

The complete program for quick die change

clamping
positioning
transporting



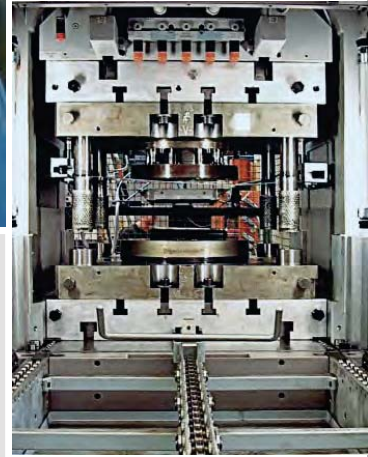
SERAPID
PUSHING AHEAD

Product variants and just-in-time manufacturing make die change an economically critical factor in running a metal-forming press. While ever smaller lots make production runs shorter, more frequent die changes make press downtime longer, and strain the costly dies. Physical stress on the users and accident hazard increase.

With SERAPID's QDX program you will eliminate these problems, dramatically reduce downtime and increase the overall efficiency of your press equipment.

The complete program for quick die change: clamping, positioning and transporting

The QDX program covers the entire process of die change. Components are optimized for results that really count to make the process of die change quick, consistent and a measurable return on investment



clamping

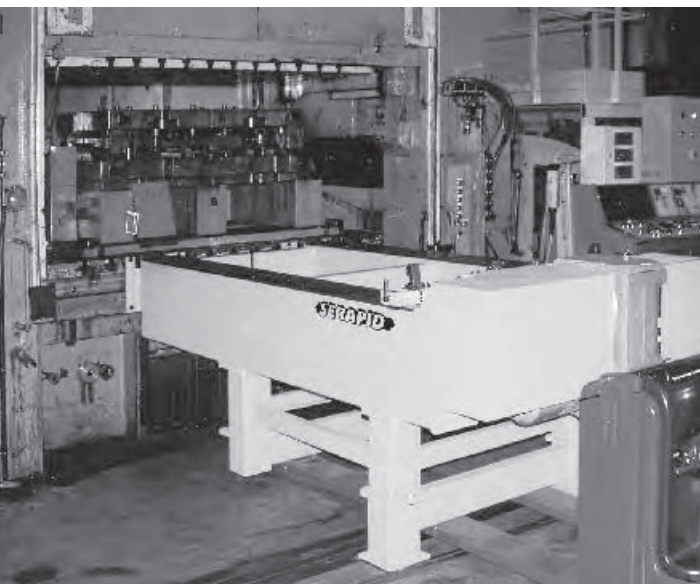
We offer a variety of clamps for standard as well as for exceptional working environments. Clamping and unclamping of dies is automatic or requires only minimal manual intervention.

positioning

Our die rollers and lifters let dies glide smoothly into their clamping positions. Our motion systems drive them safely and accurately on pre-defined transfer paths.

transporting

Our transporters range from simple die carts to rail-bound die shuttles that will take your dies to the press and back to storage. You can even get the storage racks from us.



Quickly through safety, ergonomics and efficiency

We believe really quick die change has three main requirements:

Safety: With a QDX System, no human operators have to enter or reach into hazardous areas. Interlocking and interacting safety mechanisms can be employed to effectively prevent any dangerous human interventions. No more delays or damage because of slips or accidents.

Ergonomics: The heavy loads of outgoing and incoming dies are moved by machines on pre-defined tracks. Operators control the process from remote panels. Depending on the

amount of automation implemented, manual actions will be reduced to a minimum or no longer be required at all. Operating procedures are simple and easy to learn.

Efficiency: A QDX system will reduce die change times to a few minutes. That is a figure you can count on, since the process can be repeated accurately at any time. Moreover, your equipment will be handled smoothly and gently, and be protected against damage and wear.

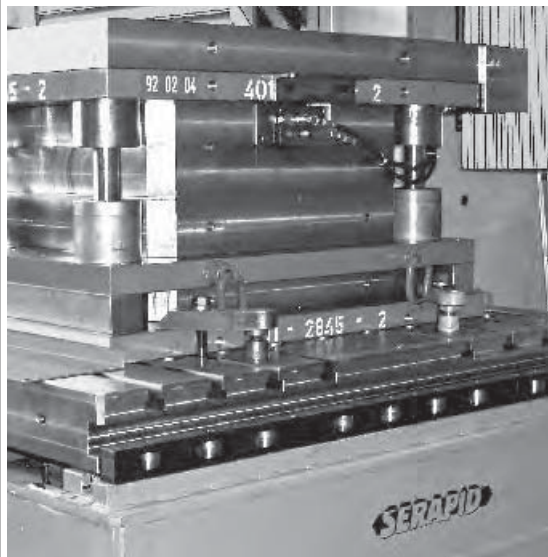
The quickest system will be one that fulfills all three goals in each of the three phases of the change process: in clamping, in positioning and in transporting.

To each his own — all from a one-stop shop

Die change is a complex process requiring experience in a number of fields. Clamping, rolling and motion technology are closely related, but encompass a broad range of engineering and manufacturing disciplines.

SERAPID keeps dedicated manufacturing sites for quick die change equipment, linear motion systems, transport equipment and custom-engineered systems. Our engineering teams are specialists in different fields, but still work together closely and maintain a constant dialogue of information and experience.

For our customers, this brings many benefits, whether you are interested in specific die change components, or a complete system. We are happy to provide you with a custom-designed solution.



Building your QDX system step by step

**rolling
elements**

**bolster
extensions**

1

Let's start with the infrastructure. Rolling elements create the low-friction paths on which the die smoothly enters the press and accurately reaches its operating position.

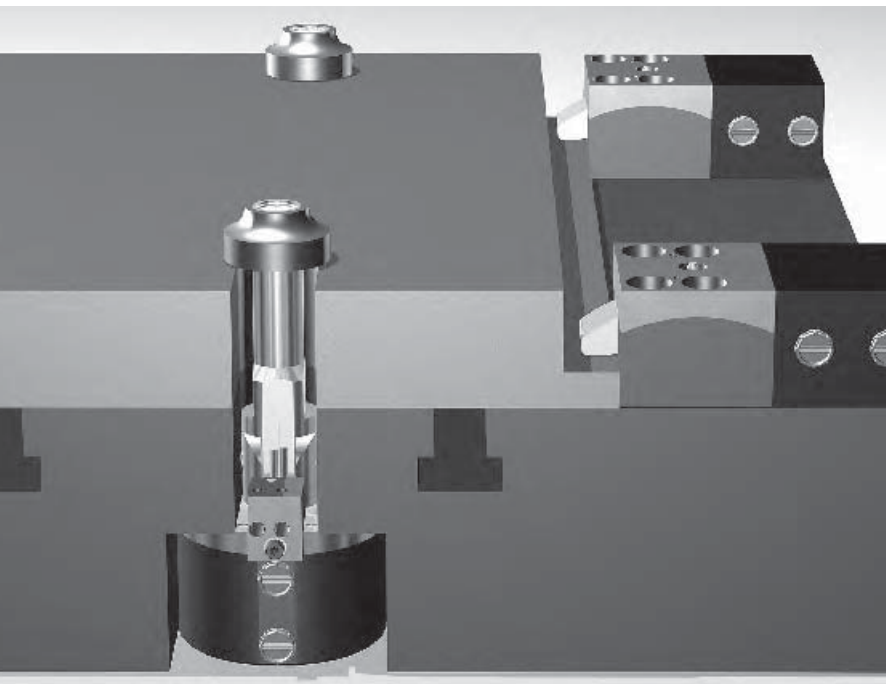
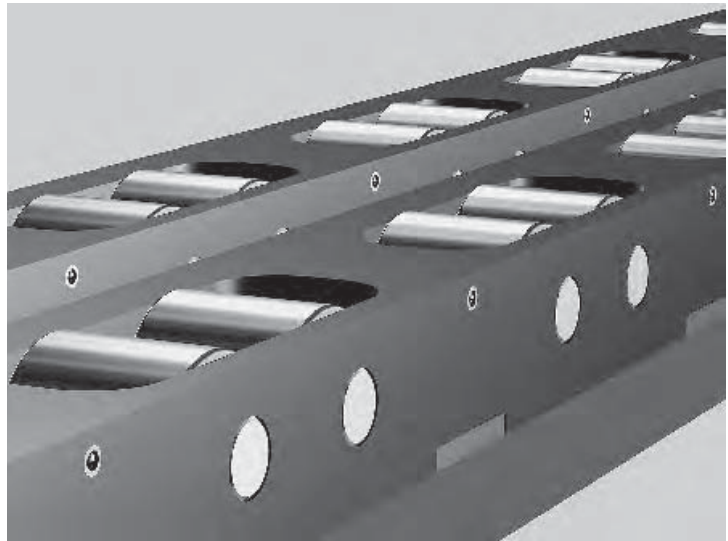
Step 1 *pp. 6 – 10*

balls / rollers / rollers on bearings

single cartridges / bars

hydraulic / mechanical lifting

bolster extensions / bars with fixed rollers



2 **clamps**

Next on schedule come clamps. We offer a comprehensive selection to choose from: fully automated or manually supported clamps, among them some innovative and practical solutions.

Step 2 *pp. 12 – 19*

fixed / removable clamps

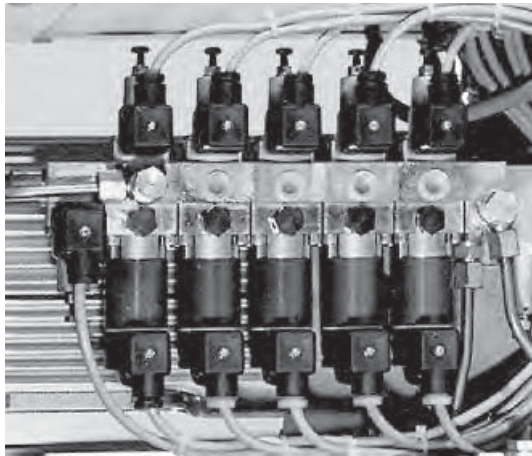
embedded / retractable clamps

roller-bar clamps

rod clamps

C-clamps

lever clamps



3 hydraulics

Rollers and clamps more often than not require a hydraulic power source. We supply equipment suitable for your system configuration, from the simple manual pump to the electrically controlled power pack.

