

Technology features 技术特点

DOUSH rubber injection 斗士橡胶注射

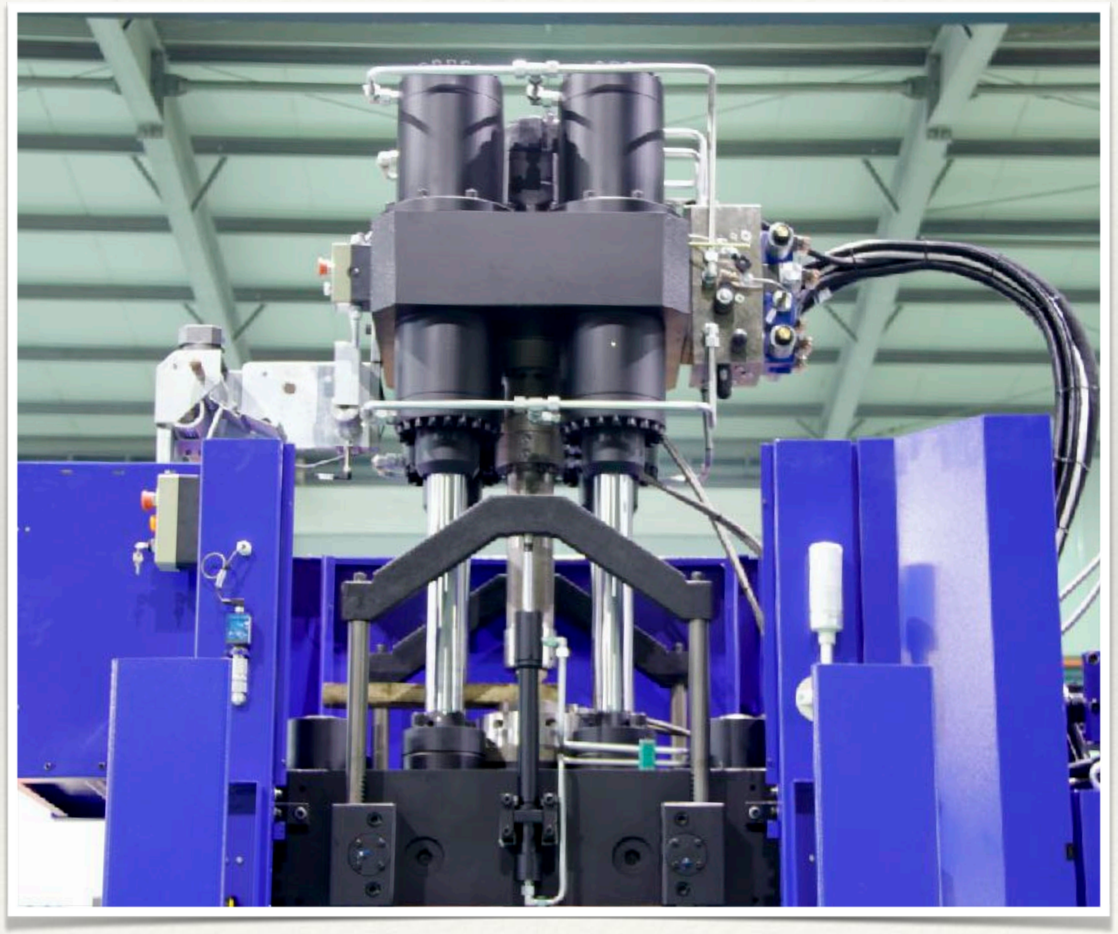
Rubber injection system橡胶注射系统

- The rubber injection unit is a very important part of every rubber injection moulding machine. They operate according to the classic screw / plunger principle or the modern specification FIFO (First In First Out). also horizontal injection design and vertical injection design.

- 注射单元是橡胶注射机非常重要的一组成部分，结构上有经典的螺杆/活塞，也有新型FIFO（先进先出），同时形式上也水平注射和垂直注射2种。

- Injection unit result injection speed, pressure and injection volume repeat, temperature control very important for process as well.

- 注射单元决定着注射速度、注射压力和注射量的重复精度，同样，温度控制也是成型工艺非常重要的一点。



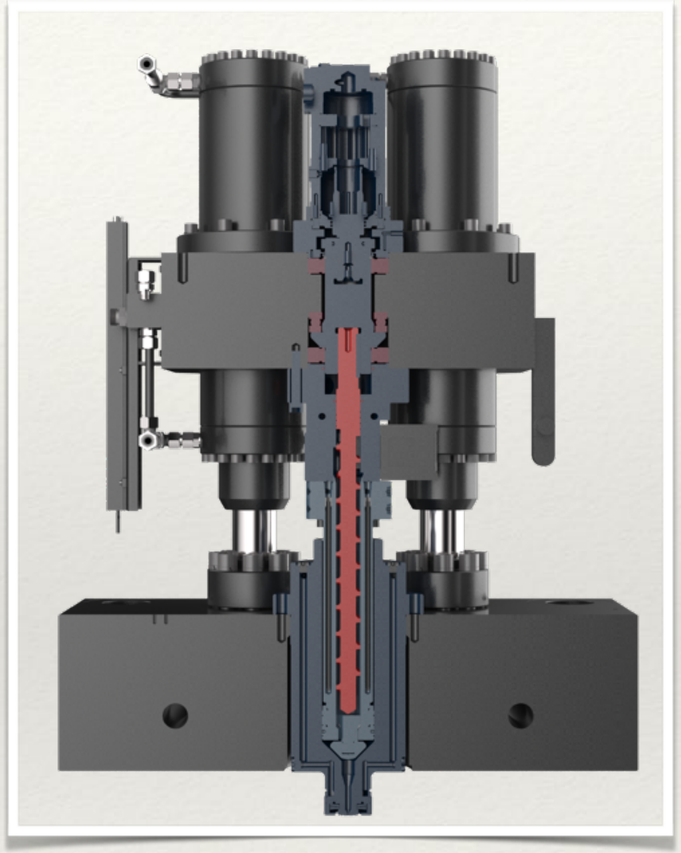
DOUSH FIFO 斗士先进先出注射单元

- DOUSH FIFO rubber injection unit is an established and still preeminent component of the DOUSH rubber injection moulding machines. Deciding preferences are the easiness of construction as well as the efficiency and preciseness of the system. The DOUSH FIFO rubber injection unit enables injection pressures up to 2500bar on the mould via an extreme short nozzle with minimum pressure loss.

