SHOCK ABSORBING CASTERS

SMART SOLUTION FOR SHOCK ABSORPTION AND NOISE REDUCTION



FOOT MASTER®

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04 | EXPANDED PRODUCT LINE



FOOT MASTER designs, engineers and manufactures casters and wheels that address industry specific performance gaps.

From our global headquarters in South Korea, engineers are striving to develop the best caster products in the world. This pursuit of perfection starts with an intense focus to serve customers and solve problems.

FAMILY OF TOP QUALITY CASTERS







SHOCK ABSORBING







the pride of TOP QUALITY



DESIGN

An engineering response to a strategic question balancing form and function.



MANUFACTURE

Precision engineering with advanced technology reflects superb craftmanship.



SOLUTION

The elimination of a problem to deliver successful outcomes and satisfaction.

the first step of innovation

CURIOUS OBSERVATION

Integrated ratcheting system improves height adjustability in leveling casters



CALIBRATED
QUESTIONS

Advanced technology introduces superior shock absorbing with special rubber cushion



ENGINEERED SOLUTIONS

Self-aligning, Dual Swivel™ casters reduce drive motor overload and minimize offset



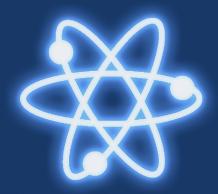
RELEASED IN 1991, GDS SERIES WAS THE WORLD'S FIRST SHOCK ABSORBING CASTER EQUIPPED WITH A SPECIAL RUBBER CUSHION.

Field-reversible brake, forged steel, and double thrust bearings used to optimize heavy loads



Premium AGV-AMR drive wheels are customized for superior performance





SHOCK PHYSICS

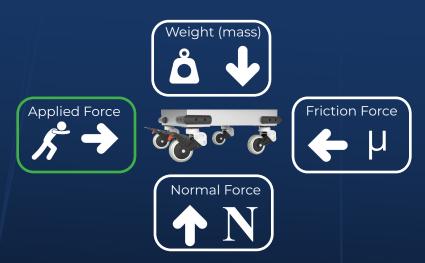
CONTACT FORCE MECHANICAL SHOCK NEWTON'S CRADLE

various types of contact forces

CONTACT FORCE

Described by Newton's laws of motion, contact forces occur as the result of objects physically interacting.

As illustrated, applied force to overcome friction force creates motion. The rate of motion is determined by the mass of the object and is measured in units called Newtons.



MECHANICAL SHOCK

The term shock is used when applied force causes a rapid acceleration of matter with respect to time, known as an impulse. The energy propagates through the object in waves to produce vibrations. In mechanics, an impact is an extreme force or shock applied over a short period of time, having a greater effect such as in a collision.

NEWTON'S CRADLE

The law of conservation of energy states that energy can neither be created nor destroyed, but only changed from one form to another, or transferred from one object to another. Newton's cradle is an elegant demonstration of the most fundamental laws of physics and mechanics. This is important when developing a solution to absorb the transfer of shock energy.

ENERGY TRANSFER

Energy cannot be created or destroyed, meaning that the total amount of energy in the universe has always been and will always be constant. However, this does not mean that energy is immutable. It can change form and be transferred between objects. A common example of energy transfer involves kinetic energy, which is the energy associated with motion.



RELATIVE MOTION

Consider a cart loaded with wine. A server applies force to move the cart forward over a brick floor. Suddenly, the object in motion collides with a stationary object.

At the instant of impact, the cart experiences an abrupt change in velocity with upward momentum. The cart, like the stationary balls in Newton's cradle, works as a medium for the impact force to change the relative motion of the wine glasses.

EFFECTS OF SHOCK

Mechanical shock has the potential to inflict a wide range of damaging effects on objects. Examples include bending, fractures, breakage, failure, spillage, inaccuracies, performance degradation, inefficiencies, weakened connections, etc. Absorbing or dampening this shock energy is important to mitigate the adverse effects of impact forces and vibrations.



