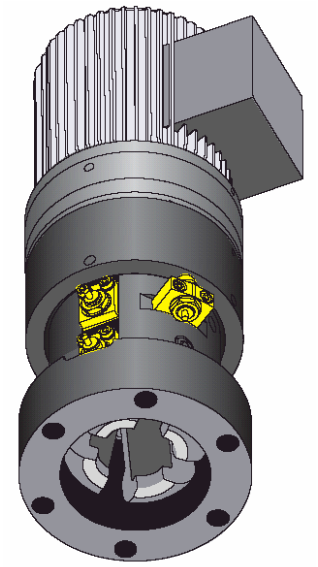
ROEMHELD
HILMA ▪ STARK

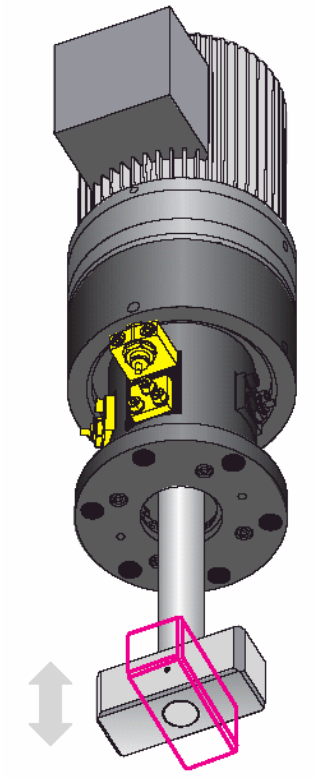
Operating manual

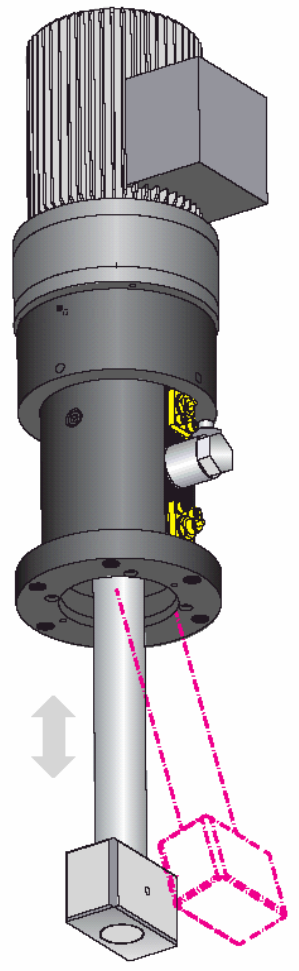
Including installation instructions
for incomplete machines as per Machinery directive 2006/42/EC

Electromechanical clamping elements

Tenon-type clamping element	Type **262x**
Swivel-and-pull clamping element	Type **264x**
Swing clamp	Type **265x**







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Apr. 13 - Printed in Germany - Änderungen vorbehalten - Subject in modification

In order to ensure safe operation of the equipment for its intended purpose, please read the operating manual before installation and before putting the system into operation for the first time!

1. General information, safety information and manufacturer's declaration

1.1 General

Hilma-Römheld electromechanical clamping elements have been thoroughly checked. They are designed for use as specified in the technical data. If the technical instructions are not observed, the safety of the operator and the proper functioning of the machine may be put at risk. Unauthorised modification or alterations to Hilma-Römheld electromechanical clamping elements are prohibited for reasons of safety. If this instruction is not observed, our guarantee will be invalid.

1.2 Field of application

Hilma-Römheld electromechanical clamping elements are intended for fully-automatic clamping of upper dies on the press slide.
The electromechanical clamping elements are fastened to the press slide, and they are electrically prepared for connection to the 'clamping element - machine' interface. The electrical interface for sensors and for the drive motor is a Harting plug.

1.3 Operating characteristics

Hilma Römheld electromechanical clamping elements must not exposed to higher loads than those specified. The maximum supply voltages must not be exceeded.

