



# TORO™ LH202 NARROW VEIN LOADER



# COMPACT AND PRODUCTIVE FOR NARROW VEIN APPLICATIONS

Toro™ LH202 loader by Sandvik is a capable and reliable workhorse for narrow-vein mining applications, specifically designed for underground conditions. With its robust structure, very compact size and three tonne payload capacity, the loader is tailored to meet productivity targets in challenging environments and is optimized to fit tunnel widths 2 – 2,5 m to reduce dilution.

In addition to underground narrow vein mines, Toro™ LH202 loader is very well suited for tunneling. Equipped with Stage V engine and other relevant options, Toro™ LH202 loader meets European requirements and is a perfect fit for civil engineering and small-scale infrastructure construction sites for building new and improving existing infrastructure. Due to its relatively light weight and the possibility to disassemble the equipment for transport, Toro™ LH202 is fit for small-dimensioned construction sites, even if located in remote areas within challenging access.

## Fast bucket filling

Toro™ LH202 loader by Sandvik has bucket hydraulics combined with smart geometry to enable the use of both lift and tilt functions simultaneously when penetrating the muck pile, making one-pass bucket filling easy and contributing to high fill factors.

## Boom floating

The optional boom floating on Toro™ LH202 loader allows the bucket to “float” close to the ground when driving the loader with an empty bucket. The boom movements are released hydraulically, which allows the bucket to smoothly follow the ground.

## High tramming speeds

Toro™ LH202 loader has a high power to weight ratio, which provides higher productivity. The advanced hydrostatic powertrain technology with two speed areas. Durable axles use limited slip differentials on the front of the loader to maintain traction and spring applied hydraulic release (SAHR) brakes for safer braking. Vehicle top speed can also be limited to improve safety in narrow tunnels and rough roads.



### Robust Tier 2 engine from Deutz

As a standard, Toro™ LH202 loader comes with a robust, reliable and well-known 50 kW air-cooled turbocharged direct injection diesel engine from Deutz, with catalytic purifier and muffler. The design requires a smaller number of parts, which means less maintenance, lower operating costs and a longer engine life. Pistons and liners can be changed without major disassembly. The cooling system of air-cooled engines require less maintenance than water cooled engines and are more reliable in severe weather conditions. The conventional inline fuel injection pump can tolerate variety of fuel qualities.

### Stage V engine from Deutz

Toro™ LH202 loader is also available with an optional Stage V engine from Deutz, which delivers best in class MSHA and CANMET ventilation rates with ultra-low Sulphur diesel fuel, while still maintaining performance and fuel efficiency. The Stage V engine after treatment is a diesel particulate filter, which uses passive regeneration, taking place during normal engine operation to oxidize the soot trapped in the DPF core.

### Reduced emissions with paraffinic fuels

In addition to traditional fossil diesel fuel, the Stage V engine can use paraffinic diesel fuels meeting the requirements of EN 15940, which reduces emissions of CO, CO<sub>2</sub>, HC, NO<sub>x</sub> and diesel particulates. Further, these engines can also use biofuel blends (such as FAME) meeting requirements of EN 590. Higher biofuel blends may also be used, but always contact your Sandvik representative prior to using any higher blends.



# OPERATOR SAFETY

## Safety onboard

All required daily checks can be done from the ground level. Energy isolation can be achieved with a lockable main switch, and standard onboard wheel chocks can be used to ensure the machine remains stationary. Easy maintenance access to the top of the machine includes three-point high contrast handles and anti-slip steps. Hydraulic hoses are secure behind steel plates.

## ROPS and FOPS certified

Toro™ LH202 is equipped with a ROPS and FOPS certified open canopy protecting the operator in case of rolling over or falling objects. The canopy is located in the rear frame of the equipment, increasing operator safety. Standard canopy and optional low-profile canopy are available.

## Safer operation

Access to the operator's position is reached with clearly marked three-point contact handles. The canopy door includes a door lock and latch mechanism with a interlock switch which automatically applies brakes and inactivates the boom, bucket and steering when the door is opened. Further, the neutral brake and ABA functional brakes are standard features in Toro™ LH202 loader.

## Adjustable armrests and low frequency suspension seat

This loader is fitted with a standard adjustable low frequency suspension seat with two-point seat belt. Padded arm rests and adjustable joysticks can be configured to suit the operator.