Shock energy is absorbed by dispersing or disrupting the energy from impacts. Absorption, or damping, reduces or eliminates the adverse effects or damage to an object. **FOOT MASTER® Shock Absorbing Casters** provide an unmatched level of protection through advanced technology.

SHOCK ABSORBING MATERIALS



STEEL COIL SPRINGS

Adopted from the automotive industry, casters have traditionally used compression springs, the most common type of coil springs. It is an elastic element made of metal in an open-coiled, helical shape.

They can store mechanical energy by changing shape as an external force is applied, then return to their original shape when the force is removed. The energy of the coil spring is stored and recovered.

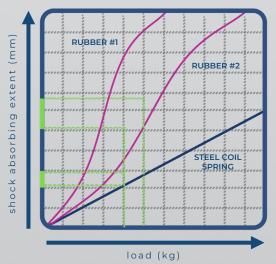
SPECIAL RUBBER CUSHIONS

In 1991, FOOT MASTER engineers innovated a special rubber to be applied to casters. The cushions are made with a proprietary blend of viscoelastic materials, which act as a liquid to absorb shock and as an elastic solid when at rest.

When subjected to shock load, viscous materials resist shearing motion and do not strain linearly with time. Elastic materials (solid) strain when stretched, while viscoelastic materials (liquid) strain as a time dependent flow.



STEEL VS RUBBER



This graph shows the relationship of increasing load relative to the capabilities of steel coil springs and rubber cushions, demonstrating deformation under the same load.

Rubber #1 and Rubber #2 represent the ability to customize the durometer of the special rubber cushion, which perform far superior with increasing load.

steel coil spring

Linear Deformation As Load Increases: EXTENSIVE WEAR & TEAR + LOSS OF TENSION + INCREASED NOISE

special rubber cushion

Non-Linear Deformation As Load Increases: SUPERIOR LIFE SPAN + ADDED PROTECTION + ZERO MAINTENANCE + NOISE REDUCTION

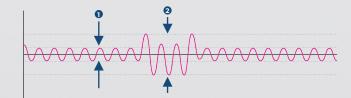
With FOOT MASTER® Advanced Shock Absorbing Technology, the special rubber cushion outperforms every other material used in shock absorbing casters. It is far superior to steel coil springs, as it absorbs additional weight more efficiently with smaller, non-linear deformation.

NOISE REDUCTION

This graph highlights how FOOT MASTER® Shock Absorbing Casters limit and potentially eliminate sound energy.

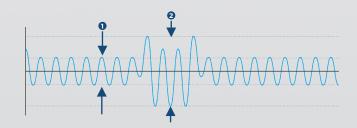
shock absorbing casters





normal casters





¹refers to the deviation over consistent ground ²refers to deviation when caster hit a bump

SMALL DEVIATION L poise reduction

2

SMALL OUTLIERS (BOUNCING)

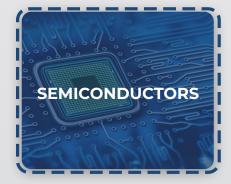
defect free solution

FOOT MASTER® Shock Absorbing Casters are designed to limit and potentially eliminate sound energy with smaller deviations. Based on mechanical engineering, reducing sound energy is accomplished by changing the form of the energy responsible. Contrary to steel coil springs, the special rubber cushion disperses the absorbed energy away from the source in the form of heat.

Defects are likely to occur when the shock energy from an impact or collision reaches a certain level, briefly exposing the application and/or its components. As shown in the graph above, FOOT MASTER® Shock Absorbing Casters generate narrow waves of force with fewer outliers to safely disperse the energy. This provides a superior level of protection for valuable items and equipment they support.