1.4 Temperatures

The maximum operating temperature for the standard version is 70 °C; for higher temperatures special versions must be used.

1.5 Important safety information

- Install the electrical system only using suitable connecting elements (see chapter 4 'Installation').
- Fasten screws by appyling the specified tightening torque (see chapter 4 "Installation").
- Installation and repair work must only be carried out if the electrical connections are broken (idle)
- Do not exceed specified voltages and temperatures.
- Never put hands or tools into the moving area of the clamping elements during clamping and unclamping. Danger of being squeezed !!!

Before putting the elements into operation, the operator must be fully trained.
Young people under 16 years old must not be allowed to operate the clamps. Staff over 16 years old are permitted to operate the consoles under supervision as part of their apprenticeship. The operating instructions must be readily accessible. The operator must inform any third parties involved of any danger in the working area.

1.6 Manufacturer's declaration

The electromechanical clamping elements have been developed, designed and manufactured in accordance with the directive "Machinery" 2006/42/EC, and they are intended, as incomplete machine, for installation in a machine.

2 Design and function

2.1 Design

The electromechanical clamping elements consist of the following items:

1. Three-phase motor
2. Step-down gear (harmonic drive)
3. Spindle drive
4. Clamping element (clamping claws or rotatable or pivoting tie rod)
5. Clamping force monitoring by Belleville spring and inductive proximity switch
6. Interrogation of the clamping and unclamping position by inductive proximity switches

2.2 Functional description

Switching status of the inductive proximity switches

	Clamping force monitoring S1	Unclamping position S2	Clamping range reached S3
Clamping (clamping range reached)	1	0	1
Clamping without die	1	0	0
Unclamping position	0	1	0

Clamping
The clamping element is in the unclamped position. The S2 proximity switch gives a signal.
After starting the three-phase motor, the rotary movement is transmitted to the spindle nut via a harmonic drive gear, and the spindle, with anti-twist protection, retracts.
The clamping element (clamping claws or rotatable or pivoting tie rod) moves to the clamping point and reaches the clamping range. The S3 proximity switch gives a signal.
The clamping element clamps the die within the clamping range. The clamping force is built up by a Belleville spring which is protected against breakage. Once the adjusted clamping force has been reached the S1 proximity switch will give a signal to stop the three-phase motor.
Another function of the S1 proximity switch is permanent monitoring of the clamping force. If the clamping force is reduced by approx. 25% (e.g. due to settling of the die, breakage of the clamping element, etc.) the signal will go out.

- Clamping without a die
If no clamping edge is available during the clamping operation (e.g. in the event of clamping without a die or if the clamping edge dimension is not correct), the clamping range will be overtravelled, and the signal of the

S3 proximity switch goes out. After reaching the inside of the inner stop of the clamping element, the clamping force builds up internally, and the S1 proximity switch gives a signal to stop the three-phase motor.

- Unclamping
For unclamping, the three-phase motor is activated in the reverse direction of rotation
The clamping element extends and is moved into the unclamping position. The signals from the S1 and S3 proximity switches go out.
When the unclamping position is reached, the S2 proximity switch gives a signal to stop the three-phase motor.

2.3 Function of the clamping elements

Tenon-type clamping element
To perform a clamping operation, the clamping claws grasp around a clamping tenon which is fastened to the die and pull it towards the clamping element. The clamping claws are pivoted from the unclamping to the clamping position using a guide profile.

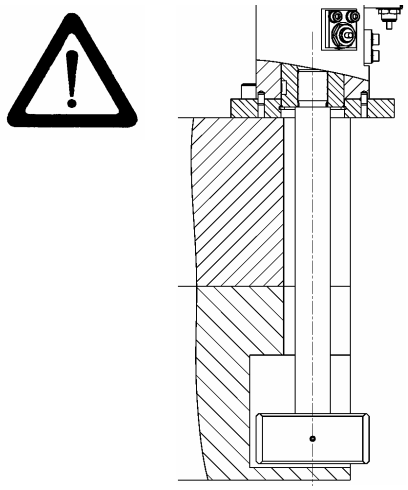
Swivel-and-pull clamping element
In this case, the tie rod is rotated by 90° from the unclamping to the clamping position using a radial cam and is pulled against the clamping edge. The rotary movement from the unclamping to the clamping position is carried out during the rotating stroke, which is part of the tie rod stroke.

