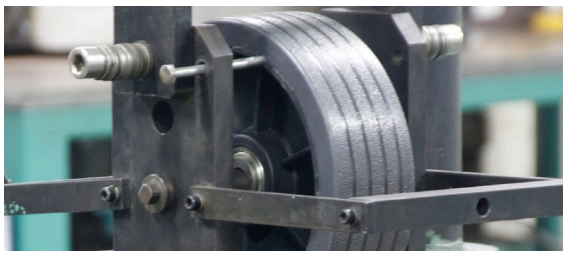
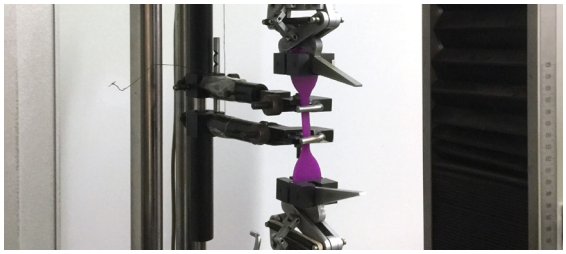
AGV/AMR/OHT CASTERS



Breakout force test

Conduct a starting force test on the driving wheels to measure the starting energy requirement under the load capacity.

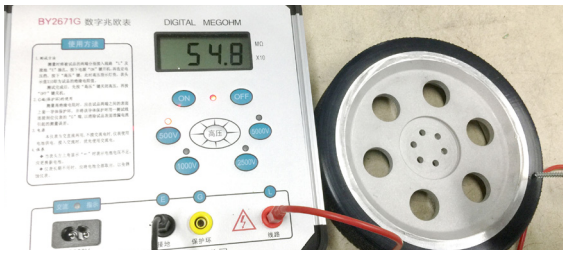


Polyurethane physical-mechanical test

Physical property testing of PU synthetic materials

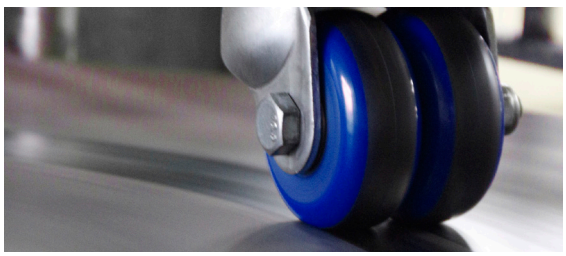
Static pressure test

Static pressure testing on the drive wheel and agv caster to measure the deformation and safety load capacity standard.



Anti-static test

Measure the anti-static of drive wheel and agv caster to ensure that the resistance of the polyurethane surface meets the standard.



Caster walking test

Walking fatigue testing to ensure that the wheel surface strength meets the standards

AGV/AMR/OHT caster application

	Light duty specification	Medium duty specification	Heavy duty specification
Load capacity(Kg)	100 kg-400 kg	400 kg-1500 kg	1500 kg-10000 kg
Wheel diameter	75-200 mm	100-300 mm	250-600 mm
Wheel width	40-80 mm	80-120 mm	80-200 mm
Speed	6-10 km/h	6-10 km/h	4-10 km/h
Fitting	Flange installation	Flange installation	-
	Keyway installation	Keyway installation	-
Material	Polyurethane + Cast steel		
	Polyurethane + Aluminum core		
Others	Grain / Anti Static	-	-
Industry	V-groove wheel for warehousing logistic Light duty AGV/AMR Cleaning equipment	AGV/AMR system Electric towing equipment Vehicle industrial assembly line Electric pallet truck	Port logistic Air cargo logistic Mining logistic OHT

