



SHIP-TO-SHORE SPREADERS

A Tradition of Innovation

BROMMA



THE FIRST NAME IN SPREADERS

*Bromma spreaders understand the terrain of the terminal,
and remain productive, reliable, and durable under
conditions that are never ideal.*

Lifting The Efficiency Of Terminal Operations

From an overall capital investment standpoint, the ship-to-shore spreader is of small importance. Yet while its cost is little more than 2% of a container crane, its performance is a critical factor in the economics of container handling. Terminals which "turn" ships faster gain a marketing advantage over peers, which can mean higher market share, better berth utilization, and greater pricing power. Spreader fleets that under-perform cost terminals – in repairs, downtime expense, and higher capital investment for spares. Yet the greatest "cost" of under-performance is how a less reliable spreader can weaken a terminal's relationships with its customers, and slow its growth.

For more than thirty years Bromma has been at the forefront of our containerized global economy. From its headquarters in Sweden, Bromma has for decades been the first name in crane spreaders, selling more than 900 telescopic crane spreaders each year – more than all of its competitors combined. Including spreaders for FLT's, Reach Stackers, and Straddle Carriers, Bromma sells more than 2,000 spreaders a year. Bromma is the market leader in every segment of the crane spreader marketplace – ship-to-shore, mobile harbour, and yard. When you partner with Bromma, you are working with the most experienced, most reliable spreader firm in the industry.

The New Frontier

Innovation is a Scandinavian tradition, and is embedded in everything Bromma does. Bromma has made a habit of finding the new frontier – with the first telescopic spreader, first twin-lift spreader, first all-electric crane spreader, first true lightweight spreader, first advanced spreader communications and control system, first advanced safety technology, such as Twin-Twenty Detection System (TTDS), and the first twin-40 and twin-45 spreader, called Bromma Tandem™. On the frontier where the future is created, Bromma R&D has made a habit of giving terminals the tools needed to take performance to a higher level.

Value-Driven Product Development

Bromma understands the familiar terrain of container handling – the tough physical environment in which terminals operate. High heat and humidity, driving rain, sleet or snow, blowing sand, wind-borne salt – such conditions would test any equipment, but in addition to this, spreaders are beat up constantly. Yet Bromma spreaders understand the terrain of the terminal, and remain productive, reliable and durable under conditions that are never ideal. Marketing language, such as "design simplicity, quality control, manufacturing integrity, or leading technology" is often viewed as slogans and nothing more. Yet, these core product development values lie at the heart of minimizing spreader downtime, and helping terminals achieve faster ship turns and the fullest possible utilization of terminal berth capacity. In addition, Bromma has the resources to invest for production success. Bromma develops its own testing systems, and its own production rigs, because Bromma understands that few physical environments are as challenging as container handling.

Thinking Strategically About Spreaders

Operational performance determines which terminals compete and win, and which flatten or decline. This is why spreader fleet planning must be based on the full spectrum of value – cost to purchase, but also cost to operate – lifetime energy and maintenance costs, fleet durability, and spreader productivity. Indeed, the Bromma Return On Investment calculator demonstrates clearly how different spreader performance indicators can have a vast impact on terminal return on investment. Growing terminals need business partners who understand the metrics of performance and the necessity of achieving high capital return on investment. Bromma supports the success and growth of our terminal partners, through our equipment, our organizational depth, our intellectual capital, and the enterprise values at Bromma which are consistent with success. Bromma is the strongest company in spreaders.

GreenLine™ - an all-electric product family

GreenLine™ spreaders from Bromma are one important step toward safe and sustainable port operating environments. They reduce consumables, lessen CO2 emissions through lower crane power consumption, protect water through the elimination of oil leaks, enhance worker safety, and lower spreader noise. Just as important, they produce spreader lifecycle cost savings that serve to economically justify green investment. Finally, they enhance a container terminal's competitive position through the superior reliability of green spreader equipment.

GreenLine™ spreaders from Bromma are strong and light, actually substantially lighter than the spreaders they replace. This significantly reduces annual crane power consumption costs as well. As a Scandinavian company, Bromma has a history of environmental awareness, and Bromma R&D has for many years made engineering choices, in part, based on environmental concerns. Bromma is committed to environmental leadership in spreaders.



THE E-SERIES™

Less Service, Lower Weight, More Uptime

The operational centre of any great container terminal is a highly productive and reliable ship-to-shore spreader operation.

Bromma's E-Series of all-electric ship-to-shore spreaders are loaded with advantages designed to create lifecycle cost savings while boosting fleet uptime.

» **ELIMINATING HYDRAULICS MEANS**

fewer service points, reduced service time and reduced service materials cost.

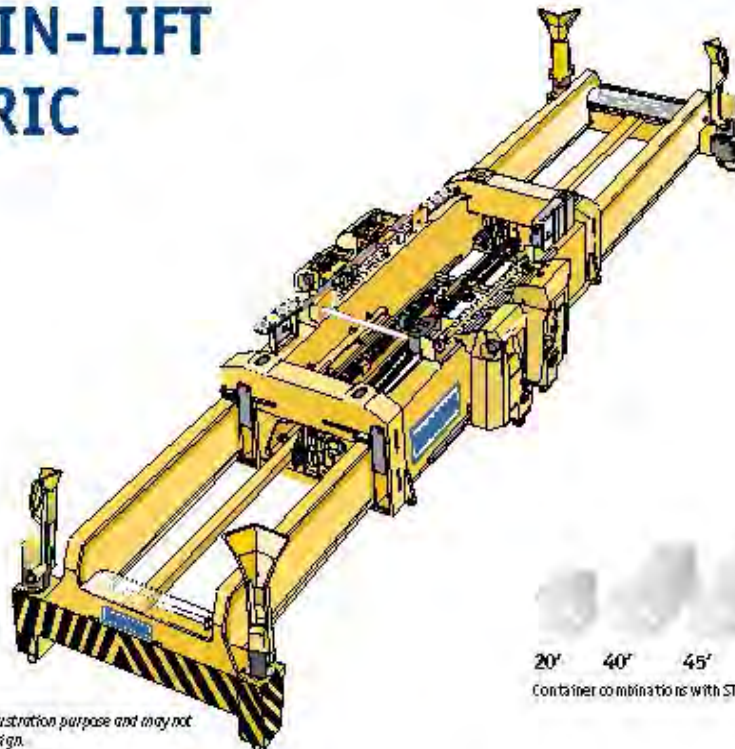
» **ELIMINATING SPREADER HYDRAULICS REDUCES**

spreader power consumption by an estimated 85%.

For every 5 kWh consumed by an STS45, less than 1 kWh is consumed by an STS45E.



STS45E TWIN-LIFT ALL-ELECTRIC



The pictures shown is for illustration purpose and may not correspond to the final design.

20' 40' 45' 2x 20'
Container combinations with STS45E

» PROVEN DESIGN

The Bromma STS45E are based on Bromma spreaders in service throughout the world

» LOWER ENERGY CONSUMPTION

Higher productivity translates into higher potential revenue. The STS45E separating twin-lift has exceptional performance characteristics. Bromma calculates that a more reliable spreader at a busy container terminal that averages just 0.5 more moves per hour can generate an additional \$30,000 USD in terminal profit per year.

Bromma's optional Memory Positioning System (MPS) makes the crane operator's task easier, and increases productivity. Options such as the Twin-Twenty Detection System (TTDS) adds safety and the Height Indication System (HIS) is ideal for use on high-speed cranes. Bromma all-electric twin-lift spreaders also have maintenance and energy consumption advantages. At only 11.7 metric tons, the STS45E will save energy compared to competing brands. For example, a 1.5 metric tons weight savings means some \$40,000 USD in energy savings over its lifetime. The elimination of the idling hydraulic pump on these all-electric spreaders

» **REDUCED SPREADER MAINTENANCE** requirements, due to the elimination of hydraulics

» **SIMPLER - LESS SETTINGS & FEWER SENSORS**

» **TWIN-LIFT SHIP-TO-SHORE SPREADERS** are the most popular products in the Bromma product line, due to their higher productivity and versatility

also adds to the energy savings. The idling action of a hydraulic pump results in energy consumption of approximately 3 kWh. Eliminating this idling hydraulic motor thus should mean an approximate \$13,500 USD in lifetime energy savings.

Bromma has been able to make the STS45E lighter through more intelligent design. Mechanical functions that perform the separating twin motion have been replaced by a new electrical concept, which allows weight reduction. The separating twin motion doesn't require any mechanical connection – hooks or latches – which lowers weight. The STS45E includes all-electric flipper, an all-electric synchronized separating system, and a faster up/down motion for twin lift boxes.

Technical Data STS45E

» LIFTING CAPACITY

51 metric tons, ±10% ecc. load
51 metric tons, evenly loaded
2 x 32.5 metric tons, evenly loaded

» LIFTING LUGS

4x10 metric tons in main frame and end beam

» WEIGHT

About 11.7 metric tons
(without extra equipment)

» SEPARATING CAPACITY

0-1600mm with full load

» TELESCOPIC MOTION

20'–45' in approx. 30 sec.

» FLIPPER ARM SPEED

180° in approx. 5 sec.

» TWISTLOCK ROTATION

90° in approx. 1 sec.

» TWIN LIFT UNIT UP/DOWN

Approx. 6 sec.