Swing clamp
In the unclamping position, the tie rod is extended by about 15°. For clamping, the tie rod is swivelled during the swing stroke, which is part of the tie rod stroke, into the vertical position by means of a spring-loaded bolt.

3 Technical data, main dimensions

Drive motor
Three-phase motor 400 V / 50 Hz, duty cycle approx. 30 clamping cycles per hour

Inductive proximity switches
24 V DC (10-30 V DC)



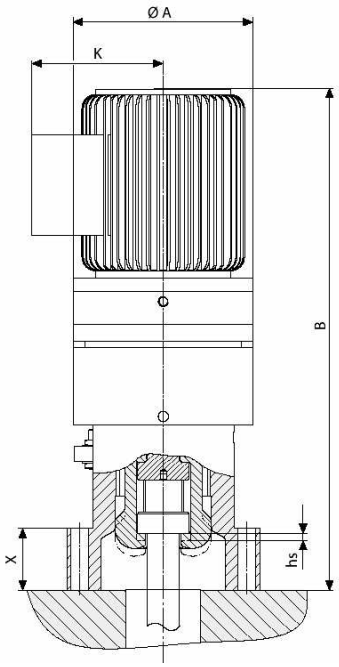
Installation space
(Clamping pocket for swivel-and-pull clamping elements and swing clamps)
If the three-phase motor is not stopped after reaching the tie rod unclamping position (e.g. defective S2 proximity switch), the tie rod is extended until the spindle runs out of the spindle nut. A locking device prevents the tie rod from falling.
In order to avoid destruction of the clamping element due to bottoming of the tie rod and subsequent build-up of force, the clamping pocket in the die must be of sufficient size.
For required dimensions of the clamping pocket, see chapter 3 "Technical data, main dimensions" (Installation space "l“) and the attached drawing.

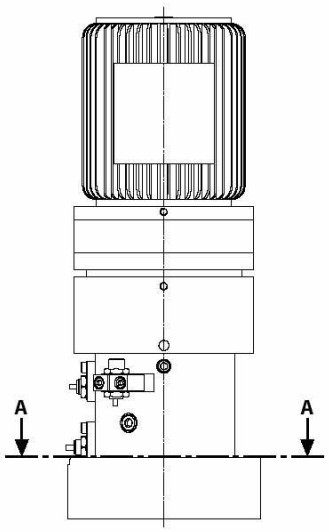
<= Clamping pocket

3.1 Tenon-type clamping element

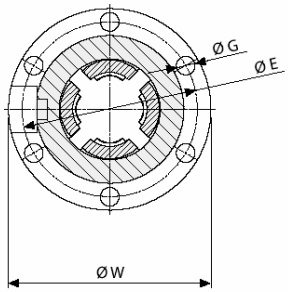
Technische Daten

Typ	8.2623.0101	8.2625.0101	8.2626.0101
Spannkraft (kN)	**70**	**120**	**160**
statische max. Kraft (kN)	110	200	300
Spanngeschwindig-keit (mm/s)	3,8	5,7	4,1
Motoranschluss-spannung V/Hz)	400/50	400/50	400/50
Motorleistung (kW)	0,55	1,1	1,1
Motor-Nennstrom (A)	2,1	3,55	3,55
a (mm)	40	50	60
b (mm)	25	32	40
c (mm)	44	48	48
d (mm)	16	20	25
A (mm)	140	160	195
B (mm)	390	470	516
E (mm)	130	150	170
G (mm)	14	14	14
Spannhub hs (mm)	5	5	5
K (mm)	102,0	112,5	112,5
W (mm)	150	172	200
X (mm)	48	55	65