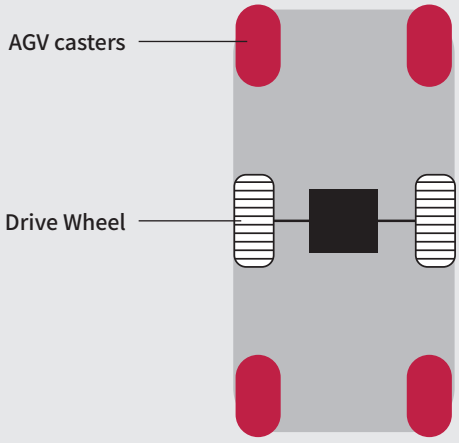
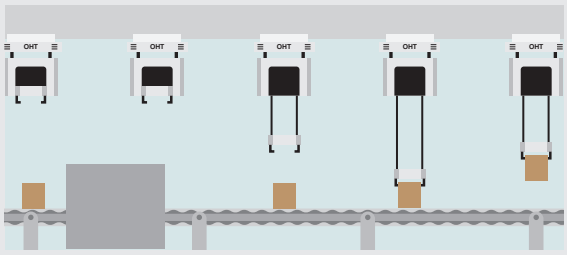


Diagram of AGV drive wheel and caster



Application

Finite element analysis - static pressure test

Specification: Hub fitting drive wheel

Item No.: 2WDWPU1540/F5070/6.5/73a/f/esd

Software: Ansys Mechanical APDL

Testing tool: Static pressure testing machine

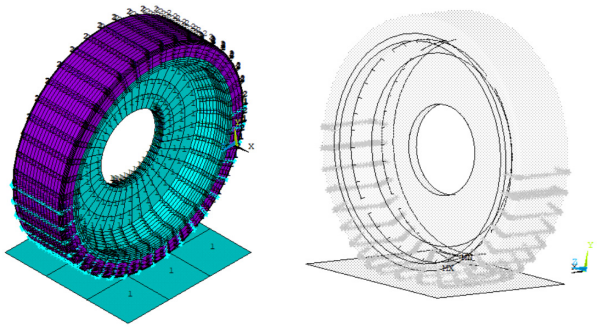
Material: Polyurethane 73A ; embossment pattern

Software structural parameter

- Wheel core material: SS41; Linear isotropic
- Polyurethane: Neo-Hookean

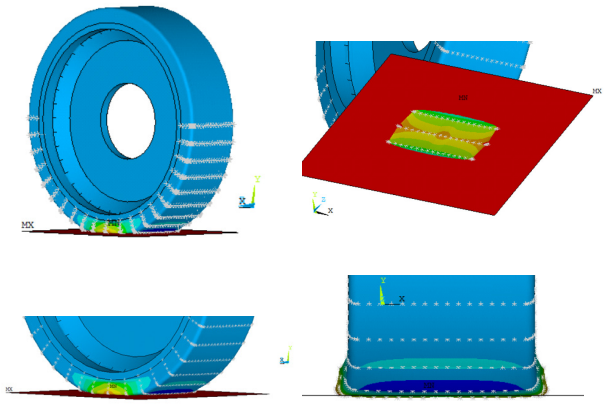
Experimental procedure

- Recording the experimental data by drive wheel running on the pressure testing machine.
- Finding the correct parameter.
- Recording the stress-strain curve



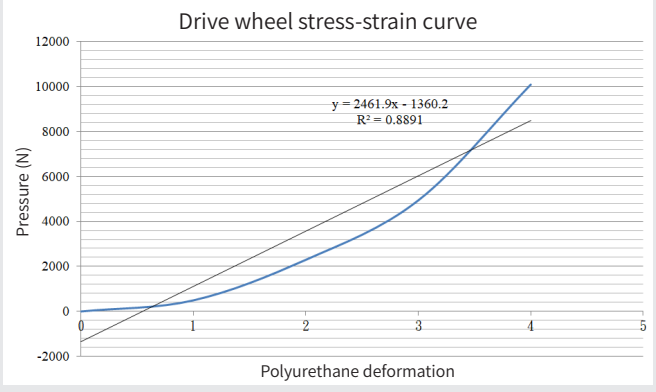
3D Model

Static pressure testing machine				
Pressure (Kg)	Time (Min.)	Deformation of wheel before pressure testing (mm)	Displacement measurement during pressure testing (mm))	Deformation of wheel after pressure testing(mm)
0	X	150.62	X	X
100	3	149.55	1.07	0.02
200	3	148.875	1.745	0.03
300	3	148.36	2.26	0.04



Testing results

Point of application					
	MU	Case	Static pressure (mm)	Stress point (N)	Kg
73A	2.7	1	2.26	2917.6	297.4108053
	2.7	2	1.745	1799.9	183.4760449

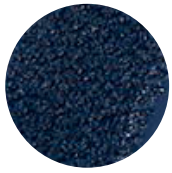


- Drive wheel deformate as the curve.
- The curve become nonlinear after the static pressure testing over 6000N.