Step 3

pp. 20 – 21

manual pump / air-driven pump

air-driven / electric power pack

accessories

full installations

positioning systems

transporters

4

Finally for the most difficult job, moving tons of costly die equipment and deploying it for work. The QDX program will provide a powerful and economical solution, well suited to your application. With capacities of 50 tons or more, we are quite certain we have got something to handle your dies, too.

Step 4

pp. 22 – 31

push-pull system

die carts

die shuttles on rails

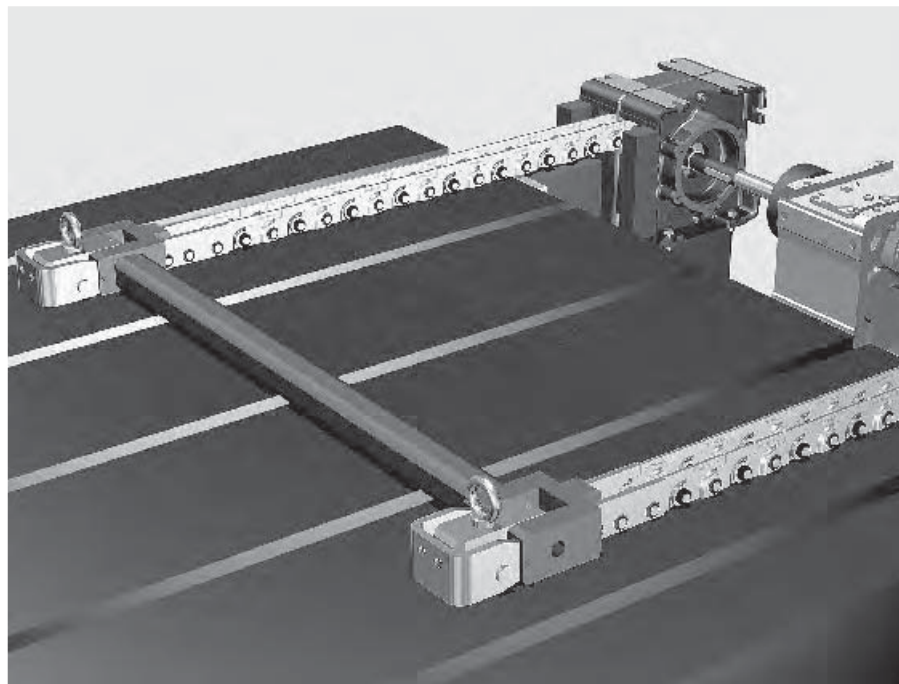
loading tables

rolling bolster systems

Domino / T-track systems

storage racks / staging tables

sample die change procedures



QUICK DIE XCHANGE
QDX

1 Rollers, roller bars, bolster extensions

Rolling elements integrated into bolsters and feeding devices make the pathways of quick die change. Considering the size and weight of the die as well as economic and application-dependent aspects, there are different ways to implement efficient rolling.

Rolling on balls

allows flexible and highly accurate positioning. The die can be moved in any direction and at any angle. This is useful for smaller dies that are positioned manually, but should not be used with heavier dies, from about two tons up. With only a point of contact, the rolling effort may become high enough to damage the die's surface. Even with low weights it must be ensured the underside of the die is of sufficient hardness.

Rolling on cylindrical rollers

allows only forward and backward movement. Positioning accuracy is ensured by using guides and/or a loading device, such as our Push-Pull System (PPS). The load capacity is much higher than with balls, because the contact surface between the roller and the die is much larger. With die surfaces of standard hardness, damage is practically ruled out.

When are rolling elements required?

Always. It might be possible in some cases to have the die simply slide across the bolster, but the more frequent the die change, the smoother it should run. Damage to the bolster and die, time lost with dies getting stuck, and a high consumption of energy will soon cut down on profitability. Rolling elements, by contrast, ensure optimal operation at one-time-only costs.

*rolling elements,
rolling bars: p. 8 – 9*

Rolling on roller bearings

is possible with some of our roller bars that can be furnished with antifriction bearings for an even lower rolling effort. These bearings are also available in waterproof, dustproof, polymer-coated and chemically resistant designs. As the bearings could be damaged by shock loads, an adequate loading device, such as a SERAPID Push-Pull System, is strongly recommended.

for further information

on our rolling elements and bolster extensions, visit our website www.serapid.com. To find or request datasheets and technical drawings, use the code specified with each product, for example:

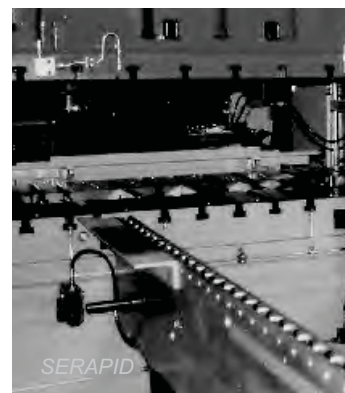
010-01 LBR

dies > 2 tons

Rolling elements should be used for any dies above two tons, in any application situation.

dies > 10 tons

For dies above 10 tons, heavy-duty bars, in special slots, should be used. If this is not possible, fixed rollers should be installed on the loading console or staging table outside the press to minimize the risk of shocks.





Selecting rolling elements

► **Mechanical or hydraulic?** Balls and rollers are lifted either mechanically, by spring force, or hydraulically, by pressure. Springs press the rolling element against the die permanently, even when it is clamped down. Hydraulically lifted rolling elements, in contrast, retract to their resting positions when the pressure is released.

► **Rolling bars or single elements?** Our rolling elements are available in bars that fit into standard or special slots in the press bolster, or in separate cartridges that can be installed in any desired arrangement.

► **Size of the T-slots?** Our rolling bars are available in ASA B5-1 sizes from A13 to A21. To be safe, always check the true dimensions of the T-slots in the press bolster. Special sizes and custom designs are regularly provided upon request.

► **Hydraulic supply?** Horizontal or vertical UNF $\frac{7}{16}$ ", UNF $\frac{9}{16}$ ", G $\frac{1}{8}$ " or G $\frac{1}{4}$ ", standard is horizontal UNF $\frac{7}{16}$ " for sizes from A13 to A17, or UNF $\frac{9}{16}$ " for sizes from A18 to A21.

► **How much lifting force?** The total force required to lift the die is spread over the minimum number of rolling elements that are in contact with the die plate at any one time. Therefore, take into account the distance between rolling elements as well as gaps in the bolster. For instructions on calculating the load see our datasheet 010-00.

► **Dynamic load?** Check the relevant graphs provided in the above mentioned datasheets to make sure the dynamic capacity of the rolling elements will not be exceeded. Dynamic overload will damage the contacting surface. If necessary, reinforce the rolling path with hardened steel strips.

► **Rolling friction?** The rolling friction depends chiefly on the hardness of the surface. With balls assume a friction coefficient between 0.15 and 0.2. With small rollers, the friction coefficient typically lies between 0.04 and 0.07. In general — the bigger the rollers, the lower the friction.



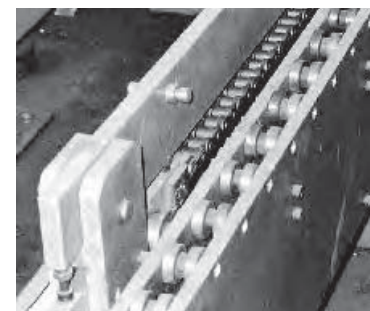
Bolster extensions

are used for positioning the die in front of the press or to bridge gaps between the bolster and a die cart. All our bolster extensions feature big rollers to ensure smooth movement of the die. The rolling paths line up seamlessly with ASA B5-1 bars in the bolster. Thanks to their light-weight structure, the bolster extensions are available as fixed, swing-aside or completely mobile versions. All types can be

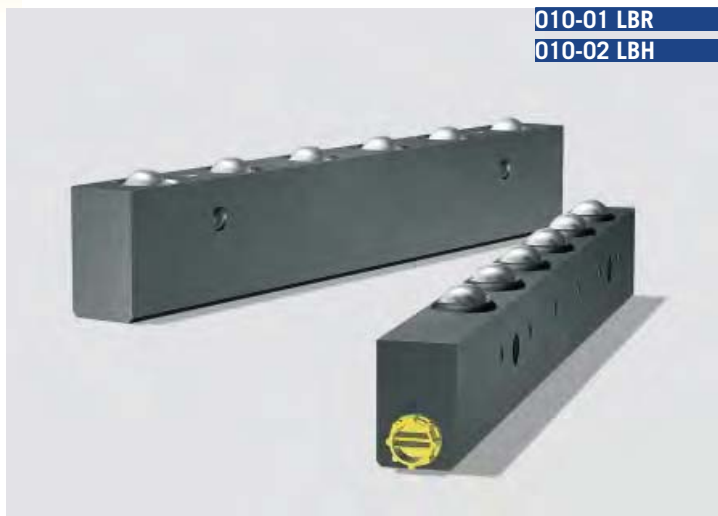
fitted with sliding mounting brackets, and with supports and extensions as required. Legs and floor rollers are also available for easy deployment at different presses.