## Reduced risk of hydraulic leakage

Toro™ LH202 loader features pilot-operated low-pressure hydraulic joystick controls for steering, boom and bucket and is designed with the minimum number of hydraulic hoses inside the operator's compartment to reduce potential hydraulic hazards.

## Smart display

Toro™ LH202 loader's display shows engine information, warning lights warns the operator of critical system malfunctions or actions needed from the operator or maintenance.





### Directional lights

Directional lights for improved safety/visibility are available as an option that indicate safer passing side, optional green and red lights and driving direction lights.

### Improved visibility

Adjustable high-power LED lights are standard configuration in every Toro™ LH202 loader. The lights can be equipped with additional cover grills to provide protection against hits and rocks.

### Line of sight radio remote control

Toro™ LH202 loader can be equipped with a line-of-sight radio remote control, available with an analogue connection. A recovery kit option releases equipment brakes by radio signal to retrieve the equipment from under unsupported roof if it is required.

### Fire safety

Toro™ LH202 loader features two fire suppression options.

Eclipse® fire suppression system by Sandvik is a foam-based fire suppression system which cuts off oxygen supply and acts as a vapor seal over the fuel. The water content in the foam cools the area, which reduces the risk of reignition. It offers two variants to suit all applications. Eclipse™ SUSTAIN version uses a foam concentrate, mixed with water and the Eclipse™ EXTREME version is suitable for subzero climates down to -40°C. Both variants are environmentally friendly, supplied standard with automatic detection, activation and engine shutdown. The firefighting liquid arrests oxygen supply, acts as a vapor seal over burning fuel and rapidly cools the area reducing risk of re-ignition.

Ansul® LVS fire suppression system is an alternative liquid system. The liquid cuts off oxygen supply to the fire and provides cooling for equipment with super-heated surface areas, reducing risk to people by providing rapid fire knockdown and reduces risk of machine loss. Automatic activation is a standard feature and the rapid cooling effect reduces the risk of re-ignition.

# EASE OF MAINTENANCE

## **HOT SIDE – COLD SIDE**

The loader rear frame design follows the basic hot and cold side design principles, where heat and ignition sources have been separated as well as practicable. The hot side includes heat shielding for exhaust components.

The cold side includes ground level access to the engine fuel filters. An efficient Donaldson powercore engine air filter is housed well within the frame for impact protection, and it utilizes an ejector valve system for increased filter lifetime.

## **ENGINE COOLER**

Toro™ LH202 loaders with a Stage V engine feature an easy-to-clean aluminum engine cooler which allow for quick and efficient cleaning. The air-cooled engine features extra free space between the engine and cooler and an easy to open rear mask.

## **LARGE FUEL TANK**

The fuel tank is sized to ensure continuous operation for a full working shift. An optional fast filling system for fuel increases equipment availability by reducing fueling time by up to 80% as well as eliminating fuel and oil spills.

## **SIMPLIFIED DESIGN**

Hydrostatic powertrain doesn't have transmission, which means less stress on the drivetrain and no risk of gear misuse, reducing machine failures and costs for unplanned maintenance. The pump and motor are slightly smaller making them easier to remove.

Toro™ LH202 loader's braking system requires less maintenance because there is no need for a brake cooling system.

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# LOW COST OF OWNERSHIP

## **STRONG RESISTANCE TO SHOCK LOADS**

Toro™ LH202 loader's welded steel box structures used in the frame and boom provide strong resistance to shock loads and are optimized to reduce stresses as well as extend frame lifetime. Computer designed frames using Finite Element Analysis (FEA) are made of high strength structural steel for superior strength to weight ratio.

## **SIMPLE AND RELIABLE HYDRAULICS**

The proven hydraulic system provides pressure and flow for greater efficiency, enabling increased tractive effort during loading. The hydraulic system is simple and reliable, contributing to ease of maintenance and lower total cost of ownership. An electric filling pump for hydraulic oil is available as an option to quickly fill the hydraulic tank through a filter ensuring clean oil to protect the hydraulic system components.



# SANDVIK 365 PARTS & SERVICES

## LIFETIME SUPPORT

Having great equipment is only part of the story. What makes working with Sandvik an unbeatable experience is the blend of lifetime support we can provide through our broad offering of genuine parts & components, services and digital innovations.