» TWIN EXPAND/RETRACT

Approx. 18 sec.

» POWER SUPPLY

400/230 VAC 50 Hz or otherwise as agreed

» MAX POWER CONSUMPTION

7.5kw

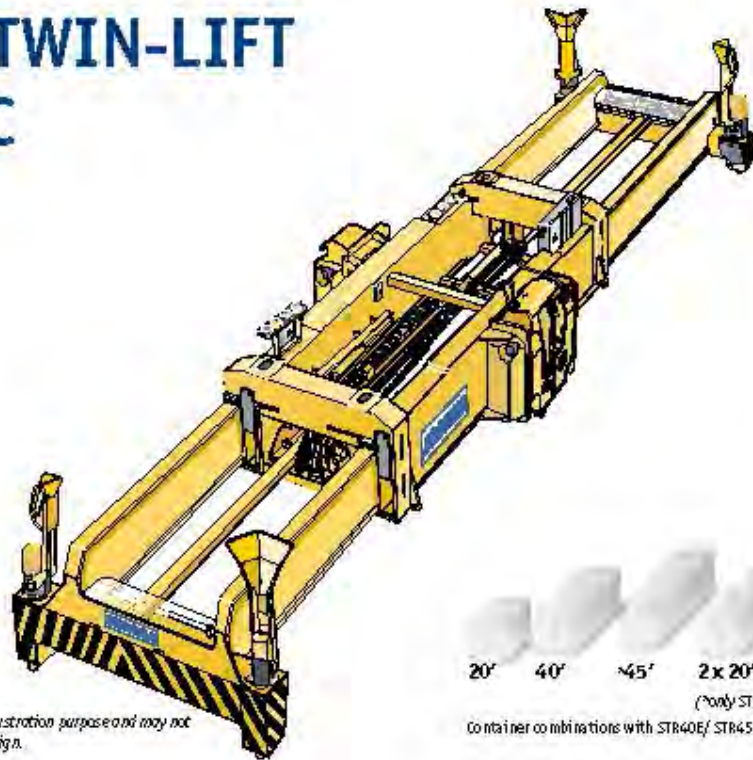
» CONTROL SYSTEM

505' spreader control system

» CONTROL VOLTAGE

24VDC

STR40E/45E TWIN-LIFT ALL-ELECTRIC



The picture shown is for illustration purpose and may not correspond to the final design.



» PROVEN DESIGN

The Bromma STR40E/45E are based on Bromma spreaders in service throughout the world.

» LOWER ENERGY CONSUMPTION

» **REDUCED SPREADER MAINTENANCE** requirements, due to the elimination of hydraulics

» SIMPLER - LESS SETTINGS & FEWER SENSORS

» **TWIN-LIFT SHIP-TO-SHORE SPREADERS** are the most popular products in the Bromma product line, due to their higher productivity and versatility

The twin spreader enables significant improvement in productivity. Plus, these spreaders can be retracted to the 19'6" position in the event the spreader becomes jammed in the ship's twentyfoot cell. Positioning to the 19'6" position can be controlled by the operator if appropriate controls are furnished in the crane cab.

The control and communications capabilities of Bromma all-electric twins are unsurpassed. Bromma SCS* is standard on these spreaders. SCS* dramatically reduces wired terminal points and I/O relays for greater simplicity, while giving terminals advanced functionality, such as on-line sensor adjustments, and communications capability, such as transmission of spreader events, logs and alarms.

Finally, Bromma is uncompromising in its selection of components and materials. Materials selected on the basis of its strength, weldability and formability.

Technical Data STR40E/45E

» LIFTING CAPACITY

51 metric tons, ±10% ecc. load
2 x 32,5 metric tons, evenly loaded

» LIFTING LUGS

4x10 metric tons in the main frame and end beams

» WEIGHT

STR40E: About 9,8 metric tons
(without extra equipment)
STR45E: About 11,3 metric tons
(without extra equipment)

» TELESCOPIC MOTION

STR40E: 20'-40' in approx. 28 sec.
STR45E: 20' - 45' in approx. 30 sec.

» FLIPPER ARM SPEED

180° in approx. 5 sec.

» TWISTLOCK ROTATION

90° in approx. 1 sec.

» TWINLIFT UNIT UP/DOWN

Approx. 6 sec.

» POWER SUPPLY

400/230 VAC 90 Hz or otherwise as agreed

» MAX POWER CONSUMPTION

7,5 kw

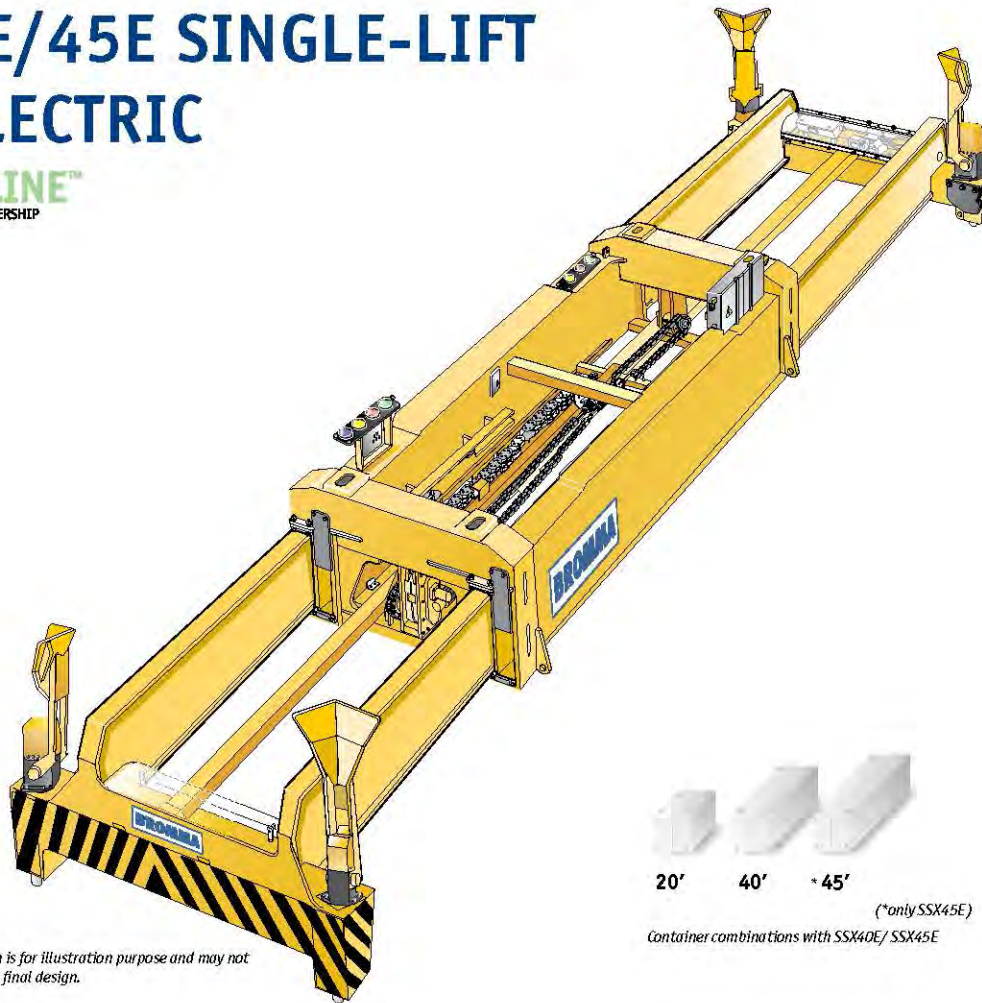
» CONTROL SYSTEM

SCS* spreader control system

» CONTROL VOLTAGE

24VDC

SSX40E/45E SINGLE-LIFT ALL-ELECTRIC



The picture shown is for illustration purpose and may not correspond to the final design.

20' 40' 45'
(*only SSX45E)
Container combinations with SSX40E/ SSX45E

» PROVEN DESIGN

the Bromma SSX40E and SSX45E structure is based on the reliable hydraulic versions of this spreader

» DESIGNED FOR LOWER OR HIGHER

throughput environments and for service on high-speed cranes

» REDUCED ROUTINE MAINTENANCE

due to all-electric design

» REDUCED ENERGY CONSUMPTION

due to elimination of the hydraulic power-pack

Bromma single-lift SSX40/45E spreaders offer strength, reliability, and durability, plus the advantage of lower lifecycle costs. On these all-electric spreaders, many service points have been taken away. There's no hydraulic powerpack and no hoses. There are no fluids, or oil filter, to replace.

This elimination of hydraulics means reduced service time and reduced service materials cost (for oil, hoses, and filters). It will also eliminate many of the "nuisance" downtime events that occur due to spreader hydraulics (bad hose connections, etc.). Making hydraulics history reduces both scheduled and unscheduled spreader downtime.

Technical Data SSX40E/45E

» LIFTING CAPACITY

41 metric tons, ±10% ecc. load
41 metric tons, evenly loaded

» WEIGHT

SSX40E: About 8.6 metric tons
(without extra equipment)
SSX45E: About 9.6 metric tons
(without extra equipment)

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» MAX POWER CONSUMPTION

7,5kw

» LIFTING LUGS

4 x 10 metric tons in main frame
and end beam

» TELESCOPIC MOTION

SSX40E: 20' - 40' in approx. 28 sec.
SSX45E: 20' - 45' in approx. 30 sec.