- 斗士 FIFO 橡胶注射装置是斗士橡胶注射成型机的成熟且仍然卓越的组件。 决定偏好的是构建的容易程度以及系统的效率和精确性。 斗士 FIFO 橡胶注射装置通过极短的喷嘴在模具上实现高达 2500bar 的注射压力，压力损失最小。

- The established sizes of the DOUSH FIFO rubber injection unit vary from 250cm³ to 8500cm³. Smaller units (25cm³ to 200cm³) as well as larger units (12000cm³ to 36000cm³) are available on request.

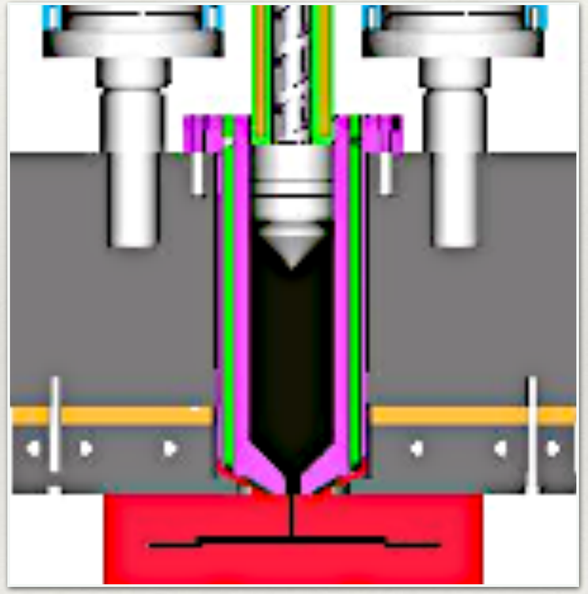
- 斗士的先进先出注射单元注射量从250cm³ 到 8500cm³，小一点注射量从25cm³ to 200cm³. 同样，我们的大注射量可以做到从12000cm³ to 36000cm³.



FIFO先进先出

Features 特点:

- exact injection volumes 精确的注射量
- perfect repeat accuracy 完美位置重复精度
- constant L/D-ratio 恒定的长径比
- up to 2500 bar injection pressure 注射压力高达2500bar
- easy maintenance 及其容易维护
- shortest nozzle 极短的注嘴
- minimum pressure loss 最小的压力损失
- nozzle uncoupling unnecessary = no leakages 注嘴无漏胶

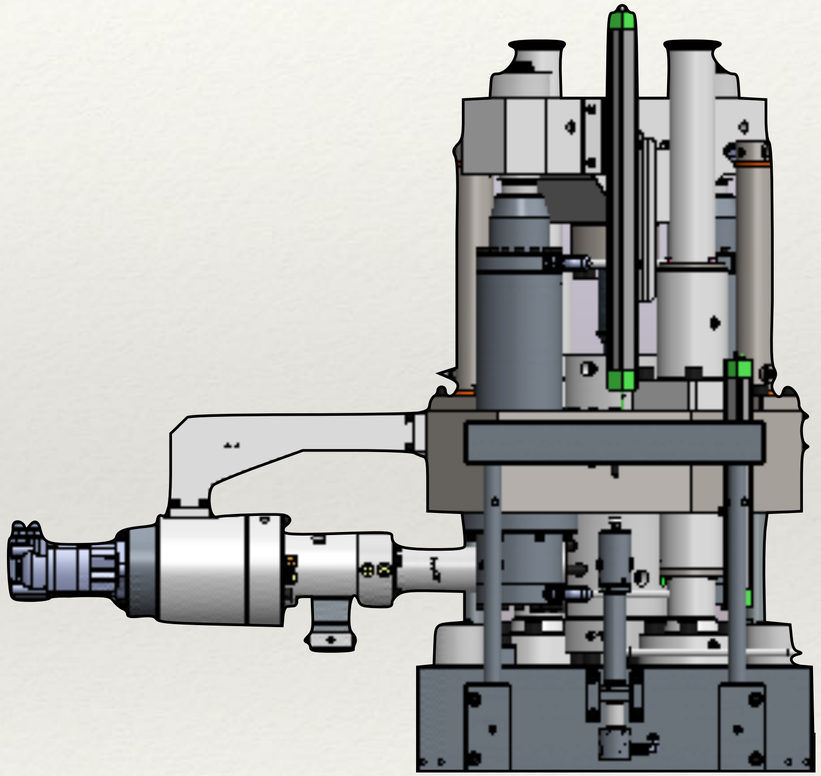


Moveable injection system 可移动注射系统

Features 特点:

Keep all advantages of DOUSH class FIFO injection design like

- up to 2500 bar injection pressure 注射压力高达2500bar
- exact injection volumes 精确的注射量
- perfect repeat accuracy 完美位置重复精度
- shortest nozzle 极短的注嘴
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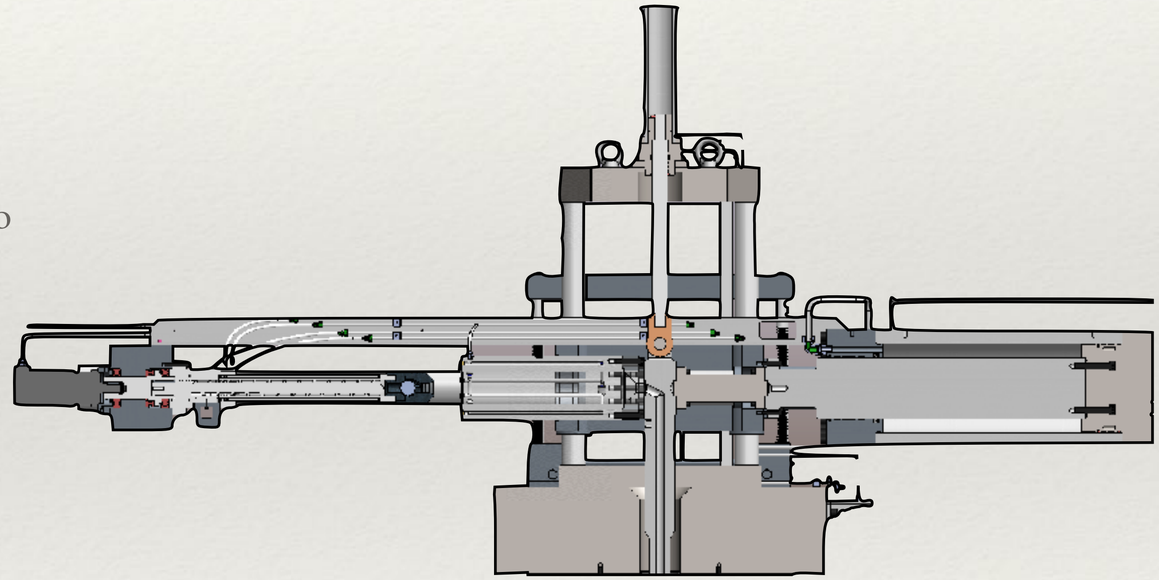
Additional function

