

Linear/swivel clamps/直线/回转式夹紧气缸

CLR-...-CS



Operating instructions/操作说明书

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Warning/警示

In order to guarantee safe operation of this device and to be able to make sure of all the function, please read these instructions thoroughly!

为了保证安全操作和性能，请务必先完整阅读本操作说明！

- Installation and maintenance must be carried out only by authorized qualified personnel in accordance with the operating instructions./安装维护必须由有资格人士按操作说明进行。
- Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on./在进行装配、安装和维护工作之前：关闭气源并防止重新接通。
- Only the spare parts from Festo or distributor authorized by Festo can be used when some parts of valve need to be replaced./只应该使用从 Festo 或者 Festo 许可的供货商处取得备件。
- Observe the specified maximum values (e.g. for pressures, temperature)./遵从产品使用的许用极限值（比如压力、温度等）。
- Please comply with national and local safety laws and regulations./请遵从国家和地方的安全标准和指令。

1. 产品概览

1.1 Technical specification/技术规格

Designation/名称	Specification/规格			
Constructive design/结构特点	Double-acting pneumatic cylinder with swivel mechanism/带旋转机构的双作用气动缸			
Piston Ø[mm]/缸径 Ø[mm]	25	32		
Pneumatic connection/气接口	M5	G1/8		
Piston rod thread/活塞杆螺纹	M6	M8		
Clamping stroke ¹⁾ [mm]/夹紧行程 ¹⁾ [mm]	10	20	10	20
Total stroke ²⁾ [mm]/总行程 ²⁾ [mm]	20	30	25	35
Frequency at stroke[Hz]/不同行程的频率[Hz]	2.5	1.7	2.5	1.7
Swivel direction/摆动方向	Right, Left/向右, 向左			
Swivel angle [°]/摆角[°]	90±4			
Operating pressure[MPa]/工作压力[MPa]	0.2...1			
Ambient temperature[°C]/环境温度[°C]	-10 ... +80			
Operating medium/工作介质	Compressed air accordance with ISO 8573-1:2010[7:4:4]/符合 ISO 8753-1:2010[7:4:4]规范的压缩空气			
Cushioning/缓冲	Elastic cushioning rings/plates at both ends/两端带弹性缓冲垫			
Position sensing/位置感测	Via proximity switch/通过接近开关			
Type of mounting/安装方式	Via proximity switch/带通孔			
	With through-hole/带内螺纹			
	Via accessories/通过附件			
Mounting position/安装位置	Any/任意			
Clamping range/夹紧范围	≥ 2 mm before the end position is reached/到达终端位置前≥2mm			

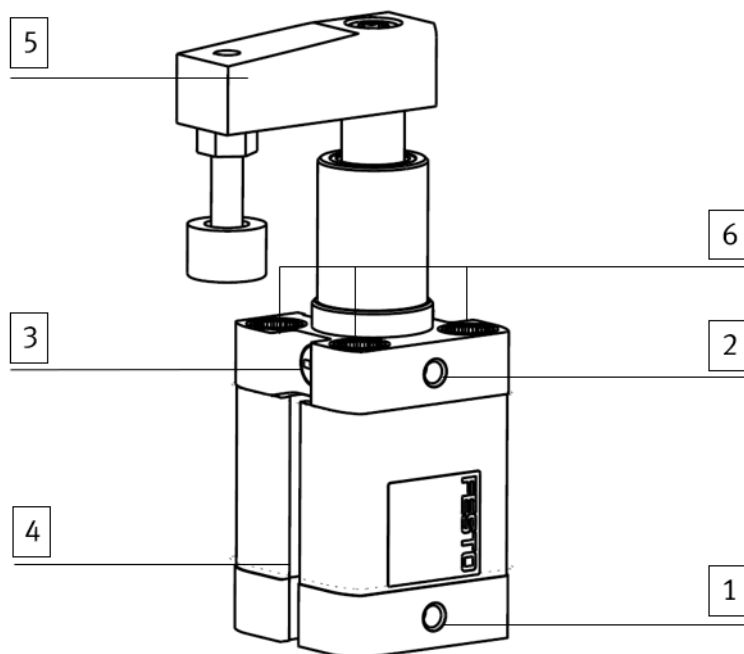
Tab. 1 Technical specification/技术规格

- 1) The clamping stroke corresponds to the linear stroke used for clamping/夹紧行程相当于用于夹紧的直行程。
- 2) The total stroke comprises the clamping stroke and the swivel stroke/总行程为夹紧行程和摆动行程之和。

1.2 Function/功能

The linear/swivel clamp CLR-CS is used for all types of clamping. Through the combination of the linear and swivel motion of the piston rod, workpieces can be inserted and removed even beyond the clamping range. There is a choice between swivelling to the right or left./直线/回转式夹紧气缸 CLR-CS 适用于各种类型的夹紧动作。通过活塞杆的直线和摆动动作的组合，甚至可以插入和移走夹紧范围以外的工件，气缸可选择向左或向右摆动。

