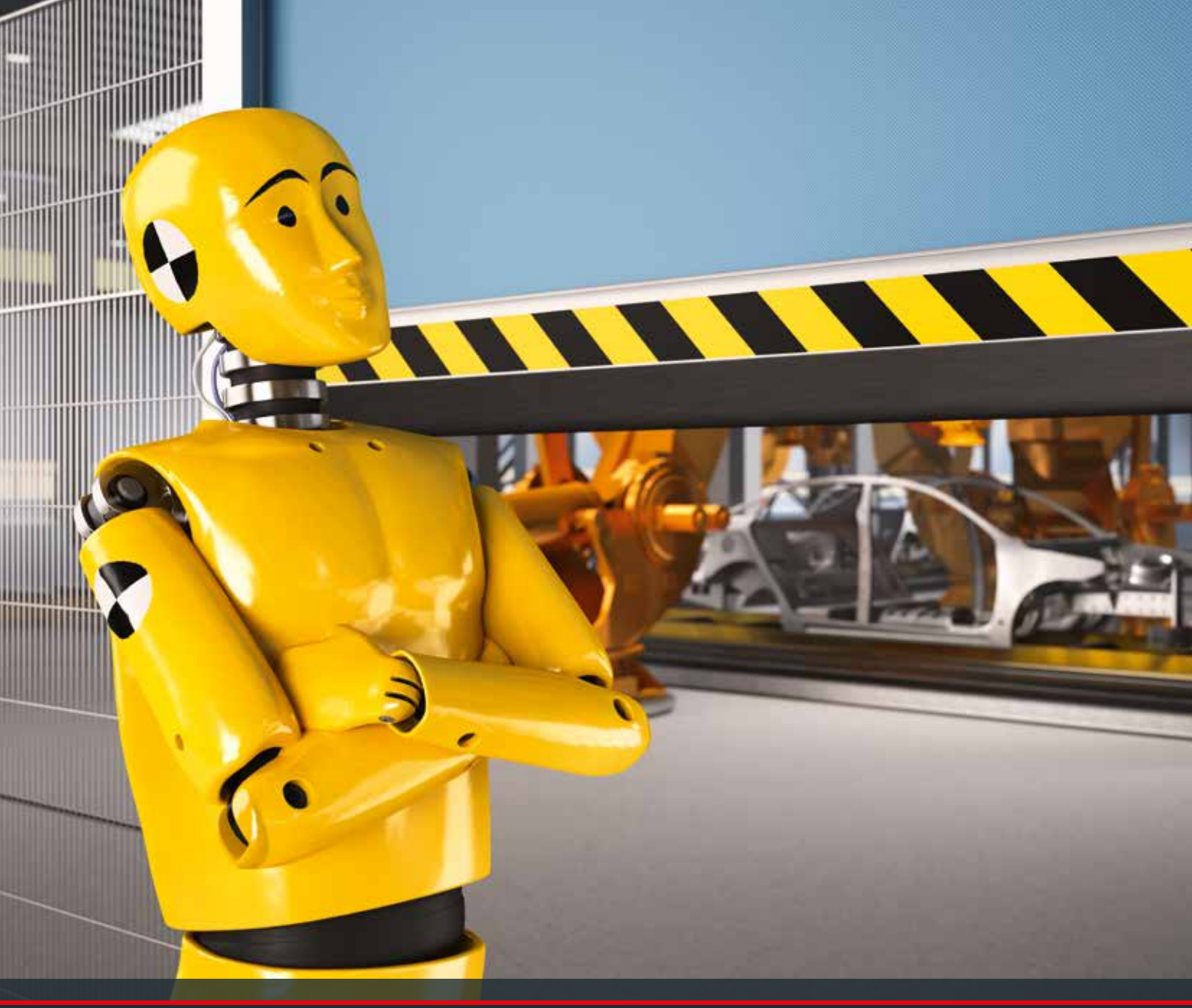
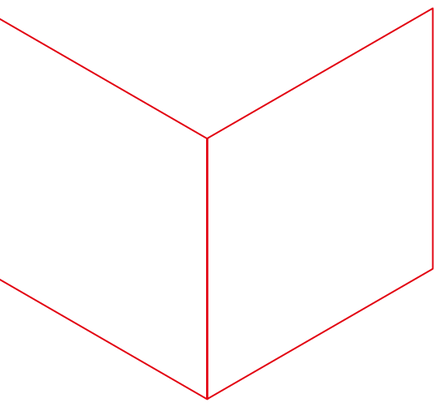


Machine protection gates

Power-operated gates for process automation

Brühl®

First in safety



Machine protection gates

Power-operated gates for process automation

Brühl®

First in safety

Contents

Brühl – first in safety

Taking the lead in quality and security. This is what makes Brühl one of Europe's largest manufacturers of machine protection gates and safety guards for machinery and plants. For us, safety is more than just a way to make money. Safety is our motivation and our promise to you. For over 35 years, we have helped to shape how humans and machinery are protected. With our high-quality safety fence systems and machine protection gates, we keep on setting new standards. We develop and produce machinery and plant solutions that are flexible, comprehensive and, where required, entirely unique and that harmonise durability, functionality and safety.
By using high-quality materials and continuous checks, we are able to provide the best possible durability, robustness and stability. To ensure things stay this way, we are committed to producing locally at our site in Netphen and supporting our region by insisting on "Made in Germany".

Safety
Reliable quality – guaranteed

To ensure comprehensive safety for persons, machinery and plants, all our safety components undergo a wide variety of tests in our in-house test lab before being launched on the market. This verified quality is also confirmed by TÜV, for example with certification to DIN EN ISO 9001, which certifies a perfect and consistent production quality of the products.

Safety –
crash tests for machine protection gates

Safety relies on testing! To ensure that this happens across the board, we will sometimes take on a pioneering role at Brühl. As part of a collaboration with a university, we used a pendulum impact test station to perform a comprehensive series of safety tests – which we have since continuously developed.

The ISO standard 14120 “Safety of machinery – Guards” cites measurement methods such as the pendulum impact method as reliable ways to assess the stability of a safety guard. The pendulum impact method involves a test body of a defined size and weight colliding against a safety guard at various points. High-speed cameras are used to reliably document the individual test series and then analyse them.

Brühl’s pendulum impact test method thus enables reproducible measurements and assessments of the dynamic strength of safety guards. Furthermore, the method can be used to set protection objectives for safety fences in accordance with DIN EN ISO 14120 (cf. Annex D.5 Pendulum test method). This makes your Brühl products twice as reliable and guarantees verified quality.

Made in Germany
by Brühl

Made in Germany

The safety guards of Brühl Safety GmbH are produced exclusively at the Netphen site in Siegerland. For us, using Germany as a production location means having a qualified workforce, sustainable employment and as a result high-quality products for machinery and plants.

TÜV SÜD ISO 9001

ISO 9001

As an innovative and competitive company, Brühl Safety GmbH fulfils all the requirements of a quality management system in accordance with DIN EN ISO 9001. Our products not only provide maximum safety and quality; they can also be adjusted flexibly to suit customer needs. To ensure that we remain in compliance with the quality management standard, we continuously work to improve our products and services.

Simply reliable support
Brühl's all-round service

Being able to offer the best possible solution for every application is Brühl's top priority. We therefore very deliberately offer a wide range of services as a comprehensive supplement to our high-quality machine protection gates for machinery and plants. Our experienced specialists can assist and support you with the all-round service for all matters relating to the development, testing and maintenance of machine protection gates – directly on site or remotely.

1 Support for the risk assessment

The legally required risk assessment is an unavoidable step on the route towards CE marking for any machinery and plant manufacturer. On the basis of the risk assessments of our customers and prospective buyers, we support them in correctly configuring the guard device, in particular with regard to special applications.

2 Gate testing according to ASR A1.7

Regular testing of power-operated machine protection gates is obligatory according to ASR A1.7. Depending on the number of strokes performed and the area of application, Brühl tests both its own plants and products from other manufacturers with its in-house specialists, and provides the required test documentation.

3 Maintenance and care

Careful maintenance and care are proven to increase the service life and functionality of machine protection gates. If desired, Brühl can take care of the regular maintenance and care of your power-operated gates.

4 Assembly service

From the instruction to the installation and even total assembly.
With the Brühl assembly service, available worldwide, professional assembly is performed by qualified specialists on site.

5 Consultation and project support

Individual consultation and planning security from a single source. Whether it's with a detailed analysis before the actual development is commenced or expert advice from an assigned project manager, Brühl can create the perfect conditions for any project – from start to finish.

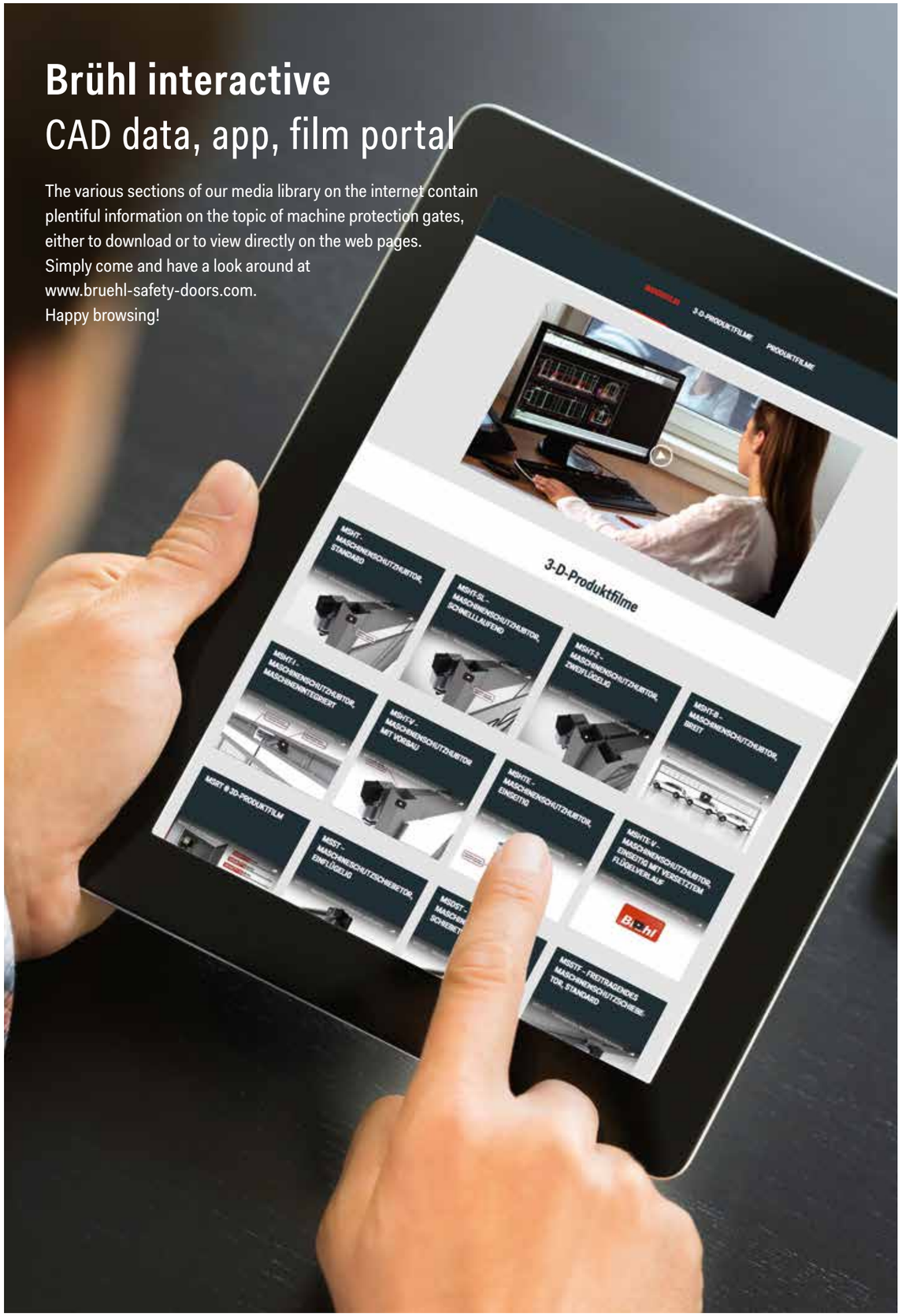
6 3D and 2D processing

Any adjustment or alterations you want to make can be implemented in the project layout directly. With Brühl order and project processing, and the corresponding 3D work stations, we can provide comprehensive machinery and plant manufacture development, adjusted to suit your needs.

Brühl interactive

CAD data, app, film portal

The various sections of our media library on the internet contain plentiful information on the topic of machine protection gates, either to download or to view directly on the web pages. Simply come and have a look around at www.bruehl-safety-doors.com.
Happy browsing!



Brühl Safety Fence Designer

With the interactive Brühl planning tool, you can plan your individual safety fence systems with integrated machine protection gates without any previous CAD system or program knowledge. The Brühl Safety Fence Designer developed by CADENAS allows you to easily create 3D gate models. Thanks to the intuitive user interface, you can design entire safety fence systems, or parts of them, including machine protection gates in just a few clicks. This means that planned layouts can easily be incorporated into existing plant layouts.

Brühl 3D component catalogue

Brühl machine protection gates can be planned and created easily thanks to the ready-made 3D STEP files from the 3D component catalogue. After registering, you will be able to log in to the portal where you can access all the available 3D components from Brühl. As a result, you will be able to work with your own CAD system – from the outset.

Brühl safety clearance configurator app

The Brühl safety clearance configurator is aimed at people involved with safety clearances created by protective barriers in connection with the risk and hazard assessment in the development of machinery and plants, and project managers who need to check safety clearances during installation on site. Users can choose between the desktop version, the mobile web version and also an app version.

Protection made visible – the Brühl film portal

Applications, safety and expansion – we have all the answers! Key information on our Brühl products for machinery and plants can be found on our Brühl film portal and on the Brühl Safety Youtube channel. In various categories, we have prepared simple introductions outlining our company and our products. In addition to the new Brühl corporate video, you can choose from our product films and 3D product films.

Machine protection gates SpeedLine®

As an expert and one of Europe's leading manufacturers for machine and plant safety, Brühl has redeveloped high-speed machine protection gates. The SpeedLine® series includes innovative technical safety features that set entirely new standards for high-speed machine protection gates. Brühl supplies efficient solutions: thanks to standardised systems with customised variants – with fine precision and high cost-effectiveness. See the results of our safety know-how, view the latest developments and discover all the advantages of our SpeedLine® gates.

Faster protection with intelligent technology – the high-speed machine protection gate from Brühl.

*illustration shows optional equipment.

Standard product characteristics
for all SpeedLine® gates

ISC® – Intelligent Safety Control
Permanent active monitoring of the entire gate closing zone with early detection of obstacles.

Press-fitted shaft
Motor runs absolutely smoothly, minimising material stress, without any oscillation or compensation movements.

ULD® – Unwinding Locking Device
Mechanical safety system in the transmission.

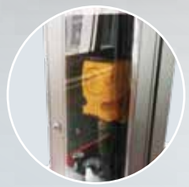
High-performance drive
Industrial three-phase gear motor with integrated ventilation for permanent availability.

ECH® – Emergency Crank Handle
Manual emergency opening, e.g. for power failure, thanks to detachable crank handle.

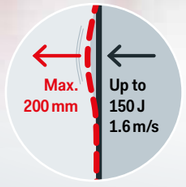
PCS® – Position Control System
Digital absolute encoder in a robust three-phase motor for optimised drive control.

Delivered ready for use
Delivered either fully assembled or in separate modules to reduce freight volume.

SLB® – Safety Light Barrier
The multiple-beam safety sensor system (PLd to EN ISO 13849-1) incorporated into the plane of the gate leaf provides an extensive detection region that includes the outer peripheral areas.



Safety switches behind transparent cover
Safety switches reliably signal in acc. with IEC 61508 / IEC 62061 the closed gate position to the higher-level plant control.



Curtain barrier
Special inelastic curtain material (Brühl-TEX-I) provides a secure barrier.

➔ *DIN EN ISO 14120:2016; C.2.5.1*

Levelling plate
To adjust the gate.

Rounded end profiles
No sharp edges to prevent injury.

Profile slot system
For integrated cable guiding, attachment of fence systems and other accessories.

SpeedLine®
For speedy workflows

The SpeedLine® product series includes innovative technical safety features that set entirely new standards when it comes to machine protection. Thanks to the intelligent gate control (ISC®) with multiple-beam visual safety sensor system (SLB®) and position control system (PCS®), the SpeedLine® series is specially designed for the strictest requirements of personal safety and the shortest cycle times in automation and machine and plant engineering. The entire drive unit of the SpeedLine® gates meets the highest standards in industrial production lines. From the development phase onwards, care has been taken to ensure high technical availability and use wear-resistant components. With a SpeedLine® gate, you are purchasing a product in premium quality.

At a glance: the advantages of SpeedLine® gates

Self-supporting structure, no additional support frame required

All SpeedLine® gates are self-supporting structures. No additional support or mounting frames are needed for free-standing installation. Gates in extra large sizes are produced with an integrated reinforcement portal as standard.

Delivered ready for use

SpeedLine® gates are delivered fully ready for use. Before dispatch, the gates are brought into a fully operational state, including the controls. This means that you receive a “turnkey” gate ready for immediate use, eliminating the need for assembly and commissioning on site.

High-speed and convenient thanks to integrated light barrier

With the high-performance asynchronous gear motor and an SLB® light barrier integrated into the plane of the gate leaf, gates in the SpeedLine® series achieve top closing speeds and provide maximum convenience and the highest level of safety as obstacles of all kinds are detected early on.

Low-maintenance

The Position Control System PCS® is installed in the motor, so the gate does not need to have a mechanical switch, which has a positive effect on gate maintenance.

Practical for attachments thanks to profile slots

The gate posts of all SpeedLine® gates consist of a special aluminium profile with profile slots on the side. These slots make it possible to lay cables tidily and directly connect Brühl fence systems and are ideal for attaching holders, control buttons, display lamps etc.