The standard versions of our bolster extensions are found on the following pages. For options use this product code:

100-07 — accessories for bolster extensions



1 Rolling elements, rolling bars

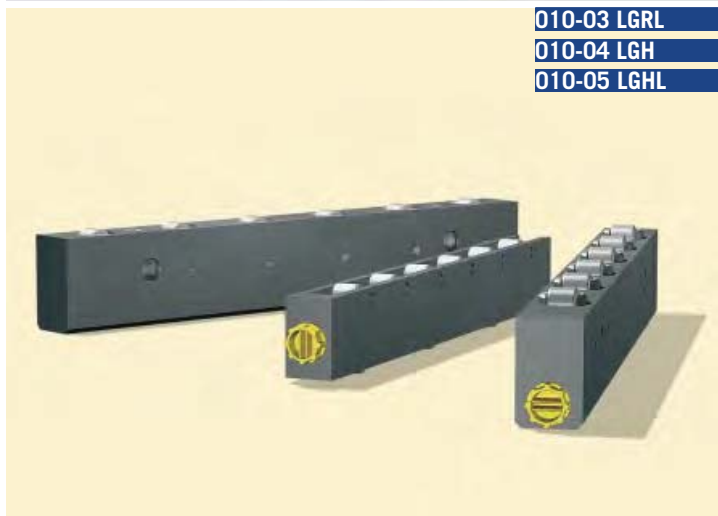


010-01 LBR

010-02 LBH

LBR / LBH ball bars

- ▶ type LBR with mechanical, type LBH with hydraulic lifting
- ▶ balls allow movements at any angle
- ▶ moderate rolling friction
- ▶ especially useful for dies that have to be accurately positioned by hand



010-03 LGRL

010-04 LGH

010-05 LGHL

LGRL / LGH / LGHL roller bars

- ▶ type LGRL with mechanical, types LGHL and LGH with hydraulic lifting
- ▶ types LGRL and LGHL with individual lifting cartridge on each roller, type LGH with hydraulic lifting for the entire bar
- ▶ forward and backward movements
- ▶ low rolling friction
- ▶ type LGH available with rollers arranged in pairs, to allow more rollers in the same space, and thus higher loads



020-01 LGGH

LGGH heavy-duty hydraulic roller bar

- ▶ for die weights above 10 tons
- ▶ low rolling friction
- ▶ hydraulic lifting
- ▶ in rolling bolster systems, the bar can be mounted inversely, with rollers down, to move the bolster on the floor

LC ball cartridge

- ▶ allows rolling areas of any size and shape
- ▶ embedded in the press bolster or the die, can be used when there are no T-slots available
- ▶ spring washer pack
- ▶ available in different sizes and with different capacities

030-01 LC



CG / CGH roller cartridge

- ▶ allows rolling areas of any size and shape
- ▶ embedded in the press bolster or the die, used when there are no T-slots available
- ▶ CG with mechanical, CGH with hydraulic lifting
- ▶ available in different sizes and with different capacities
- ▶ special version CGX with 1,350 and 2,250 lbf lifting force, custom sizes and shapes by request

030-02 CG

030-03 CGH



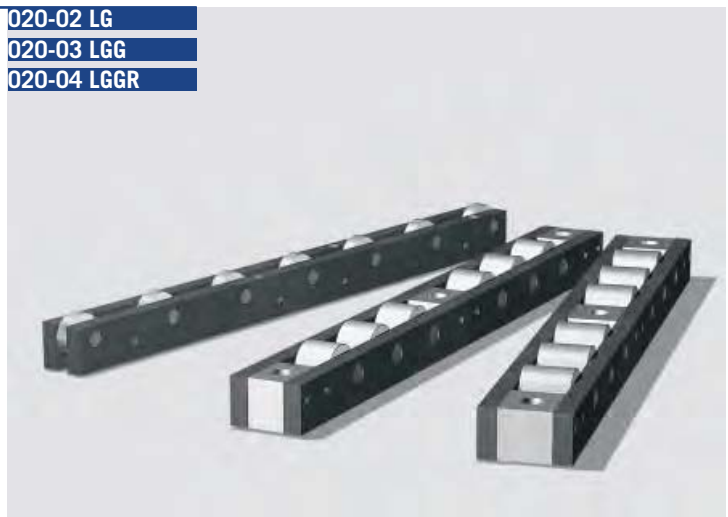
LG / LGG / LGGR heavy-duty roller bars with fixed rollers

- ▶ roller bar with fixed rollers (non-lifting)
- ▶ used in permanent rolling tracks between presses and storage locations
- ▶ used as a rolling carriage with very heavy dies
- ▶ LGG and LGGR with wide rollers (1.2 and 1.6 in, respectively) for dies > 10 tons

020-02 LG

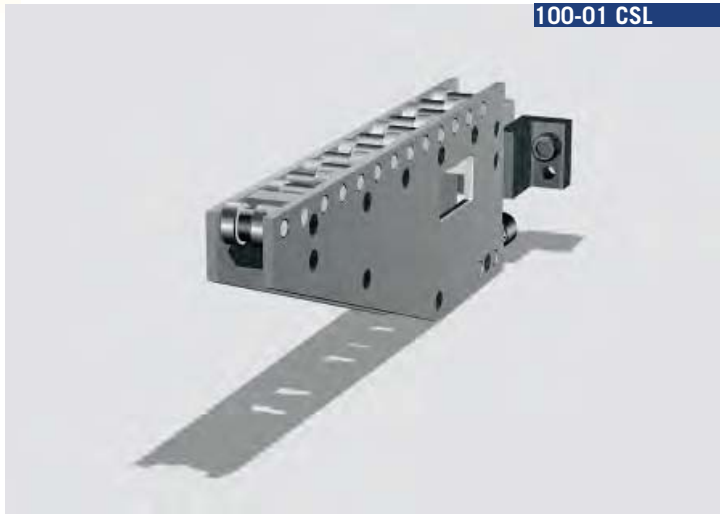
020-03 LGG

020-04 LGGR



1 Bolster extensions

100-01 CSL



CSL removable bolster extension

- ▶ quick and easy snap-in lock
- ▶ one pair suitable for up to 3 tons per 3 ft
- ▶ light-weight construction
- ▶ low rolling friction
- ▶ optional height- and level-adjustable mounting brackets allow use on different presses

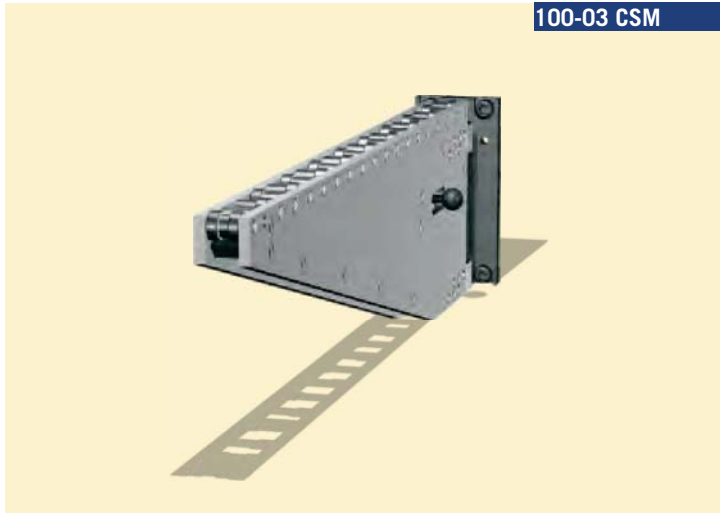
100-02 CSP



CSP removable bolster extension with leg

- ▶ quick and easy snap-in lock
- ▶ one pair suitable for up to 8 tons per 8 ft
- ▶ light-weight construction
- ▶ low rolling friction
- ▶ optional height- and level-adjustable mounting brackets allow use on different presses
- ▶ leg available with rolling foot
- ▶ optional front support leg and/or transverse beams for stand-alone use

100-03 CSM



CSM swing-aside bolster extension

- ▶ fixed mounting bracket with pivoting hinge
- ▶ easy locking lever
- ▶ one pair suitable for up to 3 tons per 3 ft
- ▶ light-weight construction
- ▶ low rolling friction

CSQ swing-aside bolster extension with leg

- ▶ fixed mounting bracket with pivoting hinge
- ▶ one pair suitable for up to 10 tons per 8 ft
- ▶ light-weight construction
- ▶ low rolling friction
- ▶ optional height- and level-adjustable mounting bracket allows use on different presses
- ▶ leg available with rolling foot
- ▶ optional front support leg and/or transverse beams for stand-alone use

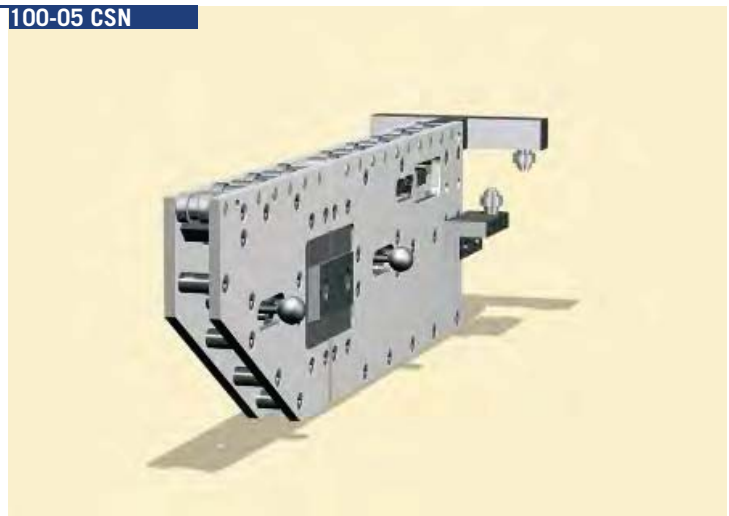
100-04 CSQ



CSN swing-aside bolster extension with double pivoting mechanism

- ▶ fixed mounting bracket with dual pivoting hinges
- ▶ one pair suitable for up to 3 tons per 4 ft
- ▶ light-weight construction
- ▶ low rolling friction

100-05 CSN



CSR swing-aside bolster extension with double pivoting mechanism and leg

- ▶ mounting bracket with dual pivoting hinges
- ▶ one pair suitable for up to 6 tons per 8 ft
- ▶ light-weight construction
- ▶ low rolling friction
- ▶ optional height- and level-adjustable mounting bracket allows use on different presses
- ▶ leg available with rolling foot
- ▶ optional front support leg and/or transverse beams for stand-alone use

100-06 CSR



2 Clamps

With respect to quick die change, the essential qualities of a clamp are the speed of opening and closing, and the ease of inserting and removing. Our comprehensive range of clamps will offer the best solution for your application.

