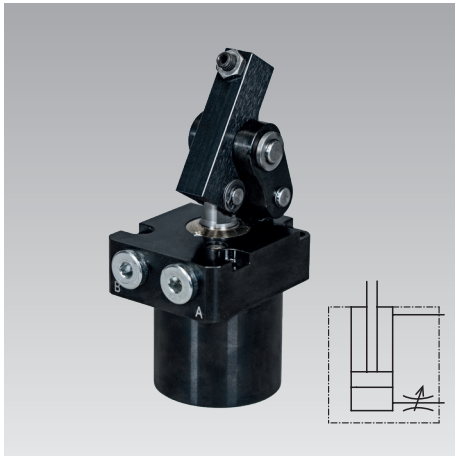




Hinge Clamps 70 bar/120 bar

with throttle valve, metallic wiper edge and optional position monitoring
double acting, max. operating pressure 120 bar



Application

Hydraulic hinge clamps are used for clamping workpieces when it is essential to keep the clamping points free for unrestricted fixture loading and unloading.

A clamping recess in the workpiece slightly wider than the clamping lever is sufficient as clamping surface.

The special kinematics allow clamping without side loads of workpieces which are very sensitive against deformation.

This series, with an operating pressure of 120 bar, is designed for direct connection to the low-pressure hydraulics of machine tools.

In combination with the optional pneumatic or electrical position monitorings, hinge clamps are particularly suitable for:

- Automatic manufacturing systems with very short cycle times
- Clamping fixtures with workpiece loading by handling systems
- Transfer lines
- Test systems for motors, gears and axes
- Assembly lines
- Special machine tools

Description

The hinge clamp is a double acting hydraulic cylinder with integrated clamping lever. When pressurising the element, the piston moves upwards and swivels the clamping lever over the hinges forwards and at the same time downwards onto the workpiece. The piston force is deviated by 180° and, depending on the lever length, is available as a clamping force (→ Page 4).

The kinematics are so designed that no side loads act on the workpiece if the clamping surface is at the same height as the centre of rotation of the clamping lever (see comparison "Forces at the clamping point").

The 3 available clamping directions (L, G, R) make it easier to adapt to the workpiece shape or the hydraulic connectivity.

All sizes are available with a switch rod for external position monitoring as an option.

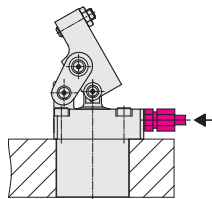
Electrical and pneumatic position monitorings for the clamping and unclamping position are available as accessories. → Page 6

Advantages

- High clamping force in the low-pressure range
- Very short clamping time (min. 0.5 s)
- Throttle valve as standard, easily adjustable from the top
- Compact design partially recessible
- Lever bolt plain bearing
- 3 clamping directions selectable
- Clamping possible without side loads
- The clamping lever can be swivelled into small recesses
- Long clamping lever adaptable to the work-piece contour
- FKM wiper protected by metallic wiper edge
- Position monitoring available as an accessory
- **NEW:** Stroke measuring system with an ultrasonic sensor
- Mounting position: any

Installation and connecting options

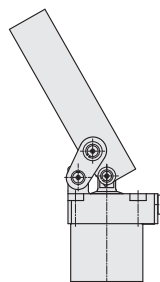
Pipe thread



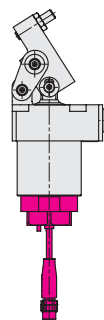
Versions

Without switch rod

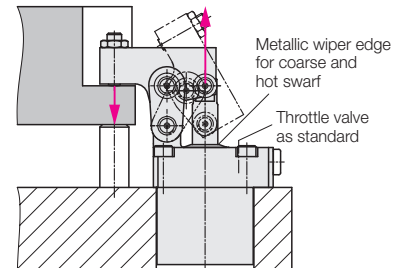
(long clamping lever option)



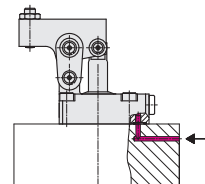
With stroke measuring system (ultrasonic sensor)