APPLICATIONS

SHOCK SENSITIVE ENVIRONMENT







NOISE SENSITIVE ENVIRONMENT







EASIER HANDLING









Materials & Specifications

Top Plate: Pressed Steel Frame: Aluminum Spring: Special Rubber Finish: Powder Coating & Zinc Galvanized Capacity: 90 - 350 kg

Temperature: (-10°)~90°C

Wheel Diameter Options

75 mm (3") 100 mm (4") 125 mm (5") 130 mm (5-1/8") 150 mm (6") 200 mm (8")



GDS-125-ASF-LUD-65

GDS COMPONENTS

RIG

For the GDS, strength and flexibility are achieved by utilizing a multi-part rig. The aluminum frame is designed to support two pressed steel legs (aluminum legs on GDS-100 and GDS-125 models) designed to facilitate movement. With this configuration, GDS is free to respond when encountering rough surfaces and abrupt transitions.



UPPER BEARING RACEWAY

Minimal effort is required to maneuver the GDS. The upper raceway is a pressed steel mounting plate with a hardened steel raceway sleeve. It is used to protect the aluminum frame from scoring and compression, leading to increased longevity. Mounting options include a threaded stem, grip ring stem and various top plates.

LOWER BEARING RACEWAY

Situated inside the aluminum frame, the hardened steel lower raceway is precisely machined to securely fasten the mounting plate and the upper raceway to the rig. While most casters simply press fit a rivet, FOOT MASTER® uses a threaded kingpin tightened with the exact amount of torque to ensure consistency and durability.



INTEGRATED AXLE



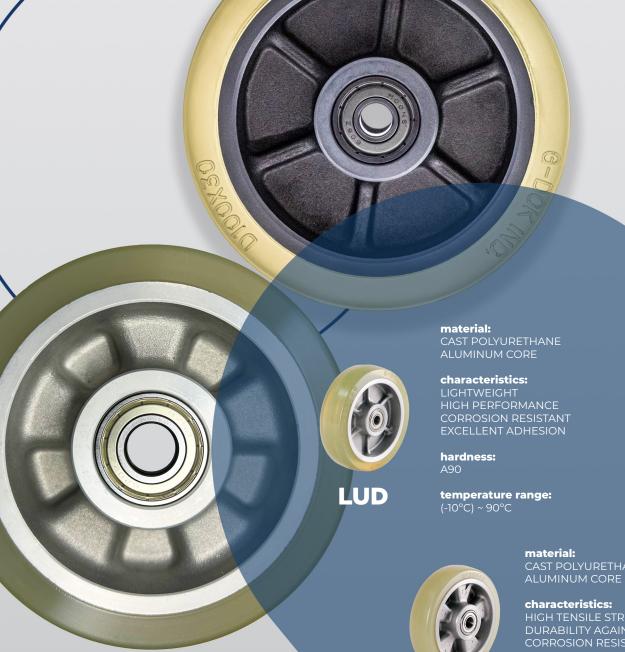
Numerous stages of meticulous machining transform high quality raw material into a perfectly balanced axle. The unique, integrated shaft design eliminates any tolerance variation that could occur during operation, improving the caster's rolling performance.

SPECIAL RUBBER CUSHION

GDS displays unrivaled performance through advanced shock absorbing technology. A specially designed rubber cushion replaces traditional steel coil springs for superior protection, noise reduction and extended product life. Various durometer options are available to meet load and operational requirements.



GDS SERIES WHEELS





HUD

CAST POLYURETHANE

HIGH TENSILE STRENGTH
DURABILITY AGAINST TEARING
CORROSION RESISTANT **EXCELLENT ADHESION**

hardness:

temperature range: (-10°C) ~ 90°C

SERIES SPECIFICATIONS (TOP PLATE)









metric

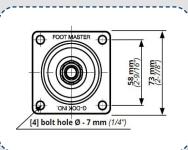
SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	mm	mm	Kg kg	₩,		mm	mm	mm
GDS-75-ASF	-	GDS-75-ARF	-	LUD	65° 75°	75	30	90	130-15	35~39	73X73	58x58	7
GDS-100-ASF	GDS-100-BSF	GDS-100-ARF	GDS-100-BRF	LUD	65° 75°	100	30	100	160-20	45~53	73x73	58x58	7
GDS-125-ASF	GDS-125-BSF	GDS-125-ARF	GDS-125-BRF	LUD	65°	125	30	100	187-20	45~54	73x73	58x58	7
GDS-130-ASF	GDS-130-BSF	GDS-130-ARF	GDS-130-BRF	HUD	65° 75°	130	40	350	200-30	36~50	95x95	70x70	11
GDS-150-ASF	GDS-150-BSF	GDS-150-ARF	GDS-150-BRF	HUD	65° 75°	150	40	350	230-30	36~50	95x95	70x70	11
GDS-200-ASF	GDS-200-BSF	GDS-200-ARF	GDS-200-BRF	HUD	65°	200	40	350	270-35	55~76	95x95	70x70	11