» TWISTLOCK ROTATION

90° in approx. 1 sec.

» CONTROL SYSTEM

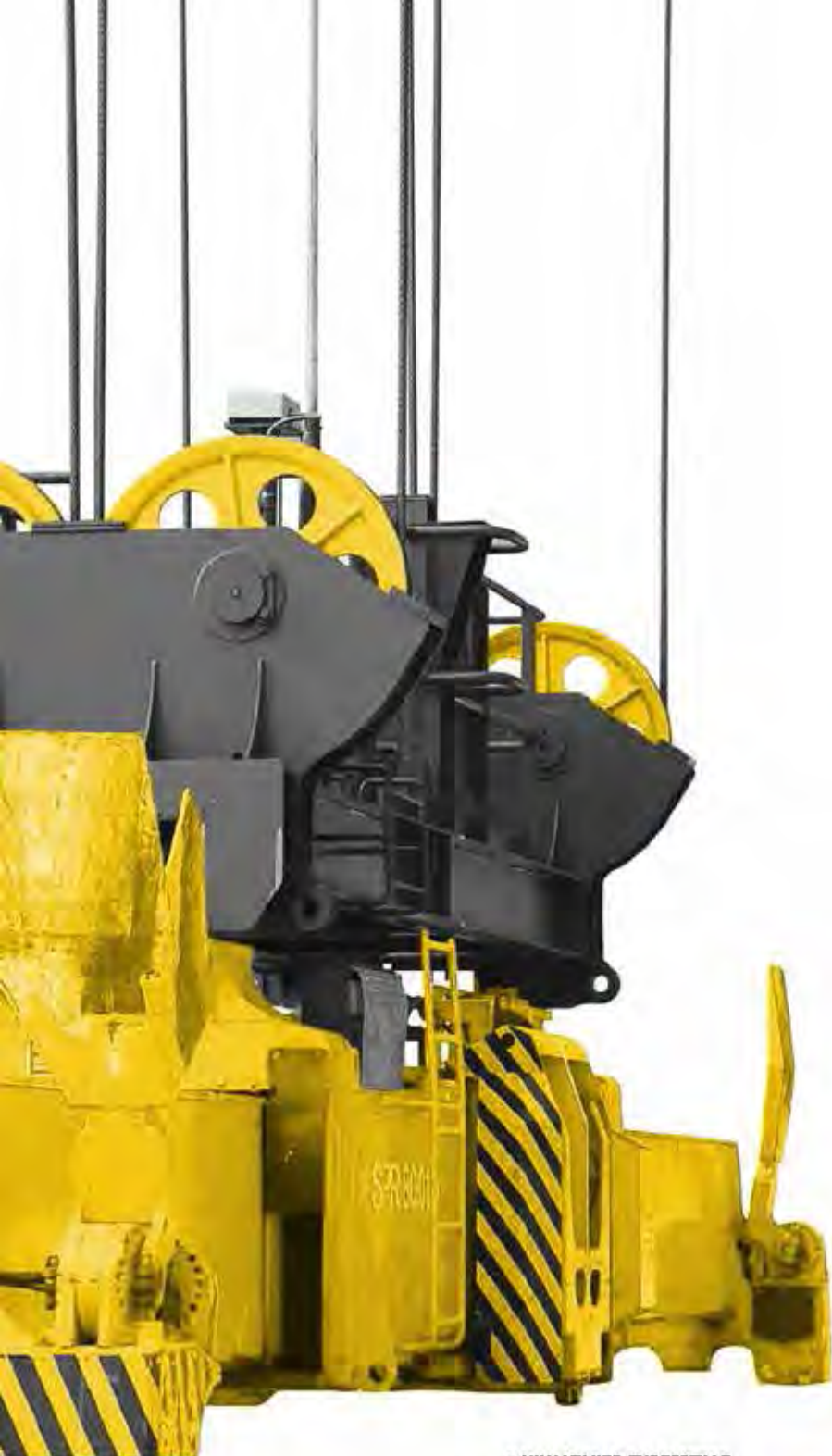
SCS[®] spreader control system

» POWER SUPPLY

400/230 VAC 50 Hz or otherwise as
agreed

» CONTROL VOLTAGE

24VDC



» **UNMATCHED EXPERIENCE**

Bromma designed the first telescopic single-lift spreader and has sold thousands of them around the world.

» **REDUCE DOWNTIME**

spreader diagnostics through Bromma SCS* to not only fix problems faster, but prevent faults (and downtime) from occurring.

» **BROMMA CALCULATES THAT A MORE RELIABLE SPREADER**

at a busy container terminal that averages just 0.5 more moves per hour can generate an additional \$30,000 USD in terminal profit per year.

» **A 1.5 METRIC TONS REDUCTION IN SHIP-TO-SHORE SPREADER**

weight can produce more than \$4,200 USD in annual crane energy savings.

» **A SPREADER THAT SHOWS UP FOR WORK EVERY DAY**

bromma ship-to-shore spreaders are also known for exceptional durability - often remaining in active service for 12 or more years at high-throughput terminals.

BROMMA HYDRAULIC SPREADERS

A Higher Level Of Reliability

Bromma is the world leader in ship-to-shore crane spreaders, with more than 60% of the global market. Bromma has a dominant position for a simple reason: Bromma spreaders show up for work every day and perform at a high level of productivity. When reliability is crucial, as it especially is in ship-to-shore operations, Bromma is the obvious choice. Bromma's family of hydraulic ship-to-shore spreaders includes single-lift spreaders, twin-lift spreaders, and the innovative, high-productivity Bromma Tandem™ product family, capable of twin-40' and twin-45' container handling.

Reduce Downtime

One of the most important technical developments in ship-to-shore spreaders in recent years has been Bromma SCS technology. In service on thousands of spreaders around the globe, Bromma SCS monitors spreader performance, reduces downtime events (through simplified wiring and fewer connections) and shortens downtime duration (through faster fault diagnosis) when faults occur. The latest generation of this technology, SCS⁴, is easy to use and simple to understand, due to an on-board touch-screen display. It also features the industry's first generation of spreader prognostics, an "early warning system" for future spreader faults. Spreader prognostics means that terminals can now not only fix problems faster, but prevent faults (and downtime) from occurring.

A Higher Level Of Productivity

Bromma ship-to-shore spreaders are known for their exceptional productivity. Bromma's top-selling STS45 separating twin-lift spreader in particular has exceptional performance characteristics. Higher productivity boosts the terminal bottom line. Bromma calculates that a more reliable spreader at a busy container terminal that averages just 0.5 more moves per hour can generate an additional \$30,000 USD in terminal profit per year.

Bromma's vast global experience is also a major factor in the dependability of Bromma equipment. Bromma knows what terminals need, what can go wrong, and how to deliver equipment that performs in the "real world" scenarios that terminals face every day.

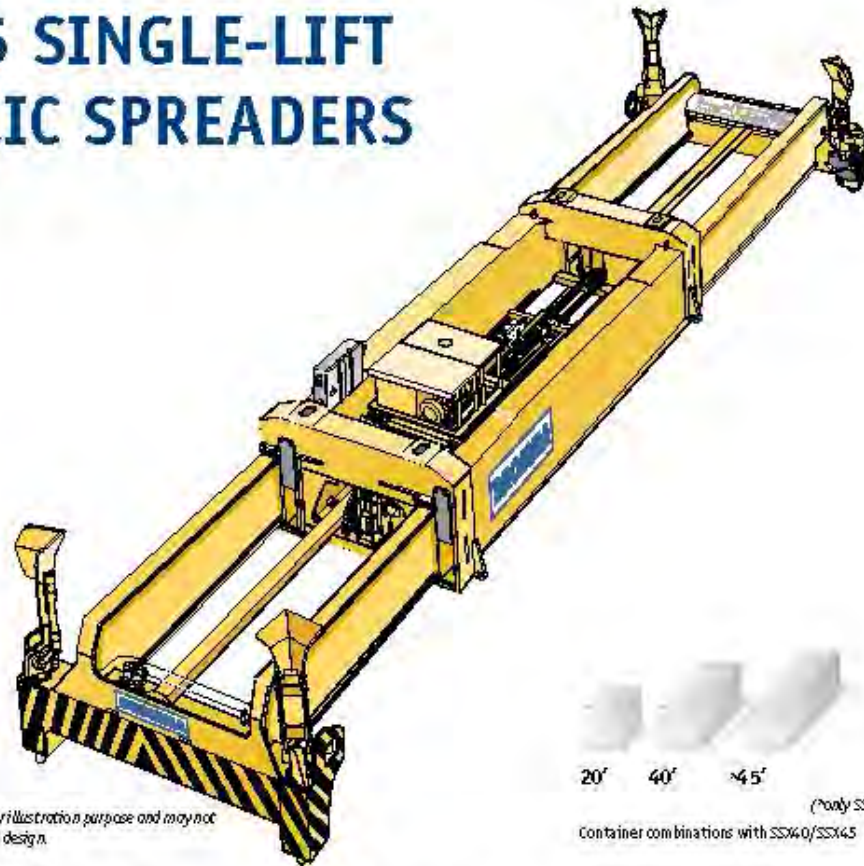
Weight & Energy

Spreader weight directly impacts crane energy consumption, an area of growing concern for terminals facing fuel cost increases. Bromma R&D models indicate that a 1.5 metric tons reduction in ship-to-shore spreader weight can produce more than \$4,200 USD in annual crane energy savings. Bromma R&D pays serious attention to spreader weight throughout its entire product line.