Lever mechanism without side loads

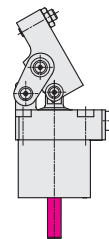


Drilled channels



With switch rod

(Accessories for position monitorings Pages 5 / 6)



Ultrasonic sensor

The ultrasonic sensor measures the piston position of the hinge clamps by measuring the duration of the ultrasonic signal in the hydraulic oil. The piston position determined in this way can be used to monitor the clamping process and can be transmitted via IO-Link, as an analogue signal or as a switching signal. → Page 4

Code for Part Numbers

1 8 2 6 X 12 X X X

Clamping direction

- R** = clockwise
G = straight
L = counterclockwise

Operating pressure

12 = 120 bar

Size

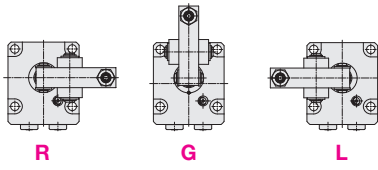
- 1** = BG 1
2 = BG 2
3 = BG 3
4 = BG 4
5 = BG 5

Clamping lever

- 0** = without clamping lever
1 = clamping lever with contact bolt
2 = long clamping lever

Versions

- 3** = without switch rod and sensor
4 = with switch rod and without sensor
5 = with ultrasonic sensor



Size		1	2	3	4	5
a	[mm]	55	60	66	82	96
a1	[mm]	35	40	46	56	68
a2	[mm]	5	5	5.5	7	9
a3	[mm]	22.5	25	28.5	35	43
Ø a4	[mm]	5.6	5.6	6.8	9	11
a5	[mm]	18	17	17	20	20
a6	[mm]	37.5	41	47	57	70.3
b	[mm]	45	50	57	70	86
b1	[mm]	35	40	46	56	68
b2 -0.05	[mm]	12	12	16	19	22
b3	[mm]	15.5	14	17	20	24
c	[mm]	22	20.8	22	26	32
c1	[mm]	63.5	68.5	77	93	110
c2	[mm]	79.8	85.5	97	116.5	138.9
c3	[mm]	129.1	152.8	157.6	204	226.8
d1	[mm]	16.5	18.5	21	24.5	30.5
d2	[mm]	20	23.5	29	32	39
d3	[mm]	88	110.5	108	148.5	159.5
d4	[mm]	20	23	29.5	31.5	37.5
d5	[mm]	82	104	100.5	138	147
d6	[mm]	14	17	21.5	21.5	26.5
Ø d12 max.	[mm]	4	4	4	6	6
d8 min.	[mm]	3	4	7	7	8
f1	[mm]	33.5	39.5	42.5	47	55
G		G1/8	G1/8	G1/8	G1/4	G1/4
Ø g1 max.	[mm]	40	48	54	64	79
Ø g2 ±0.1	[mm]	39	47	53	63	78
Ø g3	[mm]	34.5	34.5	43	48	60
h	Ideal clamping point	[mm]	48.5	51.5	56	79
ho	Upper end of the clamping range	[mm]	1	1.2	1.5	2
hu	Lower end of the clamping range	[mm]	1.1	1.3	1.5	2.1
h1	Stroke up to the ideal clamping point	[mm]	15.7	17.7	21	29
h2	Stroke up to the end of the clamping stroke	[mm]	3	3	3	3
h3		[°]	57.6	58.6	60.4	57.6
h4	Unclamping position	[mm]	60.2	68.2	72.6	78.1
h5		[mm]	17.9	17.1	15.9	14.9
h6		[mm]	8.4	8.6	8.4	8.4
j1		[mm]	12.5	12.8	14	14
j2		[mm]	20	22	23	30
j3	Fixing thread		M5	M5	M6	M8
k1		[mm]	22	24	28	36
k2		[mm]	25	28	30.5	36
Ø l1 f12	[mm]	8	10	10	12	12
l2		M5 × 15 deep	M6 × 11.5 deep	M6 × 11.5 deep	M8 × 16 deep	M8 × 16 deep
q1	[mm]	26	26	29	39	48
q2	[mm]	14	16	20	25	30
q3	[mm]	21.5	26	30	36.5	45
q4		M6	M6	M8	M10	M12
r1	[mm]	0.4	0.4	0.4	0.4	0.4
r2	[mm]	7	9	9	11	12
s1	[mm]	5.5	6	6	7	10
Ø s2 H12	[mm]	6	8	8	10	14
Ø s3 H12	[mm]	6	6	7	8	12
t	[mm]	2.4	3.9	2.5	4	4.7
t2	[mm]	6.5	9	9	10.5	14
t3	[mm]	4	3	4.3	5.1	6.6
t4	[mm]	4	17	22	22	31
u1	[mm]	14.5	17.5	17.5	19	28
u2	[mm]	16	16.5	17	19	26
u3 +0.1	[mm]	6.1	6.1	8.1	10.1	11.1
x1	[mm]	4	4	4	5	5
SW	[mm]	32	32	36	46	46
Weight	[kg]	1	1.2	1.5	2.6	4.5