Technical data SpeedLine®

Design/gate type	Roller gate MSRT®-SL	Roller gate MSRT®-SL-U	Roller gate MSRT®-SL-A	Lift gate MSHT®-SL
Closing direction				
Downwards	×	–	×	×
Upwards	–	×	–	–
Standard sizes				
Max. clear width	5000 mm	3500 mm	4000 mm	3000 mm
Max. clear height	4000 mm	3500 mm	3500 mm	3500 mm
Ground clearance	Variable	–	Variable	Variable
Design of gate curtains and wings				
Curtain TEX-I polyester monofilament, PVC-coated	×	×	–	–
Curtain made from aluminium slats, double-walled	–	–	×	–
Gate wing with panelling	–	–	–	×
Speeds				
Max. closing speed	1.6 m/s	1.0 m/s	0.8 m/s	1.0 m/s
Max. opening speed	2.0 m/s	1.2 m/s	0.8 m/s	1.2 m/s
Closing edge protection				
SLB® – safety light barrier in gate leaf plane	Standard	Standard	Standard	Standard
Electric safety edge	Optional	Optional	Optional	Optional

Machine protection roller gate SpeedLine® Standard

Product group/design
MSRT®-SL

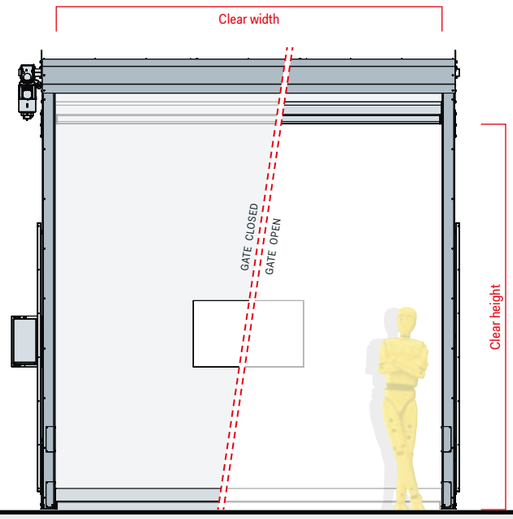
The roller gate MSRT®-SL with its classic design (downward-closing) offers top running speeds for minimum cycle times. With an opening speed of up to 2.0 m/s and a closing speed of 1.6 m/s, the MSRT®-SL provides the highest possible speeds of all the gates in the entire SpeedLine® series.

The special heavy duty, tear-resistant curtain material (Brühl-TEX-I) creates a secure barrier (to DIN EN 14120:2016, C.2.5.1). Forces of up to 150 joules are reliably absorbed. The polyester monofilament curtain, PVC-coated on both sides, is indented by a maximum of 200 mm when exposed to this force. The mesh material can even withstand stresses of up to 1200 joules with a sharp-edged profile.

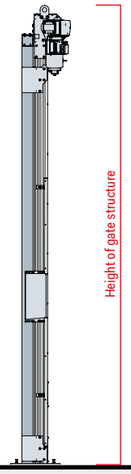
Technical data SpeedLine® MSRT®-SL

Features	**Gate design (stationary part)**	Self-supporting, robust steel-aluminium composite structure
	Additional portal integrated	For clear widths = 3000 mm or more or clear heights = 2500 mm or more
	Curtain (moving part)	Extremely tear-resistant PVC-coated polyester monofilament Brühl-TEX-1, 2 mm thick
	Curtain end strip	Stable, cross-braced aluminium profile
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	None
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Curtain guide	Sliding guides, low-wear
	Wind protection	Integrated into roller gate curtain
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	SLB® – multiple-beam visual safety sensor system in gate leaf plane
	Safety switches for closed end position	One or two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 5000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 1.6 m/s
	Opening speed	Approx. 2.0 m/s
Colouring	**Gate posts**	Aluminium, anodised
	Winding box and base plates	Standard RAL 7016 powder-coated, other colours available
	Curtain	See appendix, design of roller gate curtains, page 97
Curtain properties		See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open
Drawing shows optional portal



VIEW FROM LEFT

Machine protection roller gate SpeedLine® Bottom

Product group/design
MSRT®-SL-U

Crane loading possible

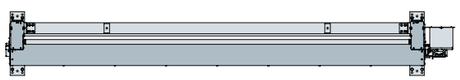
Upwards closing direction

The upwards-closing machine protection roller gate SpeedLine® MSRT®-SL-U has no obstructions restricting the gate opening at the top – perfect for use with manipulators and loading and unloading stations for crane and robot systems. With its compact overall height, the winding box makes it possible to open the gate down to just 550 mm above the ground.

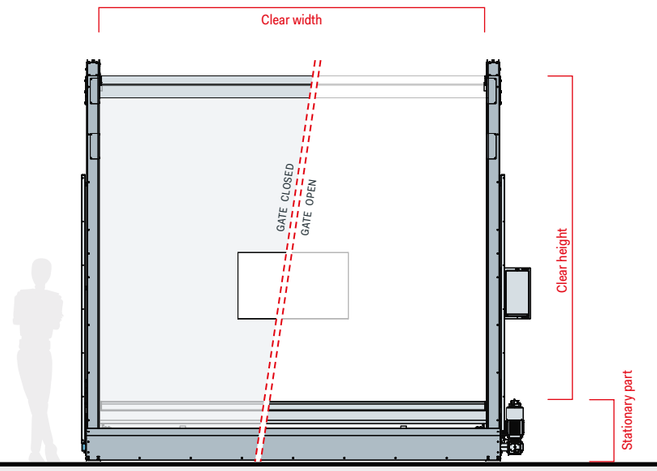
The special heavy duty, tear-resistant curtain material (Brühl-TEX-I) provides a secure barrier (to DIN EN 14120:2016, C.2.5.1). Forces of up to 150 joules are reliably absorbed. The polyester monofilament curtain, PVC-coated on both sides, is indented by a maximum of 200 mm when exposed to this force. The mesh material can even withstand stresses of up to 1200 joules with a sharp-edged profile without damage.

Technical data SpeedLine® MSRT®-SL-U

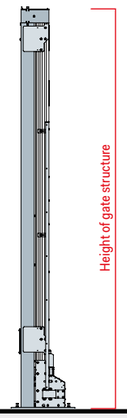
Features	**Gate design (stationary part)**	Self-supporting, robust steel-aluminium composite structure
	Additional portal	For all sizes
	Curtain (moving part)	Extremely tear-resistant PVC-coated polyester monofilament Brühl-TEX-1, 2 mm thick
	Curtain end strip	Stable, cross-braced aluminium profile 2 × 3 mm thick
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	Two counterweights in additional portal
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Curtain guide	Sliding guides, low-wear
	Wind protection	Integrated into roller gate curtain
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	SLB® – multiple-beam visual safety sensor system in gate leaf plane
	Safety switches for closed end position	One or two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission and counterweights
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 3500 mm
	Max. clear height	Up to 3500 mm
	Ground clearance	–
Speed	**Closing speed**	Approx. 1.0 m/s
	Opening speed	Approx. 1.2 m/s
Colouring	**Gate posts**	Aluminium, anodised, additional portals powder-coated
	Winding box and base plates	Standard RAL 7016 powder-coated, other colours available
	Curtain	See appendix, design of roller gate curtains, page 97
Curtain properties		See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection roller gate SpeedLine® Aluminium

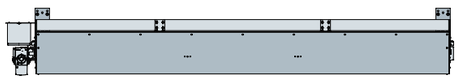
Product group/design
MSRT®-SL-A

The MSRT®-SL-A with aluminium slats is used in plants where deflection of the curtain needs to be prevented as a danger zone is located directly behind the gate curtain.

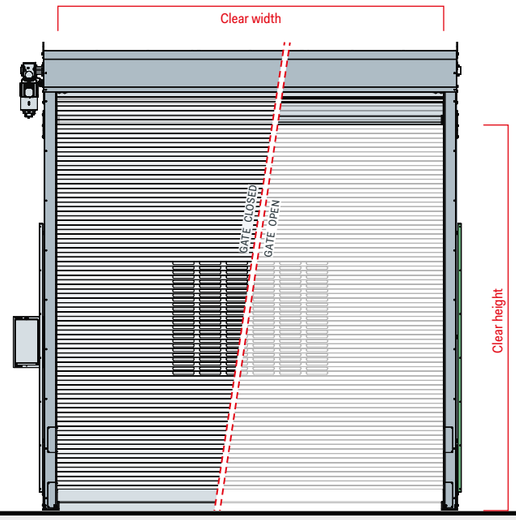
The aluminium slat used is double-walled and has a lightproof design. It is thus also suitable for use with laser plants. The slat curtain can withstand an impact of 1700 joules with no measurable deformation. To allow processes to be viewed, the same slat is available with viewing windows.

Technical data SpeedLine® MSRT®-SL-A

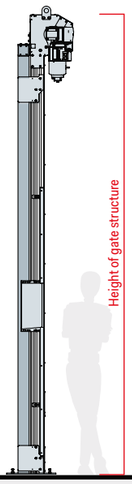
Features	**Gate design (stationary part)**	Self-supporting, robust steel-aluminium composite structure
	Additional portal integrated	For clear widths = 2500 mm or more or clear heights = 2500 mm or more
	Curtain (moving part)	Aluminium slats, double-walled with plastic joint lining, slat height = 40 mm
	Curtain end strip	Stable, cross-braced aluminium profile
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	For extra large sizes, counterweights in additional portal
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Curtain guide	Sliding guides, low-wear
	Wind protection	Provided by the rigid slat structure
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	SLB® – multiple-beam visual safety sensor system in gate leaf plane
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 4000 mm
	Max. clear height	Up to 3500 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.8 m/s
	Opening speed	Approx. 0.8 m/s
Colouring	**Gate posts**	Aluminium, anodised
	Winding box and base plates	Standard RAL 7016 powder-coated, other colours available
	Curtain	Aluminium, uncoated
Curtain properties		See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82



PLAN VIEW



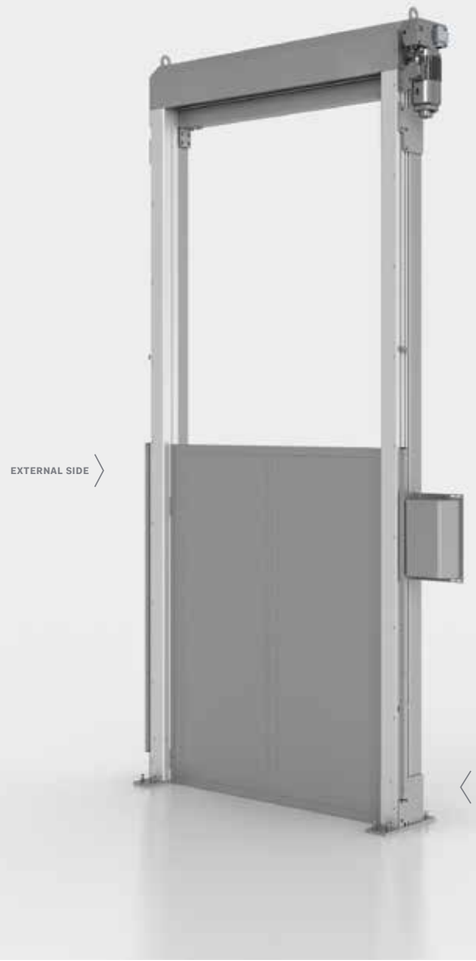
VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection lift gate SpeedLine® Standard

Product group/design
MSHT®-SL



High speed

The lift gate MSHT®-SL sets entirely new standards with regard to lift gate speeds. With the integrated light barrier (SLB®), speeds of up to 1.2 m/s can be achieved during opening and 1.0 m/s during closing.

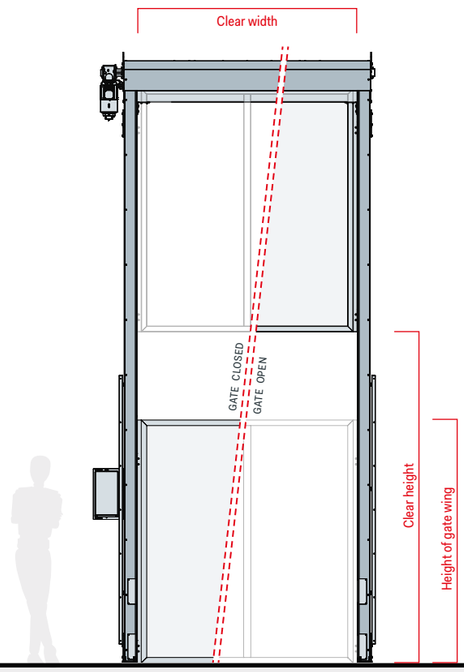
In addition to the fall protection device (ULD®) in the transmission, the counterweights that run along the gate portal provide extra fall protection for the gate wing. The MSHT®-SL thus provides maximum safety for your process. The gate wing is driven by a drive shaft in the gate header and roller chains on both sides.

Thanks to the wide selection of panelling for the gate wings and powder coating in all available RAL colours, you have plenty of choice when it comes to design.

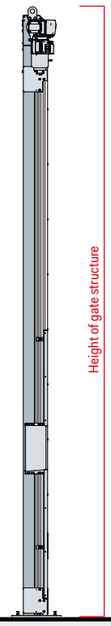
Technical data SpeedLine® MSHT®-SL

Features	**Gate design (stationary part)**	Self-supporting, robust steel-aluminium composite structure
	Additional portal	For all sizes
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	Two counterweights in additional portal
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Sliding guides, low-wear
	Wind protection	Provided by the rigid structure of the gate leaf
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	SLB® – multiple-beam visual safety sensor system in gate wing plane
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission and counterweights
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 3000 mm
	Max. clear height	Up to 3500 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 1.0 m/s
	Opening speed	Approx. 1.2 m/s
Colouring	**Gate posts**	Aluminium, anodised, portals powder-coated
	Winding box and base plates	Standard RAL 7016 powder-coated, other colours available
	Gate wing panelling	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection gates PerformanceLine®

The PerformanceLine® series represents powerful and extremely robust protection gates based on 100 % steel structures and a large number of special designs such as contours in the closing edge. We develop and produce machine protection gates and safety guards that are flexible, comprehensive and, where required, entirely unique and that find a way to harmonise durability, functionality and safety. We make use of the know-how we have developed and a large number of certification and testing procedures to make our customers' day-to-day work safer. We do this in the knowledge that we are developing and promoting safety – for us, our customers and our partners. So that we can all be on the safe side.

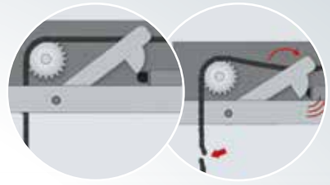
Standard product characteristics
for all PerformanceLine® gates

ECH® – Emergency Crank Handle
Manual emergency opening, e.g. for power failure, thanks to detachable crank handle.

PCS® – Position Control System
Digital absolute encoder in a robust three-phase motor for optimised drive control.

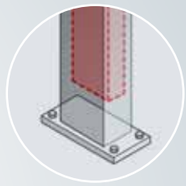
Fall protection device
Highest safety standard thanks to multiple load-carriers.

Load-carrier monitoring
Electronic load-carrier monitoring for lift gates.



ULD® – Unwinding Locking Device
Mechanical safety system in the transmission.

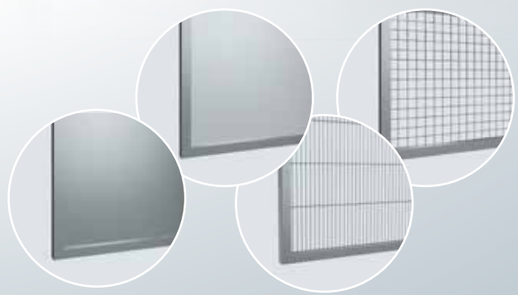
Counterweight equipment
Weight compensation for lift gates provided by concealed counterweights.



Safety switches
Safety switches reliably signal in acc. with IEC 61508 / IEC 62061 the closed gate position to the higher-level plant control.

Closing edge protection
Closing edges protected by electric safety edges.

Self-supporting structure
Solid, self-supporting steel structure for free-standing installation without additional support frame.



Wide range of designs and colours
Varied panelling types for gate wings, roller gate curtains and colours.

PerformanceLine® roller gates

The roller gates in the PerformanceLine® series feature an extremely robust design and very high availability. With a frequency-controlled gate controller and an electric safety edge, the PerformanceLine® roller gates are able to meet the strictest requirements of personal safety in industrial production plants. Because of the robust steel structure, we can deliver the roller gates in large dimensions. In comparison with the machine protection lift gates, the machine protection roller gates have particularly compact dimensions and installation heights.

At a glance: Advantages of PerformanceLine® roller gates

Robust and stable steel structure

The winding box and the gate posts are composed of a stable welded steel structure, which means that the roller gates can be manufactured in very large sizes.

Design options

Integrated and subtle or deliberately set apart from their surroundings – the gate posts can be painted in any colour of your choosing. For maximum durability, all elements are sand-blasted and powder-coated.

Diverse configuration options

All curtain variants are optionally available with viewing windows in various sizes and designs, and the end of the curtain can be manufactured with various alterations to the contour.

Technical data PerformanceLine® roller gates

Design/gate type	Roller gate MSRT®-PL	Roller gate MSRT®-PL-HV	Roller gate MSRT®-PL-KHV	Roller gate MSRT®-PL-L
Closing direction				
Downwards	×	×	×	×
Standard sizes				
Max. clear width	7500 mm	3500 mm	4000 mm	5500 mm
Max. clear height	5000 mm	3500 mm	5000 mm	5000 mm
Ground clearance	Variable	Variable	Variable	Variable
Curtain design				
TEX-II PVC film with sectional divisions	×	×	×	–
Slats, single-walled	–	–	–	×
Speeds				
Max. closing speed	0.2 m/s	0.2 m/s	0.2 m/s	0.18 m/s
Max. opening speed	0.5 m/s	0.33 m/s	0.33 m/s	0.18 m/s
Closing edge protection				
Electric safety edge	Standard	Standard	Standard	Standard
Safety light barrier front-mounted	Optional	Optional	Optional	Optional

Machine protection roller gate PerformanceLine® Standard

Product group/design
MSRT®-PL

Optional incline up to 10 degrees

Contours on closing edge possible

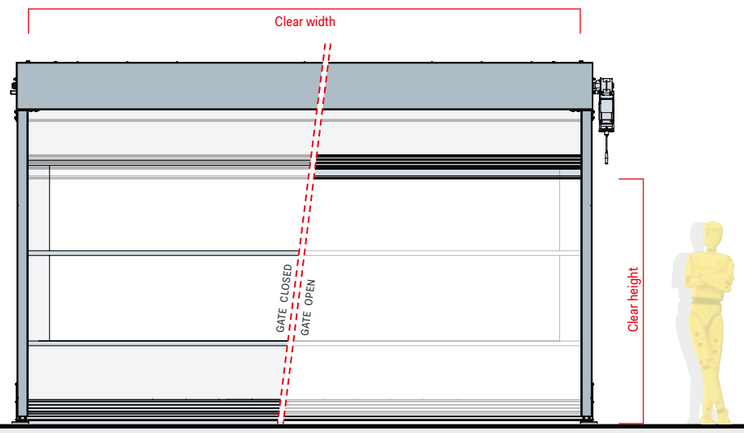
The machine protection roller gate MSRT®-PL comprises a stable self-supporting portal structure with a precision steel tube as winding shaft and, like all Brühl roller gates, it has a frequency-controlled drive unit. Safety equipment is provided in the form of an electronic safety edge on the main closing edge to initiate the reversing function.

