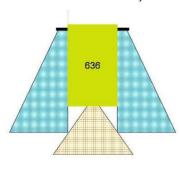
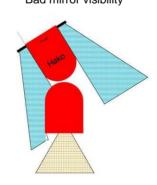




### RECOMMANDATION **GREEN MACHINES 636** HAKO CITYMASTER 1200 **TENNANT ADVANTAGES/BENEFITS** • One unique GM 636 version provided unmatched operator comfort, better dust control and +40% real hopper volume compare the Hako Citymaster 1200. • Hako Citymaster 1200 Basic version : Mechanical seat & fixed windows

		Hako Citymaster 1200 <u>Classic</u> version : Air suspension seat & Sliding windows     Hako Citymaster 1200 <u>Comfort</u> version: Air suspension seat & Sliding windows & adjustable steering column & Air conditioning
Duranta		
DIMENSIONS	1000	TENNANT ABVANTA GEO/DENESTO
GREEN MACHINES 636	HAKO CITYMASTER 1200	TENNANT ADVANTAGES/BENEFITS
Length with brushes: 3450 mm     Width: 1100 mm     Width at mirrors: 1350 mm     Height: 1980 mm	Length with brushes: 3944 mm     Width: 1193 mm     Width at mirrors: 1530 mm     Height: 1995 mm	<ul> <li>The GM 636 is 9% less wide (10 cm) than Hako         Citymaster 1200 and this is very important in the city         center, which is the main application of this class of 1 M³         machines.</li> <li>Half a meter shorter for the GM 636, means easier to</li> </ul>
Wheelbase: 1400 mm     Wall to wall turning radius: 4040 mm	Wheelbase: 1430 mm     Wall to wall turning radius: 2750 mm	transport on a trailer  Hako Citymaster 1200 has a compact turning radius due to his chassis articulation, BUT having an articulated machine has severe limitations and problems for drivers: An artic. Sweeper model is more unstable than fixed chassis,eg during turns or on bumpy roads - visibility when turning is very poor (0) is some areas and it can be hazardous for city center citizens, reversing an artic. m/c is particularly hazardous and awkward
Fixed chassis with Vari Track	Articulated chassis	<ul> <li>Hako Citymaster 1200 can easily damage the city and rear side part of the machine due to his bad rear visibility when turning. Machine tested was damaged.</li> <li>If customer sweeps close to a wall, stops and turns the steering wheel, machine and wall will be damaged.</li> <li>With the Vari track system, the sustentation polygon is bigger with the GM 636 against the Hako Citymaster 1200, so stability is better, mainly is lateral movements, creating a safer GM 636 machine.</li> <li>Stable and safer driving with the GM 636. thanks to the Vari track</li> </ul>
Good mirror visibility	Bad mirror visibility	<ul> <li>Mirror visibility: Very bad visibility of the Hako Citymaster 1200 due to his articulated chassis. The 1m³ class are used in the city center and population safety is very important. When turning, Hako has a huge rear view mirror 'blind spot'. (see drawing)</li> <li>It is not possible for the driver to put his head out of the cab window and look behind when reversing. This is a critical safety procedure that is lacking. A great</li> </ul>





- concern for any vehicle working among pedestrians.
- With the GM 636 fixed chassis layout, visibility is very good and with rear camera visibility close to 100%
- Hako Citymaster 1200 has the same issue of 'rear blind spot' - dead angle vision, with or without rear camera
- Visibility with rear camera







#### **SWEEPING PERFORMANCE**

### **GREEN MACHINES 636**



- Sweeping width : 1200 mm
- Sweeping width max. 2050 mm
- Brush diameter : 750 mm



#### **HAKO CITYMASTER 1200**



- Sweeping width: 1200 mm
- Sweeping width max. 2270 mm
- Brush diameter: 900 mm

#### Simultaneous brush Control



The Hako brushes are only 'powered' to the 'in' position.
The brushes rely on their turning action to open out. This means they cannot be hydraulically directed against difficult areas to clean.