A Spreader That Shows Up For Work Every Day

Bromma ship-to-shore spreaders are also known for exceptional durability – often remaining in active service for 12 or more years at high-throughput terminals. Bromma hydraulic ship-to-shore spreaders show up for work every day, produce more while they're on the job, and keep performing for a long time.

SSX40/45 SINGLE-LIFT HYDRAULIC SPREADERS



The picture shown is for illustration purpose and may not correspond to the final design.

20' 40' 45' (only SSX45)
Container combinations with SSX40/SSX45

» EXPERIENCE MEANS LOW DOWNTIME

at some terminals Bromma spreader availability exceeds 99%.

» DESIGNED FOR HIGHER THROUGHPUT

environments and for service on high-speed cranes.

» HIGH RELIABILITY

allows for a lower spreader spare ratio in the terminal fleet.

Bromma single-lift SSX40/45 spreaders are known throughout the world for exceptional strength, reliability, and long life. Bromma achieves superior structural strength through strategic engineering tools, such as finite element modeling, which analyzes stress points on the spreader and projects the likely effect of accumulated stress over time.

Floating ISO twistlocks allow for 6mm of float in all lateral directions, providing efficient locating in the container corner castings. The contact surfaces between the main frame and the telescoping

beams consist of grease-lubricated low-friction plates. These spreaders have the ability to retract to the 19'6" position in the event the spreader becomes jammed in the ship's twenty foot cell. Positioning to the 19'6" position can be controlled by the operator if appropriate controls are furnished in the crane cab. Bromma advanced performance technology, such as SCS⁺, Twin-Twenty Detection System (TTDS) (an excellent safety feature), and the Height Indication System (HIS) are available as options.

Technical Data SSX40/45

» LIFTING CAPACITY

41 metric tons, ±10% ecc. load
41 metric tons, evenly loaded

» WEIGHT

SSX40: About 8.7 metric tons
(without extra equipment)
SSX45: About 9.6 metric tons
(without extra equipment)

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» POWER SUPPLY

400V 230 V AC 50 Hz or otherwise
as agreed

» LIFTING LUGS

4 x 10 metric tons in main frame
and end beams

» TELESCOPIC MOTION

SSX40: 20'–40' in approx. 28 sec.
SSX45: 20'–45' in approx. 30 sec.

» TWISTLOCK ROTATION

90° in approx. 1 sec.

» MAX POWER CONSUMPTION

7.5 kW

» HYDRAULICS

System pressure 100 bar

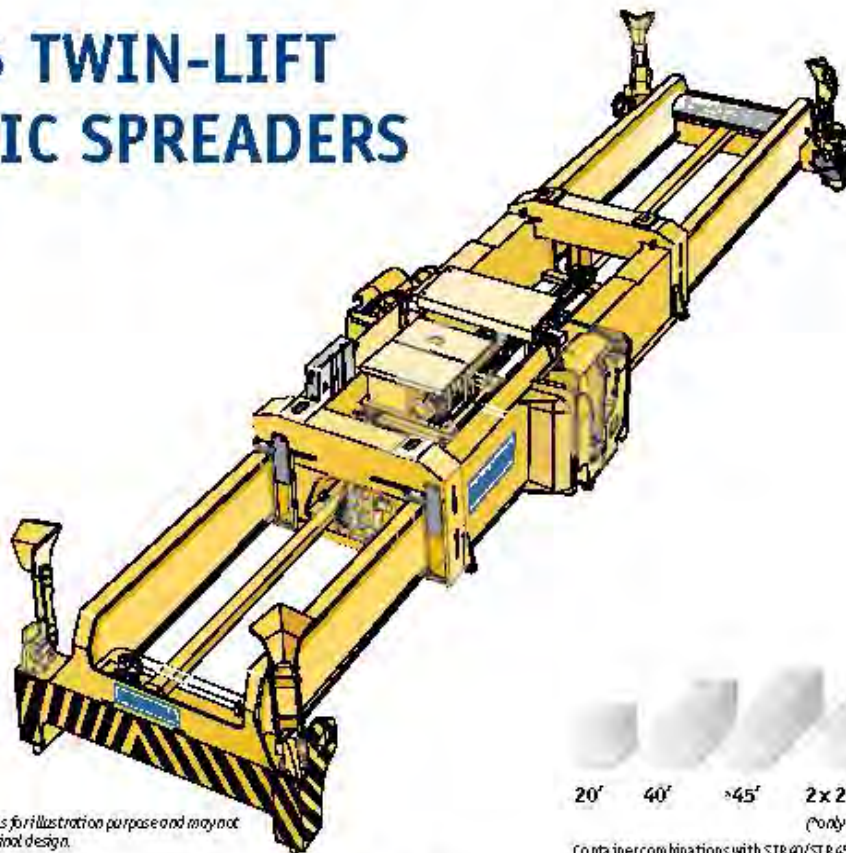
» CONTROL SYSTEM

Relay controlled
(SCS⁺ available as an option)

» CONTROL VOLTAGE

24VDC

STR40/45 TWIN-LIFT HYDRAULIC SPREADERS



The picture shown is for illustration purpose and may not correspond to the final design.

20' 40' 45' 2x 20'
(only STR45)

Contains combinations with STR40/STR45

» LIFT WITHOUT CHANGING THE SPREADER

One or two 20', one 40' or one 45' container.

» ADVANCED COMMUNICATIONS SYSTEM

reduces downtime considerably.

» FAST TROUBLE SHOOTING

The STR40 and STR45 twin-lift can lift one or two 20 foot containers, a single 40 foot container or a 45 foot container – all without changing the spreader.

The telescopic spreader is of a rectangular frame construction enabling easy location on containers. The spreader is as standard equipped with 4 x 10 metric tons lifting lugs in the corners of the end beams for heavy lifts and for handling damaged containers.

The spreader can retract to the 19 foot-6 inch position in case it becomes jammed in the ship's 20 foot cell. The design with recessed end beams makes handling of lashing frames and hatch covers possible. All motions of the spreader are controlled from the driver's cab and there are provisions made for signals in the cab indicating the position of the twistlocks and landing pin status.

Made of high quality steel, the standard STR40 and STR45 spreader provides high lifting capacity with a low nominal tare weight thanks to the box design of the telescoping beams and the main frame. The spreader is designed in accordance with EN13001. All components can be easily assembled, adjusted, removed and are accessible for inspection and maintenance.

The spreader comes with the SCS⁺, reducing and preventing downtime through improvements in the area of electrical connections. It will also shorten downtime through faster spreader fault diagnostics.

Technical Data STR40/45

» LIFTING CAPACITY

51 metric tons, ±10% ecc. load
51 metric tons, evenly loaded
2 x 32,5 metric tons, evenly loaded

» LIFTING LUGS

4 x 10 metric tons in main frame and end beam

» WEIGHT

STR40: About 9,9 metric tons
(without extra equipment)
STR45: About 11 metric tons
(without extra equipment)

» TELESCOPIC MOTION

STR40: 20'–40' in approx. 28 sec.
STR45: 20'–45' in approx. 30 sec.

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» TWISTLOCK ROTATION

90° in approx. 1,5 sec.

» HYDRAULICS

System pressure 100 bar

» TWINLIFT UNIT UP/DOWN

Approx. 8 sec.

» POWER SUPPLY

400/230 V AC 50 Hz or otherwise
as agreed

» MAX POWER CONSUMPTION

7,5 kW

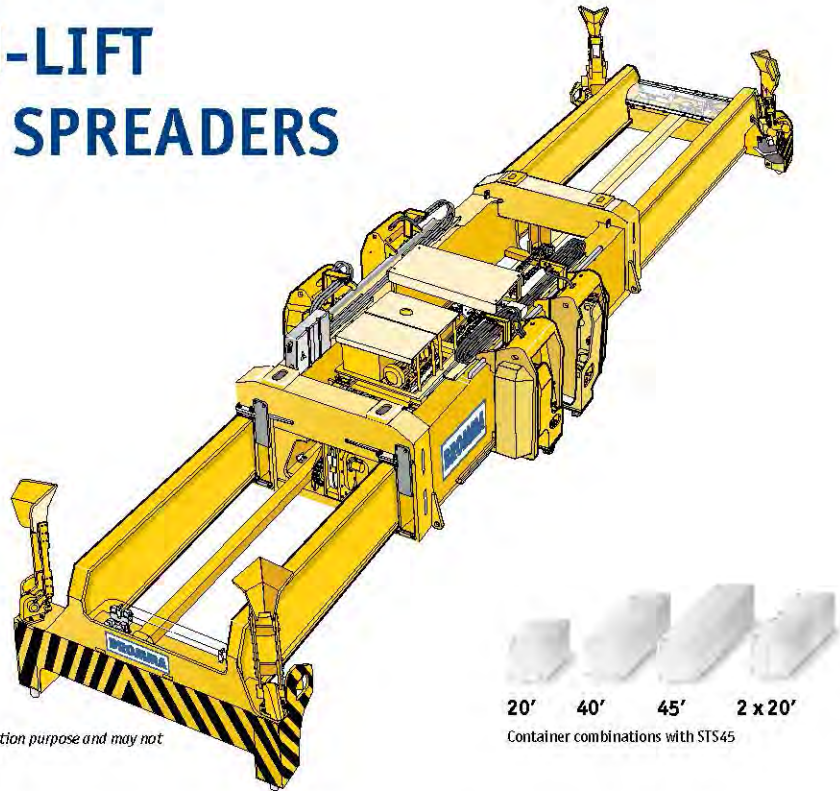
» CONTROL SYSTEM

SCS⁺ spreader control system

» CONTROL VOLTAGE

24VDC

STS45 TWIN-LIFT HYDRAULIC SPREADERS



The picture shown is for illustration purpose and may not correspond to the final design.