1.3 Structure/结构



- | | | |
|---|--|---|
| <p>1 Supply port (extending)
气源口 (伸出)</p> <p>2 Supply port (retracting)
气源口 (返回)</p> <p>3 Guide bolt for motion control
用于控制运动的导向螺栓</p> | <p>4 Slot for proximity sensor
接近开关的安装槽 (2x)</p> <p>5 Clamping finger set with clamping screw (not included in delivery)
带夹紧螺钉的夹紧指套件 (不包括在供货范围内)</p> | <p>6 Flange screws with threaded holes for fastening
带螺纹孔的法兰螺钉用于紧固 (4x)</p> |
|---|--|---|

Fig. 1 Product design/产品配置

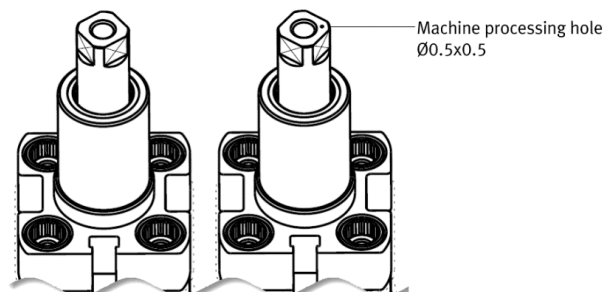


Fig. 2 Machine processing hole mark/机加孔标识

Machine processing hole mark /机加孔标识

Machine hole/机加孔	Have	Not have
Swivel direction of CLR/CLR 旋转方向	Left	Right

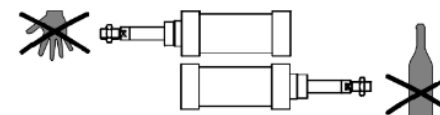
Tab. 2 Machine processing hole mark /机加孔标识



Warning/警示

Risk of injury due to unexpected movement of components./ 部件的意外运动可导致人身伤害。

- Protect the positioning range from unwanted intervention./防止肢体进入运动范围内。
- Keep foreign objects out of the positioning range./清除运动范围内的异物。



2. Mounting/装配

2.1 Assembling a clamping finger/装配夹紧手指

- Place the clamping finger on the cone of the piston rod./将夹紧手指置于活塞杆上。
- Screw the retaining screw into the threaded hole of the piston rod until the clamping finger can still just be turned./将固定螺丝拧入活塞杆的螺纹孔内，直到夹紧手指仍可转动。

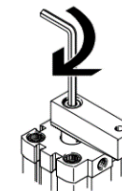


Fig. 3 Prefixed clamp finger/预固定夹紧手指

- Hold the piston rod in the place at the spanner flat using an open-ended spanner./用扳手将活塞杆固定在扳手平面上。
- Tighten the retaining screw using the tightening torque below./用紧固扭矩拧紧固定螺丝。

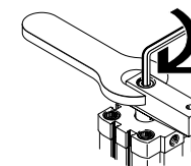


Fig. 4 Tighten the retaining screw/拧紧固定螺丝

Tightening torques [Nm]/紧固扭矩[Nm]

Piston Ø [mm]/缸径 Ø [mm]	25	32
Max. tightening torque clamping finger screw [Nm]/夹紧手指螺丝的最大紧固扭矩[Nm]	12	24

Tab. 3 Clamp finger tightening torques/夹紧手指紧固扭矩



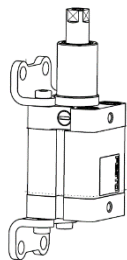

Notice/ 注意

Holding the clamping finger instead of cylinder body when tightening, or else, too much force on piston rod will damage the internal mechanism./ 拧紧时，应握住夹紧手指而不是缸体，否则，活塞杆受力过大会损坏内部机构。

2.2 Assembling CLR/装配 CLR

Place the CLR-so that no objects project into the swivel range of the clamping finger./确保CLR夹紧手指的旋转范围内没有任何物体。

Select one of the fastening possibilities listed in the following table./从下表所列的固定方式中选择一种。

Double screw connector with foot fastening type HNA in the threaded holes of the cover screws/HNA 型脚踏式双螺钉连接器，安装在盖板螺钉的螺纹孔中。	With four screws in the threaded holes of the cover screws:/ 将四颗螺钉插入盖板螺钉的螺纹孔中： -with flange mounting type FNC/带法兰安装类型 FNC -direct fastening/直接固定
	

Tab. 4 CLR fastening list /CLR 安装方式列表

The different product sizes have connector threads of the following design and with the following tightening torques:/ 不同尺寸产品的接头螺纹设计如下，拧紧扭矩如下：