#### **TENNANT ADVANTAGES/BENEFITS**

- GM 636 brush control is located on the right armrest offering ergonomic and efficiency at the same time.
   Each brush can be individually controlled, useful for instance on the path walk where operator will only control one of the two brush; others will follow the borders.
- Ergonomically, GM 636 brushes control is closed to the operator and located on the right armrest. Full independent suspension means a comfortable ride for the driver
- The Hako has no suspension on any of the road wheels. This is one of the critical selling points
- Hako Citymaster 1200 brushes; right & left brushes cannot be controlled independently, they operate together
- Sweeping mode: GM 636 Unique, On step button to activate work mode compare to the HAKO Citymaster 1200 with 5 diff. functions. à GM 636 operation simplicity.

## Automatic road/work brush positioning



Manual road/work brush positioning



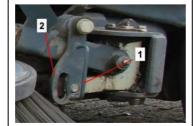
- GM 636: automatic positioning (road/sweep) of the brushes system (road, work, wear brush) via simple cab switch and brush pressure is simply control via lever in the cab.
- Hako Citymaster 1200: manual positioning (road/sweep)of the brushes system; Pos. 1 (transport); Pos. 2 (new plate brush); Pos. 3 (plate brush wearing 50%) and the driver is obliged to get out of the cab to drop brushes when in 'work' or lift brushes when 'transiting'

Automatic brush pressure via



Manual brush pressure





- Due to Dedicated parallel support system, GM 636 brushes will stay in the correct attack angle, with new brushes or used brushes.
- Hako Citymaster 1200 does have manual wearing brush positioning system but 3 Bolts need to be adjusted using tools to compensate for wear (Loss of time and operator simplicity)
- Hako Citymaster 1200 brushes are heavy and create a lot of vibration and noise, so less operator & environment comfort. A spring limits the weight of the brush on the ground, but this should be adjusted each time to compensate for wear and different surfaces otherwise premature wear of the brushes will occur!!!. Due to heavy brushes system on the Hako Citymaster 1200, the brush wear will be increasing compare to our GM 636 with incab adjustable brush pressure system.







HOPPER & SUCTION PERFORMANCE			
GREEN MACHINES 636	HAKO CITYMASTER 1200	TENNANT ADVANTAGES/BENEFITS	
Hopper capacity: 1150 L     Useable internal hopper capacity: 1001 L     Volume for leaves due to cyclone fill system: 2002 L     Diameter suction tube: 200 mm     Suction nozzle with suction nozzle unique flap	Hopper capacity: 1000 L     Measured internal uesable hopper capacity: 600 L     Diameter suction tube: 180 mm     Suction nozzle with mechanical control flap	<ul> <li>+ 35% more useable 'real' volume capacity for the GM 636 vs Hako Citymaster1200.</li> <li>Hopper 'real' volume combined compaction from cyclone system of the GM 636, means a 3 times better leaf handling capacity than the Hako Citymaster 1200.</li> <li>Much more productivity for the GM 636 by reducing the frequency of returning to depot to dump debris.</li> </ul>	
1 to 1½ compaction ratio	1 to 1 compaction ratio	Compaction for leaves and debris due to lateral cyclone filling action – (material enters hopper at a tangent, spinning material reducing volume  Leaf collection volume will be higher with the 636 providing more productivity for our customer.  If needed, during demonstration, bring always your leaves with you!!	
Filtration: 3 stages     Dust free system via twin cyclones	Filtration: 1 stage     No cyclone dust control system	<ul> <li>GM 636: 3 Stage Dust Filtration System Side Entry Cyclone Swirl Plate. 2- Stainless Steel Filter Screens. 3-Twin Cyclones</li> <li>Hako Citymaster 1200: 1 stainless steel filter screen creates a lot of dust when weather is dry.</li> <li>When sweeping areas with difficult dusty debris (sand, dust,) the level of water needed by the Hako Citymaster 1200 will be higher than the 636 with 'Cloudmaker' technology. If the driver wishes to increase the fan speed he also must increase the engine speed as they are linked together. Witht eh 636 they are independent. This means high noise for operator &amp; environment.</li> <li>As the 1m³ class sweeper machines are used in the city center or parking the GM 636 dust free sweeping will provide a better image, better noise level and better air quality for citizens and environment.</li> <li>During the demonstration, try and find a particularly dusty area in order to show that with our machine, the dust free sweeping, created by the 3 stages filtration. When a customer is sweeping in the city center, the Hako Citymaster will create a dust cloud when it hits dusty areas, not the 636.</li> <li>Our GM 636 customer will be able to clean particularly dusty city centre areas without affecting the people III</li> </ul>	
Strong linatex suction tube Side position	Standard suction tube Central position	<ul> <li>entre areas without affecting the people !!!</li> <li>Hako Citymaster 1200 uses Standard suction tube: it needs to be changed every 1000 hours compare to the GM 636 Linatex suction hose, well know in our Tennant indoor and outdoor products for the robustness and reliability.</li> <li>On the Citycat 1000; unblocking the suction mouth will not be easy as it will be very difficult to see down the suction pipe to the ground to clear obstructions as the pipe is in a central position.</li> <li>On the GM 636, accessibility of the suction tube is simplified by his side positioning and no bends so minimizing the risk to block the suction tube.</li> <li>On the GM 636, quality components are provided in standard unit to gain product durability.</li> </ul>	