Drive wheel – Key way

※Customize wheel providing

Feature：Floor protection, non-slip, abrasion resistant, noise resistant



Knerled pattern

Herringbone pattern + Knerled pattern

Unit：mm

Anti static：10^5~$10^9\Omega$

Drawing No.	Item No.	Material	Grain	Core material color	diameter	Wheel width	Axle bore	Keyway hub width	Keyway hub length	Load capacity (Kg)
1	2WDWPU1340/ K20521/ 73A/ESD	PU (Shore A73)	Knerled pattern	Cast iron Black	130	51	20	6	23	250
2	2WDWPU2040/ K16518.3/ 73A/ESD				200	45	16	5	18.3	300
3	2WPUL1250X/ P5/93A	PU (Shore A93)	Herringbone pattern + Knerled pattern	Cast iron Silver	125	50	25	8	28.3	300
4	2WPUL1550X/ P5/93A				150	50	25	8	28.3	400
5	2WPUL2050X/ P5/93A				200	50	25	8	28.3	500

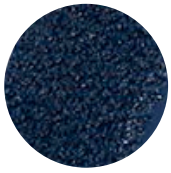
Customized AGV/AMR/OHT casters

HICKWALL can provide various types of high-quality customized wheels, including AGV, AMR, and OHT applications.The special polyurethane with high tensile strength and tear strength are our excellent characteristics.We assist well-known domestic and foreign enterprises to apply customized wheels in specific areas, and achieve customer goals. In various types of practical examples,there are many positive feedbacks after the cooperation.

Drive wheel – Hub flange

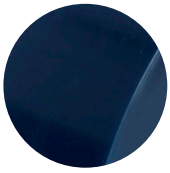
※Customize wheel providing

Feature：Floor protection, non-slip, abrasion resistant, noise resistant



Knerled pattern

Herringbone pattern



Plain

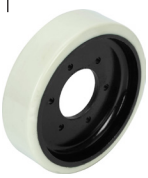
1

2

3

4

6



7

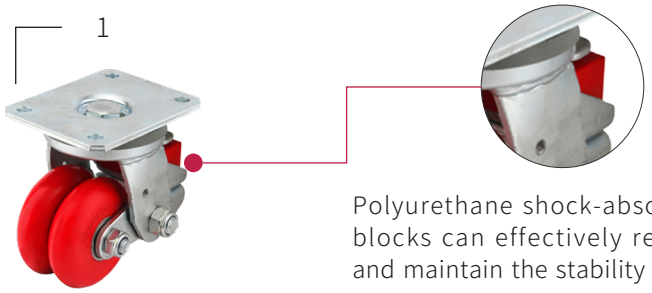
Unit：mm

Anti static：10^5~$10^9\Omega$

Drawing No.	Item No.	Material	Grain	Core material color	diameter	Wheel width	No. of Fixing hole	Central hole	PCD	Load capacity (Kg)
1	2WDWUA1340/ F4252/4/ 73A/ESD	PU (Shore A73)	Knurled pattern	Aluminum Silver	130	40	6 x M4	42	52	160
2	2WDWPU1340/ F3545/5/ 73A/ESD			Cast iron Black			6 x M5	35	45	200
3	2WDWPU1540/ F5070/6.5/ 73A/ESD		Herringbone pattern		150		6 x 6.5	50	70	250
4	2WDWPU1540/ F5070/6.5/ 73A/F/ESD		Knurled pattern							
6	2WDWPU1540/ F5070/6.5/93A	PU (Shore A93)	Plain							280
7	2WPUL2040 YDW50/QB	PU (Shore A73)	Knurled pattern		200					

AGV caster – Shock absorbing

Features：Quiet and wear-resistant without leaving traces, adaptable to uneven ground, low center of gravity, two-wheel design, flexible rotation