Standardization

is the key to efficient clamping, especially when automation is desired. For all dies in use, the following parameters should be the same:

- ▶ dimensions of die plates
- ▶ clamping stroke
- ▶ clamping positions

Even though our clamps will allow you to handle non-standard situations most efficiently, you should still try to standardize as much as possible.

These basic data

should be known to select the right type of clamp:

- ▶ press tonnage and opening force in pounds [lbs]
- ▶ weight of dies
- ▶ strike rate
- ▶ die change frequency
- ▶ space available for clamps on bolster and ram

The clamping force

should at least be equal to the opening force of the ram — approximately 10% of the striking force. The clamping force is the same on bolster and ram. Divide this force by the number of clamps to be used on either part, bolster or ram, to obtain the capacity of each clamp. For large and heavy dies, and for high strike rates (above 200 per minute), take into account the relevant amount of inertia on moving the ram.

Fixed or removable clamps?

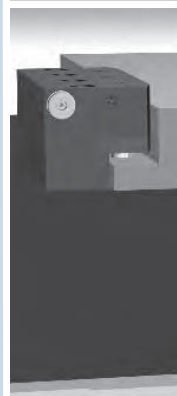
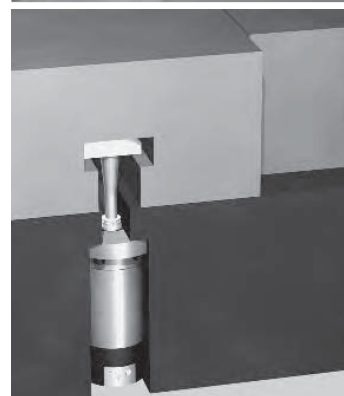
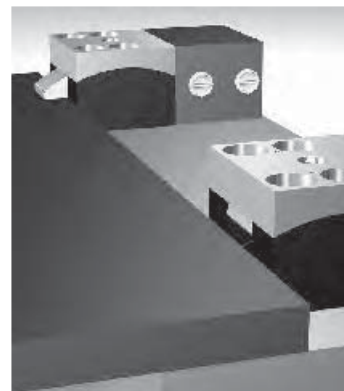
This is the question to be answered first and foremost when looking for clamping equipment. Only fixed clamps allow full automation with no further aid. Of course, they require full standardization of the die interface. Removable clamps are more flexible, but prevent full automation of the entire QDX process.

fixed

The clamp is integrated permanently into the bolster or ram, at the clamping position. When opened it clears the die's transfer path by retracting the holding part or — with roller-bar clamps — by lifting the die. These movements are driven hydraulically.

removable

For die change the clamps must be removed and re-inserted manually. — This solution is cost-saving and flexible, but more labor-intensive.



Selecting clamps

- ▶ **Clamping position:** use on bolster or ram, at the sides of the die or on its front and rear.
- ▶ **Sensor-control:** Some of our clamps are equipped with inductive sensors to ensure proper positioning.
- ▶ **Retractable clamping anchor:** The die-holding parts of the clamp are retracted when the clamp is opened.
- ▶ **Embedded:** The clamp's body is recessed into the bolster or ram. The clamping anchor grips the die inside internal slots or holes. Suitable for dies that cover the entire surface of the bolster or ram. — Also allows common clamping points for different die sizes.
- ▶ **Roller-bar clamp:** embedded twin bars, equipped with rollers on the die's side — rolling and clamping device in one piece.
- ▶ **Clamping height:** distance to be spanned by the tightened clamp
- ▶ **Clamping stroke:** distance by which the gripping parts move when the clamp is tightened; normally in the range of $\frac{3}{32}$ " to $\frac{19}{32}$ "

- ▶ **Automation capability:** We provide a large variety of clamps suitable for fully automatic clamping.
- ▶ **Clamping power:** Our clamps can be driven in three different ways:
 - Double-action, hydraulic tightening and releasing** — not only allows for optimum efficiency, but, depending on the installation, also for active safety functions or best use of available machine space.
 - Single-action, hydraulic tightening with spring release** — a cost-effective solution, which can be used for full automation in certain applications. The pressure can be controlled and monitored to allow additional safety mechanisms.
 - Mechanical tightening, hydraulic releasing** — a simple and reliable solution. Clamps must be positioned manually.
- ▶ **Hydraulic supply:** standard UNF $\frac{9}{16}$ ", also available as G $\frac{1}{4}$ ". For an overview of our hydraulic power packs, see pp. 20 – 21.

for further information

on each of our clamp types, visit our website www.serapid.com. To find or request data-sheets and technical drawings, use the code specified with each product, for example:

040-07 BTSC

2 Clamps

fixed clamps	position				features						power		
	bolster	ram	front / rear	lateral	sensors	escaping	embedded	roller-bar	automation	clamping stroke	mechanical	hydraulic, 1x	hydraulic, 2x
TBHS escaping arc clamp	■	■		■	■	■			■	0 – 3/32"			■
LSGH double T-slot roller-bar clamp	■		■				■	■	■	ASA B5-1			■
TB 90 tilting rod clamp	■	■	■		■	■	■		■	0 – 9/32"			■
PHL ledge clamp	■	□		■					■	0 – 9/32"	■		
LSHP double T-slot roller-bar clamp	■		■				■	■	■	specific			■
ROTO-ESCAM swing-sink clamp	■	■	■	■	■	■	■		■	specific			■
TBH(I) wedge clamp	■	■		■	■	■			■	0 – 3/32"			■
PSH C-clamp, fixed	■	□		■					■	0 – 15/32"	■		



TBHS



LSGH



TB90



PHL



LSHP



ROTO



TBH



TBHI

removable clamps	position				features						power		
	bolster	ram	front / rear	lateral	sensors	escaping	embedded	roller-bar	automation	clamping stroke	mechanical	hydraulic, 1x	hydraulic, 2x
PSH C-clamp for T-slot	■	■	■	■						0 – 15/32"	■		
BTSA / BTSE / BTSC rod clamp	■	■	■	□						0 – 19/32"	■		
BTM rod clamp	■	■	■	□	□					0 – 3/32"	■		
LSH double T-slot roller-bar clamp	■	□	■				■	■	■	ASA B5-1	■		
BCM lever clamp	■	■	□	■						0 – 3/32"	■		
BLH lever clamp	■	□		■	■				■	0 – 3/32"	■		



PSH



BTSC



BTM



LSH



BCM



BLH

■ standard
□ option

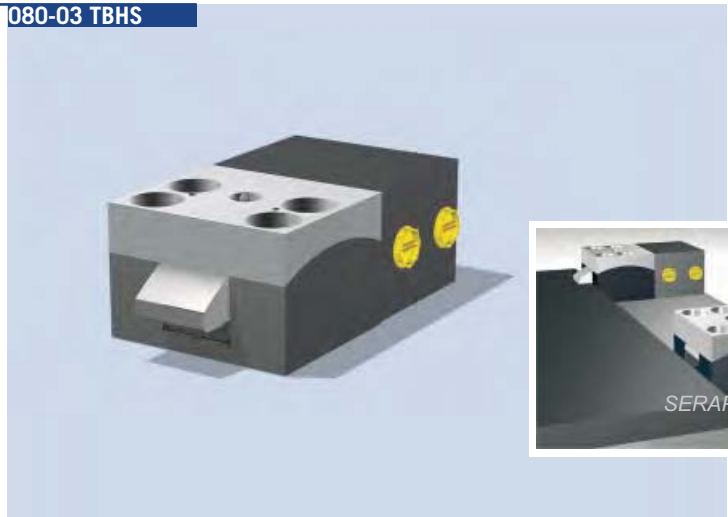
080-03 TBHS

TBHS escaping arc clamp

4,500 – 142,000 lbf · 8 models

- arc-shaped wedge, moves on a curved path
- horizontal clamping face
- clamping force acts vertical, with no radial load
- shock-resistant: no jamming in high-temperature applications
- mechanical safety lock, securing the die to the ram in event of a pressure drop

080-03 TBHS



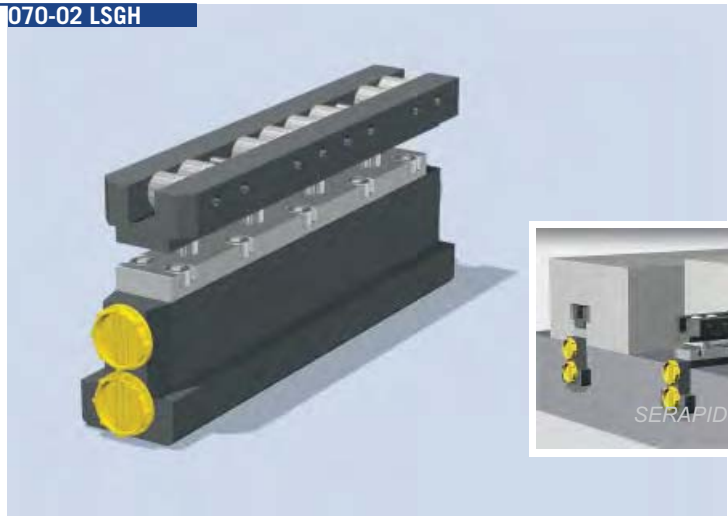
070-02 LSGH

LSGH double T-slot roller-bar clamp

5,600 – 31,500 lbf · 4 models

- fixed in T-slot on bolster, grips facing T-slot on die
- includes rollers on which the die can move when the clamp is released
- hydraulic clamping and lifting
- several units can be combined
- embedded, allows clamping of dies that extend over entire bolster or that overhang

070-02 LSGH



090-01 TB90

TB90 tilting rod clamp

13,500 – 22,500 lbf · 2 models

- double-action, fully automatic clamp
- completely integrated and hidden inside bolster or ram area
- on release, clamping rod tilts 90° to fully horizontal position
- entirely withdraws from ram or bolster surface