Operating conditions, tolerances and other data, see data sheet A 0.100

Technical Characteristics

Accessories • Conversion Kit, Stroke Measuring System

Size			1		2		3		4		5		
Operating pressure	[bar]		120	70	120	70	120	70	120	70	120	70	
Max. clamping force at	length of clamping lever d2												
	without switch rod	[kN]	4.5	2.6	6.0	3.5	7.6	4.4	12.6	7.3	20.8	12.1	
	with switch rod	[kN]	4.0	2.3	5.3	3.1	7.0	4.0	11.6	6.8	19.8	11.5	
Piston force	without switch rod	[kN]	5.9	3.4	8.5	4.9	11.5	6.7	18.2	10.6	29.6	17.2	
	with switch rod	[kN]	5.3	3.0	7.5	4.3	10.6	6.1	16.9	9.8	28.2	16.4	
Piston Ø		[mm]	25		30		35		44		56		
Piston rod Ø		[mm]	12		14		14		16		22		
Piston stroke		[mm]	18.7		20.7		24		26		32		
Piston area	Clamping without switch rod	[cm²]	4.9		7.06		9.62		15.2		24.6		
	Clamping with switch rod	[cm²]	4.4		6.28		8.83		14		23.4		
	Unclamping	[cm²]	3.77		5.52		8.08		13.1		20.8		
Oil volume	Clamping without switch rod	[cm³]	9.2		14.7		23.1		39.6		78.8		
	Clamping with switch rod	[cm³]	8.3		13		21.2		36.6		75.2		
	Unclamping	[cm³]	7.1		11.45		19.4		34.3		66.7		
Max. flow rate		[cm³/s]	16		25		40		75		150		
Weight		[kg]	1		1.2		1.5		2.6		4.5		
Part no. without switch rod													
Without clamping lever			1826X12130		1826X12230		1826X12330		1826X12430		1826X12530		
Clamping lever with contact bolt			1826X12131		1826X12231		1826X12331		1826X12431		1826X12531		
Clamping lever, long			1826X12132		1826X12232		1826X12332		1826X12432		1826X12532		
Part no. with switch rod													
Without clamping lever			1826X12140		1826X12240		1826X12340		1826X12440		1826X12540		
Clamping lever with contact bolt			1826X12141		1826X12241		1826X12341		1826X12441		1826X12541		
Clamping lever, long			1826X12142		1826X12242		1826X12342		1826X12442		1826X12542		
Part no. with stroke measuring system ultrasonic sensor													
Without clamping lever			—		1826X12250		1826X12350		1826X12450		1826X12550		
Clamping lever with contact bolt			—		1826X12251		1826X12351		1826X12451		1826X12551		
Clamping lever, long			—		1826X12252		1826X12352		1826X12452		1826X12552		
Spare O-ring			[mm]	7 × 1.5		7 × 1.5		7 × 1.5		8 × 1.5		8 × 1.5	
Part no.				3000342		3000342		3000342		3000343		3000343	

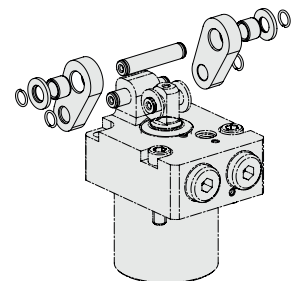
Product available on request

X = Code letter → Page 2

Conversion kit with clamping lever mechanism for operating pressure 120 bar

Existing hinge clamps rated up to 70 bar can be operated at a pressure of 120 bar by replacing the clamping lever mechanism.