- injection nozzle moveable, can be move up out of fixed platen可移动注射单元，注嘴可移至高于定模板
- Low and easy material feeding height 极低的喂料高度，易于操作人员更换材料

Horizontal injection system 水平注射系统

Features 特点:

- Very Low strip feeding height. Even with 4500 ccm injection volume the strip can be fed easily from ground level. Very ergonomical. 非常低的喂料高度，即便注射量在4500ccm也能很容易站在地上操作，非常便利。
- Cylinder for nozzle retraction and creating high contact force . No scorching of rubber. No need to Purge rubber during cycles. Also with high holding force, no leakage of rubber between nozzle and mould or CRB. 用于喷嘴缩回和产生高接触力的气缸。 不会烧焦橡胶。 循环期间无需清洗橡胶。 保持力高，喷嘴与模具或CRB之间不漏胶。
- As screw and piston is Horizontal the weight is not vertically on the rubber getting plasticized, which avoids rubber drooling from nozzle. For soft compounds we can use shut off nozzles to stop leakage as nozzle is retractable. 由于螺杆和活塞是水平的，重量不是垂直地作用在塑化的橡胶上，避免了没有平衡阀的橡胶从喷嘴流口水。 对于软化合物，我们可以使用关闭喷嘴来阻止泄漏，因为喷嘴是可伸缩的。



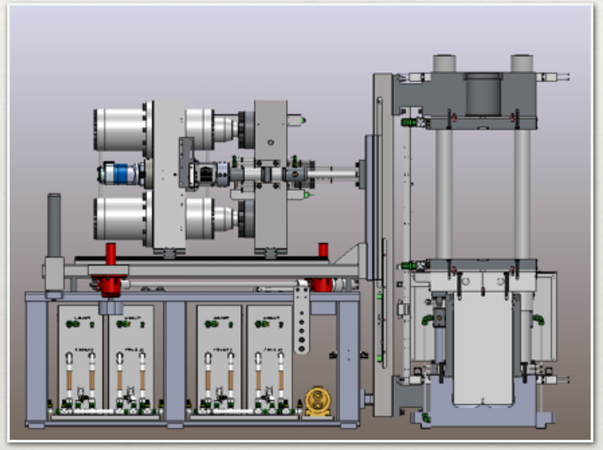
Horizontal injection, injection from bottom 水平注射, 底部注射系统

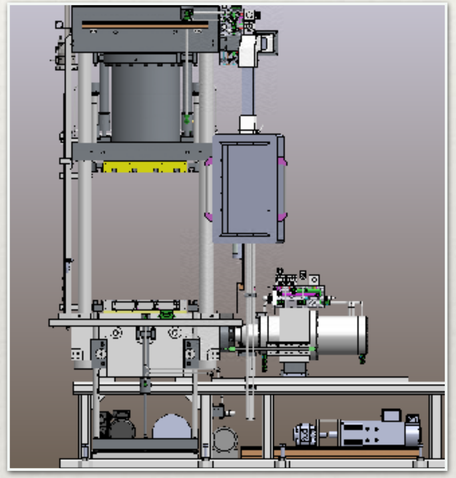
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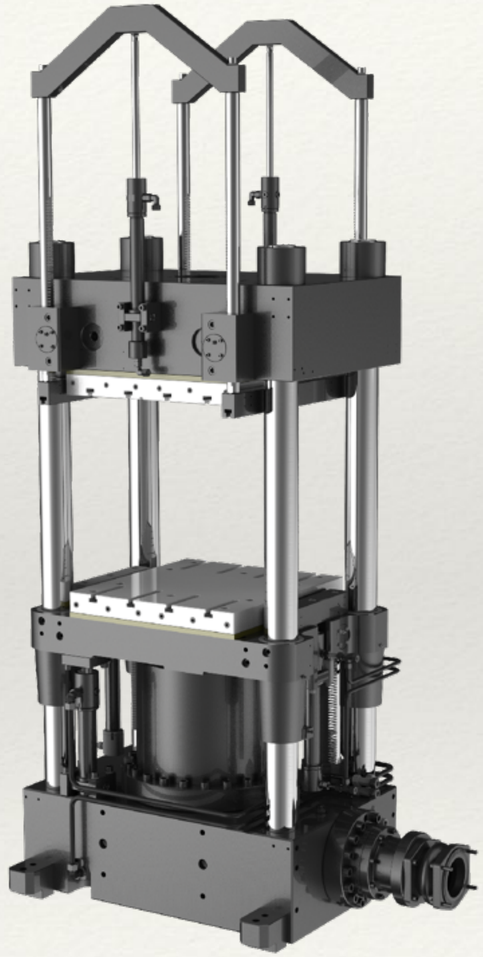




Clamping system合模系统

Clamping systems

- The function of the clamping unit is the safe and powerful keeping shut the mould. DOUSH clamping systems use the capacity from massive hydraulic cylinders and reach nearly plane parallelism.
- The servo driver hydraulic clamping unit offers the advantages of the classic clamping system like high stability, fast process times by the use of separate cylinders, easy maintenance and steadiness as well as the “ergo-specific” advantages like an ergonomic working height and a large-area backing of the cavity area.
- Thereby it is not necessary to move the whole clamping piston/clamping cylinder and the sealing gaskets are not strained by high lateral loads at the accelerating- and decelerating phase. Due to the easy assembling and the low number of moving parts the clamping system is very fast and solid.