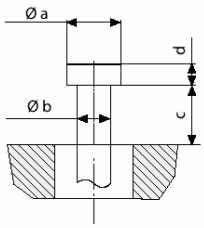




Schnitt A-A



Zapfengeometrie



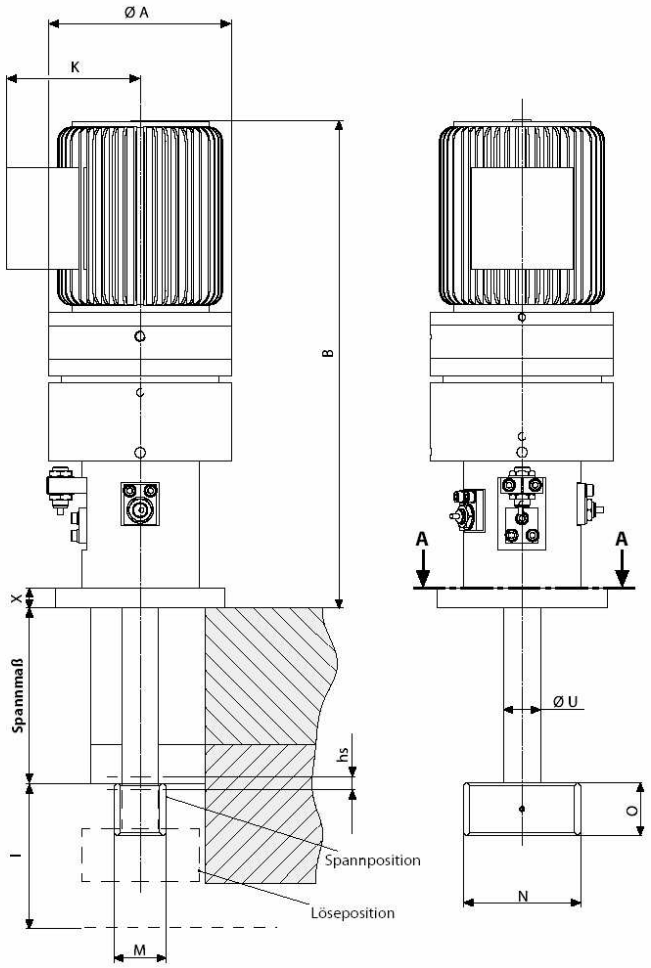
For other data and dimensions, see the attached drawings

3.2 Swivel-and-pull clamping element

Technische Daten

Typ	8.2643.0101	8.2645.0101	8.2646.0101
Spannkraft (kN)	**70**	**120**	**160**
statische max. Kraft (kN)	110	200	300
Spanngeschwindig-keit (mm/s)	3,8	5,7	4,1
Motoranschluss-spannung (V/Hz)	400/50	400/50	400/50
Motorleistung (kW)	0,55	1,1	1,1
Motor-Nennstrom (A)	2,1	3,55	3,55
A (mm)	140	160	195
B (mm)	374	441	500
E (mm)	110	140	160
G (mm)	13,5	13,5	13,5
Spannhub hs (mm)	10	10	15
Drehhub (mm)	25	30	40
Einbauraum I (mm)	90	115	135
K (mm)	102,0	112,5	112,5
M (mm)	40	50	60
N (mm)	90	90	90
O (mm)	40	60	65
U (mm)	28	40	40
W (mm)	130	160	180
X (mm)	15	20	20

Spannmaß bitte bei Bestellung angeben



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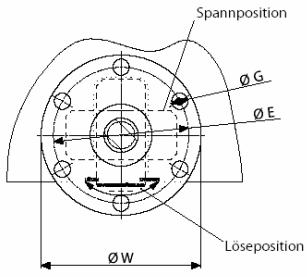


