 2198 - General Specifications

|   |  | Yale               | Yale               | Yale                       | Yale                  | Yale                  | Yale                  | Yale                  | Yale                  |
|---|--|--------------------|--------------------|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Characteristics                               | 1.1 Manufacturer   |                    | Yale               | Yale                       | Yale                  | Yale                  | Yale                  | Yale                  | Yale                  |
|   | 1.2 Model designation  |                    | <b>MS10</b>        | <b>MS12</b>                | <b>MS14</b>           | <b>MS14</b>           | <b>MS14 IL</b>        | <b>MS16</b>           | <b>MS16 IL</b>        |
|   | 1.3 Power: Battery, Diesel, LPG, Electric mains                  |                    | Battery            | Battery                    | Battery               | Battery               | Battery               | Battery               | Battery               |
|   | 1.4 Operation: Manual, pedestrian, stand-on, seated, orderpicker |                    | Pedestrian         | Pedestrian                 | Pedestrian            | Pedestrian            | Pedestrian            | Pedestrian            | Pedestrian            |
|   | 1.5 Load capacity  | Q (t)              | 1000               | 1200                       | 1400                  | 1400                  | 1400                  | 1600                  | 1600                  |
|   | 1.6 Load centre  | c (mm)             | 600                | 600                        | 600                   | 600                   | 600                   | 600                   | 600                   |
|   | 1.8 Load distance  | x (mm)             | 714                | 744 <sup>1)</sup>          | 712 <sup>2)</sup>     | 712 <sup>2)</sup>     | 818 <sup>2)</sup>     | 712 <sup>2)</sup>     | 818 <sup>2)</sup>     |
|   | 1.9 Wheelbase  | y (mm)             | 1225               | 1315                       | 1315                  | 1385                  | 1529                  | 1385                  | 1529                  |
|   | Weights  | 2.1 Unladen weight | kg                 | 880                        | 960 <sup>3)</sup>     | 1000 <sup>4)</sup>    | 1120 <sup>4)</sup>    | 1200 <sup>4)</sup>    | 1120 <sup>4)</sup>    |
| 2.2 Axle loading laden, front/rear            |  | kg                 | 660 / 1220         | 740 / 1420                 | 570 / 1830            | 810 / 1710            | 900 / 1700            | 875 / 1845            | 950 / 1850            |
| 2.3 Axle loading unladen, front/rear          |  | kg                 | 610 / 270          | 670 / 290                  | 695 / 305             | 760 / 360             | 800 / 400             | 760 / 360             | 800 / 400             |
| Wheels and Tyres                              | 3.1 Tyres - rubber, polyurethane, front/rear                     |                    | Poly / Poly        | Poly / Poly                | Poly / Poly           | Poly / Poly           | Poly / Poly           | Poly / Poly           | Poly / Poly           |
|   | 3.2 Tyre size - front  |                    | Ø 230 x 75         | Ø 230 x 75                 | Ø 230 x 75            | Ø 230 x 75            | Ø 230 x 75            | Ø 230 x 75            | Ø 230 x 75            |
|   | 3.3 Tyre size - rear   |                    | Ø 85 x 100         | Ø 85 x 100                 | Ø 85 x 70             | Ø 85 x 70             | Ø 85 x 70             | Ø 85 x 70             | Ø 85 x 70             |
|   | 3.4 Additional wheels (dimensions)                               |                    | Ø 150 x 50         | Ø 150 x 50                 | Ø 150 x 50            | Ø 150 x 50            | Ø 150 x 50            | Ø 150 x 50            | Ø 150 x 50            |
|   | 3.5 Wheels - number front/rear (x = driven)                      |                    | 1 x + 1/2          | 1 x + 1/2                  | 1 x + 1/4             | 1 x + 1/4             | 1 x + 1/4             | 1 x + 1/4             | 1 x + 1/4             |
|   | 3.6 Track width - front  | b10 (mm)           | 515                | 515                        | 515                   | 515                   | 515                   | 515                   | 515                   |
|   | 3.7 Track width - rear   | b11 (mm)           | 400                | 400                        | 400                   | 400                   | 375                   | 400                   | 375                   |
| Dimensions                                    | 4.2 Height of mast, lowered                                      | h1 (mm)            | 1870 <sup>5)</sup> | 1870 <sup>5)</sup>         | 1970 <sup>5)</sup>    | 1970 <sup>5)</sup>    | 1970 <sup>5)</sup>    | 1970 <sup>5)</sup>    | 1970 <sup>5)</sup>    |
|   | 4.3 Free lift  | h2 (mm)            | 100                | 100                        | 100                   | 100                   | 100                   | 100                   | 100                   |
|   | 4.4 Lift height  | h3 (mm)            | 2830               | 2830                       | 2965                  | 2965                  | 2965                  | 2965                  | 2965                  |
|   | 4.5 Height of mast extended                                      | h4 (mm)            | 3385               | 3385                       | 3535                  | 3535                  | 3535                  | 3535                  | 3535                  |
|   | 4.6 Initial lift   | h5 (mm)            | -                  | -                          | -                     | -                     | 130                   | -                     | 130                   |
|   | 4.9 Height of tiller arm in working position, min./max.          | h14 (mm)           | 695 / 1196         | 695 / 1196                 | 695 / 1196            | 695 / 1196            | 695 / 1196            | 695 / 1196            | 695 / 1196            |