090-01 TB90



2 Clamps

► fixed

050-04 PHL



PHL ledge clamp

19,100 – 56,200 lbf · 3 models

- lateral fixed clamp
- several units can be combined in a line
- clamping height variable through height of mounting block
- used with standard sized dies
- can be used on ram, if stroke is electronically controlled

070-03 LSHP



LSHP double T-slot roller-bar clamp

13,500 – 22,500 lbf · 2 models —
with GP45 rollers

- for heavy dies (up to 100 tons) that cover or overhang the bolster
- die moves on top of the clamping bar, using GP 45 rollers (which are integrated into the die plate)
- requires bolster and die plates to be modified for appropriate slots and holes (call us for further specifications)

090-02 ROTO



ROTO-ESCAM swing-sink clamp

11,200 – 45,000 lbf · 4 models

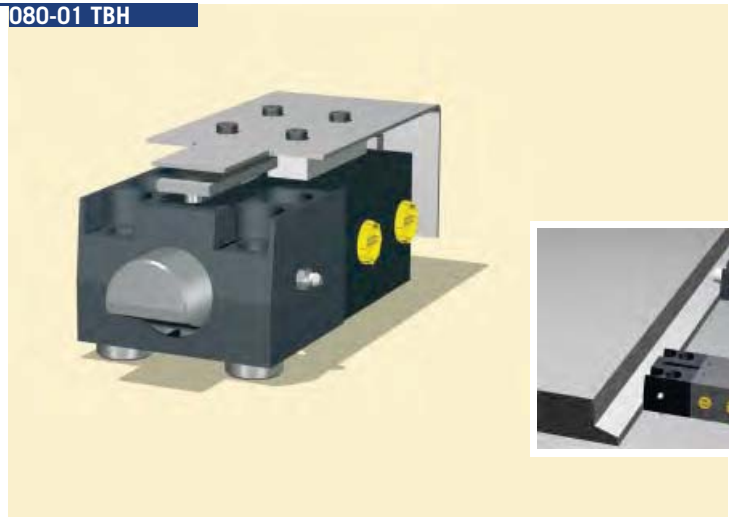
- fully automated rod clamp for DIN 650 or specific T-slots
- fully retracts into bolster / ram
- rotation separated from clamping and extending movements to prevent damage in case of accident
- positioning control using inductive sensors
- all movements controlled via PLC module
- clamping stroke as required

080-01 TBH

TBH wedge clamp

5,600 – 22,500 lbf · 3 models

- ▶ retractable clamping wedge
- ▶ clamping face slanted 20°
- ▶ requires clamping surface on die plate is also angled at 20°
- ▶ not suitable for applications in which the die is subject to shock loads and there is danger of blocking when unclamping — in this case, we recommend our TBHS escaping arc clamp

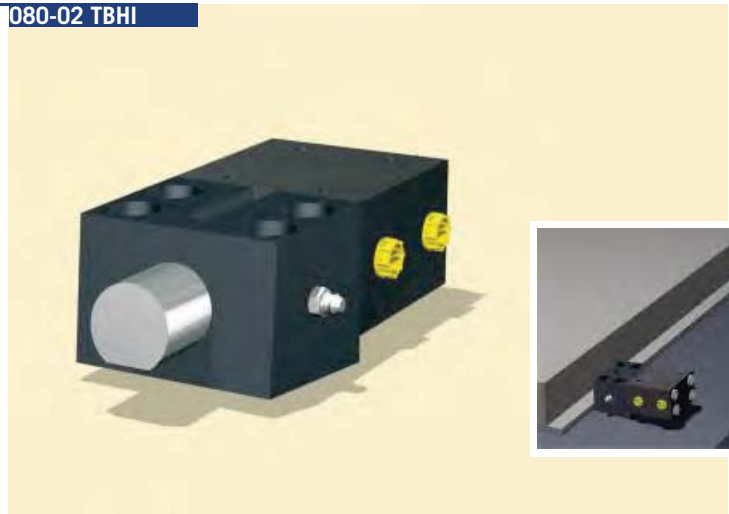


080-02 TBHI

TBHI wedge clamp

3,300 – 22,500 lbf · 4 models

- ▶ retractable clamping wedge
- ▶ clamping face horizontal, clamp body slanted 6°
- ▶ irreversible clamping mechanism
- ▶ not suitable for applications in which the die is subject to shock loads and there is danger of blocking when unclamping — in this case, we recommend our TBHS escaping arc clamp



2 Clamps

► removable

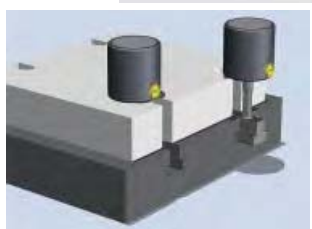


050-03 PSH

PSH C-clamp

4,500 – 22,500 lbf · 4 models

- manually placed in T-slot or fixed (without T-base)
- variable clamping stroke (max. 10/32" – 15/32", depending on model)
- can be used on both bolster and ram
- can also be fixed, allowing fully automatic clamping



040-02 BTSA

040-03 BTSC

040-07 BTSC

BTSA / BTSC / BTSC rod clamps

13,500 – 33,700 lbf · 12 models

- manually placed in T-slot or fixed
- variable clamping stroke up to 19/32" (type BTSC)
- special versions up to 90,000 lbf
- fixed (BTSC) or variable clamping height (BTSA / BTSC)
- replaces conventional nut-and-bolt clamping
- type BTSC is particularly compact in size, and cost-effective



040-01 BTM

BTM rod clamp

4,500 – 13,500 lbf · 3 models

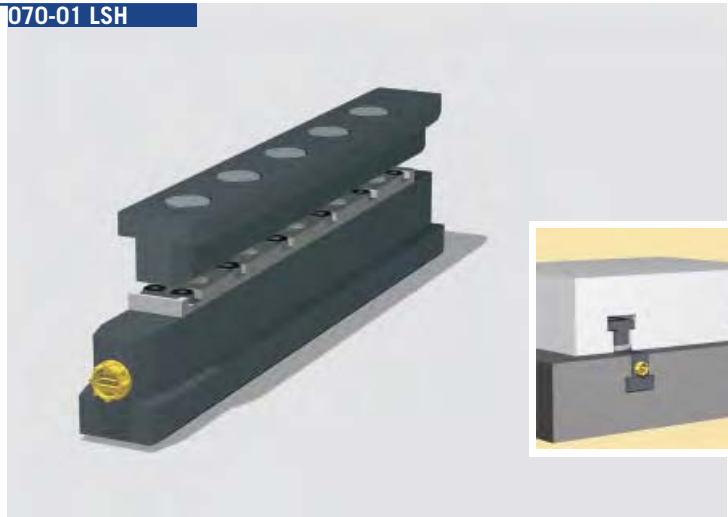
- manually placed in T-slot or fixed
- mechanical tightening using spring washers
- hydraulic opening
- replaces conventional nut-and-bolt clamping

070-01 LSH

LSH double T-slot roller-bar clamp

6,700 – 34,800 lbf · 6 models

- ▶ manually inserted into T-slots on bolster and die plate
- ▶ hydraulic clamping, mechanical opening
- ▶ several units can be combined in a line
- ▶ positioned entirely inside bolster and die, allows clamping of dies that extend over entire bolster
- ▶ can be combined with clamps type LSGH and LSHP

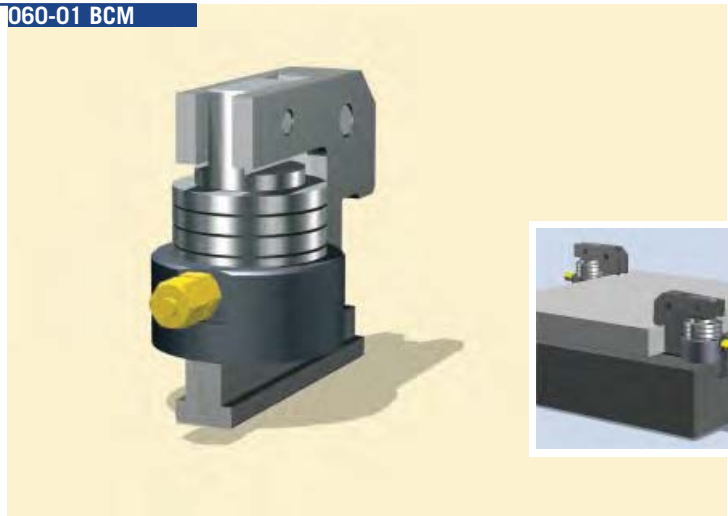


060-01 BCM

BCM lever clamp

4,500 – 13,500 lbf · 3 models

- ▶ manually placed in T-slot
- ▶ lever principle
- ▶ mechanical tightening using spring washers
- ▶ hydraulic opening

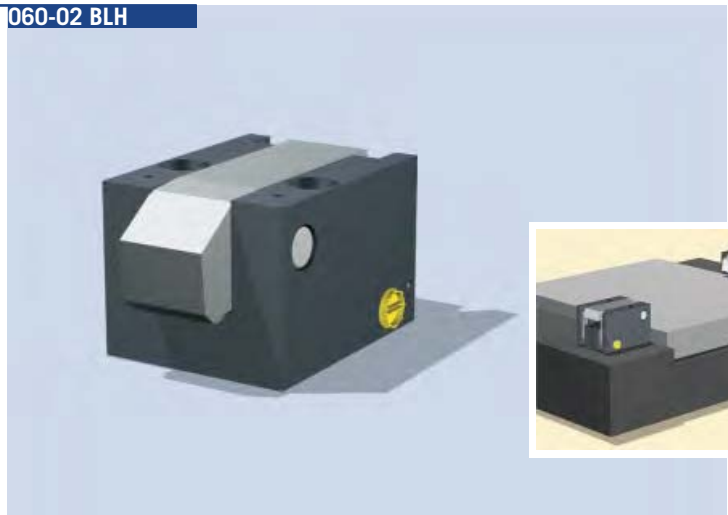


060-02 BLH

BLH lever clamp

8,000 – 13,500 lbf · 2 models

- ▶ lever principle
- ▶ hydraulic tightening, mechanical opening by spring force
- ▶ especially low profile
- ▶ used with dies of standardized height



3 Hydraulics

Depending on the size of your QDX system, you may choose between several options for driving hydraulic units. — Pump or power pack? Again, it is the degree of automation that poses the basic question.