OPERATOR ENVIRONNEMENT			
GREEN MACHINES 636	HAKO CITYMASTER 1200	TENNANT ADVANTAGES/BENEFITS	
Working place Sound level :	Working place Sound level :	GM 636 has – 2 dB(A) compare to the Hako Citymaster 1200.	
80 dB(A)	82 dB(A)	Note: One dB(A) less is a split in two.	
		<ul> <li>Hako Citymaster 1200 glass on suction nozzle very small and easily dusty.</li> <li>On the 636, a large glass provides efficient visibility on the suction nozzle.</li> <li>Standard adjustable steering column on GM 636.         Optional on Hako Citymaster 1200.     </li> <li>On Hako Citymaster 1200 : Limited foot space due to large steering column</li> </ul>	
		<ul> <li>Ergonomic: On the Hako Citymaster 1200; the forward gas pedal is close to the reverse gas pedal. With standard safety shoes it is possible that the right foot can touch the forward or rear gas pedal by accident, this is not safe at all.</li> <li>When right foot is on reserve pedal, this one is under the brake pedal and can be very dangerous as time to react will be long and feet will be blocked under brake pedal.</li> <li>On GM 636: single forward and reverse pedal with forward/neutral/reverse lever to be able to disengage drive. The drive system is always 'live' when the operator is in the cab, there is no neutral.</li> </ul>	
Windshield defroster	Windshield defroster	Hako Citymaster 1200 : very poor front window	
		<ul> <li>defroster. The air outlets are located on the front/top of the cab</li> <li>Fast &amp; efficient defrosting system with our GM 636. Thanks to the electrically heated windshield.</li> </ul>	
Full information with	No information on water , fuel,	Providing the minimum of information on a sweeper is	
monitoring  total  tota	rpm level,	<ul> <li>essential for the operator. The Hako Citymaster 1200 is so basic that no information, excepted Oil T° is indicated, neither the rpm, neither water level, neither fuel level.</li> <li>Equipped in standard with MDM (Mini Display Module) the GM 636 provides all information needed by the operator during the day (fan rpm, engine rpm, and speed) and provide fault information.</li> <li>Others information provide on 636: Fuel, tachometer, hour meter, engine T°, Parking brake indicator, Engine oil pressure,)</li> </ul>	
Cab roof ventilation		Side door opened and roof opening provided outside air flow during summer.	
Storage space	No	Some space have been dedicated to store stuff.	