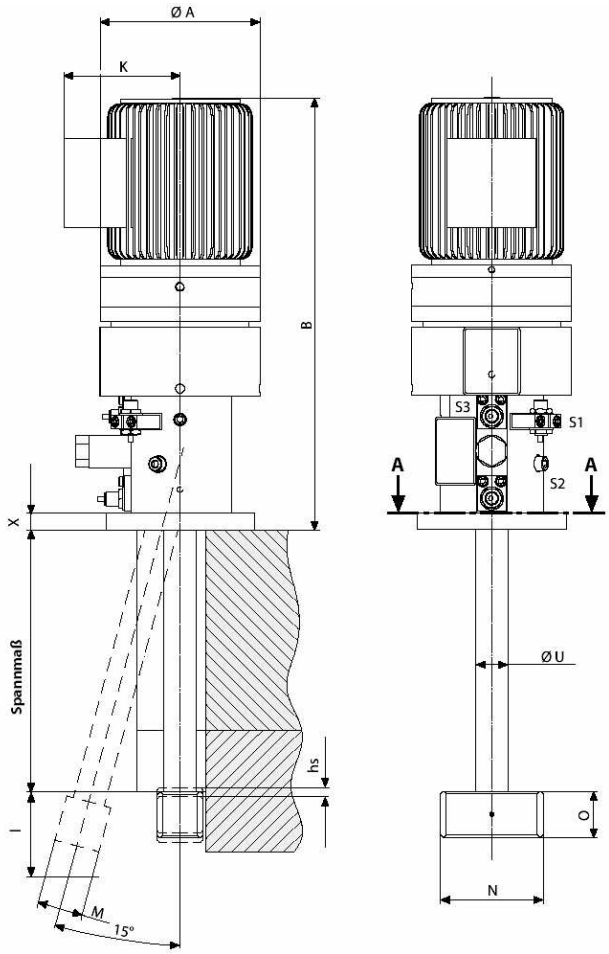
For other data and dimensions, see the attached drawings

3.1 Swing clamp

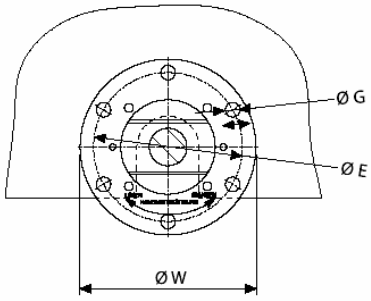
Technische Daten

Typ	8.2653.0101	8.2655.0101	8.2656.0101
Spannkraft (kN)	**70**	**120**	**160**
statische max. Kraft (kN)	110	200	300
Spanngeschwindigkeit (mm/s)	3,8	5,7	4,1
Motoranschlussspannung V/Hz)	400/50	400/50	400/50
Motorleistung (kW)	0,55	1,1	1,1
Motor-Nennstrom (A)	2,1	3,55	3,55
A (mm)	140	160	195
B (mm)	409	522	602
E (mm)	110	140	160
G (mm)	11,0	13,5	13,5
Spannhub hs (mm)	11	12	12
Schwinghub (mm)	8,0	10,5	13,0
Einbauraum I (mm)	85	120	125
K (mm)	102,0	112,5	112,5
M (mm)	40	50	60
N (mm)	90	90	90
O (mm)	40	60	65
U (mm)	28	40	40
W (mm)	130	160	180
X (mm)	42	57	65

Spannmaß bitte bei Bestellung angeben



Schnitt A-A



For other data and dimensions, see the attached drawings

4 Installation, connection and commissioning

When installing the incomplete machine 'electromechanical clamping element' the following minimum conditions must be met, in order to ensure that is can be assembled together with other components to form a complete machine without risk to the health and safety of personnel:

4.1 Installation

- Installation work must only be carried out when the system is unpressurized.
- Hole pattern as per drawing and data sheet, respectively.
- Fasten the clamping elements using approrpiate screws.
- Tighten the screws by applying the tightening torque as per DIN.