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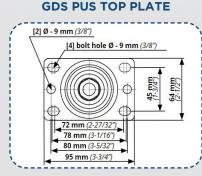
top plates

SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	(<u>o</u>). <u>s</u>	in	lbs			in	in	in
GDS-75-ASF	-	GDS-75-ARF	-	LUD	65° 75°	2.75	1.18	198	5.1-06	1.4~1.5	2.87 x2.87	2.2X2.2	0.27
GDS-100-ASF	GDS-100-BSF	GDS-100-ARF	GDS-100-BRF	LUD	65° 75°	3.94	1.18	3.94	6.3-0.7	1.7~2.0	2.87 x2.87	2.2X2.2	0.27
GDS-125-ASF	GDS-125-BSF	GDS-125-ARF	GDS-125-BRF	LUD	65° 75°	4.92	1.18	3.94	7.3-0.7	1.7~2.12	2.87 x2.87	2.2X2.2	0.27
GDS-130-ASF	GDS-130-BSF	GDS-130-ARF	GDS-130-BRF	HUD	65° 75°	5.11	1.57	13.78	7.8-1.18	1.4~1.9	3.7X3.7	2.7X2.7	0.4
GDS-150-ASF	GDS-150-BSF	GDS-150-ARF	GDS-150-BRF	HUD	65° 75°	5.90	1.57	13.78	9.0-1.18	1.4~1.9	3.7X3.7	2.7X2.7	0.4
GDS-200-ASF	GDS-200-BSF	GDS-200-ARF	GDS-200-BRF	HUD	65° 75°	7.87	1.57	13.78	10.6-1.3	2.1~3	3.7X3.7	2.7X2.7	0.4

GDS STANDARD TOP PLATE

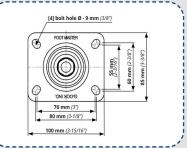


75-100-125

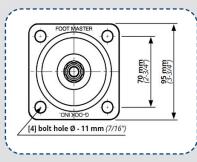


75-100-125

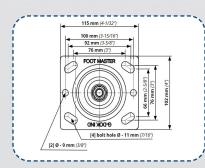
GDS PEU TOP PLATE



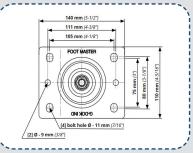
75-100-125



130-150-200



130-150-200



130-150-200

SERIES SPECIFICATIONS (STEM)









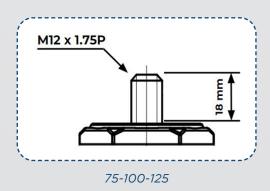


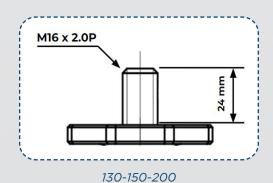
SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	mm	₩mm	Kg kg	S _{mm}	N E	mm	mm v
GDS-75-ASS	-	GDS-75-ARS	-	LUD	65° 75°	70	30	90	130-15	35~39	12x1.75P	18
GDS-100-ASS	GDS-100-BSS	GDS-100-ARS	GDS-100-BRS	LUD	65° 75°	100	30	100	160-20	45~53	12x1.75P	18
GDS-125-ASS	GDS-125-BSS	GDS-125-ARS	GDS-125-BRS	LUD	65° 75°	125	30	100	187-20	45~54	12x1.75P	18
GDS-130-ASS	GDS-130-BSS	GDS-130-ARS	GDS-130-BRS	HUD	65° 75°	130	40	350	200-30	36~50	16x2.0P	24
GDS-150-ASS	GDS-150-BSS	GDS-150-ARS	GDS-150-BRS	HUD	65° 75°	150	40	350	230-30	36~50	16x2.0P	24
GDS-200-ASS	GDS-200-BSS	GDS-200-ARS	GDS-200-BRS	HUD	65° 75°	200	40	350	270-35	55~76	16x2.0P	24