Because of the sectional divisions, this gate can be built with a clear width of up to 7500 mm. Contours can be incorporated into the curtain according to your specific requirements.

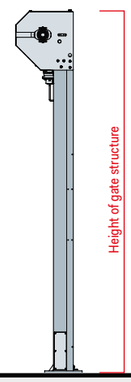
Technical data PerformanceLine® MSRT®-PL

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Curtain (moving part)	PVC film Brühl-TEX-II, with sectional divisions
	Curtain end strip	Stable, cross-braced aluminium profile
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	None
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Curtain guide	Sliding guides, low-wear
	Wind protection	Integrated into roller gate curtain
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One or two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 7500 mm
	Max. clear height	Up to 5000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Curtain	See appendix, design of roller gate curtains, page 97
Curtain	**properties**	See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection roller gate PerformanceLine® Set back

Product group/design
MSRT®-PL-HV

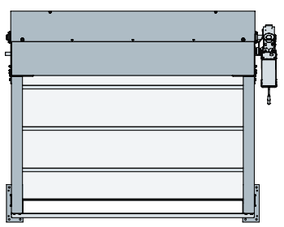
Crane loading possible

The MSRT®-PL-HV from Brühl is a roller gate that closes at an angle to the front and downwards, with a specially formed gate structure. With the set back gate header, the gate is specially designed for loading and maintenance activities performed by crane systems.

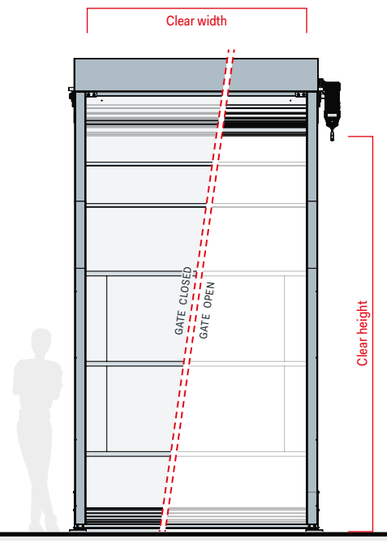
This gate is delivered with the Brühl-TEX-II film curtain, which can be combined with transparent elements for a better view of processes. Safety equipment is provided in the form of an electric safety edge on the main closing edge to initiate the reversing function. The gate requires support in the header area.

Technical data PerformanceLine® MSRT®-PL-HV

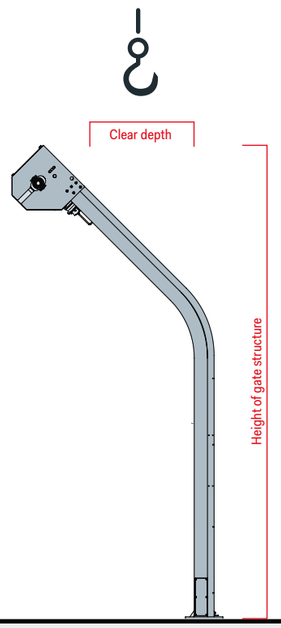
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Curtain (moving part)	PVC film Brühl-TEX-II, with sectional divisions
	Curtain end strip	Stable, cross-braced aluminium profile
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right, and pneumatic or electric drive for horizontal movement
	Weight compensation	None
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit and two inductive limit switches for horizontal movement
	Curtain guide	Sliding guides, low-wear
	Wind protection	Integrated into roller gate curtain
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One or two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 3500 mm
	Max. clear height	Up to 3500 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.33 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Curtain	See appendix, design of roller gate curtains, page 97
Curtain	**properties**	See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection roller gate PerformanceLine® Retractable header

Product group/design
MSRT®-PL-KHV

PATENT-PROTECTED

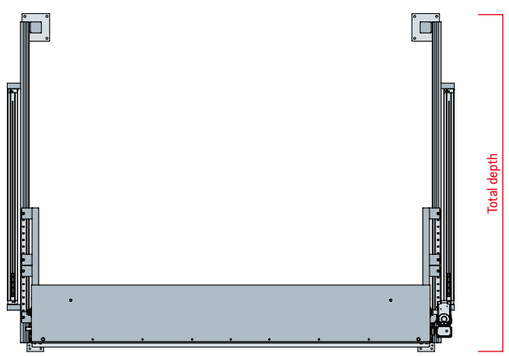
Crane loading possible

The MSRT®-PL-KHV comprises a downward-closing roller gate with a header that can be fully moved back into the machinery space via two horizontal axles. The structure is specially designed for loading and maintenance activities performed by crane systems.

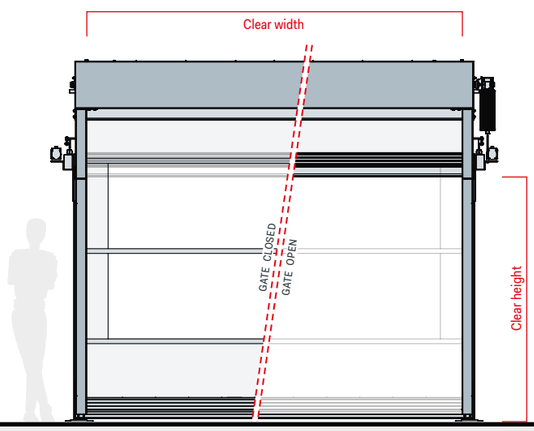
This gate is supplied with the Brühl-TEX-II film curtain, which can be combined with transparent elements for a better view of processes. Safety equipment is provided in the form of an electric safety edge on the main closing edge to initiate the reversing function.

Technical data PerformanceLine® MSRT®-PL-KHV

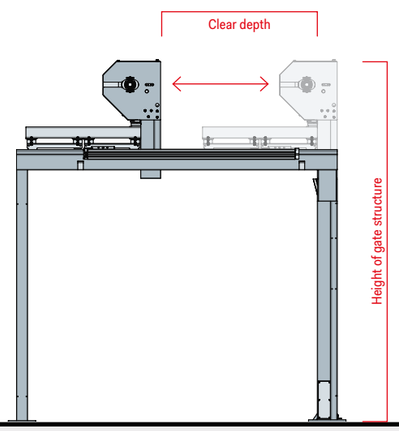
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Curtain (moving part)	PVC film Brühl-TEX-II, with sectional divisions
	Curtain end strip	Stable, cross-braced aluminium profile
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right, and pneumatic or electric drive for horizontal movement
	Weight compensation	None
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit and two inductive limit switches for horizontal movement
	Curtain guide	Sliding guides, low-wear
	Wind protection	Integrated into roller gate curtain
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One or two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 4000 mm
	Max. clear height	Up to 5000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.33 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Curtain	See appendix, design of roller gate curtains, page 97
Curtain	**properties**	See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection roller gate PerformanceLine® Slats

Product group/design
MSRT®-PL-L

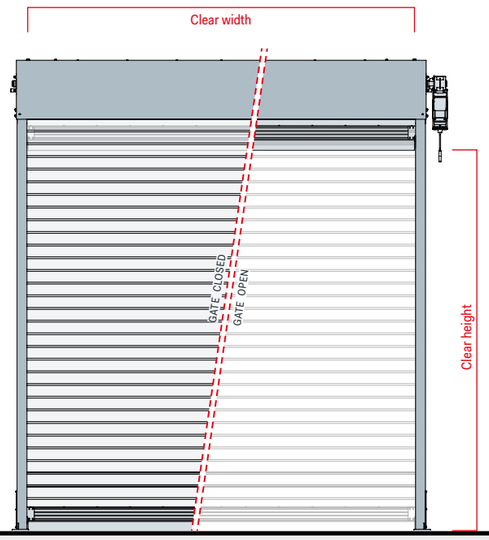
The roller gate MSRT®-PL-L has a stable and self-supporting portal structure with a precision steel tube as winding shaft and includes a frequency-controlled drive unit.

This gate can be equipped with aluminium or steel slats and is optionally available with privacy shields. Safety equipment is provided in the form of an electric safety edge on the closing edge to initiate the reversing function.

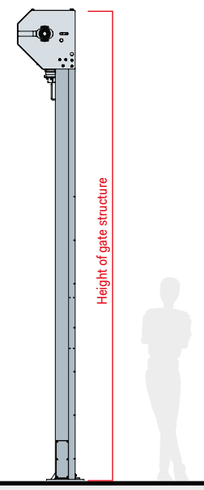
Technical data PerformanceLine® MSRT®-PL-L

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Curtain (moving part)	Aluminium or steel slats, single-walled, type BRP30, slat height = 111 mm
	Curtain end strip	Stable, cross-braced aluminium profile
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	None
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Curtain guide	Sliding guides, low-wear
	Wind protection	Provided by the rigid slat structure
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One or two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	ULD® – mechanical safety system in the transmission
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 5500 mm
	Max. clear height	Up to 5000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.18 m/s
	Opening speed	Approx. 0.18 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Curtain	See appendix, design of roller gate curtains, page 97
Curtain	**properties**	See appendix, design of roller gate curtains, page 97
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

PerformanceLine® lift gates

Brühl Safety Doors GmbH has developed a broad portfolio of machine protection lift gates in order to cater to the variety of applications that exist in practice. As a result, widths of up to 16 metres and heights of up to 7 metres can be realised within the various series. The safety equipment for power-operated lift gates from Brühl includes electromagnetic load-carrier monitoring, a visual safety edge on the closing edge and fall protection across multiple load-carriers, which comply with the standard DIN EN 12604 (Annex B).

At a glance: Advantages of PerformanceLine® lift gates

Self-supporting structure, no additional support frame required

All PerformanceLine® gates are self-supporting structures. No additional support or mounting frames are needed for free-standing installation.

Highly robust and stable thanks to steel structure

The gate header and the gate posts are composed of extremely stable welded steel structures, which means that our lift gates can be manufactured in very large sizes.

Diverse configuration options

All lift gates are available with a wide range of frame panelling and colours. The gates can be customised with contour cut-outs in all shapes and styles.

Safe drive system

The lift gates are driven by high-performance roller chains. For safety reasons, several chains are installed and they are permanently monitored by means of electric load-carrier query. Thanks to the integrated concealed counterweights, there is no risk of the gate wing falling.

Technical data PerformanceLine® lift gates

Design/gate type	Lift gate MSHT®-PL	Lift gate MSHT®-PL-XL	Lift gate MSHT®-PL-2	Lift gate MSHT®-PL-M-U	Lift gate MSHT®-PL-I	Lift gate MSHT®-PL-V	Lift gate MSHT®-PL-V-XL	Lift gate MSHT®-PL-E	Lift gate MSHT®-PL-E-U	Lift gate MSHT®-PL-E-V
Closing direction										
Downwards	×	×	×	–	×	×	×	×	–	×
Upwards	–	–	–	×	–	×	×	–	×	×
Standard sizes										
Max. clear width	9000 mm	16000 mm	5000 mm	5000 mm	6000 mm	3500 mm	6000 mm	8000 mm	8000 mm	8000 mm
Max. clear height	4000 mm	6000 mm	4000 mm	3000 mm	4000 mm	4000 mm	4000 mm	7000 mm	12000 mm	7000 mm
Max. gate wing depth	–	–	–	–	–	1000 mm	5000 mm	–	–	Variable
Ground clearance	Variable	Variable	Variable	–	–	Variable	Variable	Variable	Variable	Variable
Gate design										
With crossbar at top	×	×	×	–	×	×	×	–	–	–
Without crossbar at top	–	–	–	×	–	–	–	×	×	×
Gate passageway flush with ground	×	×	×		×	×	×	×		×
Designs of gate wings and curtains										
Number of gate wings and curtains	1	1	2	2–4	1	1	1	1	1	1
Straight design	×	×	×	×	×	–	–	×	×	–
Offset design	–	–	–	–	–	×	×	–	–	×
Speeds										
Max. closing speed	0.2 m/s	0.2 m/s	0.2 m/s	0.5 m/s	0.2 m/s	0.2 m/s	0.2 m/s	0.2 m/s	0.2 m/s	0.2 m/s
Max. opening speed	0.5 m/s	0.4 m/s	0.4 m/s	0.5 m/s	0.4 m/s	0.5 m/s	0.5 m/s	0.5 m/s	0.2 m/s	0.5 m/s
Closing edge protection										
Electric safety edge	Standard	Standard	Standard	–	Standard	Standard	Standard	Standard	Standard	Standard
Safety light barrier front-mounted	Optional	–	Optional	–	Optional	–	–	Optional	Optional	Optional
Drive unit										
Electromotive	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Pneumatic	–	–	–	Available as alternative	–	–	–	Available as alternative	Available as alternative	Available as alternative
Assembly, attachment										
Free-standing with base plate	×	×	×	×	–	×	×	×	×	×
Machine-integrated with mounting flange	–	–	–	–	×	–	–	–	–	–

Machine protection lift gate PerformanceLine® Standard

Product group/design
MSHT®-PL

PATENT-PROTECTED

Wing can extend beyond gate

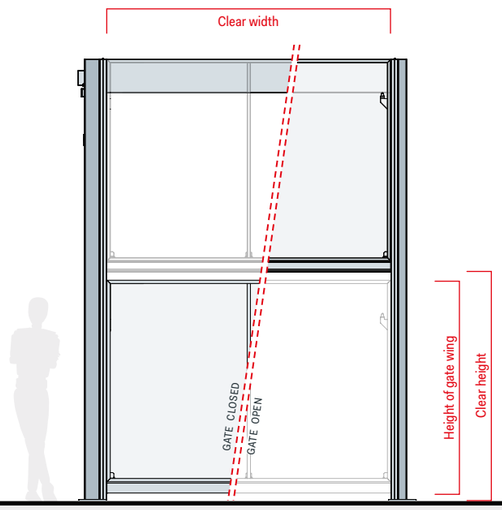
The classic machine protection lift gate MSHT®-PL , with its steel structure, is a portal that is closed at the top. Depending on the opening width, the MSHT®-PL is equipped with three to five roller chain sets and is available in widths of up to nine metres. The main closing edge is secured by an electric safety edge connected to the main frame by a trailing cable.

The gate wing can extend beyond the top of the gate portal, so extremely low installation heights can be realised. A fixed field to conceal the top of the gate is optional.

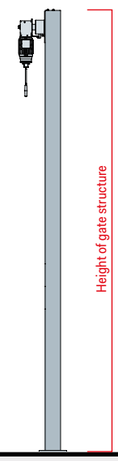
Technical data PerformanceLine® MSHT®-PL

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	Counterweights in gate posts
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Sliding guides, low-wear
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 9000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open

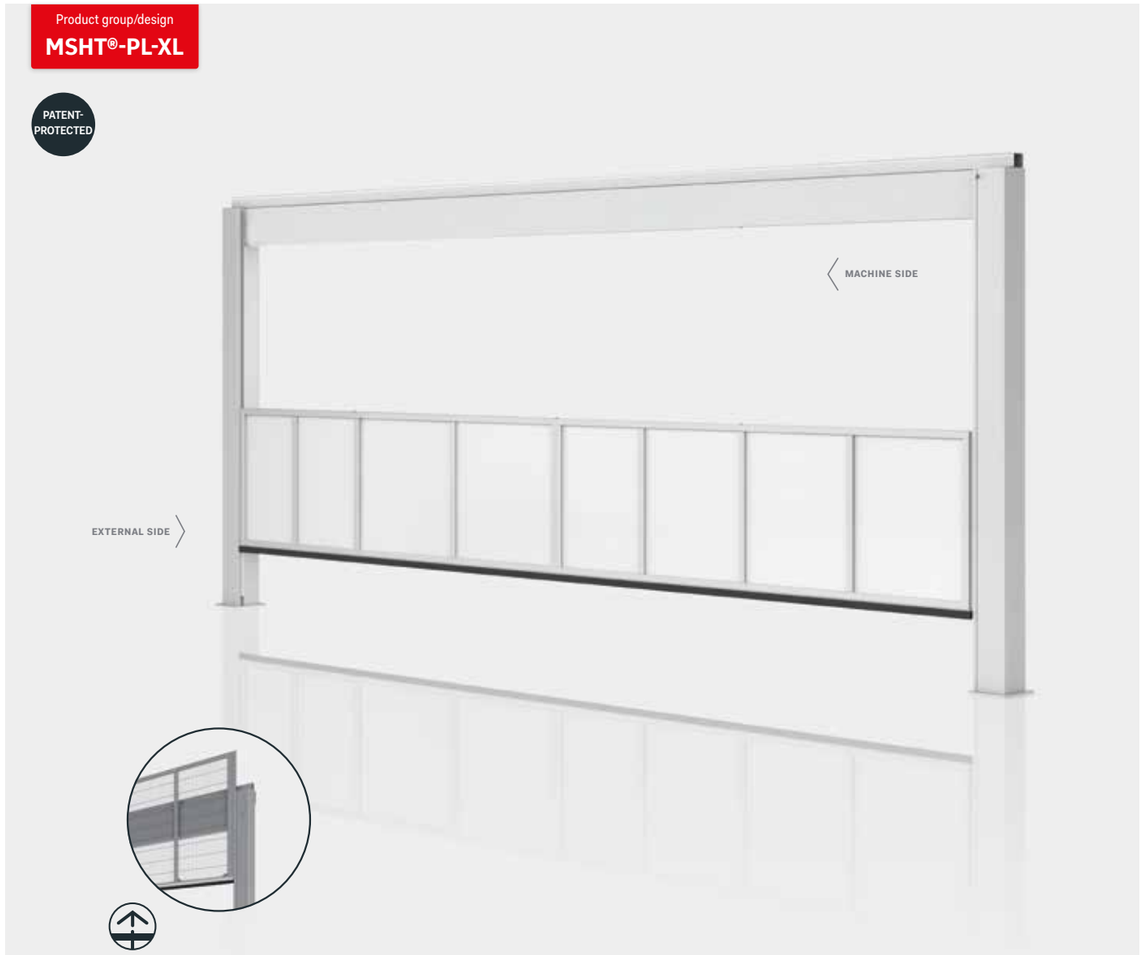


VIEW FROM LEFT

Machine protection lift gate PerformanceLine® XL

Product group/design
MSHT®-PL-XL

PATENT-PROTECTED

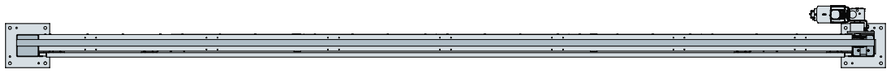


Wing can extend beyond gate

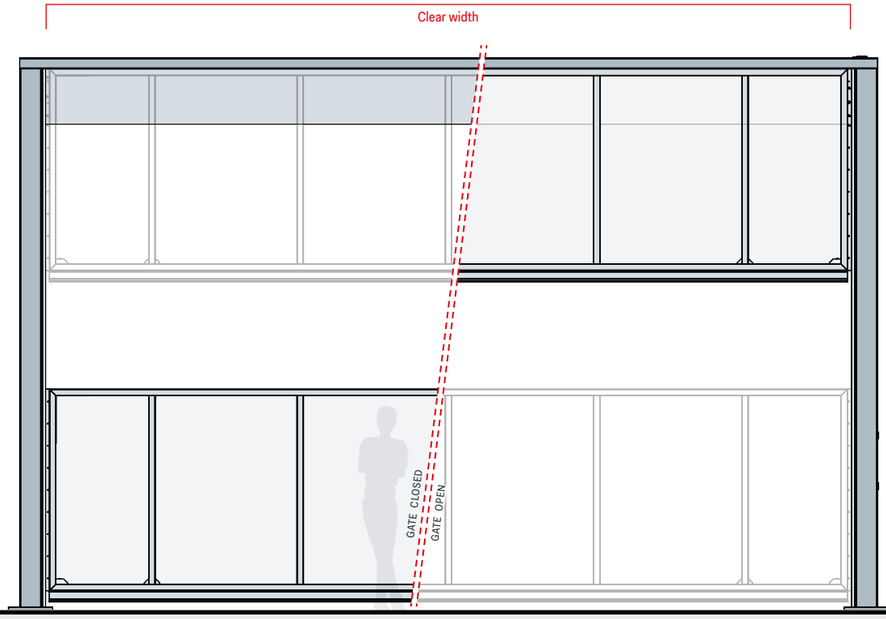
The machine protection lift gate MSHT®-PL-XL is used with clear widths of over nine metres. The lift gate comprises a steel structure with extra reinforcement designed for the elevated requirements of up to 16 metres clear width.