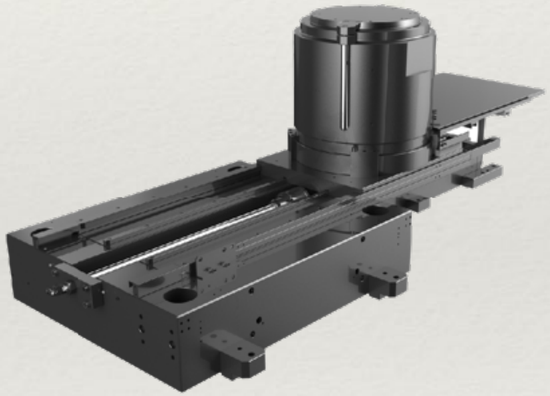


Clamping system合模系统

Mian cylinder move out clamping system

- **in order to result easy operating in low operate height, DOUSH main cylinder move out clamping system design on big size machine which bigger than 450t.**
- The full hydraulic clamping unit characterizes itself by high stability as well as the large-area backing of the cavity area, which nearly compensates the plate flexibility in connection with the DOUSH FIFO rubber injection unit. These are the best qualifications for the production of high-precise and flash-less parts Separate fast lifting cylinders ensure fast process times.
- Easy maintenance and steadiness are self-evident.



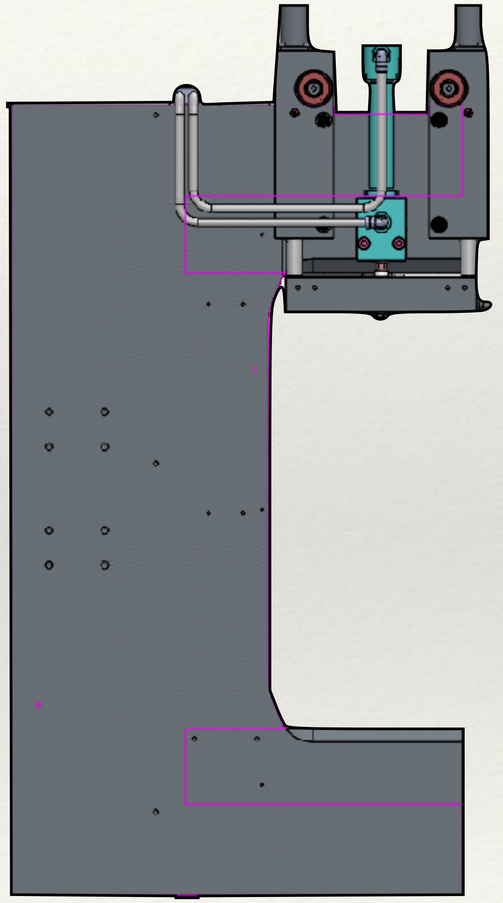


main cylinder move out clamping system
result low operation height in big size machine

Clamping system合模系统

C-frame clamping unit C型结构注射单元

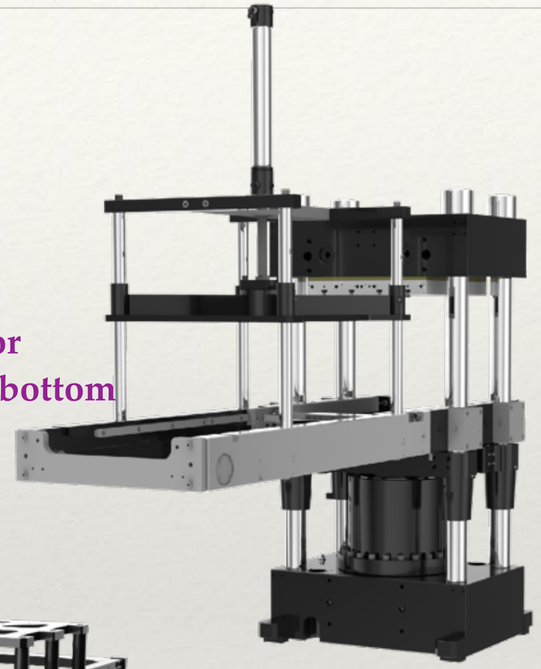
- DOUSH C frame clamping unit also equipped servo motor to driving hydraulic system, which good performance in energy saving, The full hydraulic clamping unit, in connection with a bend-proof C-frame, allows through its tie bars less design a 3-sided accessibility to the mould area for an easy mould change.
- 斗士C型合模结构同样装备了伺服驱动系统，在节能方面有着完美的表现，全液压合模单元配合防弯曲C型框架，无拉杆设计可实现3面无障碍操作和模具更换。
- These machines are used for the production of profile corner joints, hoses and smallest rubber parts, also use for single cavity mould test.
- 这类设备通常用于生产接角、软管、最小的橡胶产品，同时可用于单型腔模具的实验用。



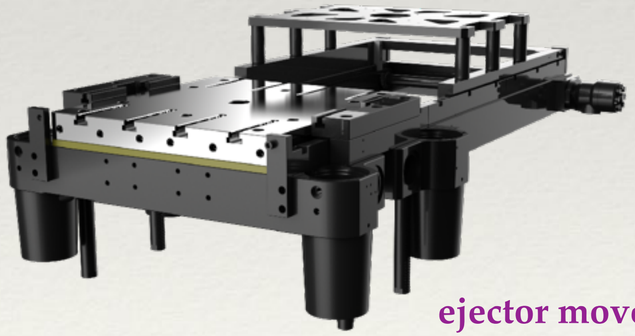
General options常规选配项

Slider and ejector 移模与顶出:

- To meet the requirements of the save energy conversation, reduce labor, DOUSH rubber injection moulding machines can be equipped optionally with different additional systems like for an easy mould handling or with demoulding systems produced rubber parts.
- 为了满足各种应用的节能、接人等应用，斗士橡胶注射机可装配多种选配装置如用于容易模具处理或者自动脱模的后移装置。
- Systems for process control and energy saving are further features of the DOUSH rubber injection moulding machine. usually this device is also used with conveyor belts in automatic production.
- 控制和节能系统是斗士橡胶注射成型机的进一步特点, 通常在自动化生产中，这个装置还会和输送带一起使用。



