Technical sheet:

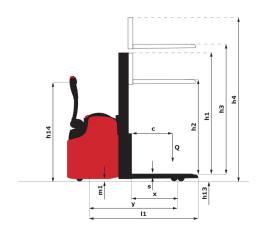
## ES 412 ET

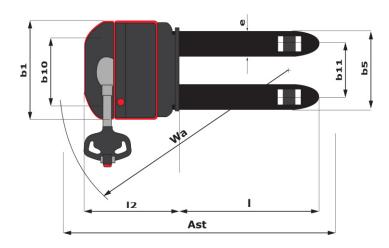




Netric					
1.2   Model Name		Technical characteristics		Metric	
Battery   Pedestrian   Pedest	1.1	Manufacturer		Manitou	
Max. capacity   Q   1200 kg	1.2	Model Name		ES 412 ET	
1.5	1.3	Power source		Battery	
1.6	1.4	Operator type		Pedestrian	
1.8   Distance from Load backrest to center of rear ade	1.5	Max. capacity	Q	1200 kg	
Weight   W	1.6	Load centre of gravity	c	600 mm	
Velight	1.8	Distance from Load backrest to center of rear axle	x	683 m	
2.1   Service weight	1.9	Wheelbase	у	1245 mm	
Weight on front ade (Isden) / rear ade (Iaden)   729 kg / 1342 kg   1320 kg   1342 kg   232 kg   233   234 keight on front ade (Unidden) / rear ade (Unidden)   612 kg / 232 kg   234 kg		Weight			
Weight on front ade (Unladen)   Fear ade (Unladen)	2.1	Service weight		874 kg	
Weight on front ade (Unladen)   Fear ade (Unladen)	2.2	Weight on front axle (laden) / rear axle (laden)		729 kg / 1342 kg	
Minetic   Mine	2.3				
3.1   Tyres type				3.	
3.5.2   Number of drive wheels - Size of forlive wheels   1 x 230x75	3.1			Polyurethane	
3.3   Number of load wheels - Size of load wheels   2 x 80x50     3.4   Number of stabilizer wheels / Size of the stabilizer wheels   2 / 2     3.6   Front wheel gauge   b10   517 mm     3.7   Rear wheel gauge   b11   380 mm				•	
Number of stabilizer wheels   Size of the stabilizer wheels   2 / 2   2   3.5   Number of front wheels   Fraze wheels   5   2 / 2   3.6   5   5   5   5   5   5   5   5   5					
3.5   Number of front wheels / rear wheels					
Sear wheel gauge					
Section   Sect		·	b10		
Dimensions					
4.2       Mast height lowered       h1       1930 mm         4.3       Mast free lift *       h2       140 mm         4.4       Mast lifting height *       h3       2930 m         4.5       Mast height extended       h4       3365 m         4.15       Fork height in low position       h13       85 mm         4.19       Overall length to face of forks       12       720 mm         4.20       Length to face of forks       12       720 mm         4.21       Overall width       b1       800 mm         4.22       Fork serriage width       b1       800 mm         4.21       Fork carriage width       b3       680 m         4.22       Fork carriage width       b3       680 m         4.31       Ground clearance below mast       m1       35 m         4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Asle width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aske width for 800 x 1200 pallet widthways       Ast       2225 m         4.35       Turning radius       Wa       1400 mm         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h       0.1 m/s / 0.1	5.7		511	500 11111	
4.3       Mast free lift *       h2       140 mm         4.4       Mast Infring height *       h3       2930 m         4.5       Mast height extended       h4       3365 m         4.15       Fork height in low position       h13       85 mm         4.19       Overall length       l1       1870 mm         4.20       Length to face of forks       l2       720 mm         4.21       Overall width       b1       800 mm         4.22       Fork section / width / length       5 / e / l       180 mm x 60 mm / 1150 mm         4.22       Fork carriage width       b3       680 m         4.31       Ground clearance below mast       m1       35 m         4.32       Ground clearance below mast       m1       35 m         4.32       Ground clearance below mast       m1       35 m         4.33       Asie width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aisle width for 800 x 1200 pallet widthways       Ast       2200 m         4.33       Turning radius       Wa       1400 mm         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s	4.2		h1	1020 mm	
4.4       Mast lifting height *       h3       2930 m         4.5       Mast height extended       h4       3365 m         4.15       Fork height in low position       h13       85 mm         4.19       Overall length       I1       1870 mm         4.20       Length to face of forks       I2       720 mm         4.21       Overall width       b1       800 mm         4.22       Forks section / width / length       s / e / I       180 mm x 60 mm / 1150 mm         4.24       Fork carriage width       b3       680 m         4.23       Ground clearance at centre of wheelbase       m2       20 m         4.31       Ground clearance at centre of wheelbase       m2       20 m         4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Asise width for 100x 1200 pallet widthways       Ast       2200 m         4.34       Asise width for 800x 1200 pallet engthways       Ast       2205 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.12 m/s		-			