Size	Part no.
BG 1	0182611
BG 2	0182612
BG 3	0182613
BG 4	0182614
BG 5	0182615



Stroke measuring system ultrasonic sensor

The ultrasonic sensor measures the piston position of the hinge clamp in absolute terms. This makes it possible to detect the clamped and unclamped positions of the clamping device or to identify when the clamping device is clamped without a workpiece in place.

The sensor is screwed into the base of the clamping device and tightened to a specified torque. If the piston moves during operation, the distance between the bottom of the piston and the sensor changes, resulting in a change in the duration of the ultrasonic signal.

Important notes

To ensure trouble-free operation, the clamping element must be carefully bled. A mounting position in which air can accumulate in the sensor's installation space (e.g. overhead) is not recommended.

Operating modes

The sensor can be connected and read in two different ways.

1. IO Link

The sensor is IO-Link compatible. If this transmission method is used, it is possible to analyse further data from the sensor or pre-process data, such as: reading the signal quality, setting switching points (e.g. clamped or unclamped position), and setting a switch counter.

2. SIO mode

In SIO (standard input/output) mode, the device can be used without an IO-Link connection. The behaviour in SIO mode is configured once via IO-Link.

The sensor can be configured so that one signal is transmitted via pin 2 (analogue or digital output) and another via pin 4 (digital output).

A complete overview of the sensor's range of functions can be found in the sensor's operating instructions.

Technical characteristics

Operating voltage	[V]	24
Max. current consumption	[mA]	130
Operating modes	IO-Link mode/ SIO mode	
Repetitive accuracy	[µm]	± 50
Tightening torque	[Nm]	58–62
Max. compressive strength	[bar]	350
Ambient temperature	[°C]	0–85

Part no. 3829519

Connection

Pin	Signal
1	L+ (operating voltage +, SIO 10–30 V, IO-Link 18–30 V)
2	I/Q (digital input / digital output / analogue output)
3	L– (operating voltage –)
4	C/Q (IO-Link communication / digital output in SIO mode)

Operating conditions, tolerances and other data, see data sheet A 0.100

Accessories

Pneumatic Position Monitoring (not adjustable)

Application

The pneumatic position monitoring signals the following conditions by closing two bore holes:

1. Piston retracted and clamping lever in off-position
2. Piston in clamping area and clamping lever in clamping position

For each control function, a pneumatic line has to be provided at the clamping fixture.

Description

When moving to a switching position, the air pressure in the supply line increases and operates a differential pressure switch or an electro-pneumatic pressure switch.

Pneumatic connection

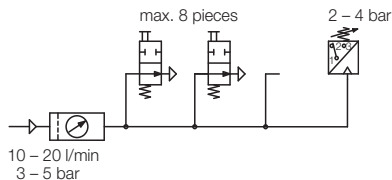
Cartridge type

The hinge clamp with the mounted position monitoring and inserted O-rings is put into the location hole and immediately ready for use.

Mounting body

The mounting body is put onto the cartridge-type version and held by the supplied safety ring. The M5 pneumatic ports can be rotated by 360°.

Monitoring by pneumatic pressure switch



For the evaluation of the pneumatic pressure increase, standard pneumatic pressure switches can be used. Up to 8 position monitorings can be controlled with one pressure switch (see circuit diagram).

Note that reliable functioning of pneumatic monitoring is only guaranteed if the throttled air pressure and air flow rate are throttled.

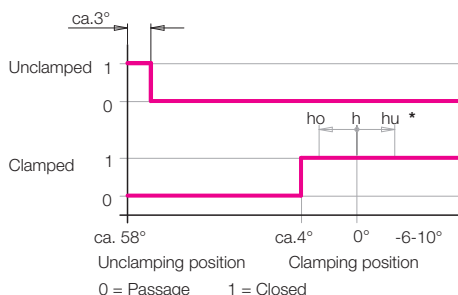
Technical characteristics

Connection	Drilled channels or threads M5
Nominal diameter	2 mm
Max. air pressure	10 bar
Range of operating pressure	3–5 bar
Differential pressure*) at	
3 bar System pressure	min. 1.5 bar
5 bar System pressure	min. 3.5 bar
Air volume **)	10 – 20 l/min

*) Minimum pressure difference, if one or several position monitorings are not operated.