Slider and ejector
Ejector from upper or bottom

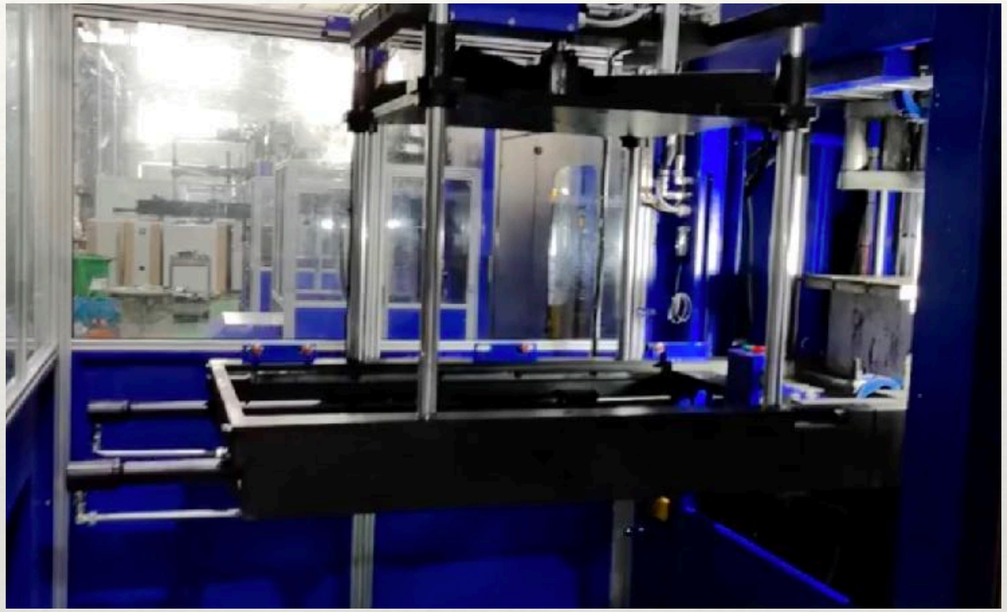


ejector move in

General options常规选配项

DOUSH H-balancer system 斗士H-Balancer系统

- DOUSH H-balancer technology purpose is to remove the mechanical balance weight. These balance weights use chains or cylinders to balance the tilt caused by the weight of the mold shifting device. These old methods are often unstable and require a larger floor area.
- 斗士H-balancer技术的目的在于去除机械式的平衡重，这些平衡重用链条或气缸去平衡掉移模装置的重量而带来的倾斜，这些陈旧的方法往往不稳定，而且需求更大的落地面积。
- Thanks to the perfect combination of hydraulic and electronic control, which need additional several valves in hydraulic system and adjust in very comprehensive control system
- 为了满足各种应用的节能、接人等应用，斗士橡胶注射机可装配多种选配装置如用于容易模具处理或者自动脱模的后移装置。





Slider without chains or cylinder balancer

Thanks to DOUSH special hydraulic design

General options常规选配项

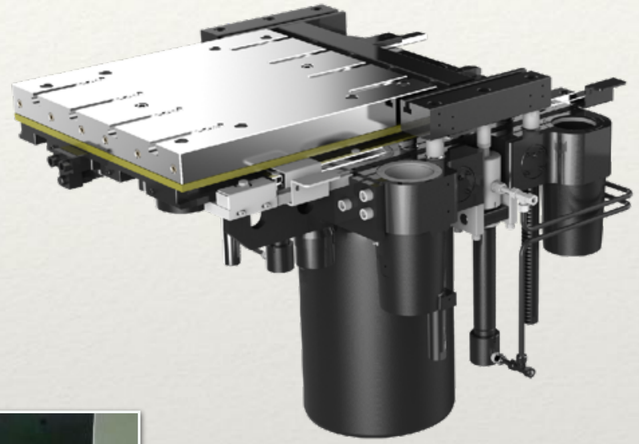
Sliding plate 热板移出:

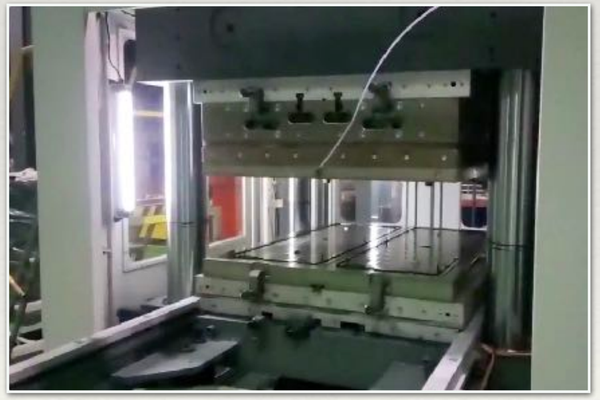
- This system will be used for shifting the whole lower mould side for 60% or 100%. So it easy to install moulds, improve the accessibility of the lower mould side and automation is possible too. If the system uses 2 lower mould halves, DOUSH talks about the sliding plate change.

- 这个系统用于快速移动整个下热板和模板，可移出60%-100%，因此非常便于模具安装，更便于人工或自动化操作，如果用到2块下模板，DOUSH注射机便可支持2个半模的交换。

- The shifting can be done in manual or hydraulic way. The system will be completely monitored from the control and so it is connected with the diagnostic and alarm system.

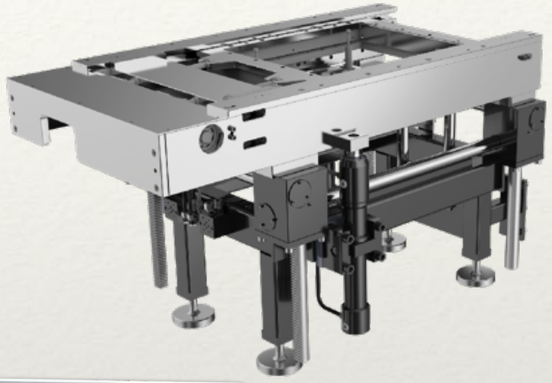
- 这个快速移出可以由人工或者液压油缸完成，完全由控制器检测和控制，并连接有安全报警系统。