At the heart of this package lies a combination of skilled people, integrated processes & systems and a global footprint.

## QUALITY SERVICE TAILORED TO YOUR NEEDS

We offer different type of service agreements and advisory services that can be adapted to suit the support you require – helping you to maintain your fleet in the optimal way.

It's our job to keep your equipment in full health and to make sure that major components of your loader are being replaced or repaired at optimum intervals. With our solutions, you can expect superior reliability and longer life than with non-OEM alternatives.

## DIGITAL SERVICES FROM THE EXPERTS

As a long established and trusted OEM we understand the challenges our customers face in their mines with our equipment. In addition to that, we have the highest number of connected mining equipment.

Our learnings over this time have helped us to understand not only capturing the data but analyzing it to provide insights which deliver tangible value to our customers. Remote Monitoring Service is one example - the service leverages state of the art cloud technologies and AI to convert machine data into actionable information, hence enabling the prevention and prediction of breakdowns before they happen.



# TECHNICAL SPECIFICATION

## TORO™ LH202

Toro™ LH202 is a compact and lightweight loader for narrow vein mining with the best payload to own weight ratio in its class. The small-size loader offers reduced dilution, better flexibility and operator safety when working in narrow vein operations. The loader is easy to operate and maintain, and it features an operator's compartment that is located in the rear frame of the machine for increased operator safety.

Toro™ LH202 is full of features which help mines maximize tonnes and minimize extraction costs. It has been engineered to optimize machine width, length and turning radius, enabling operation in more narrow tunnels and for lower operational costs. The equipment is appreciated for its low fuel consumption, and it can be equipped with a Euro Stage V low-emission engine from Deutz.

In addition to mining applications, the compact and agile equipment fits well for civil engineering and construction projects for building new and improving existing infrastructure. Due to its relatively light weight and the possibility to disassemble the equipment for transport, Toro™ LH202 is a fit match for small-dimensioned construction sites, even if located in remote areas within challenging access.

### CAPACITIES

Tramming capacity	3 000 kg
Break out force, lift	5 810 kg
Break out force, tilt	6 425 kg
Standard bucket	1.3 m <sup>3</sup>

### SPEED FORWARD & REVERSE (LEVEL/LOADED) WITH DEUTZ BF4L914 ENGINE

Tramming speed	10 km/h
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### BUCKET MOTION TIMES

Raising time	4.8 sec
Lowering time	3.3 sec
Dumping time	5.5 sec

### OPERATING WEIGHTS

Total operating weight	8 800 kg
Front axle	3 300 kg
Rear axle	5 500 kg

### LOADED WEIGHTS

Total loaded weight	11 800 kg
Front axle	7 900 kg
Rear axle	3 900 kg



## OPERATIONAL CONDITIONS AND LIMITS

Environmental temperature	From -20° C to +48° C
Standard operating altitude	Below 4500 m

## REQUIREMENTS AND COMPLIANCE

Compliance with 2006/95/EC Low voltage directive

Compliance with 2006/42/EC Machinery directive (Equipment for EU area, achieved with relevant options)

Design based on ISO 19296. Machines for underground mines. Mobile machines working underground. Safety. Part 1: Rubber tyred vehicles.

Compliance with ISO 13766-1 and -2 Electromagnetic compatibility standard

Electrical system based on IEC 60204-1. Safety of machinery – Electrical equipment of machines – Part 1: General requirements

## POWER TRAIN

### ENGINE

Diesel engine	Deutz BF4L914
Output	50 kW @ 2300 rpm
Torque	245 Nm @ 1600 rpm
Number of cylinders	In-line 4
Displacement	4.314 l
Cooling system	Air cooled
Combustion principle	4-stroke, turbo-charger
Air filtration	Two stage filtration, dry type
Electric system	24 V
Emissions	Tier 2, Euro Stage II
Exhaust system	Double wall exhaust pipe with catalytic purifier/muffler
Average fuel consumption at 50 % load	9.0 l / h
Fuel tank refill capacity	80 l

### TRANSMISSION

Hydrostatic transmission with forward and reverse. Two speed areas.