#### WATER SYSTEM

### **GREEN MACHINES 636**

- 190 L fresh water tank
- 1 water sprays on right / 1 water spray on left
- Water suction with fresh water
- Cloudmaker system Patented dust control using atomized water
- 3 water dust suppression positions



· Brush water flow control



Couldmarker



Patented automatic Water "Ejector" system



### HAKO CITYMASTER 1200

- 180 L fresh water tank.

  Measured 167 L
- 150 L water in hopper
- 2 water sprays on right brush / 1 water spray on right
- Water suction from dust water without filtration







### **TENNANT ADVANTAGES/BENEFITS**

- GM 636: fresh water supplies: 2 x sprays; Cloudmaker and suction.
- Hako Citymaster 1200: fresh water for 2 x sprays + Dusty water for suction. After 2 test minutes (sand, mud) the line was obstructed by mud / sand, obliging to stop machine, lift hopper, remove water hose connection, clean it with HP, .. Loss of time compare to our clean system.
- Hako advises to add 150 L of water into the hopper. At the bottom of the hopper (red lines) a hinged stainless steel plate covering a small dirty water reservoir on the base of the hopper - water drains through peinto this reservoir from perforated sheets located on sides (blue lines). After each full hopper, operator needs to clean the hopper, hinge out the bottom plate and carefully clean with High Pressure the two side grills. A complicated time consuming business for your customer
- Using Dirty recycled water on suction nozzle of the Hako Citymaster 1200 can be a problem because when the fan is switched off the dirty water will run out onto the ground potentially making a mess to high spec. surfaces in town centres – eq. Marble or stone!!!
- On the GM 636, 3 water positions:
- Position 0 : no water; Position 1 : dry condition : sprays, Cloudmaker and suction nozzle spray work; Position 2 : Wet condition : Spray & Suction nozzle work (not Cloudmaker) + GM 636 is equipped with water flow control knob to adjust water flow to the brushes as needed
- Picture showing the water connection between hopper and water hose. It is well known that this pipe becomes blocked very early in the machines life and thereafter ceases to be effective. Drivers stop cleaning it out and the water recirc. Is then ineffective.

### Ø Gain of productivity and operator simplicity to clean our system. No risk to block the water system

- Simple to operate via cab control, the GM 636 water ejector system will be a useful tool during wet condition.
   No need to get out of the cab in wet condition with the GM 636
- Example with the Citymaster 1200 : Operator prepares his machine with water in fresh water tank and water in hopper. When he sweeping, it starts to rain and all water on the ground will be sucked into the hopper. Only way to drain water, it's via water suction nozzle, so it means that water will be accumulated into the hopper and no way to drain it !!!!