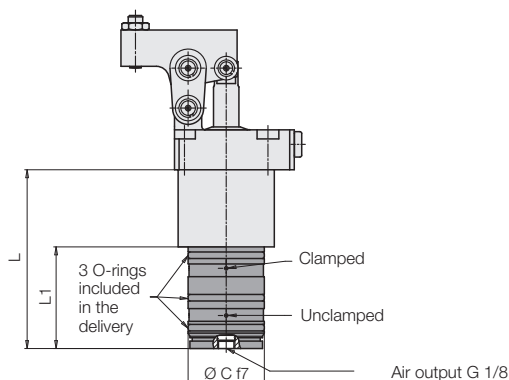
**) Appropriate devices are available to measure the flow rate.

Function chart

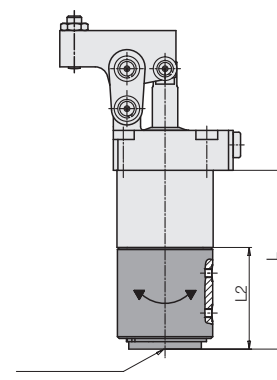


* Dimensions → Pages 2 and 3

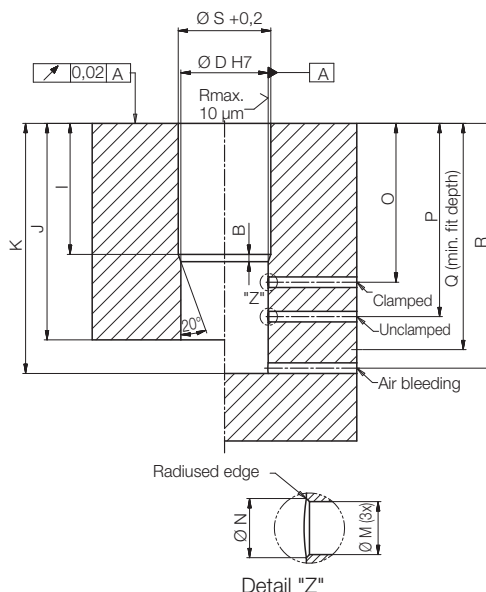
Cartridge type



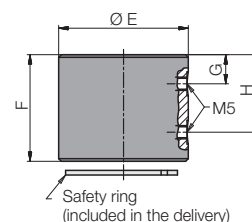
Pipe thread connection



Location hole



Mounting body



Size		1	2	3	4	5
Ø A ± 0.1	[mm]	39	47	53	63	78
B	[mm]	1.3	2	2	2	2
Ø C f7	[mm]	38	42	42	45	45
Ø D H7	[mm]	38	42	42	45	45
Ø E	[mm]	49	53	52.5	62.5	62.5
F	[mm]	40.3	46	50	54	60
G	[mm]	11	13	14	14	15
H	[mm]	29.3	33	36	40	45
I +0.2	[mm]	34	40	43	47.5	55.5
J min.	[mm]	78	87	91	100	114
K min.	[mm]	84	95	100	109	123
L	[mm]	82.5	93.5	98.5	107	121.5
L1	[mm]	49	54	56	60	66.5
L2	[mm]	46.15	53.85	55.8	59.8	65.8
Ø M	[mm]	4	4	4	4	4
Ø N	[mm]	5	5	5	5	5
O	[mm]	46	52	55.5	60	70.6
P	[mm]	65	74	80	86	100.5
Q min.	[mm]	77	85	90	98.5	113
R	[mm]	79.5	90.5	95.5	104	118.5
Ø S max.	[mm]	40	48	54	64	79

Part no.