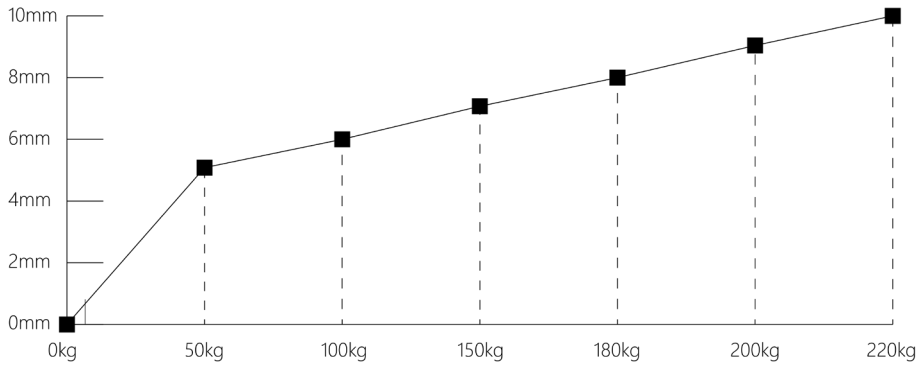
Polyurethane shock-absorbing damping blocks can effectively reduce vibration and maintain the stability of loaded items.

Unit：mm

Anti static：10^5~$10^9\Omega$

Drawing No.	Item No.	Material	Core material	diameter	Wheel width	Height	Swivel Radius
1	C415S-1.5-HEUA3100C/R	PU (Shore A93)	Aluminum	76	24 x 2	116-107	65

Initial shock absorption weight(Kg)	Maximum shock absorption weight(Kg)	Height deformation	Load Capacity (Kg)	Plate size	Plate hole distance	Plate aperture
50	160	10	220	110 x 85	86 x 60	9

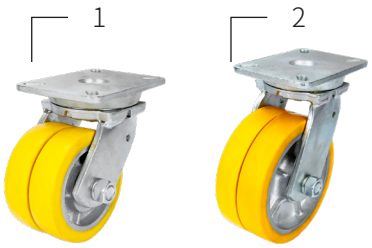


Compression curve graph

Testing items			Measurement (Original height is 116.2mm)	
Equipment	Static pressure testing machine	Load Capacity(Kg)	Spring elasticity contant (mm)	Height (mm)
Purpose	Testing deformation capacity	50	5.1	111.1
Condition	1. Set up the caster on the testing machine. 2. Recording the capacity deformation ratio. 3. Lab temperature: 23° C	100	6.2	110.0
Testing method	Set up the caster on the testing machine then exerting the pressure.	150	7.3	108.9
Standard	After 3 minutes of overload static pressure, the wheel surface has no cracks, the outer diameter deformation is less than 3mm, the rebound is good. The bearing rotates normally is qualified.	180	8.3	107.9
Result	The static pressure load of this wheel is 0-220kg. When the load reaches 220kg, the spring compression of the wheel set is 9.3mm. After the pressure is released, the outer diameter deformation of the single wheel is 0.06. The rebound effect of the wheel set is good.The bearing rotates flexibly, without jamming or loosening.	200	8.9	107.3
		220	9.3	106.9

AGV caster – Heavy duty

Features：Quiet and wear-resistant without leaving traces, adaptable to uneven ground, low center of gravity, two-wheel design, flexible rotation



Unit：mm

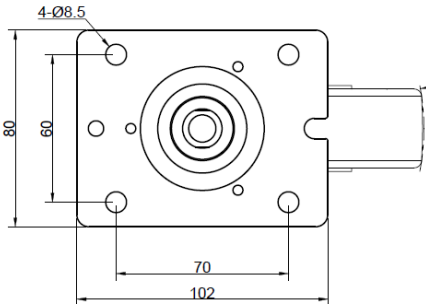
Anti static：10^5~$10^9\Omega$

Drawing No.	Item No.	Material	Core material	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
1	C910S-PRH1541YA-TWIN	PU (Shore D55)	Cast iron	150	40 x 2	204	60	185 x 134	155 / 132 X 105 / 85	14	1000
2	C910S-PRH2041YA-TWIN			200		269					1500

Self-Aligning Caster

Features：Designed for use with AGV lifting systems. The special torque-adjustable caster with an automatic reset function quickly returns to its original position, ensuring smooth repositioning of carts, cages, and logistic trolleys.