CLR	25	32
Connecting thread/固定螺纹	M5	M6
Tightening torque [Nm]/拧紧扭矩[Nm]	5	8

Tab. 5 Assembling CLR tightening torques/装配 CLR 的紧固扭矩

2.3 Assembling fitting /装配气接口

Connect the tubing of the CLR to the compressed air connections./将CLR的气口和压缩空气接口连接。

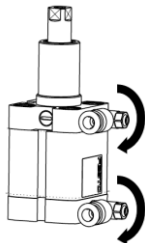


Fig. 5 Tighten the compressed air connections/固定气接口

CLR	25	32
Connecting thread/固定螺纹	M5	G1/8
Tightening torque[Nm]/拧紧扭矩[Nm]	1.5	6

Tab. 6 Compressed air connections tightening torques/压缩空气接口紧固扭矩

2.4 Electrical installation /电气安装

- Avoid external influence caused by magnetic or ferritic parts in the vicinity of the proximity switches, this ensures the proper functioning of the proximity sensors./ 避免接近开关附近的磁性或铁素体部件造成外部影响，这可确保接近传感器正常工作
- Push the proximity switches into groove 4./ 将接近开关推入凹槽 4。

3. Commissioning/调试



Warning/警示

Uncontrolled moving masses can cause injury to people or damage to objects in the area of movement (squashed fingers, eye injuries)./ 不受控制的移动物体可能会对移动区域内的人员或物体造成伤害（挤压手指、伤害眼睛）。
Make sure that nobody can place his/her hand in the operating range of the clamping finger and that there are no objects in this range, in order to avoid the risk of injury to human beings and damage to property (e.g. by providing a protective screen)./ 确保任何人都不能将手伸入夹紧指的操作范围内，并且该范围内没有任何物体，以避免人身伤害和财产损失的风险（例如通过提供保护屏）。

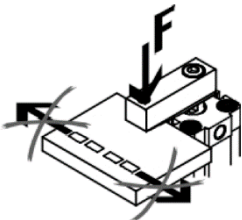
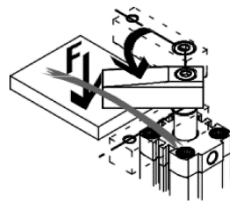
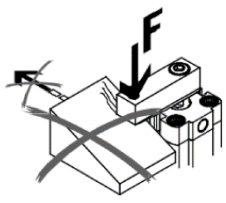


Notice/ 注意

Transverse loadings during the swivel movement can damage the bearings./ 旋转过程中的横向载荷会损坏轴承。
Make sure that the clamping finger clamps only level and resting parts in its end position./ 确保夹紧指仅在其末端位置夹紧水平和静止的部件。

3.1 Fault operation/错误操作

The clamping procedures listed in the following table are not permitted:/ 下表列出的夹紧方式是不允许的：

Clamping moving parts/夹紧活动部件	Clamping within the swivel procedure/在旋转过程中夹紧	Clamping on a sloping Surface/在倾斜表面上夹紧
		

Tab. 7 The operation is not allowed/不允许的操作

Make sure that the maximum permitted loadings are not exceeded./ 确保不超过最大允许负载。

If set correctly, the clamping finger must reach the end position safely without knocking hard against it./正确安装的情况下, 夹紧手指会安全到达末端位置, 而不会用力磕碰。

3.2 Test run/试运行

Start a test run as follows:/按照如下步骤开始试运行:

- At first with slow positioning movements./首先进行缓慢的定位动作。
- Then under conditions of use./开始运行状态。
- During the test run check that the CLR clamps reliably./在试运行期间检查 CLR 手指是否可靠夹紧。
- If the test run is without faults, end the test run./ 如果试运行无故障, 结束测试运行。

3.3 Trouble-shooting/故障排除

Fault/故障	Cause/原因	Possibilities/可能性
Proximity switch does not switch/接近开关无法工作	Ferritic objects in vicinity (fastening elements)/附近有磁性物体 (紧固件)	Use non-ferritic materials or a different type of proximity switch (SMT-8-...)/使用非磁性材料或不同类型的接近开关 (SMT8-...)
Hard impact at the end Positions/对末端位置造成强烈冲击	Mass on clamping finger too large / non-permitted parts used/夹指质量过大/非官方配件	Use clamping finger with unmodified clamping screw/使用未修改螺钉的夹紧手指
	Excessive speed/速度过快	Restrict swivel motion more/限制旋转运动速度
CLR cannot hold the part to be clamped/ CLR 无法夹住要夹紧的部件	Insufficient operating Pressure/工作压力不足	Increase operating pressure to maximum permitted value/将工作压力提高到最大允许值

Tab. 8 Trouble and trouble-shooting /故障及故障排除