PROPELLING & SUSPENSION SYS	ГЕМ		
GREEN MACHINES 636 HAKO CITYMASTER 1200		TENNANT ADVANTAGES/BENEFITS	
40 km/h     Vari track for stability     All 4 wheel braking system     4 wheels drive in transit and work modes  HARO CITYMASTER 1200      No suspension      25 km/h     Articulation creates instability     2 front brakes     2 wheel drive in Transit or 4 wheel drive in work mode		<ul> <li>GM 636 provides ideal drive operator comfort to work 5 to 8 hours per day without fatigue, thanks to the 4 Wheel Drive with independent suspensions (Koni over spring) + seat suspension. On the Hako Citymaster 1200, no chassis suspension only air seat suspension as option. Vehicle Suspension is critical to the driver and health and Safety know the importance of reducing driver fatigue and possible back injury!!!</li> <li>For kerb climbing, a differential lock system is an option on the Hako Citymaster 1200. Our GM 636 is equipped as standard with a diff. lock function that prevents one wheel spinning when climbing or descending kerbs – by sending the same quantity of hydraulic oil to each of the 4 wheels,</li> <li>With only 2 wheel front brakes in the event that the hopper is empty, there is a danger that the rear wheels will lift off the ground during a sudden stop. The GM636 and his 4 brakes, will stay stable in case of brake emergency. Safety first!</li> <li>Gain of transport time, gain of productivity</li> <li>Operator comfort and happiness to drive the GM 636</li> </ul>	
Engine & pump independent	Engine and pump in line	On the Hako Citymaster 1200; RPM fan is directly related to engine RPM as they are mounted in line. On the GM 636, engine and fan motor are independent. The benefits of this is that the RPM fan can be high and RPM engine can be high, reducing noise level and fuel consumption of the GM 636.  636 – 4 literes per hour Hako 6 liters per hour  Lower cost of fuel with the GM 636	
• Kubota Engine () V1505-T-E3B 1498 CC 33 KW @ 3000 rpm Torque: 118 Nm @ 2000 rpm	• Yanmar Engine () 4TNV88 2189 CC 33 KW @ 2600 rpm Torque: 143Nm @ 1560rpm	Yanmar engine : Engine 34.3 Kw adjusted at 33 Kw @ 2600 rpm.     Recommended Engine speed Hako : 2450 rpm     Recommended Engine speed 636 : 2100 -2200 rpm	
150 125 150 125 150 16 <u>M</u> 16 <u>M</u> 16 <u>M</u> 100 1250 1500 1750 2000 2250 2500 2750 3000 3600 		<ul> <li>Yanmar engine has his maximum torque at 2600 rpm and over 2600 rpm, the torque dramatically fall 'off'. It means that the gap is only 350 rpm between ideal rpm (2450) and maximum rpm (2600).</li> <li>Ideal Kubota rpm is between 2000 -2200 rpm, with very good performance untill 3000 rpm. It means less engine wear for the Kubota engine</li> <li>Fuel consumption is less for the Kubota engine.</li> <li>Some famous names using Kubota engine: Kubota landscaping / agriculture products; Kubota mini excavator (worldwide leader) Bobcat (Skid Steer company / construction equipment / worldwide leader)</li> </ul>	
Radiator grill	No radiator grill	On the GM 636 / Removeable dirt protection screen is positioned in front of the radiator, it stops the radiator becoming blocked with debris making it easy to clean. On the Hako Citymaster 1200, no grill and the debris passes into the radiator fins requiring regular cleaning or overheating.  Less cost of maintenance with the GM 636	







GREEN MACHINES 636	HAKO CITYMASTER 1200	TENNANT ADVANTAGES/BENEFITS
Easy accessibility	Limited accessibility	Tipping Cab makes maintenance faster easier and cheaper thanks to the full components accessibility of the 636. Side panels easily removed     Hako: the hopper can be lifted and the side panels is, via 10 screws can be removed but accessibility is not optimum due to fuel and hydraulic tanks on each sides  Ø Gain of time via easy components accessibility

ITYMASTER 1200 High Pressure	TENNANT ADVANTAGES/BENEFITS
High Pressure	The core of the LP of Done core Week and a the Helica
	<ul> <li>The use of the High Pressure Washer on the Hako Citymaster 1200 is long and complex. Operator needs to remove hydraulics connection to the fan,connect it to the HP pump and then it will work.</li> <li>With the GM 636, it is only necessary to switch the switch, pull out the reel then press the trigger.</li> <li>Ø Gain of time and simplicity of the GM 636 HP system.</li> </ul>