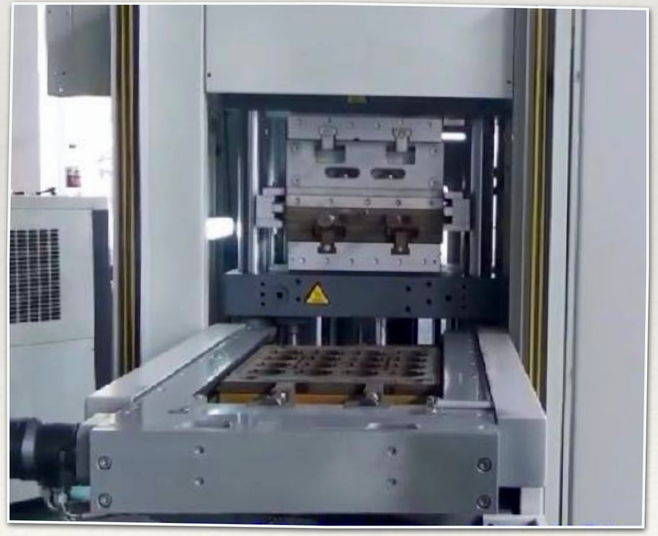
60%-100% move out available

General options常规选配项



Shuttle system 穿梭系统:

- DOUSH offer handling systems for moulds/parts of moulds for all machine sizes. The systems will be integrated completely into the control. This means, that the functions diagnostic and alarm messages are available on the control user interface.
  There are two types of handling systems:



Shuttle systems – shuttle shifting/shuttle change:

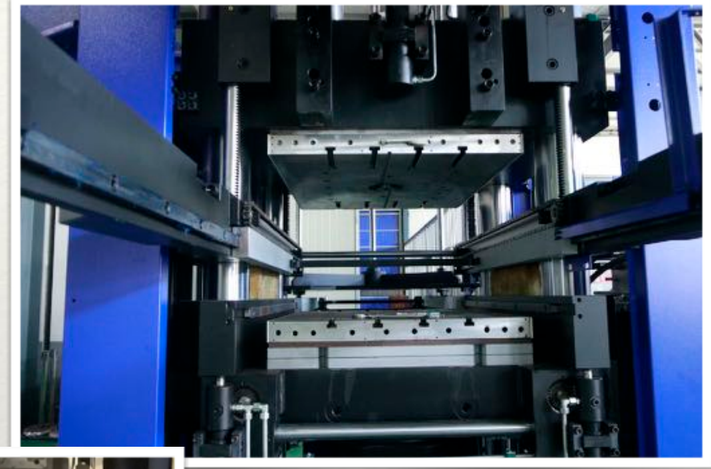
- Can be choice one shuttle plate or two, mounted on the hydraulic ejector can be moved for- or backwards into an outstation, where the shuttle plate stays for further conditioning. If two shuttle plates proceed alternative consecutively, two mould plate for change which effects a reduction of the total cycle time. The shuttle shifting happens electric or hydraulic. These shuttle systems can be equipped from top or bottom side with an external ejector (demoulding devices) for automatic part demoulding. Further it is possible to connect an external heating plate with the mould plate at the outstation. For further equipped safety system for operator.

General options常规选配项

Frame systems - frame shifting/frame change: 前后移中模交换系统

- At this system the shuttle plate moves out front or backside of the machine on a frame, which is mounted on the upper ejector or bottom side. If this system uses 2 shuttle plates, DOUSH talks about a frame change. The shifting can be done in manual or hydraulic way. The frame system will be completely monitored from the control and so it is connected with the diagnostic and alarm system.

- DOUSH前后移中模交换装置，梭板移出机器前部或后部的框架上，框架安装在上顶出器或底部。 如果该系统使用 2 个穿梭板，DOUSH 会更换前后移架。 前后移动动作可采用手动或液压方式。 框架系统将完全由控制器监控，因此它与诊断和报警系统相连。





frame shifting / frame change
前后中模交换

General options常规选配项

Brush de-moulding system 毛刷脱模系统

- The use of brush systems, which provide the process automation, is one possibility for additional equipment on DOUSH horizontal machines. 使用提供过程自动化的刷系统是 DOUSH 卧式机器上附加设备的一种可能性。

- These systems consist of robust Aluminium profiles in connection with modern guiding- and bearing technology and offers a compact space saving design. Vertical units and complete brush heads are compound in modular design and adapted to the specification of the automated process. The module driving can be carried out in electric, pneumatic or hydraulic way. Additional features like brush swiveling, reversal of rotation direction, the integration of demoulding plates and demoulding units or blowing units are possible. 这些系统由坚固的铝型材和现代导向和轴承技术组成，并提供紧凑的节省空间的设计。 垂直单元和完整的刷头采用模块化设计，并适应自动化流程的规范。 模块驱动可以采用电动、气动或液压方式进行。 其他功能，如刷子旋转、旋转方向反转、脱模板和脱模单元或吹气单元的集成都是可能的。

- As a matter of course thereby is the integration and controlling via the actual control generation from DOUSH machines. 当然，通过 DOUSH 机器的实际控制生成进行集成和控制。



General options常规选配项

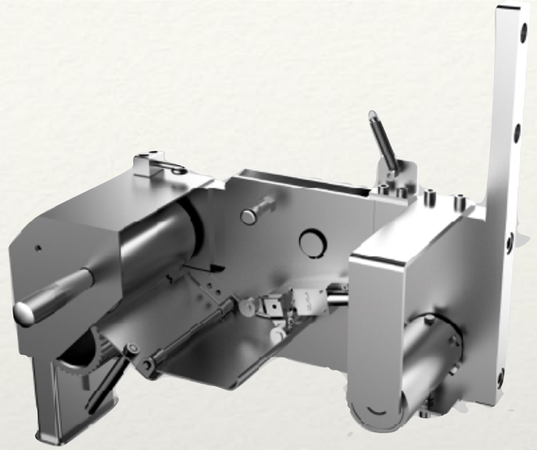
Automatic feeder 自动喂料装置

- Continuous production is a very important requirement for rubber injection machines. If continuous production is not possible, it will bring many problem: production efficiency, material utilization and workshop management. In continuous production, the raw materials of the injection unit are sometimes not supplied feed in time. Like some very soft rubber materials, the rubber strip may broken due to the gravity in a high temperature environment.