4.5   Mast height extended					
A15   Fork height in low position		5 5			
A					
4.20   Length to face of forks   12   720 mm     4.21   Overall width   20   1800 mm     4.22   Forks section / width / length   5 / e / l   1800 mm x 60 mm / 1150 mm     4.24   Fork carriage width   5   600 mm     4.24   Fork carriage width   5   600 mm     4.25   Ground clearance below mast   5   600 mm     4.31   Ground clearance at centre of wheelbase   5   700 mm     4.32   Ground clearance at centre of wheelbase   5   700 mm     4.33   Aisle width for 1000 x 1200 pallet widthways   700 mm     4.34   Aisle width for 800 x 1200 pallet lengthways   700 mm     4.35   Turning radius   700 mm     700 mm   700 mm   700 mm     700 mm   700 mm   700 mm     700 mm   700 mm   700 mm   700 mm     5.1   Travel spaced (laden / unladen)   6 km/h / 6 km/h     5.2   Lifting speed (laden / unladen)   6 km/h / 6 km/h     5.3   Lowering speed (laden / unladen)   70.1 m/s / 0.16 m/s     5.3   Lowering speed (laden / unladen)   8 % / 10 %     5.10   Service brake   8   Electro magnetic     6.1   Drive motor rating \$2.60 min   1 kW     6.2   Lift motor rating \$2.60 min   1 kW     6.3   Battery according to DIN 43531/85/36 A, B, C   DIN 43535-B     6.4   Battery / Batteries capacity   24 V · 1600 Ah     6.5   Battery weight (*/- 5%)   150 kg     Miscellaneous   10 pp of drive control   AC					
4.21       Overall width / length       b1       800 mm         4.22       Forks section / width / length       s / e / l       180 mm x 60 mm / 1150 mm         4.24       Fork carriage width       b3       680 m         4.31       Ground clearance at centre of wheelbase       m1       35 m         4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Aisle width for 1000 x 1200 pallet widthways       Ast       2285 m         4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating \$2.60 min       1 kW         6.2       Lift motor rating \$2.60 min       2 kW		-			
4.22       Forks section / width / length       s / e / l       180 mm x 60 mm / 1150 mm         4.24       Fork carriage width       b3       680 m         4.31       Ground clearance below mast       m1       35 m         4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Aisle width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h       0.1 m/s / 0.16 m/s         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s       0.1 m/s / 0.12 m/s         5.3       Lowering speed (laden / unladen)       8 % / 10 %       8 % / 10 %         5.7       Gradeability (laden / unladen)       8 % / 10 %       8 % / 10 %         5.10       Service brake       Electro magnetic         6.1       Drive motor rating st 53 15%       2 kW         6.2       Lift motor rating st 53 15%       2 kW         6.3       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery / Batteries capacity <t< td=""><td></td><td></td><td></td><td></td></t<>					
4.24       Fork carriage width       b3       680 m         4.31       Ground clearance below mast       m1       35 m         4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Aisle width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.1 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating at \$3.15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery according to DIN 43531/35/36 A, B, C       24V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous					
4.31       Ground clearance below mast       m1       35 m         4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Aisle width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating \$2.60 min       1 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery Weight (+/- 5%)       150 kg         Miscellaneous       150 kg					
4.32       Ground clearance at centre of wheelbase       m2       20 m         4.33       Aisle width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       8 % / 10 %         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2 60 min       1 kW         6.2       Lift motor rating \$2 50 min       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V · 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC		_			