standard

SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	in in	.in	lbs lbs	U _{in}	in .		in
GDS-75-ASS	-	GDS-75-ARS	-	LUD	65° 75°	2.75	1.18	198	5.1-06	1.4~1.5	0.5x0.06P	0.70
GDS-100-ASS	GDS-100-BSS	GDS-100-ARS	GDS-100-BRS	LUD	65°	3.9	1.18	220	6.2-0.7	1.7~2.0	0.5x0.06P	0.70
GDS-125-ASS	GDS-125-BSS	GDS-125-ARS	GDS-125-BRS	LUD	65° 75°	4.9	1.18	220	7.3-0.7	1.7~2.12	0.5x0.06P	0.70
GDS-130-ASS	GDS-130-BSS	GDS-130-ARS	GDS-130-BRS	HUD	65° 75°	5.11	1.57	770	7.8-1.1	1.4~1.9	0.6x0.07P	0.94
GDS-150-ASS	GDS-150-BSS	GDS-150-ARS	GDS-150-BRS	HUD	65° 75°	5.9	1.57	770	9-1.1	1.4~1.9	0.6x0.07P	0.94
GDS-200-ASS	GDS-200-BSS	GDS-200-ARS	GDS-200-BRS	HUD	65° 75°	7.8	1.57	770	10.6-1.3	2.1~2.9	0.6x0.07P	0.94

stem mounts







Heat-Resistant casters are specially modified to endure continuous exposure to excessive heat in high temperature environments.



HIGH TEMPERATURE

Engineered to beat the heat, it can withstand temperatures *up to 500°F*.



HIGH PERFORMANCE

A unique integrated shaft design is used to minimize the tolerance that might happen during operation, improving performance and durability.



PERFECT SHOCK ABSORPTION

The special rubber cushion integrates heat-resistant properties to provide superior shock protection, even in extreme temperatures.



ECO-FRIENDLY

Extensive research and tests are conducted to produce a caster that has low outgassing.





wheel



material

HEAT-RESISTANT RUBBER ALUMINUM CORE

characteristics:

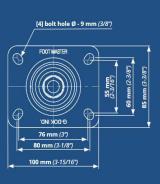
LIGHTWEIGHT STRONG CORROSION RESISTANCE RATED UP TO 250°C COLOR: DARK GRAY

hardness:

A95

temperature range: (-10°C) ~ 250°C

top plate



75

NEWI

Materials & Specifications

Top Plate: Pressed Steel Frame: Aluminum Spring: Special Rubber Finish: Powder Coating & Zinc Galvanized

Capacity: 90 - 350 kg Temperature: (-10°)~90°C

Wheel Diameter Option

100 mm (4") 125 mm (5") *Currently, only GDSB-100 and GDSB-125 are available. More sizes coming soon.



GDSB-100-BSF-LUD-PUS-65

GDSB SERIES

WORLD'S FIRST SHOCK ABSORBING CASTER WITH TOTAL LOCK BRAKE

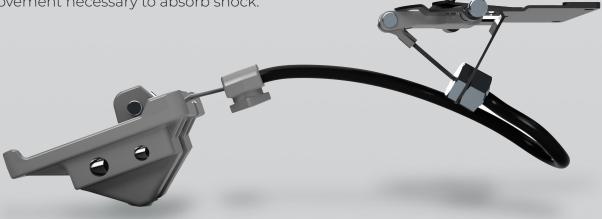
GDSB is a case of innovation upon innovation, as it incorporates *FOOT MASTER Advanced Shock Absorbing Technology*, first debuted in 1991 with the release of the GDS Series. It was the first shock absorbing caster to utilize a specially designed rubber cushion rather than steel coil springs. And just like any other FOOTMASTER casters, it is born from innovation and expertly crafted to perform.