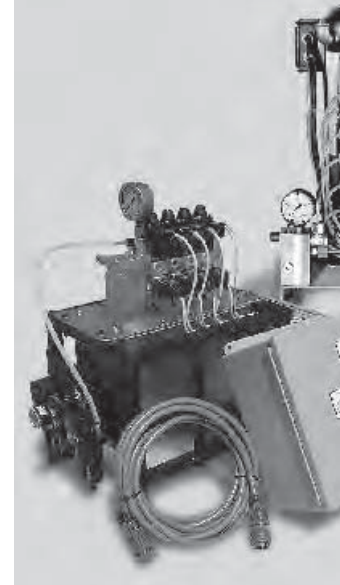
Hydraulic rollers and hydraulically opened clamps

require only one hydraulic circuit, which is used intermittently. Thus, for a limited number of bars and/or clamps, the easiest and most cost-effective solution is a manual pump. We offer a ready-to-install pump kit. For more hydraulic units, and particularly for our LGGH heavy-duty roller bar, we recommend an air-driven pump.

Fully hydraulic clamps

require control of output power for closing and therefore a regulated power pack and a directional seated valve bank.

Our clamping power packs work in watch mode. Once the working pressure has been obtained, the power pack stops output and restarts only to compensate for pressure drops. A pressure switch has to be integrated in each clamping circuit, to stop the press, if any of the clamping devices receive less than 80 % of the pressure setting.



Manual pump kit

- ▶ two speeds
- ▶ effective volume 20 in³
- ▶ operating pressure up to 5,800 PSI
- ▶ includes connectors and piping
- ▶ further accessories

110-01 — manual pump kit

Pneumatic pump

- ▶ effective volume 36 in³
- ▶ operating pressure up to 5,800 PSI
- ▶ flow rate when not under load: 0.14 gal/min, under load: 0.03 gal/min
- ▶ installation kits including fittings and hoses as required
- ▶ further accessories

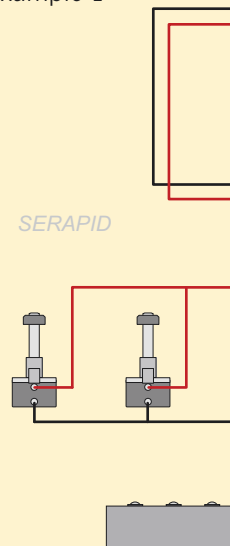
110-02 — pneumatic pump

LP air-driven hydraulics power pack

- ▶ controlled by air-to-oil pressure ratio
- ▶ pressure monitoring with compensation for pressure drops
- ▶ effective volume 244 in³
- ▶ controlled operating pressure up to 5,800 PSI
- ▶ flow rate when not under load: 0.44 gal/min, under load: 0.22 gal/min at 5,800 PSI
- ▶ air supply 87 PSI

110-03 LP — air-driven power pack

example 1

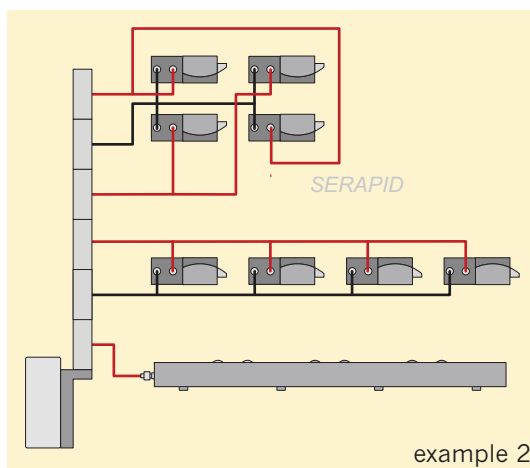


HK electric power pack

- ▶ compact unit, consisting of a radial piston type hydraulic pump and motor
- ▶ closed aluminum casing allows sufficient cooling for continuous operation
- ▶ wide range of flow-to-pressure settings
- ▶ up to three hydraulic source channels
- ▶ oil volume 146 – 330 in³
- ▶ operating pressure up to 5,800 PSI
- ▶ pressure monitoring and control functions
- ▶ with terminal box for remote control or integrated electrical control unit

110-04 HK — with terminal box

110-05 HK — with control unit



Configuration of hydraulic circuits

Example 1 shows four diagonal circuits for tightening and releasing clamps on the ram, and two circuits for tightening and releasing clamps on the bolster. One circuit supplies up to 1,400 PSI for rolling devices.

Example 2 shows two diagonal circuits for tightening and one circuit for releasing clamps on the ram, and two circuits for tightening and releasing clamps on the bolster. One circuit supplies up to 5,800 PSI to heavy-duty rollers.

Valve bank

- ▶ modular valve bank with ball valves
- ▶ compact unit including pressure limiter and switch
- ▶ one pressure-monitoring switch per clamping circuit
- ▶ valves are in resting position when circuits are in clamping, pressure-on state — safe clamping even if power fails

110-06 — valve bank

To avoid unwanted counter pressure, a power pack without return filter should be used. If a return filter has to be used, a filling indicator must be present.

Various accessories and complete hydraulics installations can be found under:

110-07 — hydraulics accessories

External hydraulic sources

may be supplied by the user under the following conditions:

- ▶ oil type HLP 32 or 46 cSt is used
- ▶ output is regulated and protected by a pressure limiter
- ▶ flow rates from 0.17 to 0.9 gal/min available
- ▶ the valve bank has to be a ball-type design with a non-return valve at the bottom of the column

4 Die positioning systems and transporters

SERAPID has been developing equipment to move heavy loads since 1972. From the beginning, die change has been within our core competence. Our rigid pushing chain, key feature in all our linear-motion technology, has proven to be an especially efficient and reliable means of transfer in die change.

The SERAPID chain is used in all types of die transfer equipment, from the manually driven die cart to the automatically controlled die carrier traveling on rails.

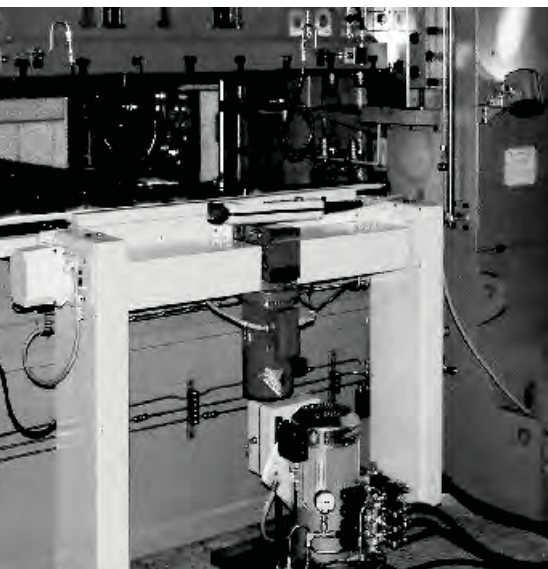


Our standard products and special solutions

cover a wide variety of standard applications up to die weights of 50 tons or more. Additionally, many operating environments and production work-flows require individually laid-out and specially designed solutions. These are also based on our proven standards. The spectrum of SERAPID systems covers virtually any requirement posed by current manufacturing methods. This includes very heavy dies, up to 100 tons or more, and for example, automated die exchange in an entire line of presses.

Our program of standard products and engineering solutions comprises:

- ▶ the PPS series of press-mounted or mobile push-pull systems
- ▶ driver-controlled die carts on rails
- ▶ pedestrian-controlled die carts on rails with single or double load platforms and positioning systems
- ▶ fixed or mobile loading tables
- ▶ rolling-bolster systems including positioning systems and control facilities
- ▶ “Domino” and “T-Track” systems serving entire lines of presses
- ▶ die storage racks and staging tables sized and configured according to the individual application





Catalog of die positioning and transport systems

Our range of die positioning and transport systems are shown on the following pages. Besides features and recommendations for the application, we specify for each product or group of products the maximum possible die weight and the anticipated exchange time.

The exchange time specified

is an average value. Depending on specific circumstances, the times actually achieved may be longer or shorter. Exchange time refers to the net time it takes to unload the old die and load the new one. For transporters with only a single load platform, it is assumed that the (one-way) distance between storage or pre-staging tables and the press can be covered in a maximum of 5 minutes.