20' 40' 45' 2 x 20'
Container combinations with STS45

» TWIN-LIFT SHIP-TO-SHORE HYDRAULIC

spreaders are the most popular products in the Bromma product line, due to their higher productivity and versatility.

» THE SEPARATING STS45 IS EXCELLENT

It can move two 20' containers apart from 0 to 1.6 meters (0'-5') under full load.

Bromma twin-lift hydraulic spreaders are feature rich. Bromma advanced performance technology, such as SCS⁴, is standard on these spreaders. Bromma's optional MPS memory positioning system, available on the STS45, makes the crane operator's task easier, and increases productivity. Options such as the Bromma Twin-Twenty Detection System adds safety and the HIS Height Indication System is ideal for use on high-speed cranes.

On the STS45 separating twin movement can be done at any time in the crane cycle, which means there is no stopping time to change the container spacing. This results in higher flexibility in container ship loading and unloading. Bromma's engineering team ensures high structural integrity through strategic engineering, such as finite element modeling, which analyzes stress points on the spreader and projects the likely effect of accumulated stress over time. Bromma design studies, including buckling, vibration, and stress-related stiffening analyses, enable Bromma Research and Development to evaluate the long-time impact of design changes, and develop optimum design solutions.

Bromma uses premium steel for spreader frame structures selected on the basis of its strength, weldability, and form ability. ISO twistlocks allow for 6mm of float in all lateral directions, providing efficient locating in the container corner castings. These spreaders can retract to the 19'6" position in the event the spreader becomes jammed in the ship's twenty foot cell. Positioning to the 19'6" position can be controlled by the operator if appropriate controls are furnished in the crane cab.

Bromma's STS45 spreader is the industry standard for ship-to-shore container handling, and a constant presence in the most demanding terminals in the world. Bromma understands what ship-to-shore container handling requires, and the twin-lift hydraulic STS spreaders from Bromma deliver it.

Technical Data STS45

» LIFTING CAPACITY

51 metric tons, ±10% ecc. load
51 metric tons, evenly loaded
2 x 32.5 metric tons, evenly loaded

» LIFTING LUGS

4 x 10 metric tons in main frame and end beam

» WEIGHT

About 12.7 metric tons
(without extra equipment)

» SEPARATING CAPACITY

0-1600mm with full load

» TELESCOPIC MOTION

20'-45' in approx. 30 sec.

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» TWISTLOCK ROTATION

90° in approx. 1.5 sec.

» HYDRAULICS

System pressure 100/160 bar

» MAX POWER CONSUMPTION

7.5 kW

» TWINLIFT UNIT UP/DOWN

Approx. 8 sec.

» TWIN EXPAND/RETRACT

Approx. 20 sec.

» POWER SUPPLY

400/230 V AC 50 Hz or otherwise as agreed

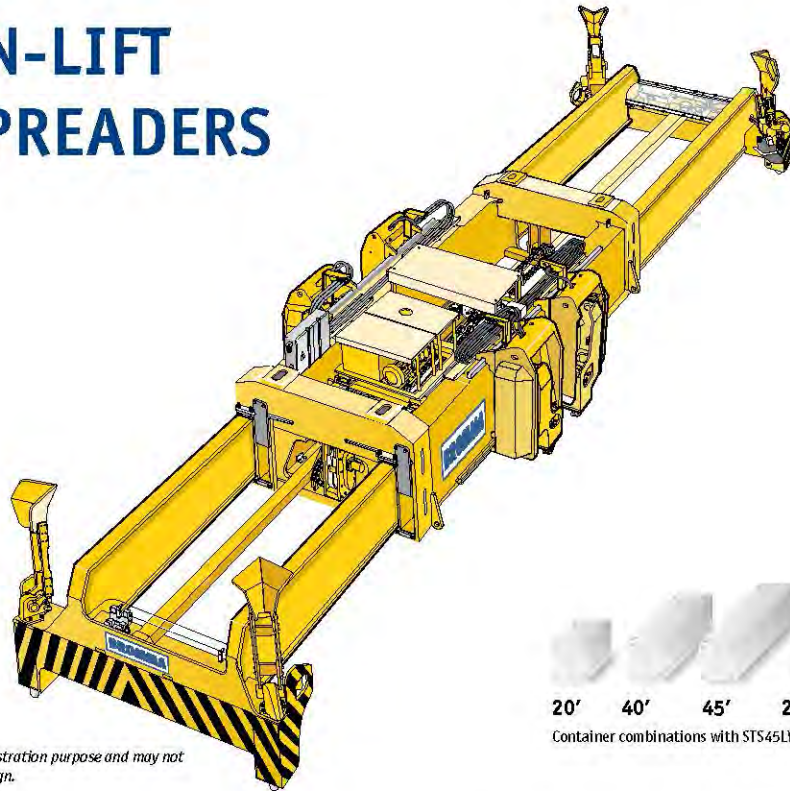
» CONTROL SYSTEM

SCS⁴ spreader control system

» CONTROL VOLTAGE

24VDC

STS45LW TWIN-LIFT HYDRAULIC SPREADERS



The picture shown is for illustration purpose and may not correspond to the final design.

20' 40' 45' 2 x 20'
Container combinations with STS45LW

»TWIN-LIFT SHIP-TO-SHORE HYDRAULIC

spreaders are the most popular products in the Bromma product line, due to their higher productivity and versatility.

»THE STS45LW

It can move two 20' containers apart from 0 to 1.6 meters (0'-5') under full load.

The Bromma STS45LW is a light-weight twin lift hydraulic spreader, ideal for use on cranes rated to lift less weight. It is a feature rich spreader with Bromma advanced performance technology, such as SCS⁴. Bromma's optional MPS memory positioning system and Twin-Twenty Detection System are available for the STS45LW, and makes the crane operator's task easier, plus increases productivity and safety.

On the STS45LW separating twin movement can be done at any time in the crane cycle, which means there is no stoping time to change the container spacing. This results in higher flexibility in container ship loading and unloading. Bromma's engineering team ensures high structural integrity through strategic engineering, such as finite element modeling, which analyzes stress points on the spreader and projects the likely effect of accumulated stress over time. Bromma design studies, including buckling, vibration, and stress-related stiffening analyses, enable Bromma Research and Development to evaluate the long-time impact of design changes, and develop optimum design solutions.

Bromma uses premium steel for spreader frame structures selected on the basis of its strength, weldability, and form ability. ISO twistlocks allow for 6mm of float in all lateral directions, providing efficient locating in the container corner castings. These spreaders can retract to the 19'6" position in the event the spreader becomes jammed in the ship's twenty foot cell. Positioning to the 19'6" position can be controlled by the operator if appropriate controls are furnished in the crane cab.

Technical Data STS45LW

» LIFTING CAPACITY

41 metric tons, ±10% ecc. load
41 metric tons, evenly loaded
2 x 25 metric tons, evenly loaded

» LIFTING LUGS

4 x 10 metric tons in main frame and end beam

» WEIGHT

About 10.7 metric tons
(without extra equipment)

» SEPARATING CAPACITY

0-1600mm with full load

» TELESCOPIC MOTION

20'-45' in approx. 30 sec.

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» TWISTLOCK ROTATION

90° in approx. 1.5 sec.

» HYDRAULICS

System pressure 100/160 bar

» MAX POWER CONSUMPTION

7.5 kW

» TWINLIFT UNIT UP/DOWN

Approx. 8 sec.

» TWIN EXPAND/RETRACT

Approx. 20 sec.

» POWER SUPPLY

400/230 V AC 50 Hz or otherwise as agreed

» CONTROL SYSTEM

SCS⁴ spreader control system

» CONTROL VOLTAGE

24VDC

BROMMA TANDEM™

A Higher Level Of Productivity

» **BROMMA TANDEM™ WILL INCREASE PRODUCTIVITY**

when loading and unloading ships stacked with 40' containers. It is also ideal for terminals with a high volume of empty containers, and cranes with limited lift capacity.

» **FOR TERMINALS MOVING A SIGNIFICANT NUMBER**

of 40' or 45' containers, Tandem™ can significantly boost the productivity of each lift cycle.



Tandem™ Productivity

Bromma Tandem™ spreaders are feature-rich. Long side flippers mounted on an inclined base, and rounded end beams, avoid jamming in cell guides. The four wagons can be moved individually to allow skewing and gravity point adjustment, should this be needed. A memory system allows a pre-set positioning distance between the spreaders. Chain suspension allows Tandem™ to handle containers of different height. Eight powerful flippers with large scoops in optimal configuration allow Tandem™ to handle different combinations efficiently.