Smooth-rolling and effortless to push. Combined with the automatic reset function, it effectively reduces wear and potential damage in the working environment.



Unit: mm

Anti static：10^5~$10^9\Omega$

Swivel Item No.	Brake Item No.	Material	Dia. x Width	Height	Radius of gyration / brake	Load capacity (Kg)	Bearing Type
3PUGAUHDA	3PUGAUHDB	PU SS41	75(3") X 32	123	82/130	100	6002 x 2
4PUGAUHDA	4PUGAUHDB		100(4") X 32	148	95/130	120	6003 x 2
5PUGAUHDA	5PUGAUHDB		125(5") X 40	169	107 /130	200	6003 x 2
6PUGAUHDA	6PUGAUHDB		150(6") X 40	190	119/130	300	6203 x 2

AGV caster – Medium duty

Features：Quiet and wear-resistant without leaving traces, adaptable to uneven ground, low center of gravity, two-wheel design, flexible rotation

Unit：mm

Anti static：10^5~$10^9\Omega$

Drawing No.	Item No.	Material	Core material	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
1	C220-1S/ HUA5714	PU (Shore A93)	Aluminum	57	14 x 2	80	22	67 x 49	52 x 35	8.4	100
2	C331S/ HUA5020C/R			50	20 x 2	82	20	111 x 80	87 / 77 x 60	8.7	150
3	C331S/ HUA5520C/P1			55	20 x 2	79	20	84 x 84	64 / 59 x 64 / 59	8.5	200
4	C331S/ HUA6524C/R			65	24 x 2	87	20	111 x 80	87 / 77 x 60	8.7	200
5	C410S/ HEUA3100C/V	PU (Shore A73)		76	24 x 2	107	20	104 x 82	82 x 60	8.7	150
6	C410S/ HEUA3100C/R	PU (Shore A93)	Aluminum	76	24 x 2	107	20	104 x 82	82 x 60	8.7	200
7	C412S/ HEUA3140C/R			76	30 x 2	107	22	116 x 100	92 / 76 x 76 / 67	11	350
8	C415S/ HPU8035C/ TWIN		#45 Steel	80	35 x 2	110	21	116 x 100	78 x 78	8.5	500
9	C415S/ HEUA3100C/R		Aluminum	76	24 x 2	107	20	110 x 85	86 x 60	9	200
10	C415S/ HEUA3100C/V	PU (Shore A73)	Aluminum	76	24 x 2	107	20	110 x 85	86 x 60	9	150
11	C415S/ HEUA310R Tv/tw/T1225			76	24 x 2	107	20	Ø88	Bolt	M12 x P1.75	150

AGV caster – Shock absorbing GDSA series

Features: Die-cast steel plate and hardened double ball bearings in the wheel frame chassis which can rotate smoothly. Ivory aluminum frame with special rubber (A65) has good shock absorption function. Extremely small eccentricity can enhance stability and smooth rolling which is a shock-absorbing caster suitable for AGV / AMR.

Unit：mm

Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GDSA-50-ASF-EUS	PU (Shore A80)	Zinc plated	50	23	87-7	23~25	55 x 55	42 x 42	6.5	30
GDSA-65-ASF-EUS			64		102-7	23~26	55 x 55	42 x 42	6.5	40

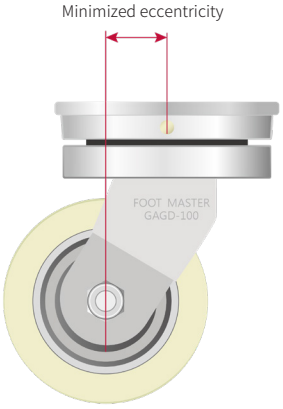
Unit：mm

Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	螺牙尺吋	Leveling Extent	Load Capacity (Kg)
GDSA-50-ASS-EUS	PU (Shore A80)	Zinc plated	50	23	87-7	23~25	M8 x P1.25	10	30
GDSA-65-ASS-EUS			64		102-7	23~26			40

Heavy duty GAGD series

AGVs with high loads are difficult to change directions. When the AGV turns, it will turn around the wheels.Therefore, when turning, the AGV casters will shake due to the size of the eccentricity. The higher the load, the more obvious the shaking phenomenon, so the AGV will deviate from the normal driving path. The GAGD series can withstand high loads. In order to prevent the AGV from suddenly stopping when turning, an excellent solution with a smaller eccentricity than ordinary casters is provided.