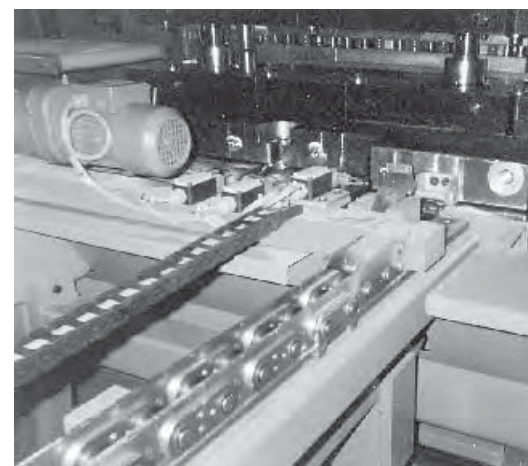
A few examples

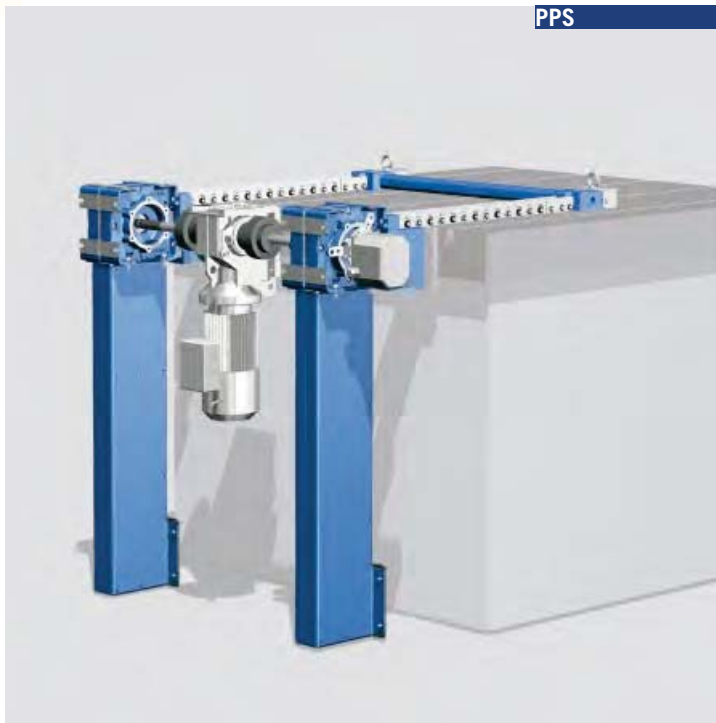
for die change procedures using our transporters are given on the pages following the catalog.

for further information

on each of our positioning systems and transporters, visit our website www.serapid.com. To find or request datasheets and technical drawings, use the code specified with each product, for example:

PPS





PPS

PPS push-pull system

up to 21 tons

The PPS can be mounted permanently to the back or side of the press. Swing-aside and mobile versions are available. Configuration and layout are flexible, allowing the system to be adapted to virtually any environment. An optional torque limiter allows dies to be positioned accurately against mechanical stops inside the press.

- ▶ exchange time: 15 min
- ▶ accurate, repeatable positioning
- ▶ sensor-controlled safety mechanisms
- ▶ stroke up to 7.9 ft
- ▶ most efficient when combined with bolster extensions and die carts on rails
- ▶ supplied ready for electrical interfacing or, as an option, with dedicated control unit



www.serapid.com

Die carts on rails with single load platform, operator on board

50+ tons

Die carts with integrated operator stand are designed to cover long distances between storage and press. They can be equipped to suit various application needs, for example, with custom loading extensions or lifting devices.

- ▶ exchange time: depending on distance between storage and press
- ▶ maximum efficiency and repeatable performance even over large distances
- ▶ ideal for serving several presses in a line
- ▶ sensor-controlled safety mechanisms for movements of transfer system and cart
- ▶ powered electrically and hydraulically: exhaust-free and independent operation, no unwieldy supply cables

www.serapid.com

Die carts on rails with single load platform, pedestrian-controlled

50+ tons

The carts are often used together with staging tables, on which dies are prepared during press uptime. They can be equipped to suit various application needs, for example, with custom loading extensions or lifting devices.

- ▶ exchange time: 5 min
- ▶ repeatable performance
- ▶ suitable for single presses and entire lines of presses
- ▶ sensor-controlled safety mechanisms for movements of transfer system and cart
- ▶ exhaust-free operation through electrical and hydraulic driving


www.serapid.com

Die carts on rails with dual load platforms, pedestrian-controlled

50+ tons

There is an individual transfer system on each of the two platforms. On one of them, the new die can be prepared already during press uptime, to ensure consistent exchange times.

- ▶ exchange time: 3 min
- ▶ repeatable performance
- ▶ requires only one staging table
- ▶ early return on investment thanks to very short exchange times
- ▶ sensor-controlled safety mechanisms for movements of transfer system and cart
- ▶ exhaust-free operation through electrical and hydraulic driving



4 Die positioning systems and transporters

www.serapid.com



Fixed and mobile loading tables and bolster extensions

50+ tons

Designed according to the individual application situation, our loading tables can also be equipped with special lifting and positioning devices, e.g. a laterally moving carrier platform on a stationary substructure.

- ▶ exchange time: 3 to 15 min
- ▶ a combination of two or three tables can yield very fast exchange times (3 to 5 min)
- ▶ accurate, repeatable positioning
- ▶ sensor-controlled safety mechanisms for movements of transfer system and platform
- ▶ exhaust-free and independent operation through electrical and hydraulic driving

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Rolling bolsters

50+ tons

Built according to the application's environment, rolling bolsters are the preferred solution when the press table is at ground level.

- ▶ exchange time: 15 min
- ▶ die handling at ground level
- ▶ sensor-controlled safety mechanism for movements of the transfer system
- ▶ very cost-effective solution
- ▶ electrical power and controls

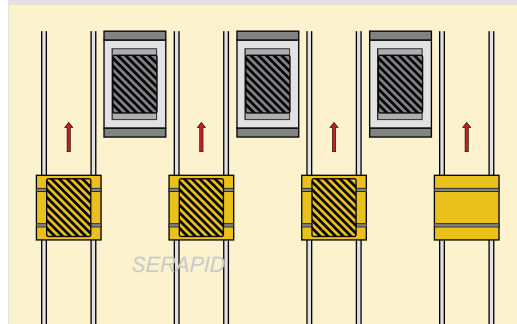
Domino systems

up to 50 tons

A Domino system simultaneously changes the dies in an entire line of automated presses.

- ▶ exchange time: below 3 min
- ▶ preparation during press uptime
- ▶ single change procedures are also possible
- ▶ sensor-controlled safety mechanism for movements of carts and transfer systems
- ▶ powered and controlled electrically
- ▶ space saving; distances between presses in the line may be reduced to a minimum
- ▶ see p. 31 for a procedural description of a Domino exchange

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Storage racks

up to 12 tons

Our storage racks are custom-sized and adapted to the transfer device in use.

- ▶ very robust welded structure
- ▶ space saving
- ▶ easy storing, easy retrieval of dies
- ▶ dies are kept safely

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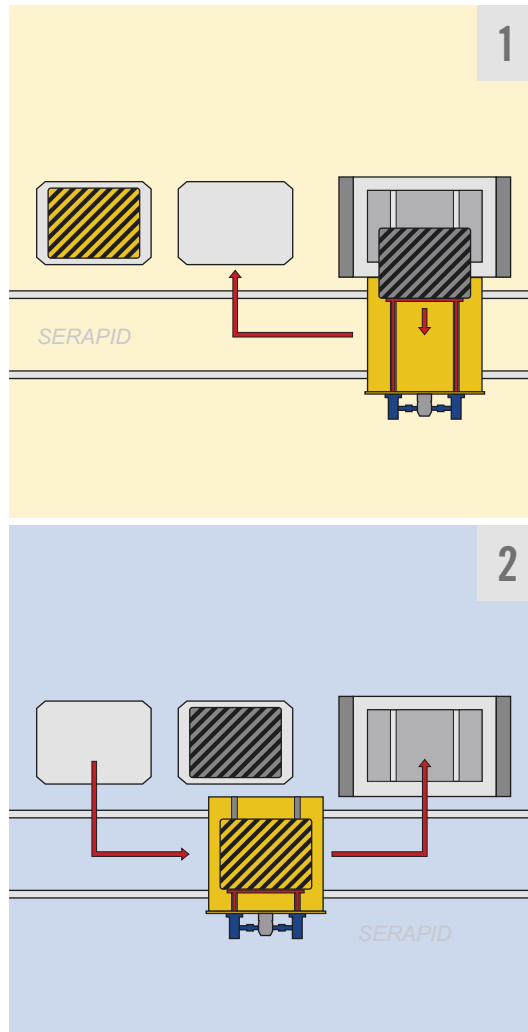


4

Die positioning systems and transporters

► sample procedures

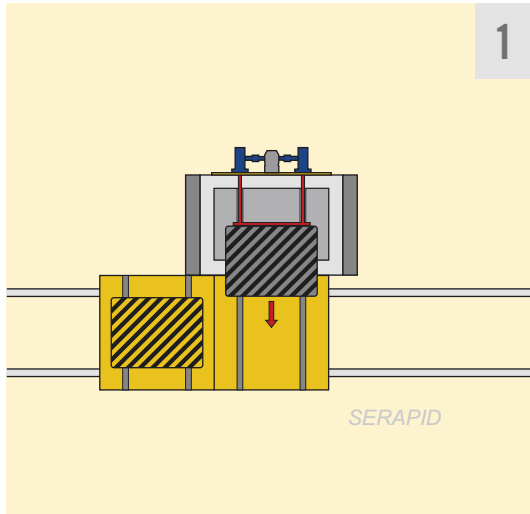
Single-platform die cart on rails, integrated Push-Pull System



1 The old die is pulled out of the press and onto the die cart. The cart brings it to the depositing table on the right.

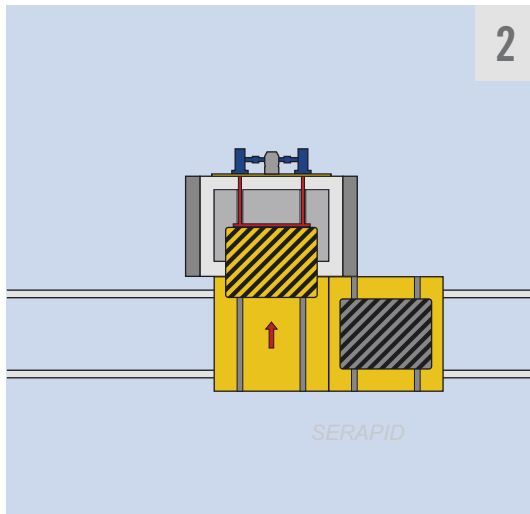
2 The cart now moves to the table on the left, picks up the new die, brings it to the press and pushes it into its operating position.

Double-platform die cart on rails, press-mounted Push-Pull System



1

The cart moves to the press, bringing the new die. First, the old die is pushed out of the press and onto the die cart's empty platform (in this example, the one on the right).