|   | 4.15 Lowered height  | h13 (mm)           | 90                 | 90                         | 90                    | 90                    | 90                    | 90                    | 90                    |
|   | 4.19 Overall length  | l1 (mm)            | 1852               | 1912 <sup>6)</sup>         | 1944 <sup>7)</sup>    | 2013 <sup>7)</sup>    | 2052 <sup>7)</sup>    | 2013 <sup>7)</sup>    | 2052 <sup>7)</sup>    |
|   | 4.20 Length to front face of forks                               | l2 (mm)            | 692                | 752 <sup>6)</sup>          | 784 <sup>7)</sup>     | 853 <sup>7)</sup>     | 892 <sup>7)</sup>     | 853 <sup>7)</sup>     | 892 <sup>7)</sup>     |
|   | 4.21 Overall width   | b1/b2 (mm)         | 800                | 800                        | 800                   | 800                   | 860                   | 800                   | 860                   |
|   | 4.22 Fork dimensions   | s/e/l (mm)         | 65 / 180 / 1160    | 65 / 180 / 1160            | 65 / 180 / 1160       | 65 / 180 / 1160       | 65 / 195 / 1160       | 65 / 180 / 1160       | 65 / 195 / 1160       |
|   | 4.24 Fork carriage width   | b3 (mm)            | 675                | 675                        | 675                   | 675                   | 675                   | 675                   | 675                   |
|   | 4.25 Outside fork width  | b5 (mm)            | 570                | 570                        | 570                   | 570                   | 570                   | 570                   | 570                   |
|   | 4.31 Ground clearance beneath mast, laden                        | m1 (mm)            | 22                 | 22                         | 22                    | 22                    | 30+130                | 22                    | 30+130                |
|   | 4.32 Ground clearance, centre of wheelbase                       | m2 (mm)            | 30                 | 30                         | 30                    | 30                    | 30+130                | 30                    | 30+130                |
| 4.33 Aisle width for pallets 1000 x 1200 wide | Ast (mm)   | 2405               | 2478 <sup>8)</sup> | 2492 <sup>10)</sup>        | 2558 <sup>10)</sup>   | 2587 <sup>10)</sup>   | 2558 <sup>10)</sup>   | 2587 <sup>10)</sup>   |                       |
| 4.34 Aisle width for pallets 800 x 1200 long  | Ast (mm)   | 2369               | 2433 <sup>9)</sup> | 2457 <sup>11)</sup>        | 2523 <sup>11)</sup>   | 2513 <sup>11)</sup>   | 2523 <sup>11)</sup>   | 2513 <sup>11)</sup>   |                       |
| 4.35 Turning radius                           | Wa (mm)  | 1540               | 1626               | 1626                       | 1692                  | 1760                  | 1692                  | 1760                  |                       |
| Performance                                   | 5.1 Travel speed, laden/unladen                                  | Kmh                | 5.6 / 6.0          | 5.6 / 6.0                  | 5.8 / 6.0             | 5.8 / 6.0             | 5.0 / 5.0             | 5.8 / 6.0             | 5.0 / 5.0             |
|   | 5.2 Lift speed, laden/unladen                                    | m/s                | 0.13 / 0.18        | 0.12 / 0.18 <sup>12)</sup> | 0.15 / 0.22           | 0.15 / 0.22           | 0.16 / 0.22           | 0.15 / 0.22           | 0.16 / 0.22           |
|   | 5.3 Lowering speed, laden/unladen                                | m/s                | 0.3 / 0.25         | 0.3 / 0.25                 | 0.3 / 0.25            | 0.3 / 0.25            | 0.28 / 0.26           | 0.3 / 0.25            | 0.28 / 0.26           |
|   | 5.8 Max. gradeability, laden/unladen                             | %                  | 8 / 10             | 8 / 10 <sup>13)</sup>      | 8 / 10 <sup>13)</sup> | 8 / 10 <sup>13)</sup> | 8 / 10 <sup>13)</sup> | 8 / 10 <sup>13)</sup> | 8 / 10 <sup>13)</sup> |
|   | 5.10 Service brake   |                    | Electromagnetic    | Electromagnetic            | Electromagnetic       | Electromagnetic       | Electromagnetic       | Electromagnetic       | Electromagnetic       |
| Motors  | 6.1 Drive motor rating (S2 60 min)                               | kW                 | 1                  | 1                          | 2                     | 2                     | 2                     | 2                     | 2                     |
|   | 6.2 Lift motor rating (S3 15%)                                   | kW                 | 2                  | 2                          | 3                     | 3                     | 3                     | 3                     | 3                     |
|   | 6.3 Battery to DIN 43531/35/36 A, B, C, no                       |                    | no                 | 43535 B                    | 43535 B               | 43535 B               | no                    | 43535 B               | no                    |
|   | 6.4 Battery voltage/capacity (5 hour rate)                       | V/Ah               | 24 / 200           | 24 / 250                   | 24 / 250              | 24 / 375              | 24 / 345              | 24 / 375              | 24 / 345              |
|   | 6.5 Battery weight   | kg                 | 225                | 240                        | 240                   | 300                   | 300                   | 300                   | 300                   |
| Other   | 8.1 Drive control  |                    | MOSFET             | MOSFET                     | MOSFET                | MOSFET                | MOSFET                | MOSFET                | MOSFET                |
|   | 8.4 Average noise level at operator's ear                        | dB (A)             | 65                 | 65                         | 65                    | 65                    | <70                   | 65                    | <70                   |