In order to improve steering smoothness under high load conditions,the GAGD series uses 2 types of bearing structures.It can ensure the durability of AGV for long-term operation under high load conditions.

As the load increases, the AGV operation will become more and more sluggish, so in order to be able to move forward, backward, and turn softly with minimal force, a twin-wheel structure is necessary. The high-performance and high-elastic polyurethane wheels used in the GAGD series can meet the above conditions.

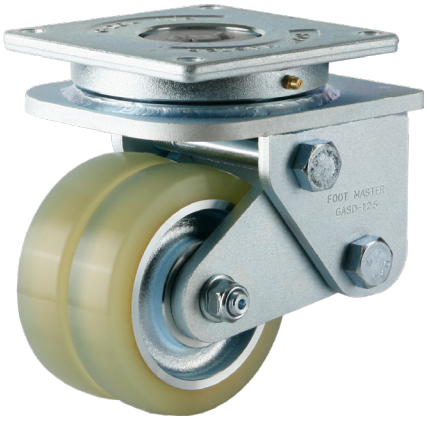
Unit：mm

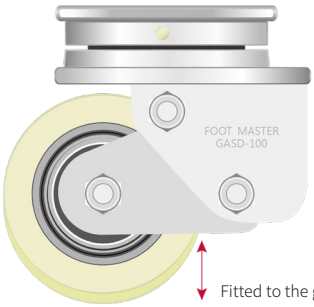
Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GAGD-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	123	30	112 x 112	92 x 92	9	250
GAGD-100-ASF-HUD			100	30 x 2	150	30	112 x 112	92 x 92	9	310
GAGD-125-ASF-HUD			125	35 x 2	175	33	145 x 145	120 x 120	11	440
GAGD-150-ASF-HUD			150	40 x 2	200	35	145 x 145	120 x 120	11	630

Heavy duty shock absorbing GASD series

What appears to be flat ground may not actually be flat. AGVs are generally equipped with 4 casters, but it often happens that one of the casters becomes separated from the uneven ground. During steering, the casters separate from the ground and then suddenly contact the ground, which will be inconsistent with the way the AGV travels, resulting in loss of balance. Therefore, the AGV will deviate from its normal driving position and stop instantly. The GASD series provides a solution to this phenomenon.





The advantage of the GASD series with shock-absorbing function is that the special rubber used in the series is different from ordinary steel springs and can absorb repeated subtle vibrations when moving on uneven ground.

The GASD series uses special rubber to provide 10mm of shock-absorbing compression space. Under the 10mm shock-absorbing compression space, the AGV can always run close to the ground, thus significantly reducing the possibility of the AGV stopping instantaneously due to vibration when changing directions.

Unit：mm

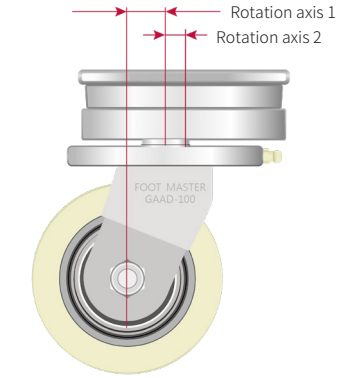
Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GASD-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	130-10	30	112 x 112	92 x 92	9	250
GASD-100-ASF-HUD			100	30 x 2	160-10	30	112 x 112	92 x 92	9	310
GASD-125-ASF-HUD			125	35 x 2	185-10	33	145 x 145	120 x 120	11	440
GASD-150-ASF-HUD			150	40 x 2	220-10	35	145 x 145	120 x 120	11	630

Heavy duty self-aligned and dual wheels GAAD series

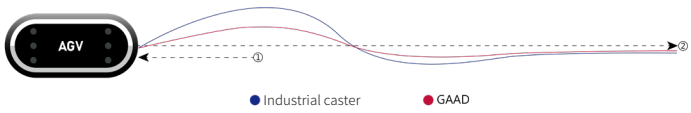
The AGV driven wheel of the GAAD series uses two rotation axes with different rotation radii during forward and reverse operation. The rotation axis will be automatically adjusted according to the moving direction to achieve a structure that adjusts to the minimum rotation radius.