WHAT IS A TOTAL LOCK BRAKE?

A total lock brake allows users to lock the wheel and swivel section. Typical configurations are activated by a foot pedal to secure the wheel, complemented by mechanical means to lock the swivel section. Easy to accomplish with casters using a one-piece rig, however, shock absorbing casters have legs that move independently from the rig to allow movement. This presents a problem, as any mechanical linkage would prohibit the movement necessary to absorb shock.

Engineers have solved this problem with a patented swivel lock-by-cable system. Using a cable lends the flexibility required for the legs to move independently of the rig. This allows superior shock absorption when moving, and the capability to lock the swivel section once positioned to offer precise control and stability.



SPECIAL FEATURES







SERIES SPECIFICATIONS









metric

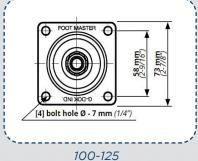
SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	mm mm	E	Kg Kg	E E		mm	mm	mm
GDSB-100-ASF	GDSB-100-BSF	GDSB-100-ARF	GDSB-100-BRF	LUD	65º/ 75º	100	30	100	171-20	45~54	73x73	58x58	7
GDSB-125-ASF	GDSB-125-BSF	GDSB-125-ARF	GDSB-125-BRF	LUD	65º/ 75º	125	30	100	197-20	45~54	73x73	58x58	7

standard

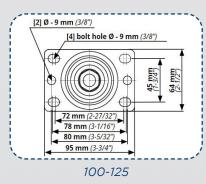
	SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	in	in	lbs	in	in	in	in	in
	GDSB-100-ASF	GDSB-100-BSF	GDSB-100-ARF	GDSB-100-BRF	LUD	65º/75º	3.93	1.18	220	6.7-0.78	1.77~2.12	2.8x2.8	2.28x2.28	0.27
Ī	GDSB-125-ASF	GDSB-125-BSF	GDSB-125-ARF	GDSB-125-BRF	LUD	65º/75º	4.92	1.18	220	7.75-0.78	1.77~2.12	2.8x2.8	2.28x2.28	0.27

GDSB STANDARD TOP PLATE

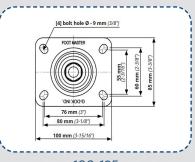
top plates



GDSB PUS TOP PLATE



GDSB PEU TOP PLATE



100-125

wheel option



material:

CAST POLYURETHANE **ALUMINUM CORE**

characteristics:

LIGHTWEIGHT HIGH PERFORMANCE **CORROSION RESISTANT EXCELLENT ADHESION**

hardness:

A90

temperature range:

(-10°C) ~ 90°C



Materials & Specifications

Top plate: Pressed Steel Frame: Strong Welded Frame Spring: Special Rubber Finish: Zinc Plated Capacity: 360 - 450 kg Temperature: (-10°)~90°C

Manual or Tow

Speed: Up to 20 km/h

Wheel Diameter Options

150 mm (6") 200 mm (8")



GDSP-200-BSF-MUD-75

GDSP COMPONENTS

RIG

GDSP possesses a strong welded frame to endure challenging environments and tough usage. It is fully capable as a towable caster up to 20 km/h under power. This multi-part rig is firm and stable under heavy loads, while lending the confident assurance of maintaining ground contact while absorbing vibration.



BOLTED AXLE

A super strong bolt axle structure employs top hat spacers between the wheel and legs. To hold the wheel tight and to prevent poor performance, a nylon locking nut is secured to the axle.

BEARING SPACER

To prolong the life of the wheel bearings, GDSP calls on an aluminum spacer to ensure there is no play or rattling. Installed on the bolted axle between the two bearings, it enables the wheel to rotate smoothly, to drastically reduce noise and maintain precision performance.