The main closing edge is protected by an electric safety edge connected to the main frame by a trailing cable. The gate wing can extend beyond the top of the gate portal, so extremely low installation heights can be realised. A fixed field to conceal the top of the gate is optional.

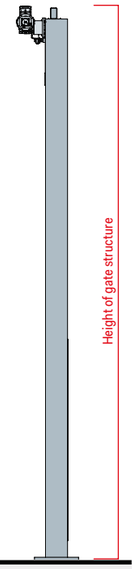
Technical data PerformanceLine® MSHT®-PL-XL		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure, possibly with additional supports
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	Counterweights in gate posts
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Sliding guides, low-wear
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 16000 mm
	Max. clear height	Up to 6000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.4 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open

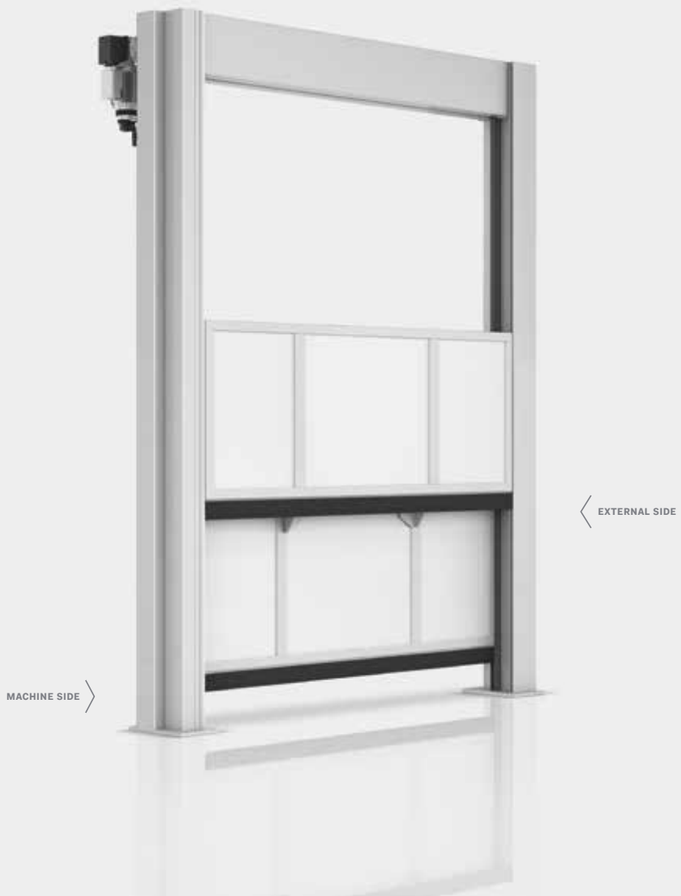


VIEW FROM LEFT

Machine protection lift gate PerformanceLine® Two wings

Product group/design
MSHT®-PL-2

PATENT-PROTECTED

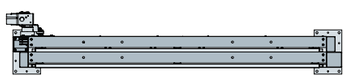


The MSHT®-PL-2 comprises a stable steel structure that forms a portal which is closed at the top. The gate has two driven wings, which open by telescoping upwards. This enables a low overall installation height and very low space requirements when open, even for large openings.

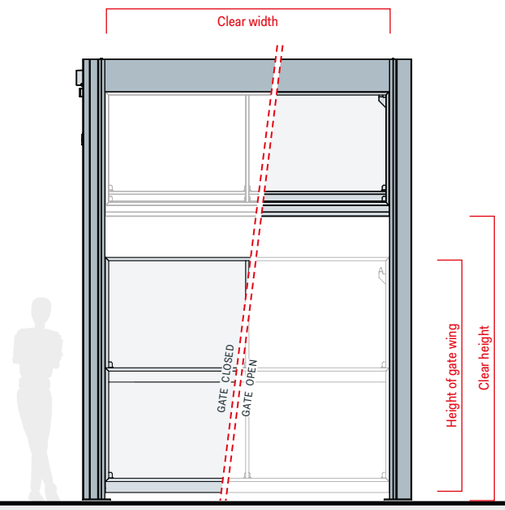
The closing edge is protected with electric safety edges connected to the main frame by trailing cables. A fixed field to conceal the top of the gate is optional.

Technical data PerformanceLine® MSHT®-PL-2

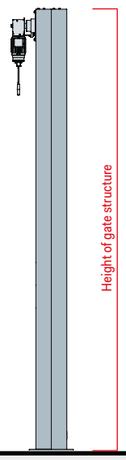
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Two gate wing steel frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake, either on left or right
	Weight compensation	Counterweights in gate posts
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Sliding guides, low-wear
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	Two safety switches, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 4000 mm
	Max. clear height	Up to 4000 mm
	Gate wing depth	–
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.4 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection lift gate PerformanceLine® Multi-wing bottom

Product group/design
MSHT®-PL-M-U

Extremely compact gate design

Upwards closing direction

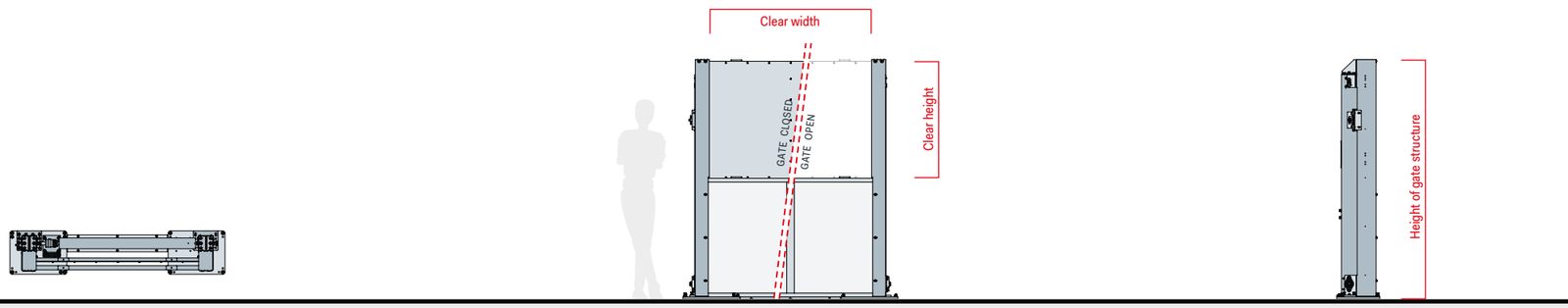
The lift gate MSHT®-PL-M-U closes upwards with two to four jointly driven gate wings. The gate comprises a stable steel structure that forms a portal without crossbar that is open at the top.

A classic application for this gate design is to partition areas between production cells with robots, e.g. to pass parts in low ground superstructures. The telescopic arrangement of the gate wings results in a comparatively low opening bottom edge with a comparatively high lift.

Alternatively, this lift gate is also available with pneumatic drive on request. This gate is only available without closing edge protection and it is used as a barrier for separating areas with no personal protection within closed safety circuits.

Technical data PerformanceLine® MSHT®-PL-M-U

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	2 to 4 gate wing steel frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	–
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Roller guides low-wear
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	None
	Standard type, closing edge protection	–
	Safety switches for closed end position	Two safety switches, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 5000 mm
	Max. clear height	Up to 3000 mm
	Gate wing depth	–
	Ground clearance	–
Speed	**Closing speed**	Approx. 0.5 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW

VIEW FROM FRONT
Shown closed and open

VIEW FROM LEFT

Machine protection lift gate PerformanceLine® Integrated

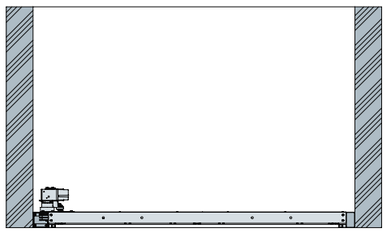
Product group/design
MSHT®-PL-I

PATENT-PROTECTED

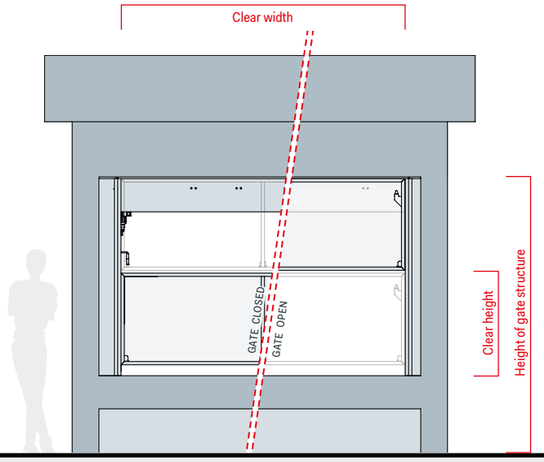
The MSHT®-PL-I is designed for integration into machines, presses and material loading and unloading stations. This design also comprises a stable steel structure that forms a portal that is closed at the top. The gate has one driven wing, which closes from top to bottom.

The closing edge is protected with an electric safety edge or optionally with a front-mounted safety light barrier. The gate has varied options for motor attachment and mounting, enabling a customised design. A fixed field to conceal the top of the gate is optional.

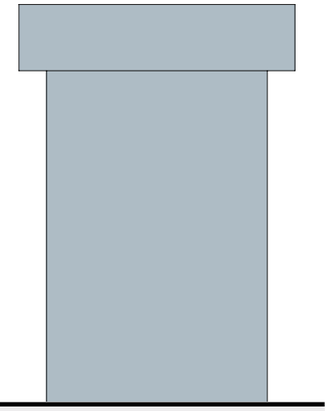
Technical data PerformanceLine® MSHT®-PL-I		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure for machine integration
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	Counterweights in gate posts
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Sliding guides, low-wear
	Assembly/installation	Floor anchoring without additional frame or suspended mounting on the machine
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 6000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.4 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open

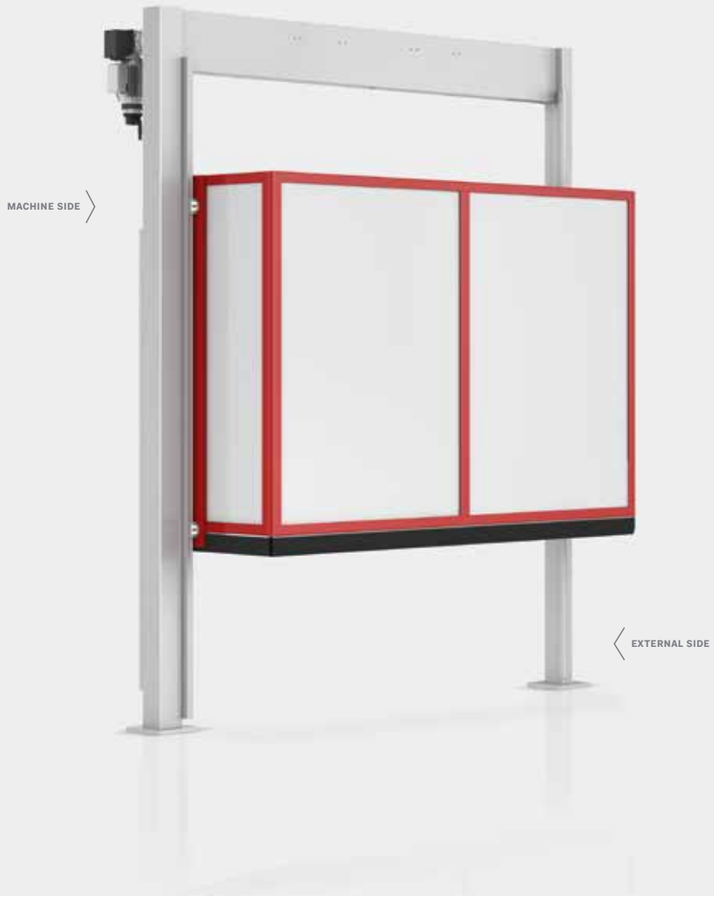


VIEW FROM LEFT

Machine protection lift gate PerformanceLine® Front-mounted

Product group/design
MSHT®-PL-V

PATENT-PROTECTED



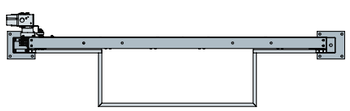
Precision linear guide

Closing direction up or down

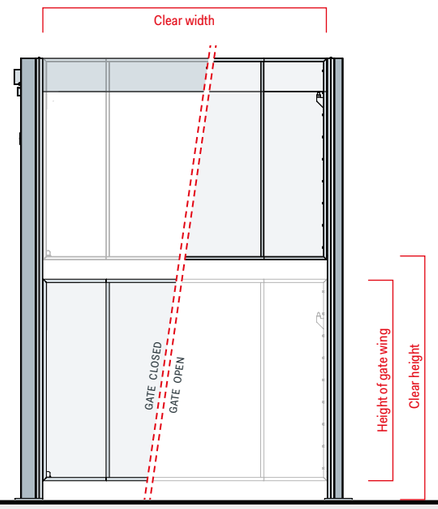
The MSHT®-PL-V is a special version of the classic lift gate MSHT®-PL. The moving gate wing is designed with three sides and extends out in front of the gate housing. The precision guides of the gate wing make it possible to design heavy gate wings with large depths. This design can be used to encase special machine parts and fixtures that need to be accessible from two or three sides, for example when the gate is open.

This design also comprises a stable steel structure that forms a portal that is closed at the top. The gate has a driven wing that closes either from top to bottom or from bottom to top. The closing edges are protected by electric safety edges.

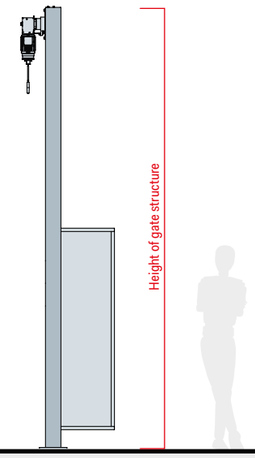
Technical data PerformanceLine® MSHT®-PL-V		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profiles, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	Counterweights in gate posts
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Precision linear guide
	Assembly/installation	Floor anchoring without additional frame or suspended mounting
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 3500 mm
	Max. clear height	Up to 4000 mm
	Gate wing depth	Up to 1000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection lift gate PerformanceLine® Front-mounted XL

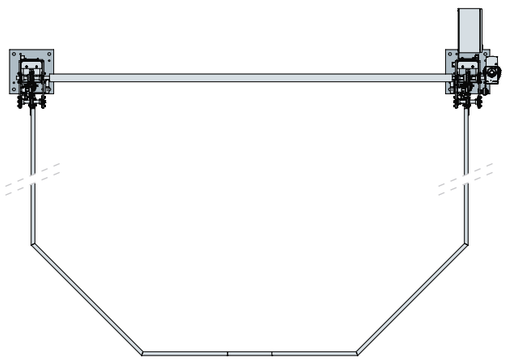
Product group/design
MSHT®-PL-V-XL

Optionally heat-resistant

Closing direction up or down

The MSHT®-PL-V-XL is another lift gate design with a three-sided gate wing that extends in front of the gate housing. The precision guides make it possible to design heavy gate wings with especially large depths. This design can be used to encase special machine parts and fixtures that need to be accessible from two or three sides, for example when the gate is open.

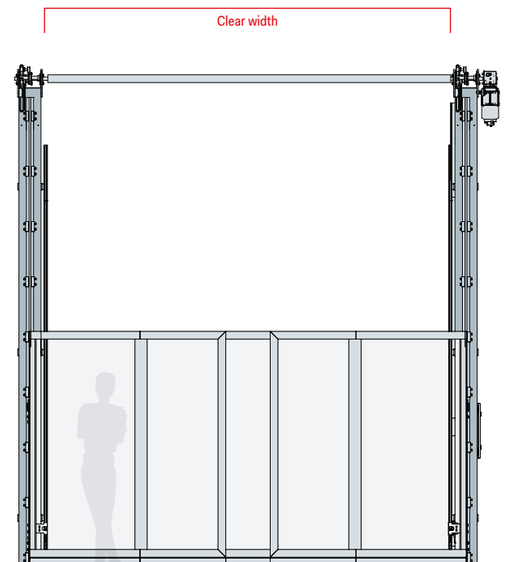
This design also comprises a stable steel structure that forms a portal that is closed at the top. The gate has a continuous or a vertically divided wing that closes either from top to bottom or from bottom to top. The closing edges are protected by electric safety edges.