Two rotation axes with different rotation radii



The running stability of the AGV is greatly affected by the eccentricity of the casters. If the eccentricity is too large, the AGV will shake too much, causing it to deviate from the prescribed travel route; if the eccentricity is too small, the AGV's motor will be overloaded.For AGVs that need to move forward and backward, the GAAD series is the most suitable solution.

Movement path difference Industrial caster v.s. GAAD



Unit：mm

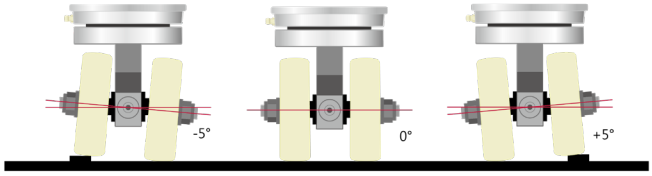
Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GAAD-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	130	10~30	112 x 112	92 x 92	9	250
GAAD-100-ASF-HUD			100	30 x 2	160	10~30	112 x 112	92 x 92	9	310
GAAD-125-ASF-HUD			125	35 x 2	185	15~33	145 x 145	120 x 120	11	440
GAAD-150-ASF-HUD			150	40 x 2	220	15~33	145 x 145	120 x 120	11	630

Heavy duty tilting and dual wheels GATD series

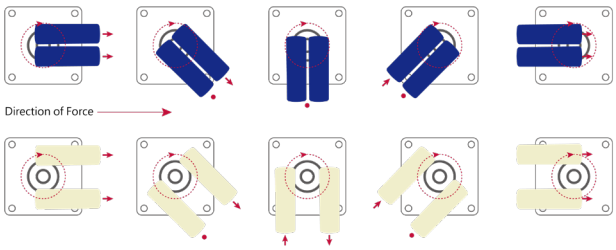
FOOT MASTER®
Casters & Wheels

The GATD series has a balanceable structure. The wheel axle can tilt freely according to the flatness of the ground within a range of ±5° from the central axis. The freedom of the wheel axle allows the casters to remain close to the ground, thereby reducing the shaking caused by the AGV turning, maintaining stable operation, and protecting the loaded transport items.



Different from the general two-wheel structure, the GATD series has a structure with a large distance between the two wheels. When the two wheels rotate in the direction of the AGV, the two wheels will rotate in opposite directions within a certain range. After reaching a specific orientation, they will start to rotate in the same direction. Reducing the eccentric distance is called the self-compensation effect.The GATD series has a better self-compensation effect than ordinary two-wheelers, which can prevent the AGV from leaving the driving path.

Comparison of rotation directions Industrial caster v.s. GATD



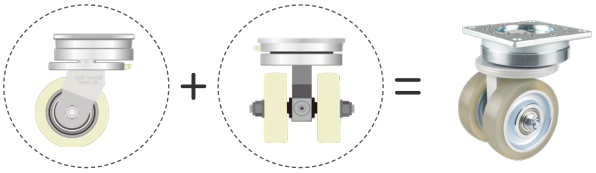
Unit：mm

Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GATD-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	123	30	112 x 112	92 x 92	9	250
GATD-100-ASF-HUD			100	30 x 2	150	30	112 x 112	92 x 92	9	310
GATD-125-ASF-HUD			125	35 x 2	175	33	145 x 145	120 x 120	11	440
GATD-150-ASF-HUD			150	40 x 2	200	35	145 x 145	120 x 120	11	630

Heavy duty AGV/AMR caster GAMT series

The innovative AGV-AMR caster with ALL-IN-ONE function is an up-to-date polyurethane caster designed for smart factory mobile robots.The predicaments caused by AGV-AMR caster are diverse and there are many unexpected challenges. Especially in real factory environments, problems are often complex and tricky. HICKWALL rolls out the all-in-one AGV-AMR casters addressing the concern.