- 连续性生产对于橡胶注射机是一个非常重要的要求，如果不能连续生产，将会给生产效率、材料利用以及车间管理带来很多的问。而在连续生产中有时会因为注射单元的原材料不能及时供应而导致，如有一些非常软的橡胶材料，在高温环境中，由于重力的影响而导致橡胶条断裂的情况。

- The automatic feeding device of the DOUSH rubber injection machine is specially designed to solve this problem. It is based on overcoming the gravity of the material, and has the functions of automatic metering, automatic pre-feeding and material interruption alarm for the conveyed material. It can be combined with the program to be able to set the time in the equipment. Remind the operator when the material storage is completed inside.

- 斗士橡胶注射机的自动喂料装置就是专门为解决这个问题而设计，它基于克服材料重力，为输送材料自动计量、自动预喂料和断料报警功能，结合程序可在设备不能在设定时间内完成储料而提醒操作人员。





About safety 关于安全

Safety is the most important for labor and companies user, DOUSH rubber injection machine alway keep the highest level standard. All of our machine is in conformity with all requirement of Annex I of Directive 2006/42/EC，CE confirmed by TUV Rheinland. 设备的安全对操作人员和公司来说无疑是最重要的一点，斗士橡胶注射机一直依照最高安全标准去去做，所有的设备都符合指令 2006/42/EC 附件 I 的所有要求，并有莱茵公司确认并取得CE证书。

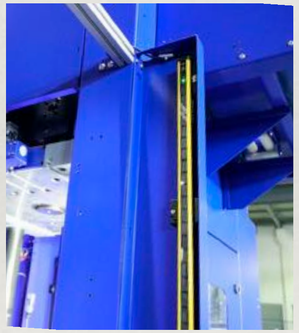
DOUSH rubber injection machine safety system involves all aspects of electrical, hydraulic and mechanical. 斗士橡胶注射机安全系统覆盖了电气、液压和机械的各个方面。

Safety in electric and program 电气和程序安全：

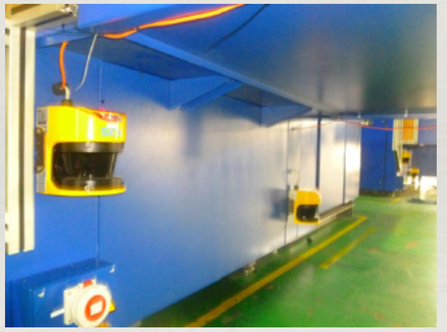


safety PLC





light curtain and emergency button for injection unit / clamping unit / slider and shuttle system



Scanner for operator area





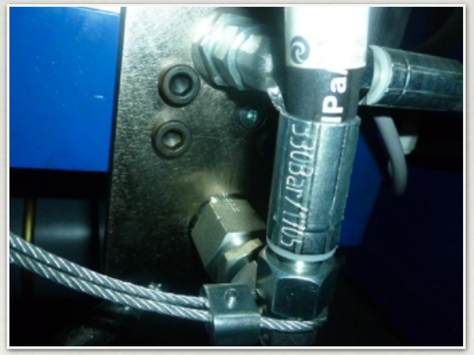
switch for doors

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Safety in hydraulic and mechanical 液压和机械的安全：



hoses explosion proof



hydraulic locking cylinder



protective switch



anti-falling lock block



protective in feeder hole

General options常规选配项

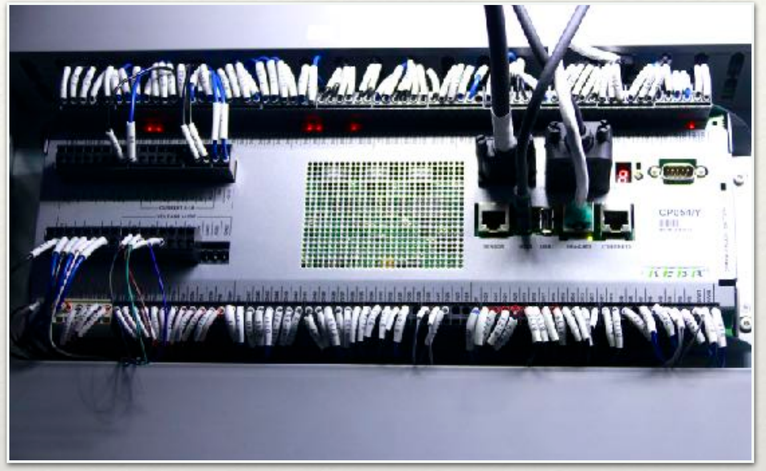
Logical Movements 动作逻辑

- An efficient production requires additional automation facilities even more. These additional movements should be optimal integrated in the machine course. It should be possible to adjust new requirements of the plant in a flexible and quick way.

- 高效的生产更需要额外的自动化设施。 这些额外的运动应该最佳地集成到机器过程中。 应该可以灵活快速地调整工厂的新要求。

- KEBA i2000 and i5000 system offers with the Logical Movements the possibility of integrating individual customized auxiliary movements into the machine. Both hydraulic and pneumatic or electrical movements are integrable. In addition no programming knowledge is necessary. The integration is made by a configuration dialogue. These additional movements are naturally complete integrated both into the diagnostic system and into the assistance- and alarm system of the machine. The system offers the possibility of changing and configuring existing movements and alarms.

- KEBA i2000 和 i5000 系统为逻辑运动提供了将个性化定制辅助运动集成到机器中的可能性。 液压和气动或电动运动都是可集成的。 此外，不需要任何编程知识。 集成是通过配置对话完成的。 这些额外的运动自然而然地完全集成到诊断系统和机器的辅助和警报系统中。 该系统提供了更改和配置现有运动和警报的可能性。





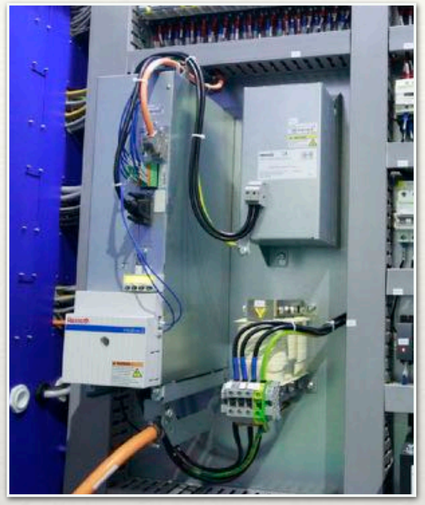
Rexroth servo motor system

- DOUSH Machines with Rexroth servo motor system can save partially much energy costs. At rubber injection moulding machines there is normally a high rate of idle current results from comparatively low motor efficiency at rubber injection moulding machines. The idle current loads the energy transmission path without use for the machine.