Cartridge type with 4 screws	0353341	0353342	0353343	0353344	0353345
Mounting body	0353341A	0353342A	0353343A	0353344A	0353345A
For retrofitting of the cartridge type					

Operating conditions, tolerances and other data, see data sheet A 0.100

Application

The electrical position monitoring signals the following conditions due to damping of two inductive proximity switches:

1. Piston retracted and clamping lever in off-position.
2. Piston extended and clamping lever in off-position.

For each control function, an electrical line has to be provided at the clamping fixture.

Description

The electrical position monitoring can be easily retrofitted at all hinge clamps with switch rod (1826X12X4X).

Included in our delivery are:

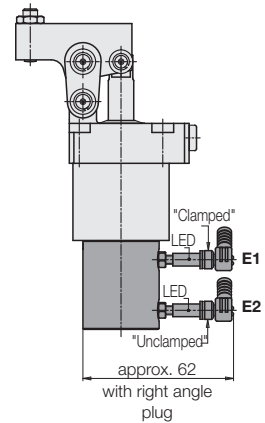
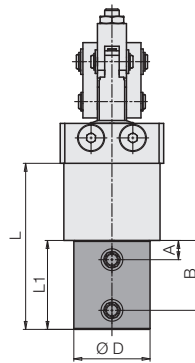
- 1 Signal sleeve with screw
- 1 Adapter with 4 countersunk screws
- 1 Control housing with 3 set screws
- 2 Inductive proximity switches with right angle plug (if ordered)

The signal sleeve is screwed onto the switch rod. The adapter is mounted with 4 countersunk screws on the bottom cover.

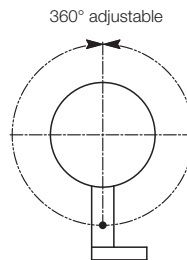
The control housing can be put onto the adapter in any angular position and locked with 3 set screws. For information on adjustment of proximity switches, see operating manual.

Important notes

Inductive position monitorings are not suitable for the use in coolant and swarf areas. According to the corresponding application conditions, safety measures have to be planned and checked later on.



Four fixing screws included in our delivery



Possible position of the proximity switches

Technical characteristics

Operating voltage	10–30 V DC
Max. residual ripple	10 %
Max. constant current	100 mA
Switching function	interlock
Output	PNP
Housing material	stainless steel
Thread	M 5 × 0.5
Code class	IP 67
Ambient temperature	–25 to +70 °C
LED function display	Yes
Protected against short circuits	Yes
Type of connection	Connector
Length of cable	5 m

Size		1	2	3	4	5
A	[mm]	12.5	12.5	10.5	10	12
B	[mm]	35	37	38.5	42.5	50
Ø D	[mm]	33	42	42	45	45
L	[mm]	75.5	84.5	91.5	103.5	117
L1	[mm]	42	45	49	56.5	62

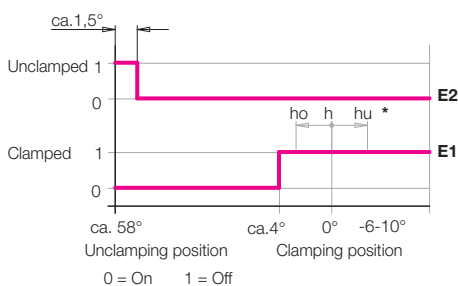
Part no.

without switches	0353 351	0353 352	0353 353	0353 354	0353 355
with switch and plug	0353 351S	0353 352S	0353 353S	0353 354S	0353 355S

Spare parts

Inductive proximity switch	3829 198	3829 198	3829 198	3829 198	3829 198
Right angle plug with cable 5 m	3829 099	3829 099	3829 099	3829 099	3829 099

Function chart



* Dimensions see Pages 2 and 3

Important notes

Hinge clamps must only be used for clamping of workpieces in industrial applications and may only be operated with hydraulic oil.

Hinge clamps can generate very high forces. The workpiece, the fixture or the machine must be in the position to absorb these forces. Considerable injuries to fingers during clamping and unclamping in the effective area of the clamping lever can occur.

The manufacturer of the fixture or the machine is obliged to provide effective protection devices.

Hinge clamps have to be checked regularly on contamination by swarf and have to be cleaned.