GAAD GATD

The GAMT series combines the existing double-rotating caster GAAD with the tilting structure GATD. By combining the two most popular casters among G-DOK AGV AMR caster series, it is a multi-purpose caster that can most quickly respond to the various needs of customers.

Unit：mm

Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GAMT-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	130	10~30	112 x 112	92 x 92	9	250
GAMT-100-ASF-HUD			100	30 x 2	160					310
GAMT-125-ASF-HUD			125	35 x 2	190	15~33	145 x 145	120 x 120	11	440
GAMT-150-ASF-HUD			150	40 x 2	215	15~35				630

Heavy duty AGV/AMR caster GAMS series

The innovative AGV-AMR caster with ALL-IN-ONE function is an up-to-date polyurethane caster designed for smart factory mobile robots.The predicaments caused by AGV-AMR caster are diverse and there are many unexpected challenges. Especially in real factory environments, problems are often complex and tricky. HICKWALL rolls out the all-in-one AGV-AMR casters addressing the concern.

GAAD GASD

The GAMS series combines a shock absorption function GASD with a double rotation structure GAAD that minimizes the path deviation of AGV/AMR. Mobile robots are designed to perform optimally even in the environments of older, legacy factories.

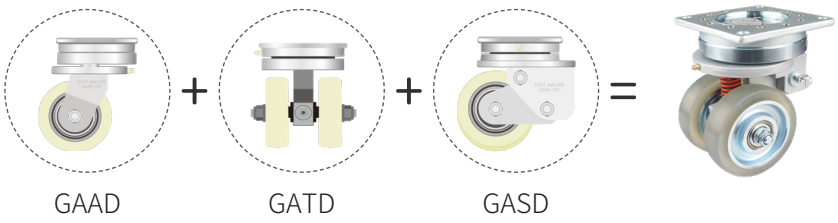
Unit：mm

Temperature ：-10~+90°C

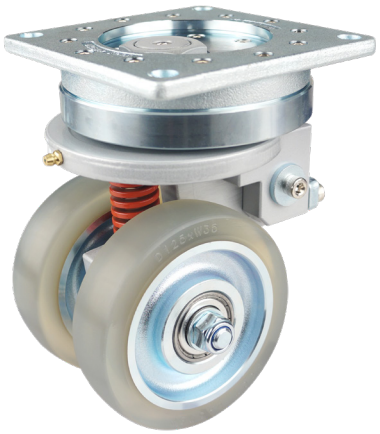
Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GAMS-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	150-10	10~30	112 x 112	92 x 92	9	250
GAMS-100-ASF-HUD			100	30 x 2	180-10					310
GAMS-125-ASF-HUD			125	35 x 2	210-10	15~33	145 x 145	120 x 120	11	440
GAMS-150-ASF-HUD			150	40 x 2	235-10	15~36				630

Heavy duty AGV/AMR caster GAMA series

The innovative AGV-AMR caster with ALL-IN-ONE function is an up-to-date polyurethane caster designed for smart factory mobile robots.The predicaments caused by AGV-AMR caster are diverse and there are many unexpected challenges. Especially in real factory environments, problems are often complex and tricky. HICKWALL rolls out the all-in-one AGV-AMR casters addressing the concern.



GAAD GATD GASD



The GAMA series not only combines the existing double-rotating caster GAAD and the tilting structure GATD, but also adds a spring shock absorption function.Designed to ensure that AGV/AMR can operate properly in any environment. It is the ultimate solution for AGV/AMR with a 3 in 1 system.

Unit：mm

Temperature ：-10~+90°C

Swivel Item No.	Wheel material	Surface Treatment	diameter	Wheel width	Height	Eccentricity	Plate size	Plate hole distance	Plate aperture	Load Capacity (Kg)
GAMA-75-ASF-HUD	PU (Shore A95)	Powder Coating	75	30 x 2	147-10	10~30	112 x 112	92 x 92	9	250
GAMA-100-ASF-HUD			100	30 x 2	170-10					310
GAMA-125-ASF-HUD			125	35 x 2	205-10	15~33	145 x 145	120 x 120	11	440
GAMA-150-ASF-HUD			150	40 x 2	230-10	15~35				630