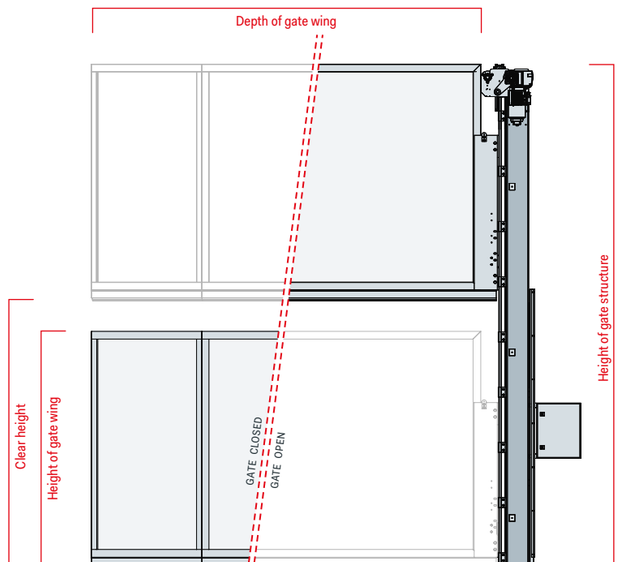
PLAN VIEW

Technical data PerformanceLine MSHT®-PL-V-XL

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profiles, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	Counterweights in gate posts
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Precision linear guide
	Assembly/installation	Floor anchoring without additional frame or suspended mounting
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 6000 mm
	Max. clear height	Up to 4000 mm
	Gate wing depth	Up to 5000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



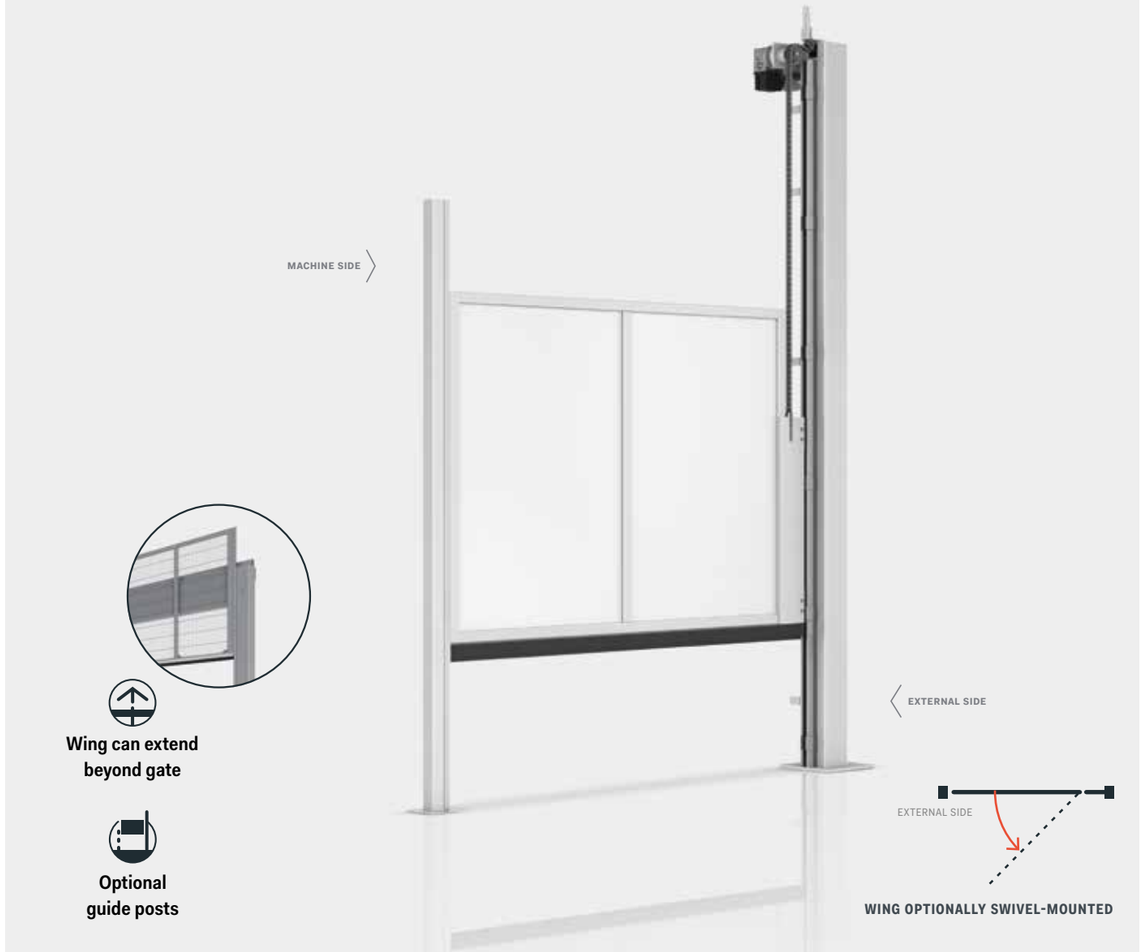
VIEW FROM FRONT



VIEW FROM LEFT
Shown closed and open

Machine protection lift gate PerformanceLine® Single-sided

Product group/design
MSHT®-PL-E

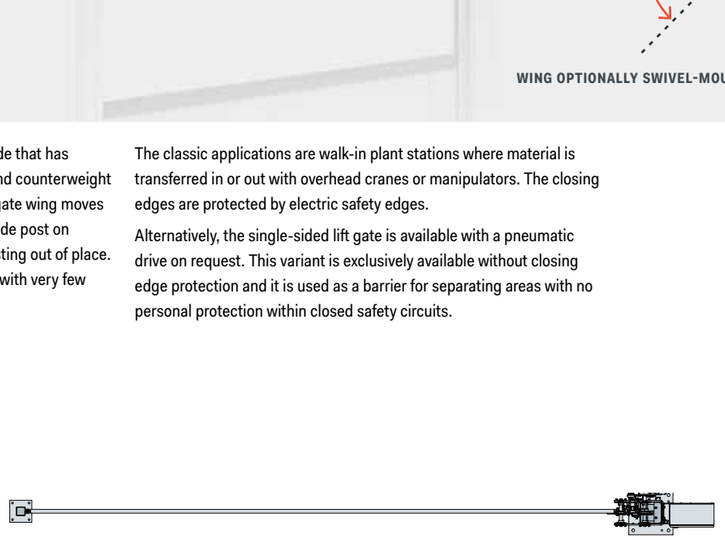


The MSHT®-PL-E is a lift gate driven from a single side that has various uses in production plants. The entire drive and counterweight unit is located in one single main post. The moving gate wing moves along this gate post in linear guides, with a small guide post on the opposite side preventing the gate wing from twisting out of place. This concept results in a highly compact guard gate with very few fixed parts and with no obstructive crossbars.

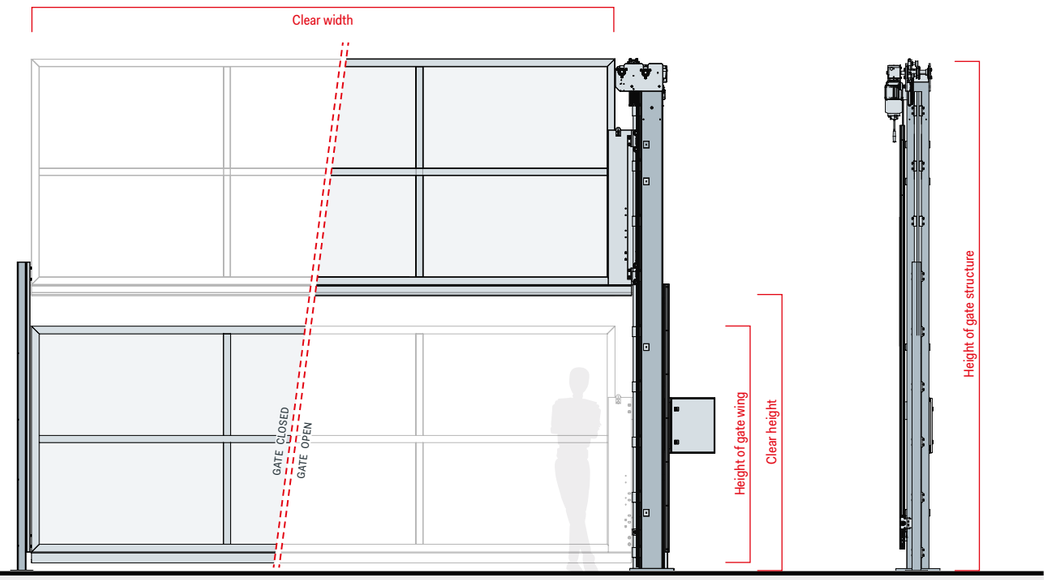
The classic applications are walk-in plant stations where material is transferred in or out with overhead cranes or manipulators. The closing edges are protected by electric safety edges.

Alternatively, the single-sided lift gate is available with a pneumatic drive on request. This variant is exclusively available without closing edge protection and it is used as a barrier for separating areas with no personal protection within closed safety circuits.

Technical data PerformanceLine® MSHT®-PL-E		
Features	**Gate design (stationary part)**	Self-supporting, robust steel posts
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	Counterweight in main post
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Guide rail or precision linear guide
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 8000 mm
	Max. clear height	Up to 7000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW



VIEW FROM FRONT
Shown closed and open

VIEW FROM LEFT

Machine protection lift gate PerformanceLine® Single-sided, bottom

Product group/design
MSHT®-PL-E-U

Upwards closing direction

Optional guide posts

The MSHT®-PL-E-U is a lift gate that is driven from a single side and that closes from bottom to top. The entire drive and counterweight unit is located in one single main post. The moving gate wing moves along this post in linear guides, with an optional guide post on the opposite side preventing the gate wing from twisting out of place. This concept results in a highly compact guard gate with very few fixed parts and with no obstructive crossbars.

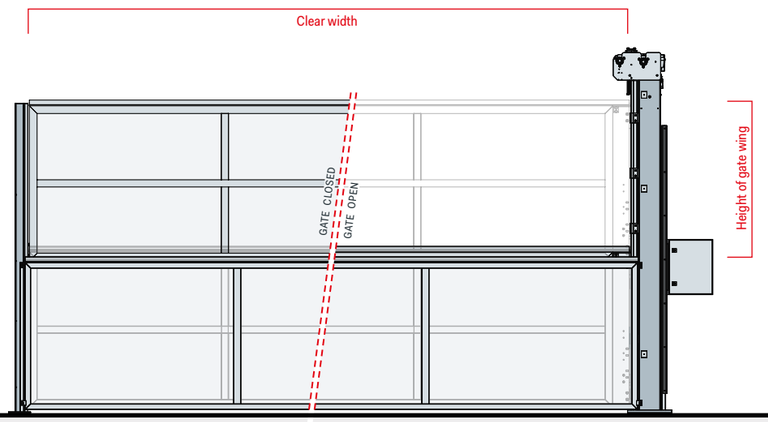
The classic applications are walk-in plant stations where material is transferred in or out with overhead cranes or manipulators. The closing edges are protected by electric safety edges.

Alternatively, the single-sided lift gate is available with a pneumatic drive on request. This variant is exclusively available without closing edge protection and it is used as a barrier for separating areas with no personal protection within closed safety circuits.

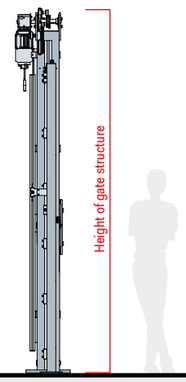
Technical data PerformanceLine® MSHT®-PL-E-U

Features	**Gate design (stationary part)**	Self-supporting, robust steel posts
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	Counterweight in main post
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Guide rail or precision linear guide
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 8000 mm
	Max. clear height	Up to 12000 mm
	Gate wing depth	–
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.2 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PLAN VIEW



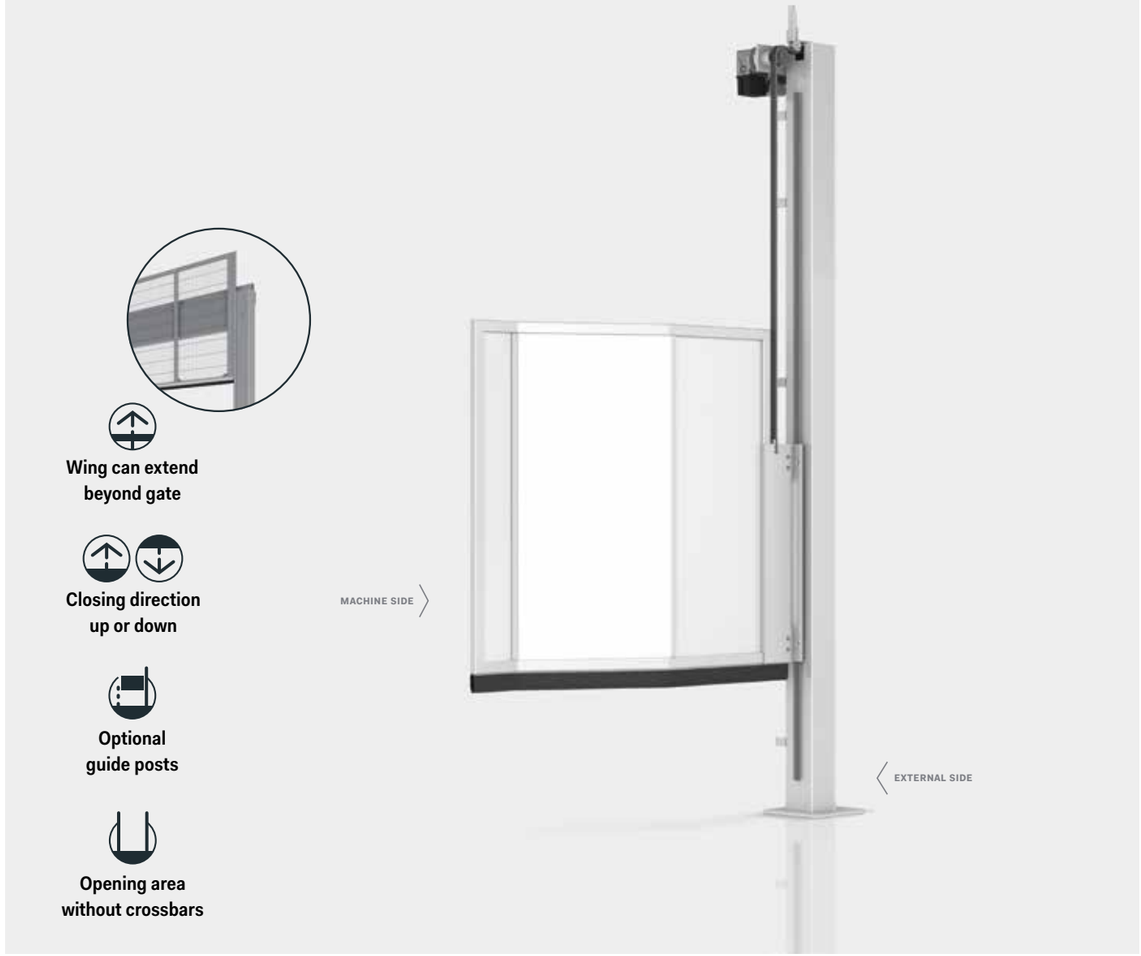
VIEW FROM FRONT
Shown closed and open
Drawing shows optional guide posts.



VIEW FROM LEFT

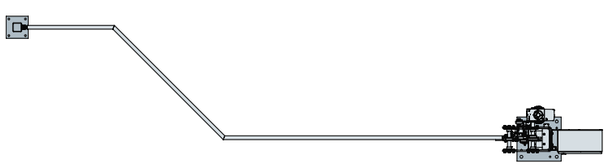
Machine protection lift gate PerformanceLine® Single-sided offset wing

Product group/design
MSHT®-PL-E-V

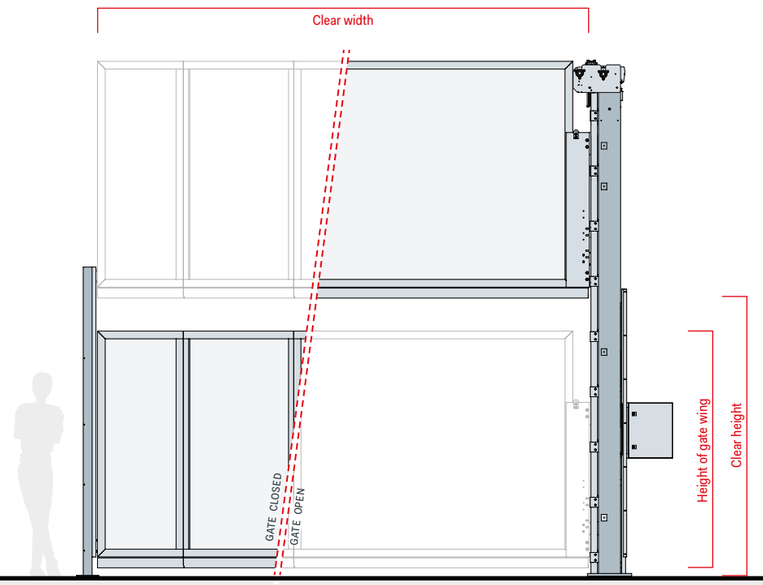


The MSHT®-PL-E-V is a special version of the single-sided lift gate MSHT®-PL-E. The entire drive and counterweight unit is located in one single main post. The moving gate wing moves along this post in linear guides, with an optional guide post on the opposite side preventing the gate wing from twisting out of place. This concept results in a highly compact guard gate with very few fixed parts and with no obstructive crossbars.

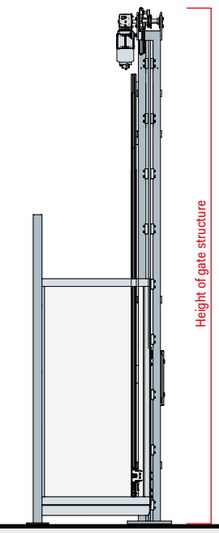
The customisable design of the offset gate wing contour enables use in stations with particularly limited space. The classic applications are walk-in plant stations where material is transferred in or out with overhead cranes or manipulators. The gate has a driven wing that closes either from top to bottom or from bottom to top. The closing edges are protected by electric safety edges.



PLAN VIEW



VIEW FROM FRONT
Shown closed and open
Drawing shows optional guide posts.