- 配备 Rexroth 伺服电机系统的 DOUSH 机器可以部分节省大量能源成本。 在橡胶注射成型机中，通常由于橡胶注射成型机的电机效率相对较低而导致高闲置电流率。 空闲电流加载能量传输路径而不用于机器。

- Modern rubber injection moulding machines demand a dynamic compensation of the idle power via intense different power consumption during the machine cycle. The idle power compensation can be carried out central for all machines together or via compensation directly on the machine.
  These devices additionally reduce the active energy consumption and enable a gentle soft start of the drive.

- 现代橡胶注塑机需要通过机器循环期间强烈的不同功耗来动态补偿空闲功率。 空转功率补偿可以集中在所有机器上进行，也可以通过直接在机器上进行补偿。 这些设备还降低了有功能耗并实现了驱动器的温和软启动。





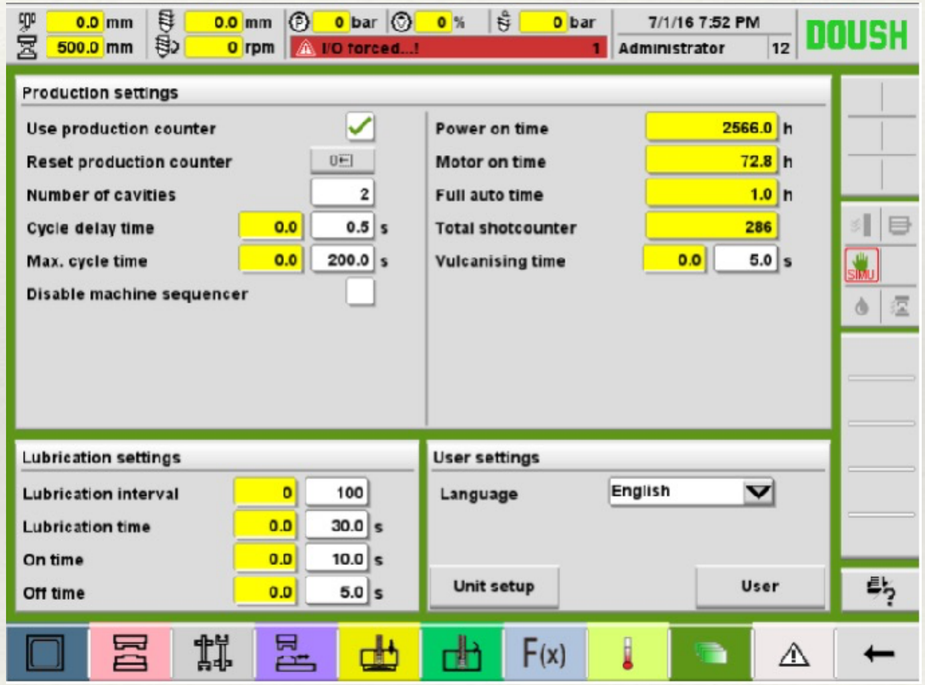


Energy saving points节能减排

Energy saving features on DOUSH machines which we answer to the raising energy costs in our customers side.

斗士 机器的节能功能，先于客户考虑应对各方面不断提高的能源成本。

- Heating plate border insulating, reduce temperature losing 加热板边缘隔热，减少温度损失
- Power down the drive during long curing periods 在长时间硫化期间关闭驱动器停止工作
- Rexroth servo motor cooperate with Rexroth pump energy saving system力士乐伺服电机油泵节能系统
- Optimized temperature allocation at heating plates加热板温度分配优化
- minimum pressure and speed lose in movement to reduce extra energy lose 各动作中的最小压力和速度损失以减少额外的能量损失



Process control 生产工艺控制

- All used process parameters (set value) can be put down as prescription at the internal memory, on a USB stick or on a network drive assembly. Thus with a mold change the data are immediately again available. All set values changes are naturally logged and together with an alarm register represent an extensive register function.

- 所有使用的工艺参数（设定值）都可以作为处方保存在内部存储器、U 盘或网络驱动器组件上。 因此，更换模具后，数据可立即再次可用。 所有设定值的变化都会被自然记录下来，并与报警寄存器一起代表一个广泛的寄存器功能。

- Quality assurance and graphic evaluation are essential elements of an efficient production. CP 054 provides with the injection- and trend graphics an instrument for process monitoring and evaluation. Of course there is the possibility of exporting the recorded values to the super ordinate control system.

- 质量保证和图形评估是高效生产的基本要素。 CP 054 为注入和趋势图提供了一种用于过程监控和评估的工具。 当然，也可以将记录的值输出到上级控制系统。



Configuration 配置

- An efficient DOUSH control distinguishes itself by the possibility of configuring broad categories. Through the graphic cycle editor the machine running can be controlled. In addition are available up to 5 parallel step chains. The step progress is supervised in the diagnostic function “DOUSH F(x)” and missing conditions are distinctly pointed out to the operator. To each condition / movement are available additional auxiliary information.

- 一个有效的 DOUSH 控制通过配置广泛类别的可能性而与众不同。 通过图形循环编辑器可以控制机器运行。 此外，最多可提供 5 个平行阶梯链。 在诊断功能“DOUSH F(x)”中监控步骤进度，并向操作员明确指出缺失的情况。 对每个条件/运动都有额外的辅助信息。

- The Logical Movements give the possibility to adjust new movements or configure the heating-/cooling zones of the machine. Via the feature “user page” it is possible to adjust your own visualization page.

- 逻辑运动使调整新运动或配置机器的加热/冷却区域成为可能。通过“用户页面”功能，可以调整您自己的可视化页面。

- The access to the machine, through a properly user management, can be individually regulated. It can be assured that only authorized personnel makes changes at the process parameters.

- 通过适当的用户管理，可以单独调节对机器的访问。 可以确保只有经过授权的人员才能更改过程参数。