### AXLES

Front axle	Kessler D41, SAHR brakes, Limited slip differential
Rear axle	Kessler D41, SAHR brakes, No-slip differential, oscillating +- 8 degrees

### TIRES

Tire size (Tires are application approved. Brand and type subject to availability.)	9.00 R20 L5S
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## FRAME

### REAR AND FRONT FRAME

High strength welded steel structure with optimized material thicknesses

Central hinge with adjustable upper bearing

Tanks bolted to the frame

## OPERATOR'S COMPARTMENT

### CANOPY

ROPS certification according to EN ISO 3471

FOPS certification according to EN ISO 3449

No high pressure hoses in the operator's compartment

Inclinometers to indicate operating angle

Emergency exit

Floor washable with water to reduce dust

Three-point contact access system

12/24 V output for communication radio connection

Remote circuit breaker switch

### OPERATOR'S SEAT

Low frequency suspension

Height adjustment

Adjustment according to the operator's weight

Fore-aft isolation

Padded and adjustable arm rests

Adjustable lumbar support

Two-point seat belt

### DASHBOARD AND DISPLAYS

Critical warnings and alarms displayed as warning lights

Instrument panel with electric gauges and illuminated switches

## HYDRAULICS

Door interlock for brakes and boom, bucket, and steering hydraulics

Oil cooler for hydraulic oil

ORFS fittings

ORFS hoses

Hydraulic oil tank capacity 120 l

Sight glass for oil level, 2 pcs

### STEERING HYDRAULICS

Hydraulically operated, center-point articulation, power steering with one double acting cylinder. Steering controlled by hydraulic joystick. Interlock protection.

Steering main valve Open center type

Steering hydraulic cylinders 80 mm, 1 pc

Steering pump Gear type

Steering and servo hydraulic pumps Gear type

### BUCKET HYDRAULICS

The oil flow from steering hydraulic pump is directed to bucket hydraulics when steering is not used. Joystick bucket and boom control (hydraulic), equipped with gear pump that delivers oil to the bucket hydraulic main valve.

Boom system Straight boom

Lift cylinders 100 mm, 2 pcs

Dump cylinder 125 mm, 1 pc

Main valve Open center type

Pump for bucket hydraulics Gear type

## BRAKES

Service brakes are spring applied; hydraulically released multidisc wet brakes on all wheels. Two independent circuits: one for the front and one for the rear axle. Service brakes also function as an emergency and parking brake. Brake system performance complies with requirements of EN ISO 3450, AS2958.1 and SABS 1589.

Neutral brake

Automatic brake activation system, ABA

Emergency brake release pump

## ELECTRICAL EQUIPMENT

### MAIN COMPONENTS

Alternator	55 A
Batteries	2 x 12V
Starter	4 kW, 24 V
Driving lights	LED lights: 2 pcs in front 2 pcs in rear 2 pcs in canopy
Parking, brake and indicator (blinkers) lights	LED lights: 2 pcs in front 2 pcs in rear
Reverse alarm	
Flashing beacon	

## INCLUDED SAFETY FEATURES

### FIRE SAFETY

Portable fire extinguisher, 6 kg
Hot side - cold side design
Isolation of combustibles and ignition sources
Heat insulation on exhaust manifold, turbo, and isolated exhaust pipe

### ENERGY ISOLATION

Lockable main switch, ground level access
Emergency stop push buttons according to EN ISO 13850
Pressure release in the radiator cap (Standard in Stage V engine. Not available for Tier 2 engine)
Automatic discharge for pressure accumulators (brake system and pilot circuit)
Frame articulation locking device
Mechanical boom locking device

## GRADE PERFORMANCE

Deutz BF4L914

### Empty

Percent grade	0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17
Speed (km/h)	10	10	10	10	10	10	8.8	7.9	7.0

### Loaded

Percent grade	0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17
Speed (km/h)	10	10	10	10	9.3	7.9	6.8	6	5.3

## DOCUMENTATION

### STANDARD MANUALS

Operator's Manual	English and other EU languages
Maintenance Manual	English and other EU languages
Parts Manual	English
Service and Repair Manual	English
ToolMan	2 x USB stick in PDF format, includes all the manuals
Decals	English, French, Spanish, German