VIEW FROM LEFT

Technical data PerformanceLine® MSHT®-PL-E-V		
Features	**Gate design (stationary part)**	Self-supporting, robust steel posts
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profiles, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Weight compensation	Counterweight in main post
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Precision linear guide
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edges, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Fall protection device	Counterweights, multiple load-carriers, electric load-carrier monitoring
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 8000 mm
	Max. clear height	Up to 7000 mm
	Ground clearance	Variable
Speed	**Closing speed**	Approx. 0.2 m/s
	Opening speed	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PerformanceLine® sliding gates

Brühl Safety Doors GmbH supplies a wide range of machine protection sliding gates for the diverse requirements of machinery and plants. As a result, widths of up to 6 metres and heights of up to 4.8 metres can be realised within the various series. Sliding gates generally tend to have extremely low heights, and they are thus ideal for confined height conditions. As safety equipment for power-operated sliding gates from Brühl, electric safety edges are used on the closing edges, with front-mounted safety light barriers available as an option.

At a glance: Advantages of PerformanceLine® sliding gates and swing gates

Self-supporting structure, no additional support frame required

All PerformanceLine® gates are self-supporting structures. No additional support or mounting frames are needed for free-standing installation.

Highly robust and stable thanks to steel structure

The gate header and the gate posts are composed of extremely stable welded steel structures, which means that our sliding gates can be manufactured in very large sizes.

Diverse configuration options

All sliding gates are available with a wide range of frame panelling and colours. The gates can be customised with contour cut-outs in all shapes and styles.

Technical data PerformanceLine® Sliding and swing gates

Design/gate type	Sliding gate MSST®-PL	Sliding gate MSST®-PL-M	Sliding gate MSST®-PL-D	Sliding gate MSST®-PL-B	Sliding gate MSST®-PL-F	Sliding gate MSST®-PL-2-F	Swing gate MSDT-PL	Swing gate MSDT-PL-D
Closing direction								
To the left or right	×	×	–	–	×	×	×	–
To the left and right	–	–	–	×	–	–	–	–
Both sides to centre	–	–	×	–	–	–	–	×
Standard sizes								
Max. clear width	10000 mm	10000 mm	4000 mm	4000 mm	7000 mm	5000 mm	3000 mm	6000 mm
Max. clear height	4000 mm	4000 mm	4000 mm	4000 mm	4800 mm	3000 mm	3000 mm	3000 mm
Ground clearance	175 mm	175 mm	175 mm	175 mm	175 mm	175 mm	175 mm	175 mm
Gate design								
With crossbar at top	×	×	×	×	–	–	–	–
Without crossbar at top	–	–	–	–	×	×	×	×
Design of gate wing								
Number of gate wings	1	2–4	2	2	1	2	1	2
Drive unit								
Number of drives, electromotive	1	1	1	2	1	1	1	2
Speeds								
Max. closing speed	0.33 m/s	0.33 m/s	0.33 m/s	0.33 m/s	0.33 m/s	0.33 m/s	NA dependent on gate wing width	NA dependent on gate wing width
Max. opening speed (without opposing closing safety edge)	0.33 m/s	0.5 m/s	0.5 m/s	0.33 m/s	0.5 m/s	0.5 m/s	NA dependent on gate wing width	NA dependent on gate wing width
Closing edge protection								
Electric safety edge	Standard	Standard	Standard	Standard	Standard	Standard	–	–
Mech. friction disc coupling	–	–	–	–	–	–	Standard	Standard
Safety light barrier front-mounted	Optional	Optional	Optional	Optional	Optional	Optional	–	–

Machine protection sliding gate PerformanceLine® Standard

Product group/design
MSST®-PL

PATENT-PROTECTED

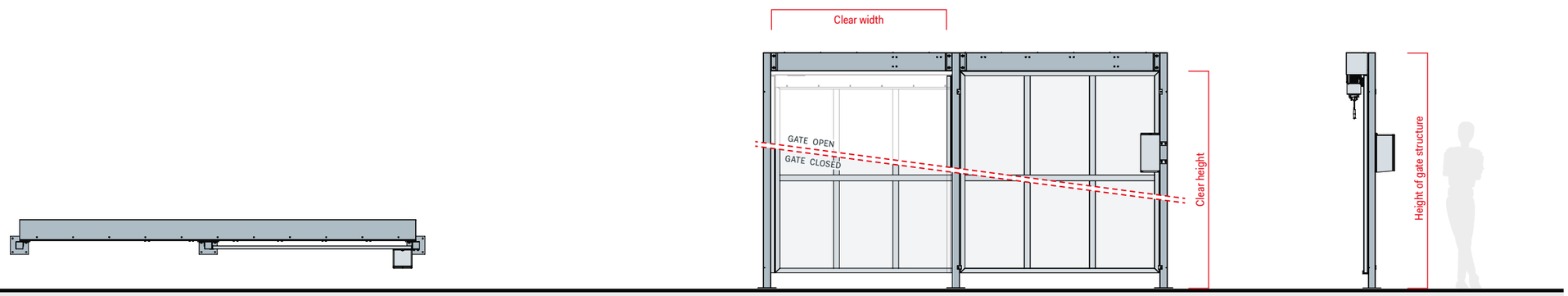
The sliding gate MSST®-PL Standard comprises a stable steel structure that forms a portal that is closed at the top. Both the drive unit with gear motor and roller chain and the safety switch are located entirely in the gate header.

The sliding gate is available in a left-opening and a right-opening version. With its three base plates, the gate has an extremely stable footing on the ground and can be produced with a clear width of up to four metres.

The main closing edge is protected by an electric safety edge connected to the main frame by a cable carrier.

Technical data PerformanceLine® MSST®-PL

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Guide rail
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 10000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	Approx. 0.33 m/s
	Max. opening speed (without opposing closing safety edge)	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW

VIEW FROM FRONT
Shown closed and open

VIEW FROM LEFT

Machine protection sliding gate PerformanceLine® Multi-wing

Product group/design
MSST®-PL-M

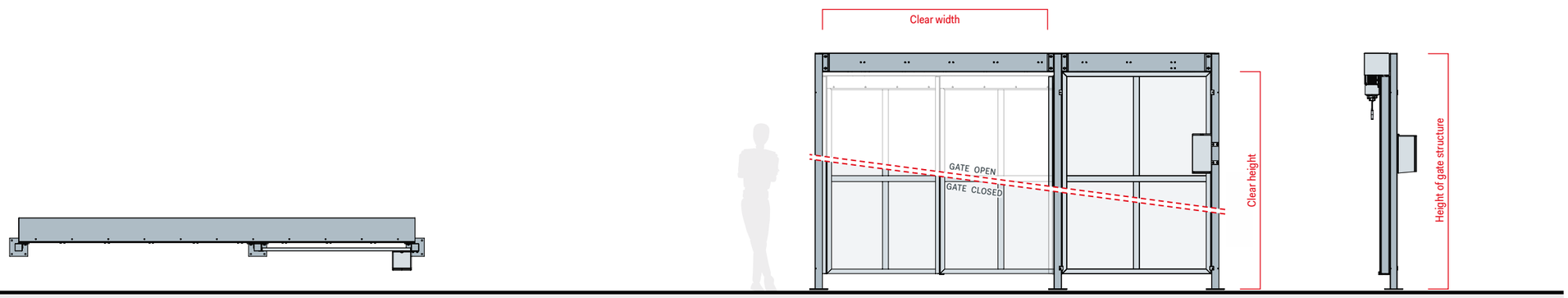
PATENT-PROTECTED

The sliding gate MSST®-PL-M is the multi-wing version of the MSST®-PL. It is mainly used in confined space conditions and is also available in a left-closing and a right-closing version. The telescopic gate wings enable large opening widths combined with low overall installation widths.

The main closing edge is protected by an electric safety edge connected to the main frame by a cable carrier.

Technical data PerformanceLine® MSST®-PL-M

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	2–4 gate wing steel frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Guide rail
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 10000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	Approx. 0.33 m/s
	Opening speed (without opposing closing safety edge)	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW

VIEW FROM FRONT
Shown closed and open

VIEW FROM LEFT

Machine protection sliding gate PerformanceLine® Double

Product group/design
MSST®-PL-D

PATENT-PROTECTED

RIGHT- AND LEFT-OPENING

RIGHT- AND LEFT-OPENING, FOUR-WING

The sliding gate MSST®-PL-D closes with two opposing gate wings from the left and the right towards the centre of the opening. Its steel structure forms a portal that is closed at the top and that has an extremely stable footing on the ground thanks to the four base plates. This means that a clear width of up to four metres can be provided.

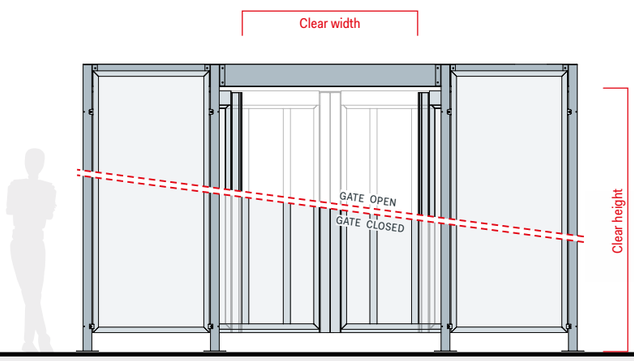
Both the drive unit with gear motor and roller chain and the safety switch are located entirely in the gate header. Any ground clearance can be chosen, within the standard requirements.

The main closing edges are protected by electric safety edges connected to the main frame by cable carriers. The sliding gate is available with multiple wings on request.

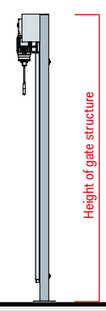
Technical data PerformanceLine® MSST®-PL-D

Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Two gate wing steel frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profiles, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Guide rail
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Two safety edges, electric
	Safety switches for closed end position	Two safety switches, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 4000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	Approx. 0.33 m/s
	Opening speed (without opposing closing safety edge)	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection sliding gate PerformanceLine® Double-sided

Product group/design
MSST®-PL-B

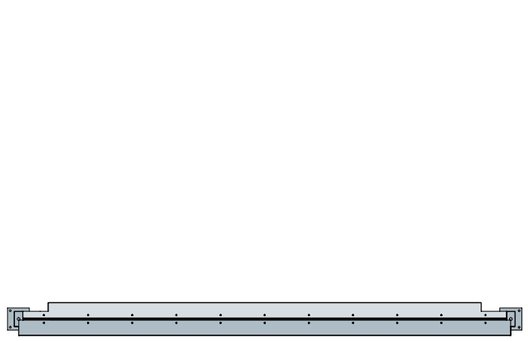
PATENT-PROTECTED

FRONT WING LEFT-OPENING **FRONT WING RIGHT-OPENING**

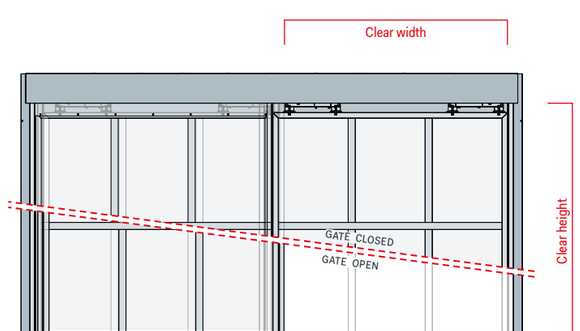
The double-sided sliding gate MSST®-PL-B is equipped with two gate wings that can be moved separately by two separate drive units. As a result, the left and the right gate opening can be opened and closed independently. With the continuous gate header girder, the gate forms a portal that is closed at the top. The drive units with gear motors, roller chains and the safety switches are all equipped inside the gate header. With the four base plates, the gate has a stable footing on the ground and any ground clearance can be configured, within the standard requirements.

The main closing edges are protected by electric safety edges connected to the main frame by cable carriers.

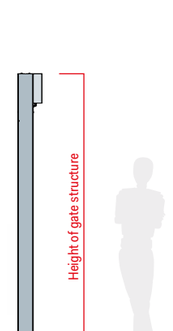
Technical data PerformanceLine® MSST®-PL-B		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Two gate wing steel frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profiles, quick-change
	Drive unit	Two three-phase gear motors with electromechanical holding brakes
	Limit switch	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Guide rail
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	Two safety switches, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 4000 mm
	Max. clear height	Up to 4000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	Approx. 0.33 m/s
	Opening speed (without opposing closing safety edge)	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82



PLAN VIEW



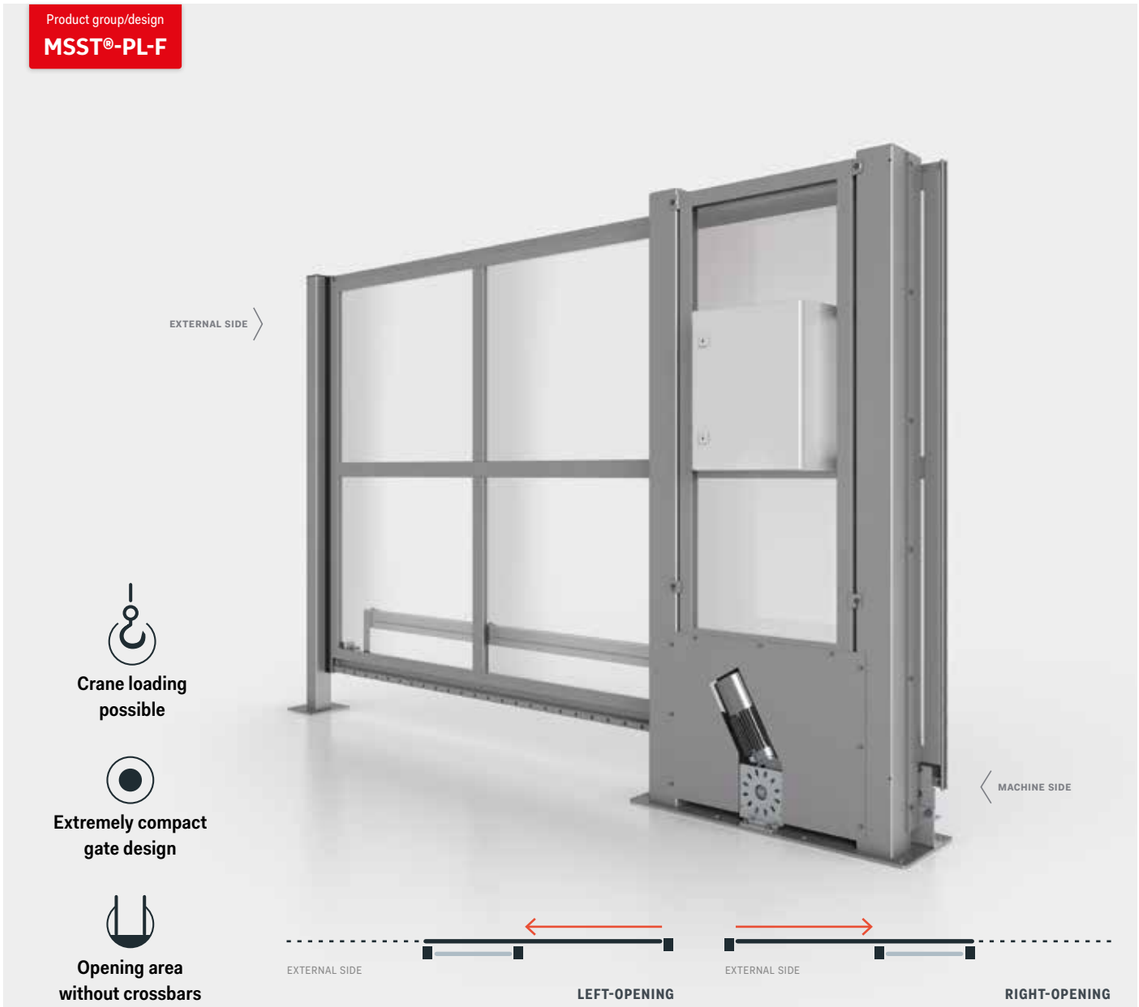
VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection sliding gate PerformanceLine® Self-supporting

Product group/design
MSST®-PL-F

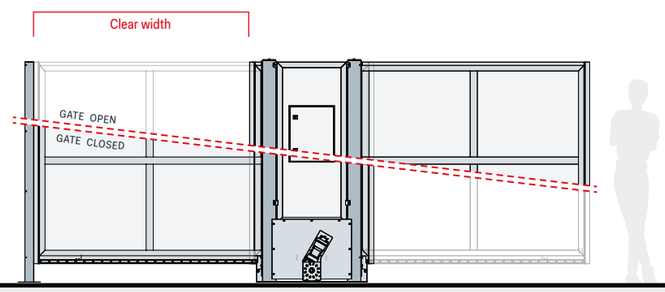


The self-supporting sliding gate MSST®-PL-F is an extremely compact sliding gate design with no portal frame. Both the drive unit with gear motor and roller chain and the safety switch are located entirely in the gate base. The sliding gate is available in a left-opening and a right-opening version and with an opening width of up to seven metres. Widths of up to 14 metres are possible if two self-supporting sliding gates are placed in an opposing arrangement. With its structure without a portal, this gate design is the perfect solution for securing walk-in plant stations with crane or manipulator loading.

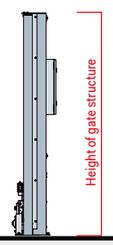
The main closing edge is protected by an electric safety edge connected to the main frame by a cable carrier. Optionally, the rear auxiliary closing edge can be equipped with an additional electric safety edge.

Technical data PerformanceLine® MSST®-PL-F		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profile, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Precision linear guide
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edge, electric
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 7000 mm (up to 14000 mm for two gates in an opposing arrangement)
	Max. height of gate structure	Up to 4800 mm
	Ground clearance	175 mm
Speed	**Closing speed**	Approx. 0.33 m/s
	Opening speed (without opposing closing safety edge)	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open

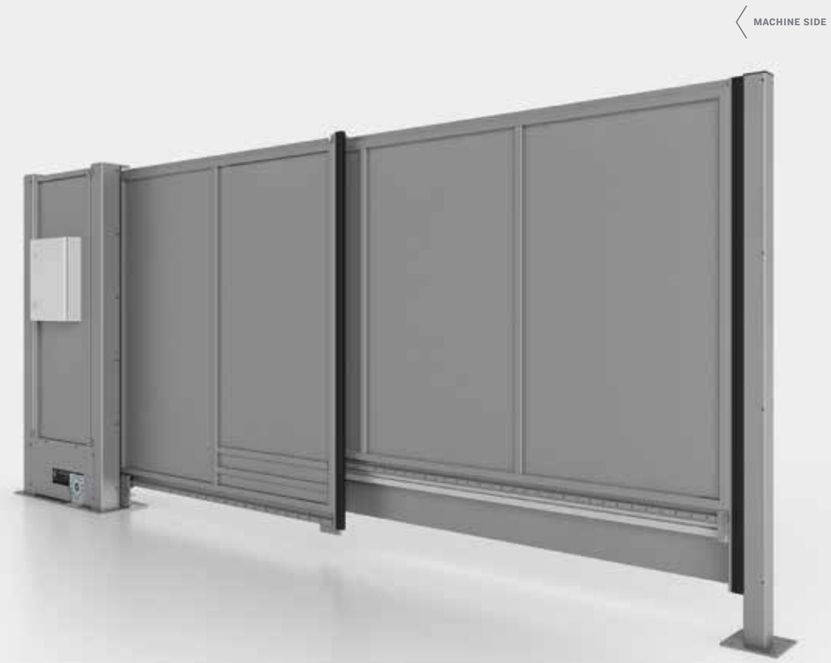


VIEW FROM LEFT

Machine protection sliding gate PerformanceLine® Two wings, (...)