The Bromma Tandem™ Headblock with a adjustable pulley wheel distance keeps the gravity point of the two containers between the pulley wheels center in Tandem™ mode. When operating with a standard spreader, the pulley wheels will retract to normal headblock width. Pulley wheels move from standard narrow width position to a wide width position. Bromma can also provide a fully automatic electrical plug/socket interface and can assist in modification work for the existing crane electrical interface and communication system to enable the handling of Tandem™ spreaders.

The Bromma Tandem™ spreader is a new productivity tool for an industry that's hungry for productivity. At container terminals around the world, there are more and more 40' containers, and fewer 20' containers. The type of spreader used to handle these containers, and the brand of spreader selected, can have a major impact on operating efficiency. Bromma Tandem™ is one tool in the effort to boost productivity, as it offers the opportunity to greatly expand the productivity of each lift cycle.

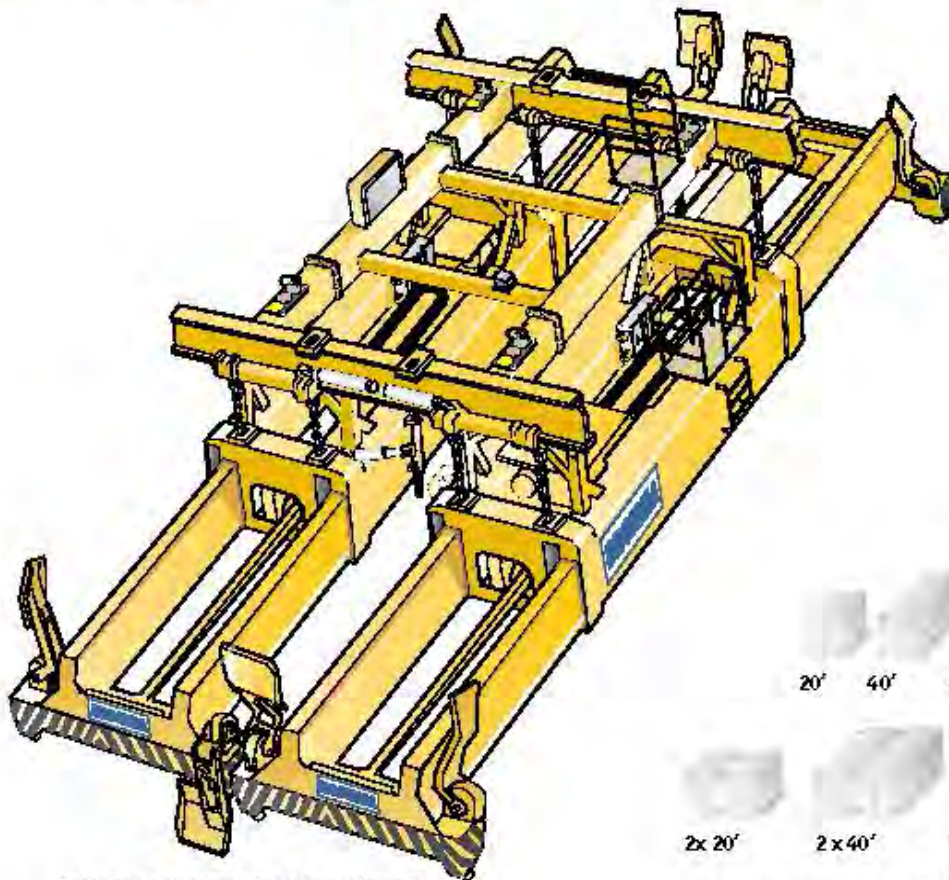
Chances are that whatever your terminal's container mix is today, it will be somewhat different tomorrow, and that whatever your terminal's container volume is today, it will be somewhat greater tomorrow. Bromma Tandem™ is a spreader advance in both areas – providing both a productivity boost and an extremely versatile lifting tool. Bromma Tandem™ will increase productivity when loading and unloading those sections of container ships stacked with 40' containers. It is also ideal for terminals with a high volume of empty containers and cranes with limited lifting capacity. Bromma Tandem™ has the ability to simultaneously lift four 20' containers (Tandem™ Quattro), or two 40' containers, or two 45' containers, or many other combinations, including hatch covers. It can easily handle container height differences of up to 700mm, and has productivity of up to 60 40' or 45' containers per hour.

A Proven Design

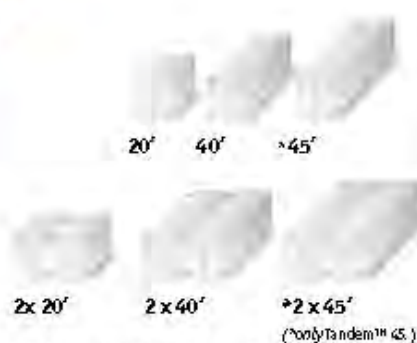
Moreover, except for lifting capacity, there is no need for a special crane design. With Bromma's pioneering SCS⁴ spreader technology, terminals can swap spreaders between different cranes, and install new spreader models, such as Tandem™, without any concern about the interface with other spreader models.

While Bromma Tandem™ is innovative, it is also important to note that it is based on a simple technical approach that features spreader design and technology with proven reliability. The fixed-length Tandem™ was first put into field tests in 2003. It is also not a complicated design solution. The type of Tandem™ spreader selected depends on the crane lift capacity. Except for sufficient lifting capacity, there is no need for a special crane design. The inherent versatility of the Bromma Tandem™ family makes it an ideal choice for terminals looking to the horizon and operating with a long-term perspective when making spreader fleet planning decisions.

TANDEM™ 40/45



The picture shown is for illustration purpose and may not correspond to the final design.



Container combinations with Tandem™ 40/45

» THE TANDEM™ 40/45 SPREADER

is able to twin-lift two 20', 40', or 45' containers without the need, as in the Tandem™ fixed-length version, for change-out.

» THIS IS A PROVEN SPREADER DESIGN

field-tested in high throughput European and Asian terminals.

» THE TANDEM™ HEADBLOCK

is necessary for the efficient handling of the Tandem™ spreader line.

The Tandem™ 40/45 spreader is based on proven Bromma spreader design, as it uses the SSX40/45 spreader as its standard base. A terminal planning to utilize the full 70 metric tons capacity under the spreader will need crane capacity of approximately 100 metric tons in the ropes.

As such, the Tandem™ 40/45 can be used without restriction on many last-generation container cranes already in service today. Customers who handle very few 45' containers may wish to consider the 40' version of the Tandem™ 40/45. This will save approximately 2 metric tons in spreader weight.

Technical Data Tandem™ 40/45

» LIFTING CAPACITY

2x41 metric tons

» POWER SUPPLY

400/230 VAC 50 Hz or otherwise as agreed

» MAX POWER CONSUMPTION

15 kW

» SKEWING

±20 degrees

» WEIGHT

TANDEM™ 40: About 20.5 metric tons (without extra equipment)

TANDEM™ 45: About 22.1 metric tons (without extra equipment)

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» CONTROL SYSTEM

SCS⁺ spreader control system

» SKEWING SPEED

1 degree in 2 sec.

» TELESCOPIC MOTION

TANDEM™ 40: 20'-40' in approx. 28 sec.

TANDEM™ 45: 20'-45' in approx. 30 sec.

» HYDRAULICS

System pressure 140 bar

» CONTROL VOLTAGE

24VDC

» TANDEM SEPARATING SPEED

1000 mm in 10 sec.

CONTAINER HEIGHT DIFFERENCE (Loading/Unloading)

» 2 / 660 mm

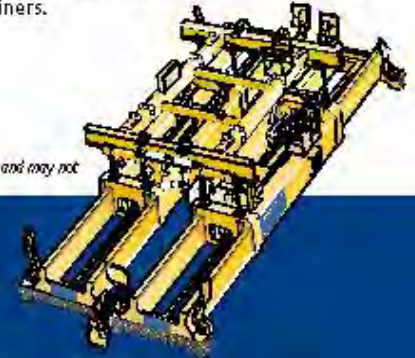
The Bromma Tandem™ E3 spreader offers great capacity and flexibility. Low spreader weight is combined with the ability to lift different combinations of 40 or 45 foot containers side by side as shown below. The spreader can also lift single 40 and 45 foot containers.



40' 45' 2x40' 2x45'

Container combinations with Tandem™ E3

The Tandem™ E3 spreader also offers another advantage: the capability to do side shift on individual spreaders, which is useful when the chassis or containers on the ground are not fully lined up in the longitudinal direction. The limitation on the E3 is that it cannot lift 20 foot containers. Due to this limitation, the Tandem™ E3 is especially well-suited for container terminals that have a high percentage of 40 and 45 foot containers, and a low percentage of 20 foot containers.



The picture shown is for illustration purpose and may not correspond to the final design.

Technical Data Tandem™ E3

» **LIFTING CAPACITY**

2 x 41 metric tons

» **HYDRAULICS**

System pressure 140 bar

» **CONTROL VOLTAGE**

24VDC

» **WEIGHT**

About 21 metric tons
(without extra equipment)

» **TWISTLOCK ROTATION**

90° in approx. 1 sec.

» **CONTAINER HEIGHT DIFFERENCE**

(Loading/Unloading)
» 2/600 mm

» **SKEWING SPEED**

1 degree in 2 sec.