SPECIAL RUBBER CUSHION

Fine shock absorption functionality is achieved through a specially designed, dual stage rubber cushion with unique features. This design eliminates the loud noise typical of moving an empty cart, while offering superior protection when loaded with items such as semiconductors, specialized equipment and other sensitive objects. GDSP is the reliable solution to run on a wide range of applications.

STEEL -TOP BRAKE SYSTEM (OPTIONAL)

GDSP is designed to be towed up to 20 km/h. To lock down this fast mover, an optional steel-top brake system is available for making the application stationary. This system is field reversible offering users the abilityn to position the brake in the leading or trailing position.



GDSP SERIES WHEEL



material:

CAST POLYURETHANE ALUMINUM CORE

characteristics:

LIGHTWEIGHT CORROSION RESISTANT EXCELLENT ADHESION OIL RESISTANT

hardness:

A95

temperature range:

(-10°C) ~ 90°C

MOUNTING OPTIONS & PLATE CONFIGURATIONS







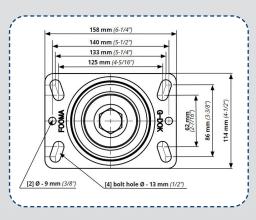


metric

SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	mm	<mark>C</mark> €	(Kg) &			mm	Em	mm
GDSP-150-ASF	GDSP-150-BSF	GDSP-150-ARF	GDSP-150-BRF	MUD	65°	150	48	360	202-14	48~53		133x86	
GDSP-200-ASF	GDSP-200-BSF	GDSP-200-ARF	GDSP-200-BRF	MUD	75°	200	48	450	253-15	65~75	158x114	125x62	13
GDSP-150-ASF-PEU	GDSP-150-BSF-PEU	GDSP-150-ARF-PEU	GDSP-150-BRF-PEU	MUD	65°	150	48	360	202-14	48~53		105x80	
GDSP-200-ASF-PEU	GDSP-200-BSF-PEU	GDSP-200-ARF-PEU	GDSP-200-BRF-PEU	MUD	75°	200	48	450	253-15	65~75	140x110	105x75	11

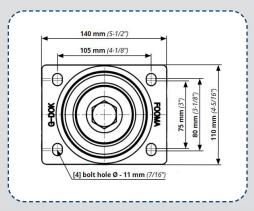
	SWIVEL	SWIVEL/BRAKE	RIGID	RIGID/BRAKE	WHEEL	RUBBER	in	e.	lbs	in	<u> </u>	in	in	in
70 5	GDSP-150-ASF	GDSP-150-BSF	GDSP-150-ARF	GDSP-150-BRF	MUD	65°	5.9	1.8	794	7.9-0.5	1.8~2.1		6.2x3.3	
	GDSP-200-ASF	GDSP-200-BSF	GDSP-200-ARF	GDSP-200-BRF	MUD	75°	7.9	1.8	992	9.9-0.6	2.5~2.9	6.2x4.4	5x2.4	0.5
5	GDSP-150-ASF-PEU	GDSP-150-BSF-PEU	GDSP-150-ARF-PEU	GDSP-150-BRF-PEU	MUD	65°	5.9	1.8	794	7.9-0.5	1.8~2.1		4.1x3.14	
ב	GDSP-200-ASF-PEU	GDSP-200-BSF-PEU	GDSP-200-ARF-PEU	GDSP-200-BRF-PEU	MUD	75°	7.9	1.8	992	9.9-0.6	2.5~2.9	5.5x4.3	4.1x2.9	0.4

GDSP STANDARD TOP PLATE

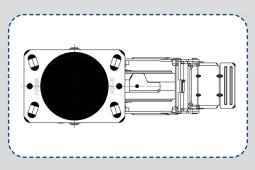


75-100-125

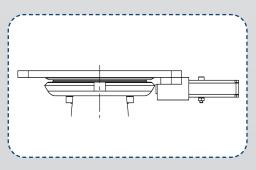
GDSP PEU TOP PLATE



75-100-125



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