(...) self-supporting

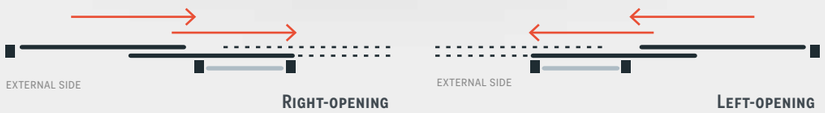
Product group/design
MSST®-PL-2-F



Crane loading possible

Extremely compact gate design

Opening area without crossbars



The self-supporting sliding gate MSST®-PL-2-F is the two-wing variant of the sliding gate MSST®-PL. This gate is an extremely compact sliding gate design with no portal frame. With its telescoping gate wings, a large closing area is formed, combined with compact dimensions in an open state. Both the drive unit with gear motor and roller chain and the safety switch are located entirely in the gate base.

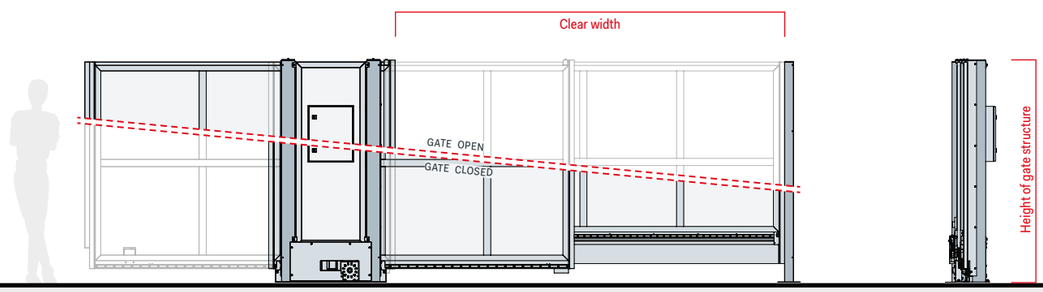
The sliding gate is available in a left-opening and a right-opening version and with a width of up to five metres.

With its structure without a portal, this gate design is the perfect solution for securing walk-in plant stations with crane or manipulator loading.

The main closing edges are protected by electric safety edges connected to the main frame of the gate by cable carriers. Optionally, the rear auxiliary closing edges are available with electric safety edges.

Technical data PerformanceLine® MSST®-PL-2-F		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Two gate wing steel frame with panelling of your choice
	Main closing edge	EPDM rubber hollow profiles, quick-change
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Position sensors	PCS® – absolute rotary encoder integrated into drive unit
	Gate wing guide	Precision linear guides
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Optionally with or without
	Standard type, closing edge protection	Safety edges, electric
	Safety switches for closed end position	Two safety switches, touchless, coded PLe/SIL 3
	Emergency opening	ECH® – detachable crank handle, electr. monitored
Standard sizes	**Max. clear opening width**	Up to 5000 mm (up to 10000 mm for two gates in an opposing arrangement)
	Max. height of gate structure	Up to 3000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	Approx. 0.33 m/s
	Opening speed (without opposing closing safety edge)	Approx. 0.5 m/s
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		See section on gate controllers, from page 82

PLAN VIEW



VIEW FROM FRONT
Shown closed and open

VIEW FROM LEFT

Machine protection swing gate PerformanceLine® Standard

Product group/design
MSDT-PL

Crane loading possible

Mechanical interlock

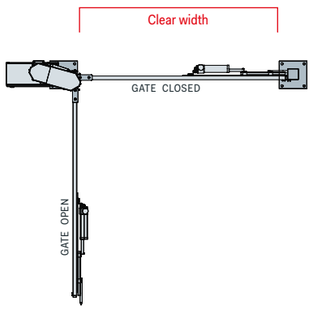
RIGHT-OPENING **LEFT-OPENING**

The swing gate MSDT-PL essentially consists of a gate post and a gate wing that pivots 90 degrees horizontally. Both the drive unit with gear motor and the position sensor and safety switch are mounted centrally on the gate post.

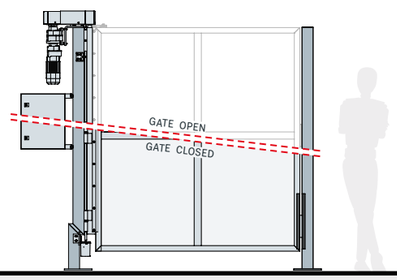
The gate is attached on the left or the right side, depending on the model, and provides unimpaired access to the machine area as it is designed without an obstructive portal. It is thus the perfect solution for securing walk-in plant stations with crane or manipulator loading.

The closing edge is protected by a mechanical friction disc coupling in the drive unit.

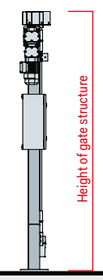
Technical data PerformanceLine® MSDT-PL		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Steel gate wing frame with panelling of your choice
	Main closing edge	Tubular steel surface
	Drive unit	Three-phase gear motor with electromechanical holding brake
	Limit switch	PCS® – absolute rotary encoder mounted separately
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Friction disc coupling in the gate wing drive unit
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
Standard sizes	**Max. clear opening width**	Up to 3000 mm
	Max. height of gate structure	Up to 3000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	NA – dependent on gate wing width
	Opening speed	NA – dependent on gate wing width
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		TCT®-FST-75-S



PLAN VIEW



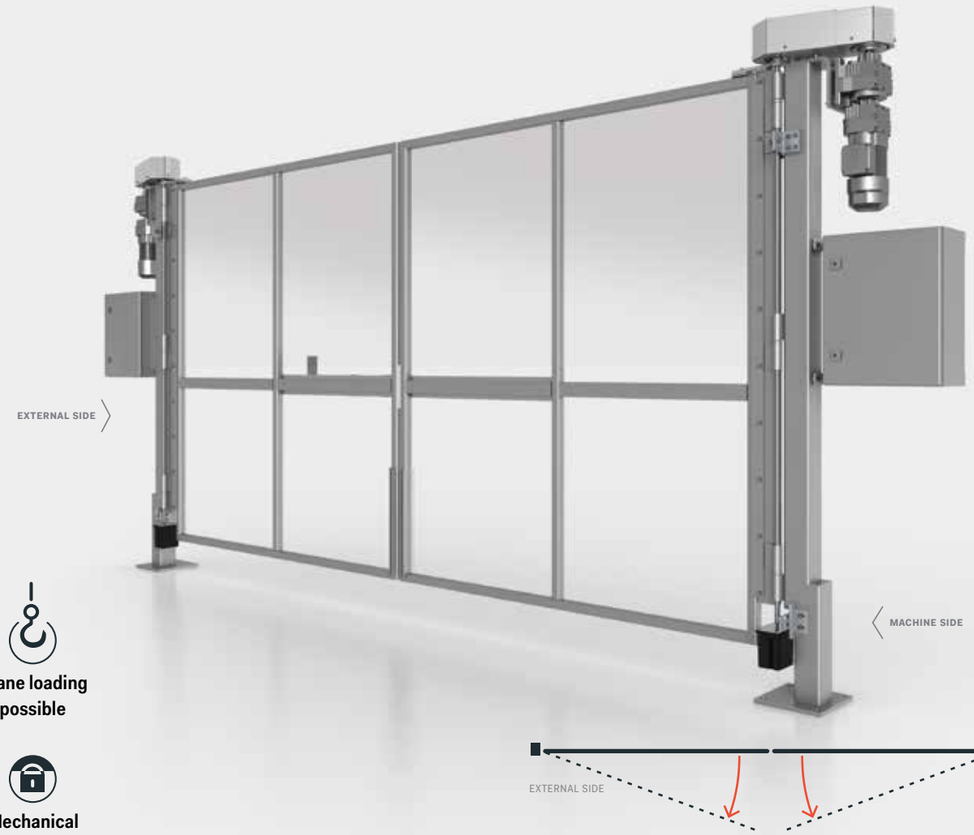
VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Machine protection swing gate PerformanceLine® Double

Product group/design
MSDT-PL-D



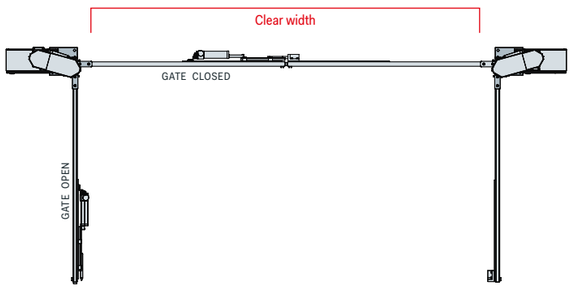
RIGHT- AND LEFT-OPENING

The swing gate MSDT-PL-D comprises two single-wing gates of the type MSDT-PL in a mirrored arrangement. The two halves of the gate are equipped with separate drive units and sensors, making it possible to open and close the two gate wings independently.

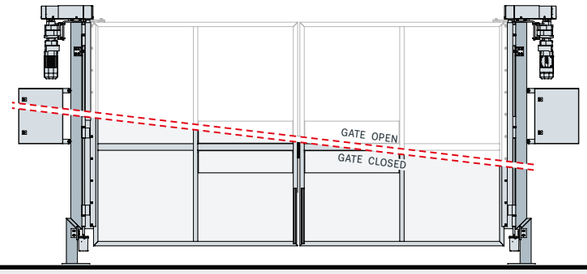
Both the drive units and the position sensor and safety switch are mounted centrally on the gate post. The gate provides unimpaired access to the machine area as it is designed without an obstructive portal. It thus provides the perfect solution for securing walk-in plant stations with crane or manipulator loading.

The closing edges are protected by mechanical friction disc couplings in the drive units.

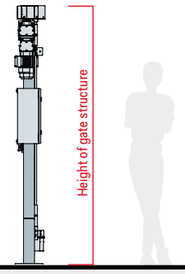
Technical data PerformanceLine® MSDT-PL-D		
Features	**Gate design (stationary part)**	Self-supporting, robust steel structure
	Gate wing (moving part)	Two gate wing steel frame with panelling of your choice
	Main closing edge	Tubular steel surfaces
	Drive unit	Two three-phase gear motors with electromechanical holding brakes
	Limit switch	Two PCS® – absolute rotary encoders mounted separately
	Assembly/installation	Fastened to floor, no additional frame
Safety equipment	**Closing edge protection**	Friction disc couplings in both gate wing drive units
	Safety switches for closed end position	One safety switch, touchless, coded PLe/SIL 3
Standard sizes	**Max. clear opening width**	Up to 6000 mm
	Max. height of gate structure	Up to 3000 mm
	Ground clearance	175 mm
Speed	**Closing speed**	NA – dependent on gate wing width
	Opening speed	NA – dependent on gate wing width
Colouring	**Gate structure**	Powder-coated, any colour
	Gate wing	See appendix, design of gate wings, page 96
Gate wing properties		See appendix, design of gate wings, page 96
Control		TCT®-FST-75-S



PLAN VIEW



VIEW FROM FRONT
Shown closed and open



VIEW FROM LEFT

Controls and accessories

Controls determine the safety of power-operated gates. At Brühl we therefore apply the same high quality standards to our gate controllers as for the machine protection gates. We always supply suitable gate controllers for our wide variety of gate variants, perfectly adjusted to suit the particular application. This means that you receive a machine protection gate with controller as a ready-to-use unit from a single supplier, all “Made in Germany”.

Standard product characteristics
for all Brühl gate controllers

Convenient maintenance
All controllers in the housing with integrated maintenance switch. Electronics in the housing can be changed.

Housing variants
Various designs available: Sheet steel or plastic housing.

PLC interface
Interface for external control (PLC interface) integrated.

PLASTIC HOUSING

SHEET STEEL HOUSING

Large selection
The right controller for any application.

Intermediate positions
Integrated as standard and positionable.

Documentation
With EPLAN for control integration into existing system.

Optional connectors
For power supply, motor connection and PLC interface.

Accessories
A wide range of accessories can be connected.

User-friendliness
Control buttons and display integrated, automatic teach and learn functions.

Top safety features
Certified functional safety features up to PLe to EN ISO 13489-1

Frequency regulation
For dynamic travel performance, gentle on material

Selection criteria standard controllers

Type	TCT®-FUF2	TCT®-FUF2-S	TCT®-FU3F	TCT®-FU3F-S	TCT®-FU3F-UL	TCT®-FU3F-PNS
Mains connection						
Single-phase	×	×	–	–	–	–
Three-phase	–	–	×	×	×	×
Mains voltage range	110–240 VAC +/-10 %	110–240 VAC +/-10 %	200–480 VAC +/-10 %	200–480 VAC +/-10 %	200–480 VAC +/-10 %	200–480 VAC +/-10 %
Mains frequency range	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Motor connection						
Max. power	1.5 kW	1.5 kW	2.2 kW	2.2 kW	2.2 kW	2.2 kW
Max. output current	8 A	8 A	5 A	5 A	5 A	5 A
Duty cycle	100%	100%	100%	100%	100%	100%
Motor brake connection						
24 VDC electronically monitored	×	×	×	×	×	×
PLC interface						
24 V signals on terminal connection	×	×	×	×	×	–
Industrial bus*	–	–	–	–	–	Profinet-safe
Connections for external peripherals						
Digital inputs and outputs 24 VDC	Plug-in terminal	Plug-in terminal	Plug-in terminal	Plug-in terminal	Plug-in terminal	Plug-in M12
Digital inputs fail-safe 24 VDC	–	–	–	–	–	Plug-in M12
IO-Link ports	–	–	–	–	–	Plug-in M12
24 VDC supply for ext. peripherals	Plug-in terminal	Plug-in terminal	Plug-in terminal	Plug-in terminal	Plug-in terminal	Plug-in M12
Safety						
Emergency stop function (STOP)	Cat.3 PLe/SIL3	Cat.3 PLe/SIL3	Cat.3 PLe/SIL3	Cat.3 PLe/SIL3	Cat.3 PLe/SIL3	Cat.3 PLe/SIL3
Evaluation, safety edges 8k2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2
Evaluation, safety systems OSE	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2
Evaluation, intelligent gate line light barrier	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2	Cat. 2 PLd/SIL2
Operation						
Maintenance switch	×	×	×	×	×	×
Plain text display 2 × 20 characters	×	×	×	×	×	×
Keypad (OPEN/STOP/CLOSE)	×	×	×	×	×	×
Password protection, parameter menu	×	×	×	×	×	×
Real-time clock	×	×	×	×	×	×
USB port	×	×	×	×	×	×
Housing design						
Plastic (IP65)	×	–	×	–	–	–
Sheet steel (IP66)	–	×	–	×	×	×
Dimensions						
Width	210 mm	300 mm	210 mm	300 mm	300 mm	300 mm
Height	420 mm	400 mm	420 mm	400 mm	400 mm	400 mm
Depth	205 mm	200 mm	205 mm	200 mm	200 mm	200 mm
Permissible ambient conditions						
Temperature range	-20–50 °C	-20–50 °C	-20–50 °C	-20–50 °C	-20–50 °C	-20–50 °C
Humidity	NA	NA	NA	NA	NA	NA
Max. cable length to gate drive unit	30 m	30 m	30 m	30 m	30 m	30 m

* Additional bus systems available (see customer-specific designs, page 96)

Gate controller, single-phase in plastic housing

Product group/design
TCT®-FUF2

The gate controller TCT®-FUF2 is a versatile device, suitable for universal use with all gate designs and applications. With the integrated keypad, the gate can be controlled directly on site, independently from a higher-level control. The plain text display helps the user keep track of information and operating instructions.

The grid connection is designed as wide voltage range single-phase and the integrated PLC interface in the form of a conventional 24 V-DIO interface provides all the required signals for the external control and querying of an external machine protection gate. The device is TÜV type-tested with its safety functionalities.

Features
Mains voltage range 110–240 VAC +/-10 %, 50/60 Hz
ESD strength up to over 25 kV
Output power 1.5 kW at 100% duty cycle
Electronically monitored motor brake output 24 VDC
Two safety inputs for safety edges, light barrier etc. Cat. 2/PLd
Three safety inputs for emergency stop (STOP) Cat. 3/PLe
Three relay outputs with changeover contacts, function parametrisable
12 digital inputs 24 VDC, function parametrisable
2 digital outputs 24 VDC, function parametrisable
24 VDC supply for external peripherals up to 3.5 A
USB port for service
Annual time switch buffered
Electric connections on plug-in terminals, internal
Dimensions (W×H×D = 210 × 420 × 205 mm)

For further technical data, see overview on page 85

Gate controller, single-phase in sheet steel housing

Product group/design
TCT®-FUF2-S

The gate controller TCT®-FUF2-S is a versatile device and with its robust sheet steel housing it is specially designed for use in rough industrial environments. With the integrated keypad, the gate can be controlled directly on site, independently from a higher-level control. The plain text display helps the user keep track of information and operating instructions.

The grid connection is designed as wide voltage range single-phase and the integrated PLC interface in the form of a conventional 24 V-DIO interface provides all the required signals for the external control and querying of an external machine protection gate. The device is TÜV type-tested with its safety functionalities.

Features
Mains voltage range 110–240 VAC +/-10 %, 50/60 Hz
ESD strength up to over 25 kV
Output power 1.5 kW at 100% duty cycle
Electronically monitored motor brake output 24 VDC
Two safety inputs for safety edges, light barrier etc. Cat. 2/PLd
Three safety inputs for emergency stop (STOP) Cat. 3/PLe
Three relay outputs with changeover contacts, function parametrisable
12 digital inputs 24 VDC, function parametrisable
2 digital outputs 24 VDC, function parametrisable
24 VDC supply for external peripherals up to 3.5 A
USB port for service
Annual time switch buffered
Electric connections on plug-in terminals, internal
Dimensions (W×H×D = 300 × 400 × 200 mm)

For further technical data, see overview on page 85

Gate controller, three-phase in plastic housing

Product group/design
TCT®-FU3F

The gate controller TCT®-FU3F is a versatile device, suitable for universal use with all gate designs and applications. With the integrated keypad, the gate can be controlled directly on site, independently from a higher-level control. The plain text display helps the user keep track of information and operating instructions.