» **TELESCOPIC MOTION**

40'-45' in approx. 18-20 sec.

» **MAX POWER CONSUMPTION**

15 kW

» **SKEWING**

±20 degrees

» **TANDEM SEPARATING SPEED**

1000 mm in 10 sec.

» **FLIPPER ARM SPEED**

180° in 3 to 5 sec.

» **CONTROL SYSTEM**

SIS⁺ spreader control system

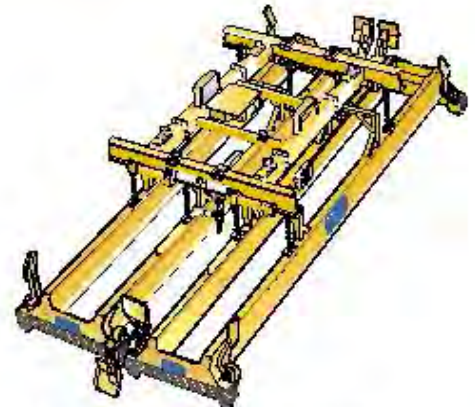
The Tandem™ Fix 40 is an ideal choice for customers interested in gaining the added productivity of twin-40 container handling, but who are somewhat restricted in their choices due to cranes with limited lifting capacity.

The Tandem™ Fix 40 is, from a design standpoint, the simplest Tandem™ model available today. It uses Bromma spreader design and technology that has been proven to be reliable over many years and many millions of lift cycles. Customers should keep in mind that the operating limitation of the Tandem™ Fix 40 is that it is for 40' containers only. This is why the Tandem™ Fix 40 is best-suited for terminals where ships tend to be stacked with a high percentage of 40' containers, or when the crane has a limited lift capacity.



40' 2x40'

Container combinations with TANDEM™ Fix 40



The picture shown is for illustration purpose and may not correspond to the final design.

Technical Data Tandem™ Fix 40

» **LIFTING CAPACITY**

2 x 35 metric tons

» **FLIPPER ARM SPEED**

180° in 3 to 5 sec.

» **MAX POWER CONSUMPTION**

15 kW

» **SKEWING**

±20 degrees

» **WEIGHT**

About 16 metric tons
(without extra equipment)

» **TWISTLOCK ROTATION**

90° in approx. 1 sec.

» **CONTROL SYSTEM**

SIS⁺ spreader control system

» **SKEWING SPEED**

1 degree in 2 sec.

» **HYDRAULICS**

System pressure 140 bar

» **CONTROL VOLTAGE**

24VDC

» **TANDEM SEPARATING SPEED**

1000 mm in 10 sec.

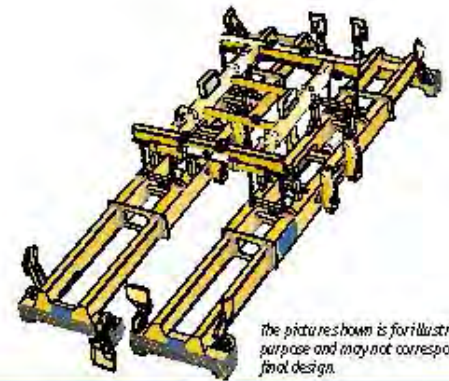
» **POWER SUPPLY**

400/230 VAC 50 Hz or otherwise as agreed

» **CONTAINER HEIGHT DIFFERENCE**

(Loading/Unloading)
» 2/600 mm

The Tandem™ Quattro is a high-productivity, lower weight Tandem™ solution. The limitation on Tandem™ Quattro is that it is not designed to lift a single 20' container. The Tandem™ Quattro is especially well-suited for container terminals that have a high percentage of 40' and 45' containers, and a low percentage of 20' containers that are located in such a way that they need to be loaded/unloaded in single lift mode. The Tandem™ Quattro offers the ability to handle four 20 foot containers at a time – two 20 foot containers under each spreader.



The picture shown is for illustration purpose and may not correspond to the final design.



40' 45' 2 x 20' 2 x 40' 2 x 45' 4 x 20'
Container combinations with Tandem™ Quattro

Technical Data Tandem™ Quattro

» LIFTING CAPACITY

2 x 51 metric tons
4 x 32,5 metric tons

» WEIGHT

About 24 metric tons
(without extra equipment)

» TELESCOPIC MOTION

40'-45' in approx. 18-20 sec

» FLIPPER ARM SPEED

180° in 3 to 5 sec.

» HYDRAULICS

System pressure 140 bar

» TWISTLOCK ROTATION

90° in approx. 1 sec.

» MAX POWER CONSUMPTION

15 kW

» CONTROL SYSTEM

SCS⁴ spreader control system

» CONTROL VOLTAGE

24VDC

» CONTAINER HEIGHT DIFFERENCE

(Loading/Unloading)
» 2/600 mm

» SKEWING

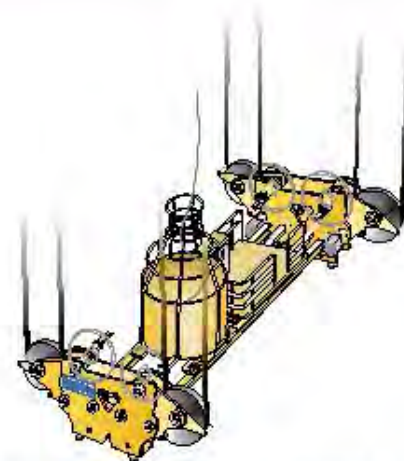
±20 degrees

» SKEWING SPEED

1 degree in 2 sec.

» TANDEM SEPARATING SPEED

1000 mm in 10 sec.



The picture shown is for illustration purpose and may not correspond to the final design.

Technical Data Tandem™ Headblock

» LIFTING CAPACITY UNDER HEADBLOCK

165 metric tons (for Tandem 45)

» HEADBLOCK TARE WEIGHT

About 6,8 metric tons
(for Tandem 45)
(without extra equipment)

» HYDRAULICS

System pressure 100 bar

» CONNECTION TO SPREADER

Twistlock

» TWISTLOCK ROTATION

90° in approx. 1,5 sec.

» MAX POWER CONSUMPTION

3 kW at 50-60 Hz

» CONTROL VOLTAGE

24VDC

» PULLEY WHEEL DISTANCE

Approx. 5 min. (manual)
Approx. 1 min. (fully automatic)



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YTR40/45	1010280
YSX40/45B	1010282
YSX40/45	1010281
STS45 Mechanics	1010273
STS45 Hydraulics	1010272
STR40/45	1010276
SSX40/45	1010277