<sup>1)</sup> With three stage mast : - 50mm

<sup>2)</sup> With three stage mast : - 18mm

<sup>3)</sup> With three stage mast : + 175kg

<sup>4)</sup> With three stage mast : + 115kg

<sup>5)</sup> With free lift : 100mm

<sup>6)</sup> With three stage mast : + 50mm

<sup>7)</sup> With three stage mast : + 18mm

<sup>8)</sup> With three stage mast : + 22mm

<sup>9)</sup> With three stage mast : + 38mm

<sup>10)</sup> With three stage mast : + 8mm

<sup>11)</sup> With three stage mast : + 14mm

<sup>12)</sup> With three stage mast : 0.10/0, 18m/s

<sup>13)</sup> With three stage mast : 7/10%

**Notes:** Equipment Weight

Weights are based on following mast specifications:

**MS10:** 2830mm

**MS12:** 2830mm

**MS14:** 2965mm

**MS16:** 2965mm

## Models:

MS10, MS12, MS14, MS14 IL, MS16, MS16 IL

### Tiller head and controls

The tiller head features an ergonomic shaped handle with integral hand guard. Large dimensioned, low effort butterfly buttons control direction of travel and speed as well as the electromagnetic brake. Lift and lower buttons are conveniently located on the tiller head and can be readily accessed for left/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 conveniently actuated by thumb or forefinger. An optional creep speed control allows the truck to be operated with the tiller arm in the vertical position at reduced speed for manoeuvring in tight confines.

### Tiller arm

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

### Chassis

The all welded chassis provides fully enclosed protection for the drive train and main components. The compact chassis width of 800mm is standard across the range.

### Mast and forks

2 stage clearview 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 mast types depending on the model and including single stage, 2 stage and 3 stage with full free lift are offered. Rollers are permanently lubricated and sealed for maximum service life. Masts are bolt-on type. The standard fork section is 65mm thick. A slim line fork profile

(55mm) option is available for handling cage pallets lengthwise in block stacking operations.

### Traction and pump control

A new generation MOSFET high frequency Combi controller is used to regulate both traction and pump operation. Energy efficient, 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 antirollback start-up on an incline. 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 and deceleration on lifting and lowering.

### Drive unit

Separately excited (SEM) drive motors are used across the range. They deliver fast travel speeds in the laden/ unladen condition, high start-up torque and acceleration as well as efficient running. The use of SEM motor technology eliminates forward and reverse contactors.

The motors are mounted vertically for easy brush access, improved ventilation and minimum contamination from floor conditions. Motors are flanged directly on to a helicoidal gear transmission running in an oil bath. Drive wheel is mounted automobile style to the wheel hub for easy change.

### Hydraulics

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 tiller head controls via the Combi 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 facilitates checking of the oil level.

### Braking

The electromagnetic brake is electrically released and spring applied. The brake is opened and closed by activation of the butterfly buttons with the tiller arm in the working position. The brake is closed by bringing the tiller arm to the vertical or horizontal position. Reverse current braking is applied by inverting the direction of travel. Releasing the butterfly buttons induces both reverse current braking (adjustable) and regenerative braking.

### Dashboard

A combined hourmeter/battery discharge indicator with lift interrupt is featured on the dashboard. The indicator also displays alarm conditions should they occur. A quick disconnect traction cut-out button is mounted on the dashboard.

### Options

A comprehensive range of options including tandem load wheels (MS10/12), load backrest, tyres, cold store protection and creep speed control are available.



**NACCO Materials Handling Limited**  
trading as **Yale Europe Materials Handling**  
Flagship House, Reading Road North,  
Fleet, Hampshire GU51 4WD, United Kingdom.  
Tel: + 44 (0) 1252 770700 Fax: + 44 (0) 1252 770784  
www.yale-europe.com

Country of Registration: England. Company Registration Number: 02636775



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

Publication part no. 258979879 Rev.04  
Printed in The United Kingdom (110610/1543HG) EN

Yale is a registered trade mark.  
© Yale Europe Materials Handling 2006. All rights reserved.

Truck shown with optional equipment