The grid connection is designed as wide voltage range three-phase and the integrated PLC interface in the form of a conventional 24 V-DIO interface provides all the required signals for the external control and querying of an external machine protection gate. The device is TÜV type-tested with its safety functionalities.

Features
Mains voltage range three-phase 3 × 200–480 VAC +/-10%, 50/60 Hz
Neutral conductor not required
ESD strength up to over 25 kV
Output power 2.2 kW at 100 % duty cycle
Electronically monitored motor brake output 24 VDC
Two safety inputs for safety edges, light barrier etc. Cat. 2/PLd
Three safety inputs for emergency stop (STOP) Cat. 3/PLe
Three relay outputs with changeover contacts, function parametrisable
12 digital inputs 24 VDC, function parametrisable
2 digital outputs 24 VDC, function parametrisable
24 VDC supply for external peripherals up to 3.5 A
USB port for service
Annual time switch buffered
Electric connections on plug-in terminals, internal
Dimensions (W×H×D = 210 × 420 × 205 mm)

For further technical data, see overview on page 85

Gate controller, three-phase in sheet steel housing

Product group/design
TCT®-FU3F-S

The gate controller TCT®-FU3F-S is a versatile device and with its robust sheet steel housing it is specially designed for use in rough industrial environments. With the integrated keypad, the gate can be controlled directly on site, independently from a higher-level control. The plain text display helps the user keep track of information and operating instructions.

The grid connection is designed as wide voltage range three-phase and the integrated PLC interface in the form of a conventional 24 V-DIO interface provides all the required signals for the external control and querying of an external machine protection gate. The device is TÜV type-tested with its safety functionalities.

Features
Mains voltage range three-phase 3 × 200–480 VAC +/-10 %, 50/60 Hz
Neutral conductor not required
ESD strength up to over 25 kV
Output power 2.2 kW at 100 % duty cycle
Electronically monitored motor brake output 24 VDC
Two safety inputs for safety edges, light barrier etc. Cat. 2/PLd
Three safety inputs for emergency stop (STOP) Cat. 3/PLe
Three relay outputs with changeover contacts, function parametrisable
12 digital inputs 24 VDC, function parametrisable
2 digital outputs 24 VDC, function parametrisable
24 VDC supply for external peripherals up to 3.5 A
USB port for service
Annual time switch buffered
Electric connections on plug-in terminals, internal
Dimensions (W×H×D = 300 × 400 × 200 mm)

For further technical data, see overview on page 85

Gate controller UL-listed in sheet steel housing

Product group/design
TCT®-FU3F-UL

UL listed

Canadian Standards Association

The gate controller TCT®-FU3F-UL is a UL-listed device and is thus approved for use in the USA and Canada. With the integrated keypad, the gate can be controlled directly on site, independently from a higher-level control. The plain text display helps the user keep track of information and operating instructions.

The grid connection is designed three-phase as wide voltage range and the integrated PLC interface in the form of a conventional 24 V-DIO interface provides all the required signals for the external control and querying of an external machine protection gate.

Features

Mains voltage range three-phase 3 × 200–480 VAC +/-10 %, 50/60 Hz
Neutral conductor not required
ESD strength up to over 25 kV
Output power 2.2 kW at 100 % duty cycle
Electronically monitored motor brake output 24 VDC
Two safety inputs for safety edges, light barrier etc. Cat. 2/PLd
Three safety inputs for emergency stop (STOP) Cat. 3/PLe
Three relay outputs with changeover contacts, function parametrisable
12 digital inputs 24 VDC, function parametrisable
2 digital outputs 24 VDC, function parametrisable
24 VDC supply for external peripherals up to 3.5 A
USB port for service
Annual time switch buffered
Electric connections on plug-in terminals, internal
Dimensions (W×H×D = 300 × 400 × 200 mm)

For further technical data, see overview on page 85

Gate controller PNS in sheet steel housing

Product group/design
TCT®-FU3F-PNS

AIDA Standard

PROFINET-SAFE interface

The gate controller TCT®-FU3F-PNS is specially designed for automotive manufacture. This controller is based on the model TCT®-FU3F-S (page 89) and is equipped with an additional communication assembly.

The double Profinet-Safe interface forms the connection to the industrial network and the higher-level control. Extensive connections for peripheral devices are provided on the underside of the controller, in a plug-in design.

Main additional features compared with TCT®-FU3F-S

2 × Profinet interface via push-pull connector RJ45, Conformance Class C
3 × 24 VDCsupply/forwarding via push-pull power connector
Six safety inputs 24 V, 2-channel on M12 socket to connect secure sensors
Six inputs/outputs 24 V, on M12 socket in pairs to connect standard peripherals
Four IO-Link ports on M12 socket to connect IO-Link peripherals
Complete diagnosis of the gate controller and connected peripherals via Profinet
Firmware updates, data/parameter back-up via Profinet/Ethernet
GSD file available

For further technical data, see overview on page 85

Gate controllers in customised designs

Product group/design
TCT® SPECIAL DESIGNS

Cabinet in customised size

Additional assemblies
and terminal blocks

Extension box for BUS port

Externally connectible control panel

Radio remote control

In addition to the standard designs, our product range includes special customised designs.

We produce and supply our gate controllers in special designs, adjusted to suit the needs of our customers with regard to electric interfaces, BUS capability, plug-in connections and integrated options, even in small batches or as single items.

Please ask us for advice on all the varied options!

Examples of special designs

PLC interface, plug-in design
Motor cable set, plug-in design
Mains power supply, plug-in design
Mains transformer for special mains voltages
Expansion cards for additional signal exchange
Additional assemblies, terminal blocks in the switch cabinet internally
Controller sheet steel cabinets in customised sizes
Additional control buttons/signal lamps built into switch cabinet door
Externally connectible control panel
Parametrisation of additional signals on PLC interface
Parametrisation of an intermediate gate position
Extension box for connection to ProfiNet, Profibus, Ethernet-IP etc.
Expansion of radio remote control for the gate function

Optional accessories for machine protection lift gates and sliding gates

Connectors

Safety bus

Manual control panel

Emergency stop button

Intermediate terminal strip

Start button

Colour-coded indicator

Display lamp

Motion sensor

External control unit

Remote control

Captron button

Extra circuit board

PNS module

Expansion board

Motor cover

Fence attachment

Misc

- Black and yellow safety marking for end profile
- Special coating for winding roller cover/gate post
- Removable parapet plates
- Levelling plates
- Pull-wire for industrial trucks and forklifts
- Impact protection pillars
- Special drive units, e.g. SEW
- Special safety switches
- NES cam control mechanism
- Conventional safety switches
- Key switches

Appendix

Safety requires straightforward facts and compelling real-life examples. Our appendix contains all information on the various panellings for the gate wings and the different curtain variants. The pages with the example implementations and applications provide a brief overview of our varied industry solutions.

Design of gate wings for lift and sliding gates

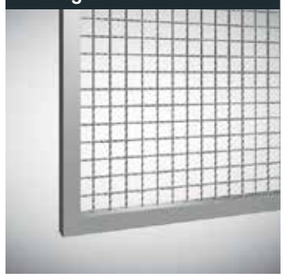
Our lift and sliding gates can be designed with various types of panelling. Viewing windows can be installed with special clamping profiles.

Sheet metal

Polycarbonate

FLEX II

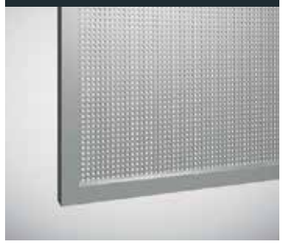
Corrugated mesh 40



Corrugated mesh 25

Welded mesh 40

Perforated plate Round holes Rv 5-8



Perforated plate Square holes Qg 8-12

Shaded welding glass Reddish brownT50

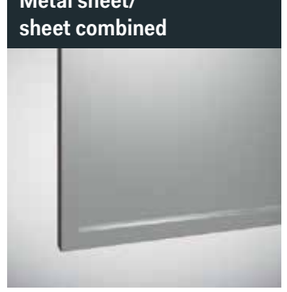
Shaded welding glass Green T75

Laminated safety glass

Sound insulation glass

Sound insulation

Metal sheet/ sheet combined



Combination of mesh/polycarbonate

Design of curtains for roller gates SpeedLine®

Vision curtain

Maxi-Vision curtain

Dual-Vision curtain

Welding-Vision curtain

Structure, TEX-I curtains
Highly tear-resistant, two-layer polyester fabric in warp and woof
Coated on both sides with polyvinyl chloride (0.1 mm)
Total thickness: 2 mm
Spec. weight: 2.4 kg/m²
End profile made from highly robust, impact-resistant aluminium profile
Standard version with sealed PVC transparent field W × H = 1000 × 600 mm

Properties, TEX-I curtains
Approved for operating temperatures of –10 °C to +70 °C, briefly up to +90 °C
Total thickness: 2 mm
Tested for resistance and durability in automatic welding plants

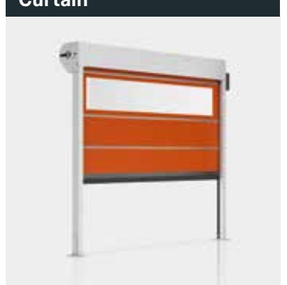
Curtains, colour variants, price 1
Orange similar to RAL 2004
Blue similar to RAL 5000

Curtains, colour variants, price 2
Yellow similar to RAL 1023
Red similar to RAL 3002
Grey similar to RAL 7038

Curtains, colour variants, price 3
Anthracite similar to RAL 7011
Black similar to RAL 9005

Designs of curtains and slats for roller gates PerformanceLine®

Curtain



Slat, aluminium

Slat, aluminium with privacy shield

Slat, steel

Structure, TEX-II curtains
Coating type: PVC
Finishing: coated on both sides (high-gloss)
Total weight: 900 g/m² EN ISO 2286-2
Support fabric: Material PES DIN ISO 2076, thread thickness 1100 dtex DIN ISO 2060, weave P 2/2

Properties, TEX-II curtains
Combustion behaviour: DIN 75200, ISO 3795 < 100 mm/min.
Tear strength warp/woof: 4300/4000 N/50 mm, DIN 53354, DIN EN ISO 1421/V1
Tear propagation resistance warp/woof: 500/500 N, DIN 53363
Adhesive strength: 20 N/cm LB 3.04-1 (Complan)
Resistance to cold: -30 °C DIN 53361
Resistance to heat: +70 °C Complan guidelines
Light-fastness: >6 grade, val. DIN 54004, DIN EN ISO 105 B02
Buckling resistance: no cracks <100000 ×, DIN 53359 A

Curtains, colour variants, price 1
Signal yellow similar to RAL 1003
Yellow similar to RAL 1021
Red similar to RAL 3020
Grey similar to RAL 7035

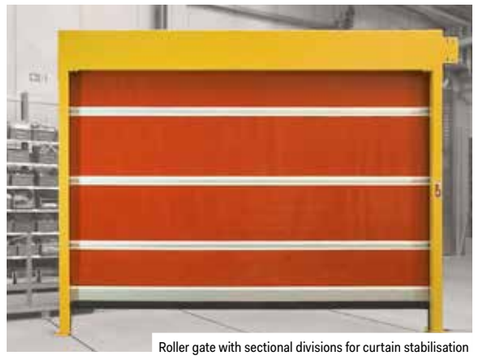
Example implementations, roller gates


Roller gate MSRT®-SL in front of outward transfer


Machine protection roller gates SpeedLine® as worker protection for removable storage units

MSRT®-SL with safety fence system FLEX II

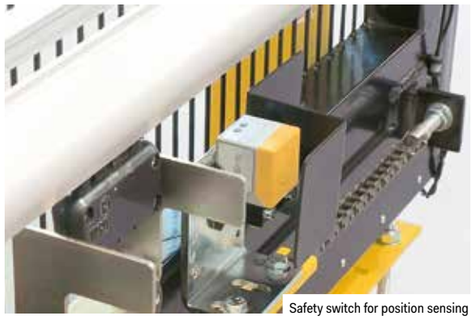

Machine protection roller gate with aluminium slats


Roller gate with sectional divisions for curtain stabilisation


MSRT®-PL-XL with Brühl-TEX-II strip curtain


Machine protection roller gate MSRT®-SL

Example implementations, sliding gates


Safety switch for position sensing


Machine protection sliding gate with drive unit at top


Power-operated sliding gate with sheet metal cladding and viewing window


Self-supporting machine protection sliding gate in automated application


Special application with installation height of 4800 mm


Output station of a conveyor plant


Chip protection cab as an example application

APPENDIX

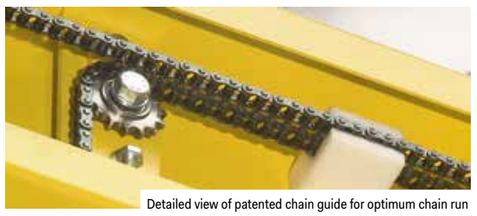
Example implementations, lift gates

Detail of extending wing for a compact design

Compact machine protection gate as process integration with low installation height

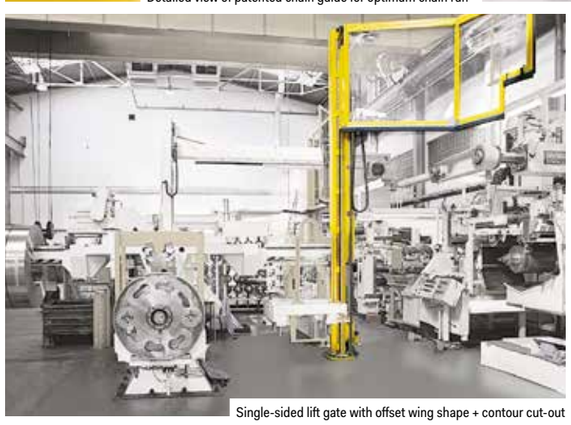
Integrated lift gate to secure plant

Machine protection lift gate XL for flexible and rapid plant access and optimum view of process



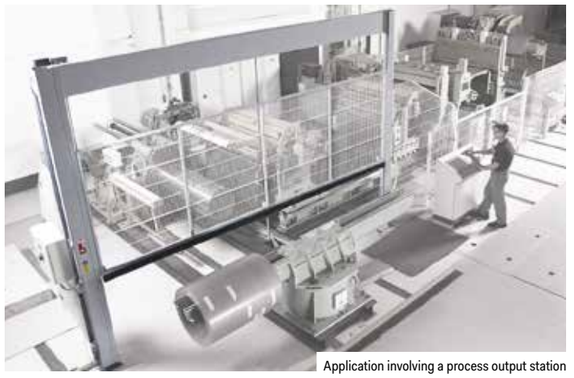
Detailed view of patented chain guide for optimum chain run

A conveyor plant application



Single-sided lift gate with offset wing shape + contour cut-out

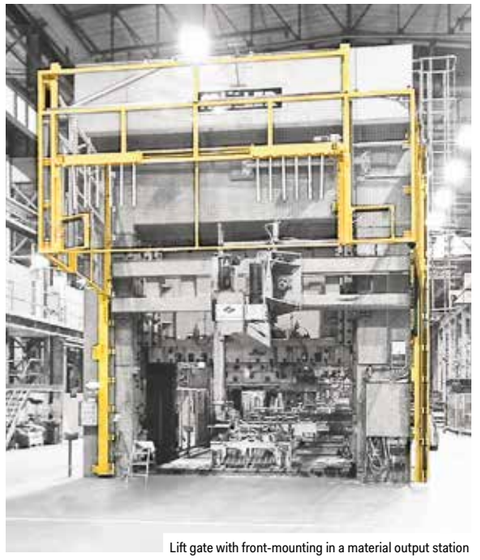
Single-sided lift gate at a material output station



Application involving a process output station

Application involving a material output station

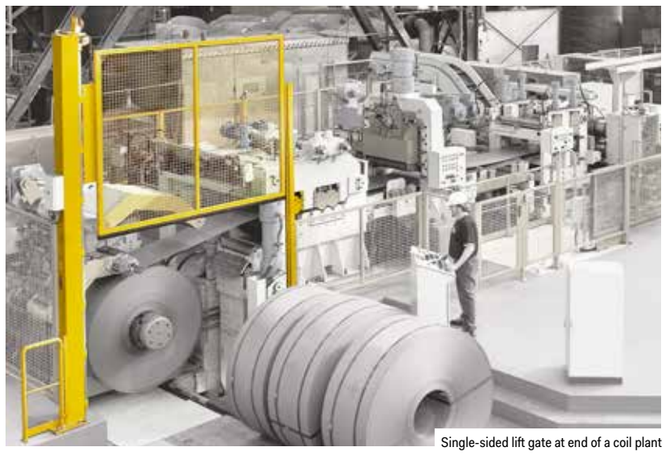
Conveyor plant with multiple adjacent single-sided lift gates with offset wing shape



Lift gate with front-mounting in a material output station

With sheet aluminium panelling and privacy shield glazing

Two-wing lift gate as solution for low installation heights



Single-sided lift gate at end of a coil plant

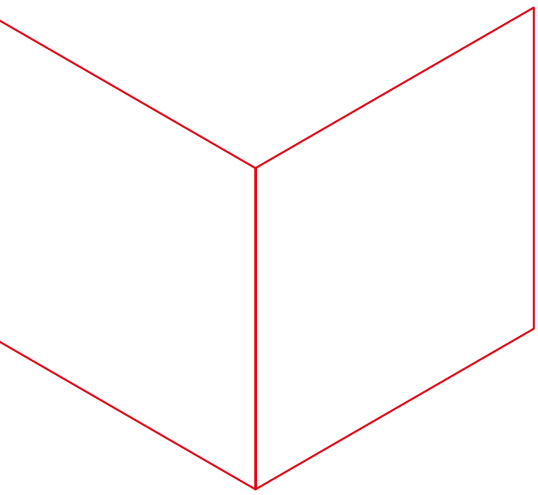
APPENDIX

Imprint

Brühl Safety Doors GmbH
Managing directors:
Heinrich Brühl
Kai Wienecke

Waldstraße 63b
57250 Netphen, Germany

Tel.: +49 (0) 2737 59 34 0
Fax: +49 (0) 2737 59 19 46
info@bruehl-safety.com
www.bruehl-safety-doors.com



Brühl Safety Doors GmbH · Waldstraße 63b · 57250 Netphen · Germany
Tel. +49 (0) 2737 5934 0 · Fax +49 (0) 2737 5919 46 · info@bruehl-safety.com
www.bruehl-safety-doors.com