Videos

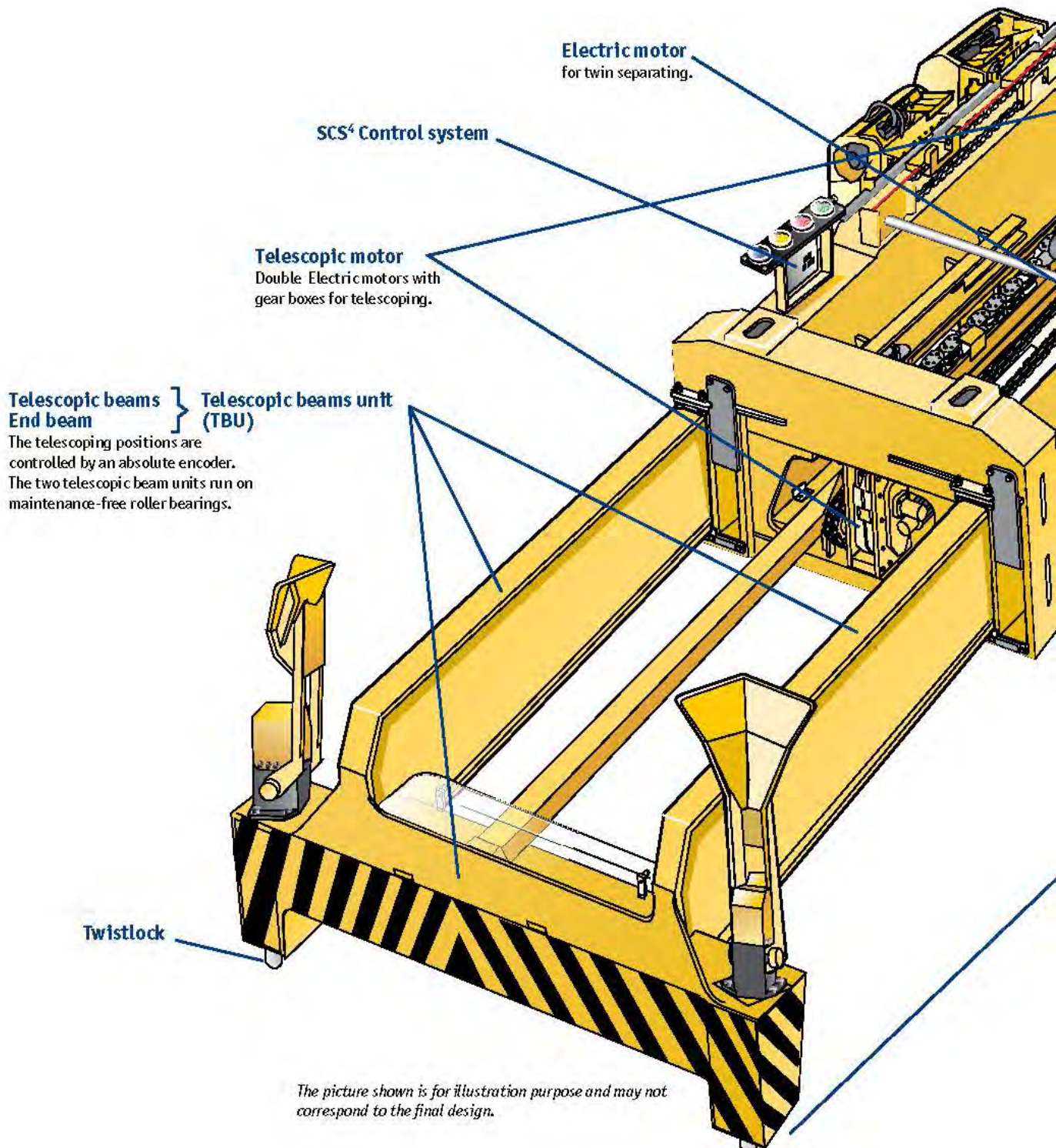
Bromma Report

SCS³ Spreader Control System

KEY FEATURES

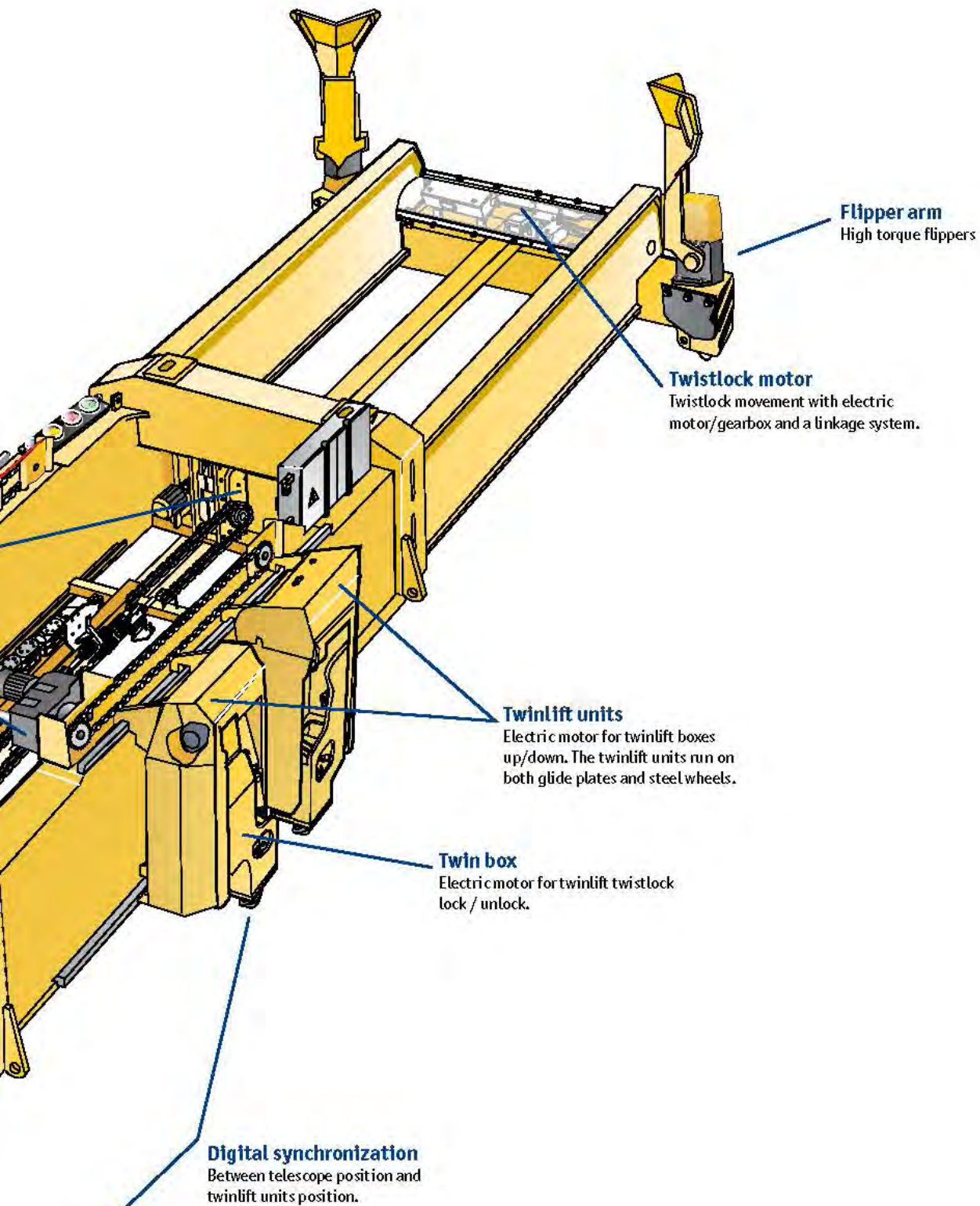
» DUE TO BROMMA'S LONG EXPERIENCE IN CONTAINER HANDLING Bromma engineers have developed a number of smart and reliable solutions for the ship to shore spreaders.

» THESE SPREADERS ARE DESIGNED TO WITHSTAND hard treatment with less servicing need, and have contributed greatly to the success of Bromma and our leading market position.



Telescopic beams } Telescopic beams unit (TBU)
End beam
The telescoping positions are controlled by an absolute encoder. The two telescopic beam units run on maintenance-free roller bearings.

The picture shown is for illustration purpose and may not correspond to the final design.



SHIP-TO-SHORE SPREADERS

CONTAINER HANDLING CAPABILITY

Page

| 20' | 40' | 45' | 2x20' | 2x40' | 2x45' | 4x20' |

Approximate Weight

GREENLINE E-SERIES



STS45E

5

| • | • | • | • | | | | |

11.7 metric tons



STR40E

6

| • | • | | • | | | | |

9.8 metric tons



STR45E

6

| • | • | • | • | | | | |

11.3 metric tons



SSX40E

7

| • | • | | | | | | |

8.6 metric tons



SSX45E

7

| • | • | • | | | | | |

9.6 metric tons



SSX40

10

| • | • | | | | | | |

8.7 metric tons



SSX45

10

| • | • | • | | | | | |

9.6 metric tons



STR40

11

| • | • | | • | | | | |

9.9 metric tons



STR45

11

| • | • | • | • | | | | |

11 metric tons



STS45

12

| • | • | • | • | | | | |

12.7 metric tons



STS45LW

13

| • | • | • | • | | | | |

10.7 metric tons

HYDRAULIC

TANDEM



TANDEM 40

15

| • | • | | • | • | | | |

20.5 metric tons



TANDEM 45

15

| • | • | • | • | • | | | |

22.1 metric tons



TANDEM E3

16

| | • | • | | • | • | | | |

21 metric tons



TANDEM FIX40

16

| | • | | | • | | | | |

16 metric tons



TANDEM QUATTRO

17

| | • | • | • | • | • | • | |

24 metric tons



HEADBLOCK

17

| | | | | | | | | |

6.8 metric tons

MAX POWER (kW)	SWL (in metric tons)			SPEED (sec.)		Operating Details
	Even.	Eccen.	Twin	Twistlocks 90°	Telescopic	

7.5	51	51	2x32.5	~1	~30	Twinlift unit up/down approx. 6 sec. Twin separating speed approx. 18 sec.
7.5	51	51	2x32.5	~1	~28	Twinlift unit up/down approx. 6 sec.
7.5	51	51	2x32.5	~1	~30	Twinlift unit up/down approx. 6 sec.
7.5	41	41	-	~1	~28	
7.5	41	41	-	~1	~30	
7.5	41	41	-	~1	~28	
7.5	41	41	-	~1	~30	
7.5	51	51	2x32.5	~1.5	~28	Twinlift unit up/down approx. 8 sec.
7.5	51	51	2x32.5	~1.5	~30	Twinlift unit up/down approx. 8 sec.
7.5	51	51	2x32.5	~1.5	~30	Twinlift unit up/down approx. 8 sec. Twin separating speed approx. 20 sec.
7.5	41	41	2x25	~1.5	~30	Twinlift unit up/down approx. 8 sec. Twin separating speed approx. 20 sec.
15	2x41	2x41	-	~1	~28	Container Height Difference (Loading/unloading): 660 mm (standard); Skewing: ±20°; Separating speed: 1000 mm in 10 sec.
15	2x41	2x41	-	~1	~30	Container Height Difference (Loading/unloading): 660 mm (standard); Skewing: ±20°; Separating speed: 1000 mm in 10 sec.
15	2x41	2x41	-	~1	-	Container Height Difference (Loading/unloading): 660 mm (standard); Skewing: ±20°; Separating speed: 1000 mm in 10 sec.
15	2x35	2x35	-	~1	-	Container Height Difference (Loading/unloading): 660 mm (standard); Skewing: ±20°; Separating speed: 1000 mm in 10 sec.
15	2x35	2x35	4x32,5	~1	-	Container Height Difference (Loading/unloading): 660 mm (standard); Skewing: ±20°; Separating speed: 1000 mm in 10 sec.
-	165 metric tons	-	-	~1.5	-	Pulley wheel distance adjustment: About 5 min. (manual), About 1 min. (fully automatic)