## OPTIONS

ANSUL® LVS fire suppression system ANSUL, with or without CHECKFIRE, including auto shutdown
Eclipse® fire suppression system with auto shutdown, Sustain or Extreme agent delivered separately
Arctic package (240V heater elements) for Stage V engine only
Automatic central lubrication
Boom floating
CE Declaration of conformity
Cover grills for lamps
Direct feed for beacon
Driving direction lights (red / green)
Electric filling pump for hydraulic oil
Emergency steering (CE)
Line of sight radio remote control HBC, analogue
Lower canopy (2017 mm)
Radio remote control interface HBC, analogue
Recovery kit (brake release by radio signal), hook included
Spare rim 10.00-25/1.5 (for tyres 14.00 R25)
Starter isolator
Wheel chocks and brackets
Wiggins fuel fill system

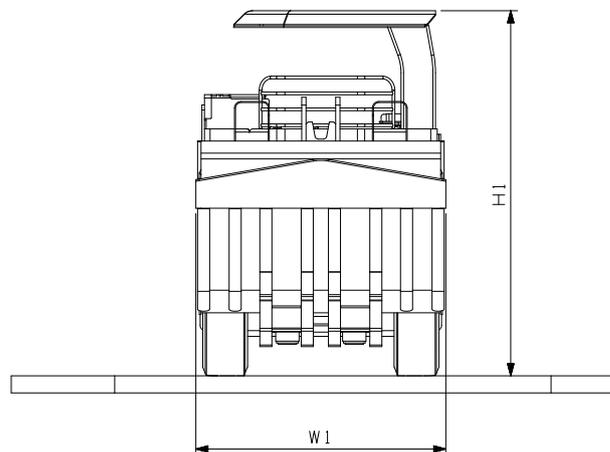
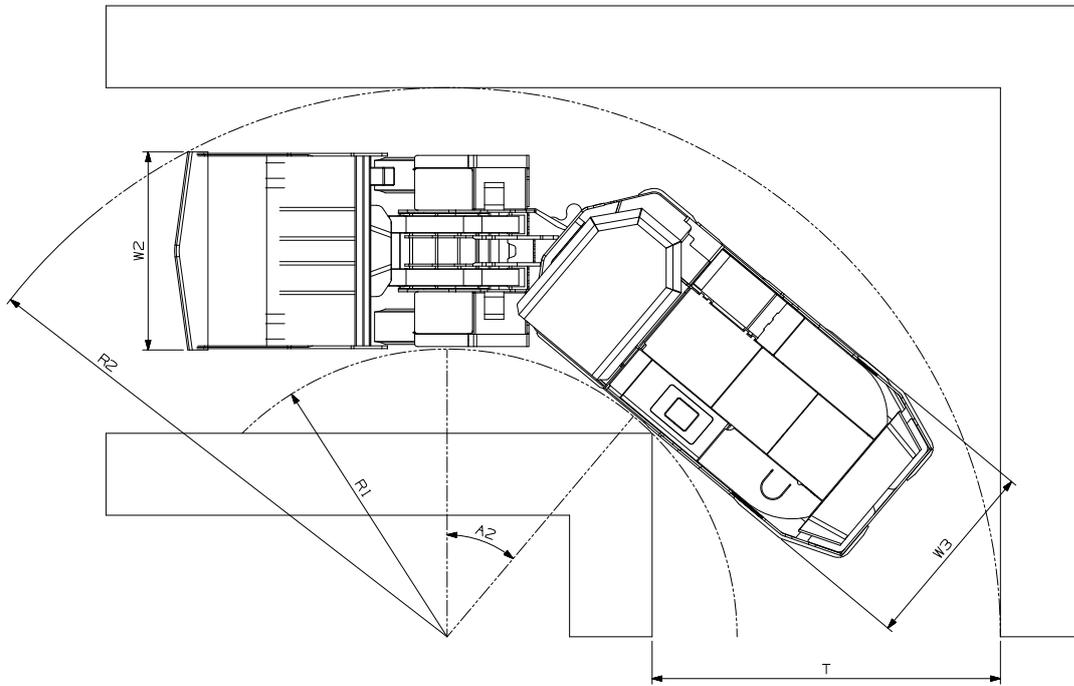
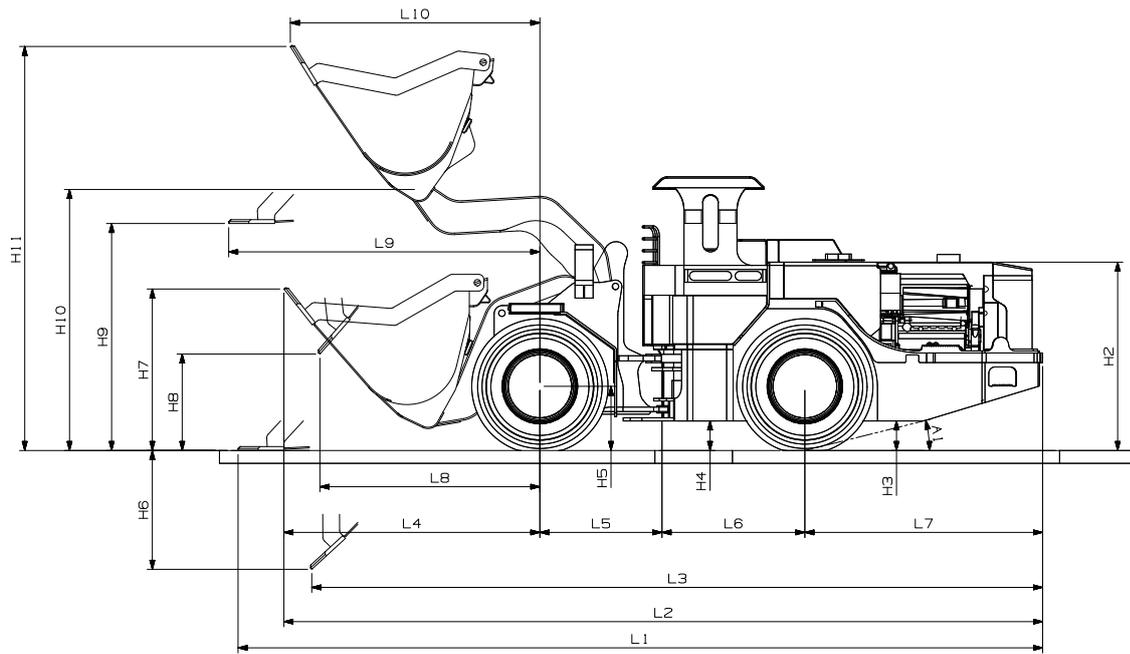
## OPTIONAL ENGINES