For the hole pattern for fastening, see the drawing in chapter 3 (Technical data, main dimensions)

4.2 Electrical installation

Pin assignment for Harting plug:

HAN 3 HvE (motor)

	Contact
	-
	-
U1	3
	-
	-
	-
V1	7
	-
W1	9
PE	PE

HAN 10 E (proximity switch)

		Contact
Clamping force control	brown	1
	blue	2
S1	black	3
Unclamping position	brown	4
	blue	5
S2	black	6
Clamping range reached	brown	7
	blue	8
S3	black	9
		10
		PE

After electrical connection via the Harting plug the clamping element is in the operating condition.

4.4 Commissioning

Read the operating manual before commissioning!

Clamp and unclamp the clamping element several times without a die.
Check whether the clamping element, after overtravelling the clamping range, builds up the clamping force properly and then switches off.
Clamp and unclamp the clamping element several times with the die mounted.
Check whether all functions and proximitiy switch signals work correctly.

ATTENTION: When clamping and unclamping operations are carried out, keep your hands and and all tools well away from the moving range of the clamping elements. **DANGER OF INJURY!**

The maximum number of subsequent clamping and unclamping cycles must not exceed 25. The pause after these cycles must be long enough to allow the three-phase motor to cool down to ambient temperature.

5 Trouble shooting

The electromechanical clamping element has left our premises in perfect condition. All functions have been tested, and necessary adjustments have been made.
If any malfunction should occur even though the conditions stipulated in chapter 4.0 (Installation and commissioning) have been duly observed, please try to establish the cause using the table below:

Failure	Cause	Remedial action
The clamping force is not reached. S1 proximity switch does not trigger.	The required motor voltage is not available. S1 proximity switch or cable defective.	Check / correct motor voltage. Check / replace proximity switch or cable.
S3 proximity switch '*Clamping range reached*' is not triggered.	S3 proximity switch or cable defective. Dimensions of clamping edge or clamping bolt are not correct (clamping range is not reached or is overtravelled)	Check / replace S3 proximity switch / cable. Check / corrrect dimensions of clamping edge or clamping bolt.
S2 proximity switch *'Unclamping position'* is not triggered.	S2 proximity switch or cable defective.	Check / replace proximity switch / cable.
The unclamping position is overtravelled, the spindle runs out of the spindle nut	S2 proximity switch or cable defective.	Check / replace proximity switch / cable. Manually rotate motor (SW on B shaft end of the three-phase motor) and thread spindle again into the nut. *Please note for swing clamp: Remove the spring-loaded bolt beforehand!*

6 Maintenance and repair

Under normal conditions, electromechanical clamps do not need any special maintenance. However, a visual check of the clamps should be carried out once a week.
When carrying out routine maintenance work on the press:
- visually check the electrical connections (plugs, cables, proximity switches) for any damage.

In the event of a malfunction, it is recommended that the clamping element is replaced with a spare element, in order to prevent press downtime. Repairs can then be carried out away from the press (if necessary at our Hilchenbach premises).

Repair work on clamping elements must only be carried out by qualified personnel!

ATTENTION
Before dismantling the clamping elements undo the electrical connections!
For dismantling, the clamping elements (clamping claw or tie rod) must be in the unclamping position!

For commissioning, see chapter 4.0 (Installation und commissioning)

7 Technical appendix

Declaration of incorporation

as per

Machinery Directive EC-RL 2006/42/EC dated June 9, 2006.

We, **Hilma- Römheld**
Schützenstrasse 74
57271 Hilchenbach, declare, that the incomplete machine and its variants:

electromechanical clamping element
type 262x
type 264x
type 265x

as supplied by us has been specifically designed for incorporation into a machine, taking full account of DIN-EN 294. The documentation has been prepared in conformity with appendix VII B. If required, the national authority may receive the documentation as a hard copy by post or by e-mail as a PDF format file. The machine into which the parts are to be integrated must only be put into operation after the conformity of the machine with the above EC directive has been demonstrated.
The design of our products is in accordance with DIN EN 982, DIN 24346 and EN 60204-1.

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Hilchenbach April 10., 2007
H.- J. Molka
Managing Director