4.33       Aisle width for 1000 x 1200 pallet widthways       Ast       2200 m         4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       8 % / 10 %         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating at \$3.15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
4.34       Aisle width for 800 x 1200 pallet lengthways       Ast       2285 m         4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating at \$3.15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
4.35       Turning radius       Wa       1400 mm         Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       8 % / 10 %         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2 60 min       1 kW         6.2       Lift motor rating at \$3 15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
Performances         5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating at \$3.15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
5.1       Travel speed (laden / unladen)       6 km/h / 6 km/h         5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating \$2 60 min       1 kW         6.2       Lift motor rating at \$3 15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC	4.35		Wa	1400 mm	
5.2       Lifting speed (laden / unladen)       0.1 m/s / 0.16 m/s         5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating S2 60 min       1 kW         6.2       Lift motor rating at S3 15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
5.3       Lowering speed (laden / unladen)       0.14 m/s / 0.12 m/s         5.7       Gradeability (laden / unladen)       8 % / 10 %         5.10       Service brake       Electro magnetic         Engine         6.1       Drive motor rating S2 60 min       1 kW         6.2       Lift motor rating at S3 15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
5.7 Gradeability (laden / unladen)  5.10 Service brake  Engine  6.1 Drive motor rating \$2 60 min  6.2 Lift motor rating at \$3 15%  6.3 Battery according to DIN 43531/35/36 A, B, C  6.4 Battery / Batteries capacity  6.5 Battery weight (+/- 5%)  Miscellaneous  8.1 Type of drive control  8 % / 10 %  Electro magnetic  Electro magnetic  2 kW  6 3 DIN 43535-B  6 4 DIN 43535-B  6 5 AC					
Service brake       Electro magnetic         Engine       Image: Electro magnetic         6.1       Drive motor rating \$2.60 min       1 kW         6.2       Lift motor rating at \$3.15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
Engine         Engine           6.1         Drive motor rating \$2 60 min         1 kW           6.2         Lift motor rating at \$3 15%         2 kW           6.3         Battery according to DIN 43531/35/36 A, B, C         DIN 43535-B           6.4         Battery / Batteries capacity         24 V - 160 Ah           6.5         Battery weight (+/- 5%)         150 kg           Miscellaneous           8.1         Type of drive control         AC					
6.1       Drive motor rating S2 60 min       1 kW         6.2       Lift motor rating at S3 15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC	5.10			Electro magnetic	
6.2       Lift motor rating at S3 15%       2 kW         6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
6.3       Battery according to DIN 43531/35/36 A, B, C       DIN 43535-B         6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC		-			
6.4       Battery / Batteries capacity       24 V - 160 Ah         6.5       Battery weight (+/- 5%)       150 kg         Miscellaneous         8.1       Type of drive control       AC					
6.5 Battery weight (+/- 5%)  Miscellaneous  8.1 Type of drive control  AC					
Miscellaneous  8.1 Type of drive control  AC					
8.1 Type of drive control AC	6.5			150 kg	
21		Miscellaneous			
8.4 Sound level at the driver's ear according to DIN 12 053	8.1	Type of drive control			
5. State letter at the driver 5 car according to 514 12 555	8.4	Sound level at the driver's ear according to DIN 12 053		65 dB(A)	

## **Dimensional drawing**





## Characteristics of masts and residual capacities

Central Cylinder Duplex		CCD 26	CCD 29	CCD 34
h1 - Height mast lowered *	mm	1780	1930	2180
h2 - Free lift	mm	140	140	140
h3 - Lifting Height	mm	2630	2930	3430
h4 - Height mast extended *	mm	3065	3365	3865
Residual capacity without attachment (Industrial load chart)	kg	1200	1200	900

Central Cylinder Simplex	CCS 15	CCS 17	
h1 - Height mast lowered *	mm	1940	2190
h2 - Free lift	mm	1510	1760
h3 - Lifting Height	mm	1510	1760
h4 - Height mast extended *	mm	1940	2190
Residual capacity without attachment (Industrial load chart)	kg	1200	1200





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