SUMMARY			
Brand & Model	GREEN MACHINE 636	Hako Citymaster 1200	TENNANT ADVANTAGES
DIMENSIONS: L X L X W	3450 x 1130 x 1980	3944 x 1193 x 1995	COMPACTNESS
SWEEP WIDTH (MINI. / MAXI.)	1200/2050	1200 / 2270	=
CHASSIS	FIXED +VARI TRACK	ARTICULATED	BETTER STABILITY
HOPPER VOLUME (ON BROCHURE)	1000 L	1000 L	=
HOPPER REAL VOLUME	1001 L	600 L	+40%
LEAVES VOLUME IN HOPPER	2002 L	600 L	+330%
DUST CONTROL SUPPRESSION	3 STAGES	1 STAGE	FREE DUST CONTROL
FRESH WATER CAPACITY	190	180 / REEL 167 L	+15%
RECOVERY WATER CAPACITY	No	150 L	No RISK OF BLOCKAGE
WATER DUMP VALVE FOR WET WEATHER SWEEPING	YES	No	
ENGINE POWER	33 KW	33 KW	=
SPEED	40 KM/H	25 км/н	GAIN OF TIME
WHEEL DRIVE	4	2 OR 4	BETTER TRACTION
4 WHEEL DRIVE IN TRANSIT	STANDARD	No & Not an Option	BETTER TRACTION
DIFFERENTIAL LOCK	STANDARD	OPTION	BETTER TRACTION
Suspension	4	0	+++ CONFORT
Brakes	4	2	+++ SAFETY
ADJUSTABLE & INDEPENDENT FAN SPEED	STANDARD	No & Not an Option	LESS FUEL CONSUMPTION
SUCTION NOZZLE	WITH SKID / LIMITED	WITH RUBBER +	LESS COST OF SERVICE
	ADJUSTEMENT	WHEELS	
SUCTION TUBE	LINATEX	STANDARD	QUALITY & DURABILITY
INDEPENDENT BRUSH CONTROL	STANDARD	No & Not an Option	
HYD BRUSH CONTROL IN AND OUT	STANDARD	No & Not an Option	
IN-CAB BRUSH PRESSURE ADJUSTER	STANDARD	No & Not an Option	BETTER EFFICIENCY
PARALLELOGRAM BRUSH ARMS FOR EFFECTIVE	STANDARD	No & Not an Option	LESS COST OF MAINTENANCE
SWEEPING WITH WORN BRUSHES	OTANDAND	NO WHOT AN OTHOR	LEGS COST OF MAINTENANCE
Noise Level DP/A)	80	82	+++ Confort
Noise Level DB(A)  Rev Counter	STANDARD	No & Not an Option	
	STANDARD	No & Not an Option	LESS FUEL CONSUMPTION GO HOME SAFELY!
FUEL GAUGE	STANDARD		
ENGINE TEMP GAUGE HYDRAULIC OIL GAUGE	STANDARD	No & NOT AN OPTION STANDARD	MACHINE PROTECTION  MACHINE PROTECTION
	STANDARD	No & Not an Option	SAFETY & MACHINE SELF
OIL TEMP, ENGINE TEMP, ENGINE COOLANT, AIR FILTER, HYD OIL LEVER, BATTERY CHARGE,	STANDARD	NO & NOT AN OPTION	PROTECTION
HYD SYSTEM PRESSURE: SYSTEM SHUTDOWN/WARNING	STANDARD	No & Not an Option	SAFETY & MACHINE SELF
ALARM	STANDARD	NO & NOT AN OPTION	PROTECTION
HEATED FRONT SCREEN	STANDARD	No & Not an Option	BETTER EFFICIENCY
Sun roof	STANDARD	No & Not an Option	+++ CONFORT
2 STAGE WIPER	STANDARD	No & Not an Option	SAFETY
HANDBRAKE WARNING BEEPER	STANDARD	No & Not an Option	SAFETY
REVERSE BEEPER	STANDARD	No & Not an Option	SAFETY
TIPPING CAB FOR ACCESS	STANDARD	No & Not an Option	BETTER ACCESSIBILITY
AUTOMATIC PARK AND LOCK BRUSHES	STANDARD	No & Not an Option	SAFETY
SWING OUT TANKS FOR ACCESS	STANDARD	No & Not an Option	BETTER ACCESSIBILITY
F/N/R DRIVE ENGAGEMENT/FULLY AUTOMATIC	STANDARD	No & Not an Option	BETTER EFFICIENCY
SWEEPING FUNCTION DEPLOYMENT	O I ANDAND	110 G ITOT AIR OF HOR	BETTER ET TOLENOT
UNBREAKABLE WING MIRRORS N	STANDARD	No & Not an Option	LESS COST OF MAINTENANCE
ADJUSTABLE STEERING COLUMN	STANDARD	OPTION ON BASIC	+++ CONFORT
		VERSION	