2

The cart now moves to the right, to position its other platform, holding the new die, in front of the press. The loader pulls the die into its operating position. The cart may now bring the old die to storage.

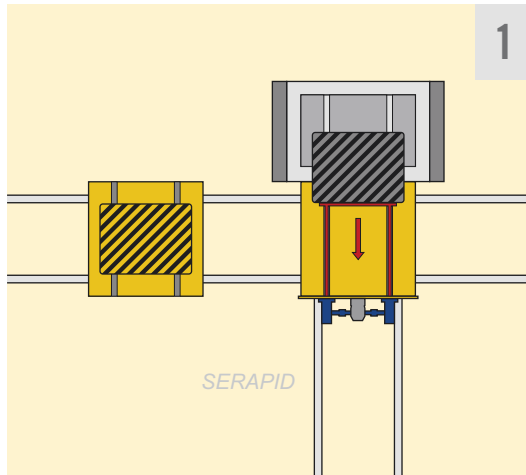
Note: Instead of having a Push-Pull System at the press, the die cart could be fitted with one system on each of its platforms. The PPS can also be floor-mounted behind the die cart.

4

Die positioning systems and transporters

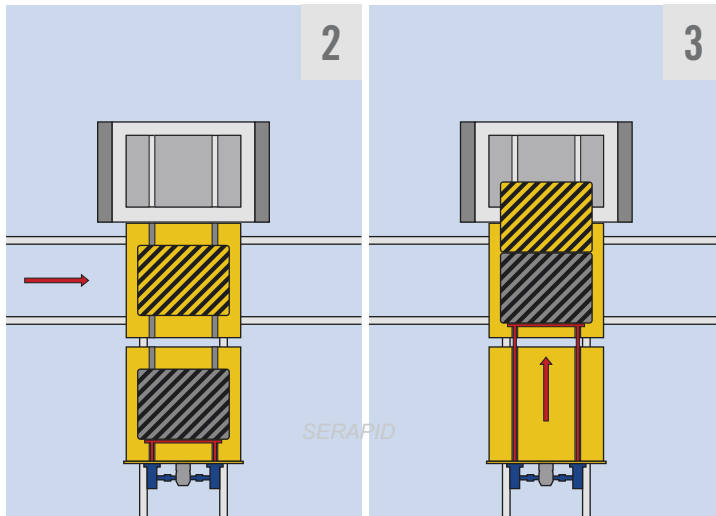
► sample procedures

Two single-platform carts, one with a Push-Pull System — T-track exchange

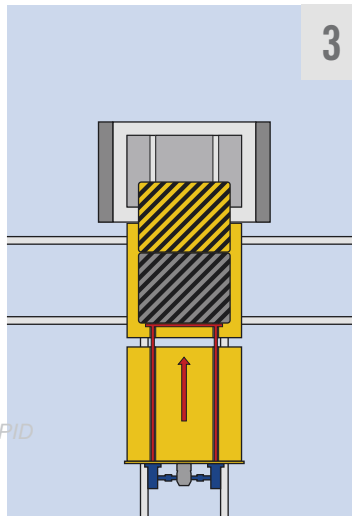


1

The cart on the left brings the new die. It moves on rails approaching the press from the side. The other cart, equipped with a push-pull system, pulls the old die out of the press. It then moves backwards on its rails, which are perpendicular to the press front.



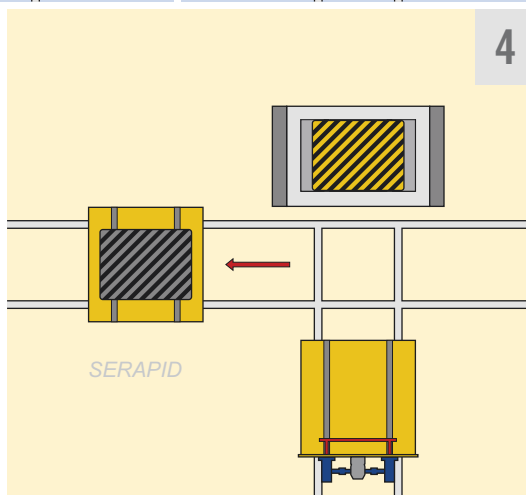
2



3

The cart with the new die now moves in front of the press, so it stands exactly between the press and the cart holding the old die.

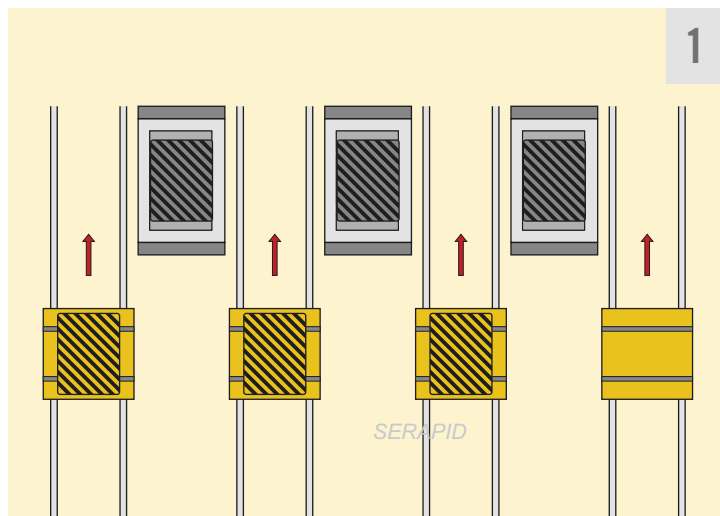
The push-pull unit on the second cart pushes the old tool onto the first cart and, at the same time, it pushes the new tool into the press.



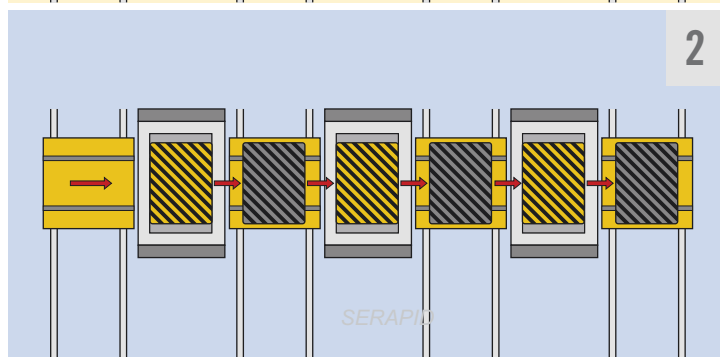
4

The cart that first brought the new die now brings the old die back to storage.

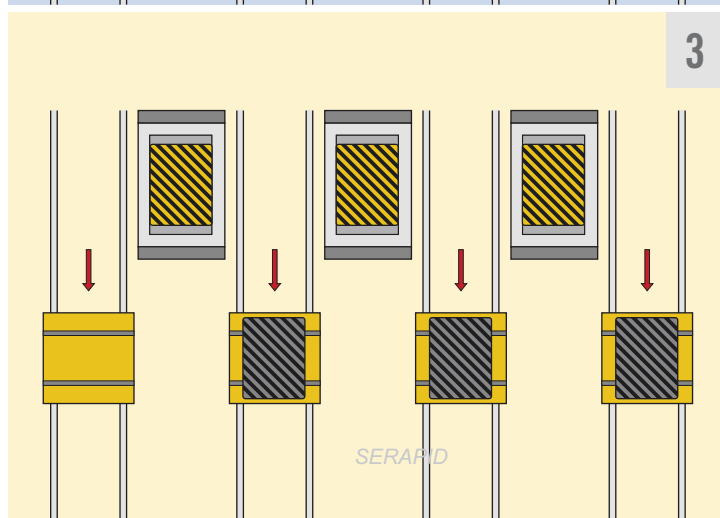
Domino System



A Domino System serves several presses in a line, changing dies simultaneously. First, the die carts move in front of their respective presses, each one carrying the appropriate new die. In addition, one empty cart moves to the rear of the last press.



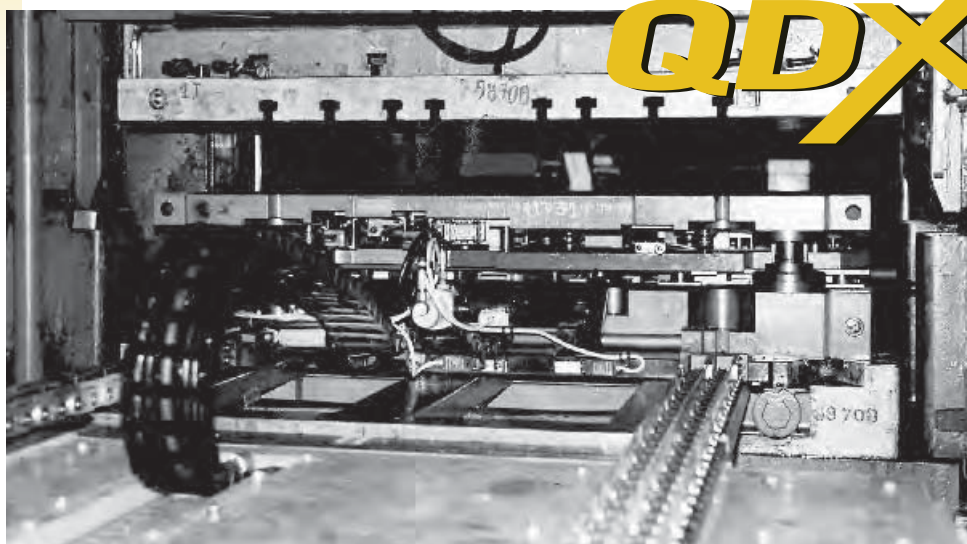
Carts and press bolsters are perfectly in line. New dies are now pushed into their presses, and, in turn, push old dies onto the carts at the rear of these presses. This is the Domino move.



The carts move back again and bring the old dies back to storage.

QUICK DIE XCHANGE

QDX



SERAPID
PUSHING AHEAD

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