Engine Deutz F4L914 air cooled, natural aspirated, 56 kW, 2300 rpm, Tier 2

Engine Deutz TD3.6 L4 liquid cooled, Turbo Charged, 55 kW, 2300 rpm, Stage V

Ventilation rate: CANMET 4.63 m<sup>3</sup>/s, MSHA 5500 cfm  
Particulate index: MSHA 500 cfm

DIMENSIONS



## DIMENSIONS

	Standard		
Bucket alternatives (m <sup>3</sup> )	1.3 m <sup>3</sup>	1.5 m <sup>3</sup>	1.75 m <sup>3</sup>
Lip plate type	Bare lip	Bare lip	Bare lip
L1 (mm)	6220	6358	6312
L2 (mm)	5864	5774	5910
L3 (mm)	5649	5760	5736
L4 (mm)	1980	2054	2020
L5 (mm)	1000	1000	1000
L6 (mm)	1050	1050	1050
L7 (mm)	1840	1840	1840
L8 (mm)	1702	1804	1784
L9 (mm)	2407	2540	2500
L10 (mm)	1931	1999	1967
H1 (mm), open cabin, STD	2134	2134	2134
H1 (mm), open cabin, Low	2017	2017	2017
H2 (mm)	1468	1468	1468
H3 (mm)	230	230	230
H4 (mm)	188	188	188
H5 (mm)	500	500	500
H6 (mm)	926	1022	986
H7 (mm)	1259	1373	1347
H8 (mm)	752	653	691
H9 (mm)	1770	1772	1784
H10 (mm)	2035	2035	2035
H11 (mm)	3150	3273	3236
W1 (mm)	1450	1450	1666
W2 (mm)	1450	1450	1666
W3 (mm)	1400	1400	1400
A1	14°	14°	14°
A2	40.0°	40.0°	40.0°
R1, left turn (mm)	2107	2107	2107
R2, left turn (mm)	4021	4054	4182
T, left turn (mm)	2531	2564	2733
R1, right turn (mm)	2107	2107	2027
R2, right turn (mm)	4021	4054	4182
T, right turn (mm)	2531	2564	2733

