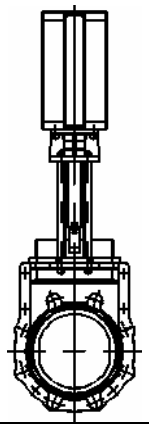
Operating Instructions

ERHARD ERU Knife Gate Valve K1

DN 50 - 600

With FESTO COPAC Actuator



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These operating instructions must always be used in combination with operating instructions BA01E001!

1 Safety ⚠

Access to the moving range of the gate of ERU Knife Gate Valves with piston actuator has to be restricted by means of protective devices. Effective protective devices have to be installed by the user.

On request, we will supply suitable protective guards.

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2 Description of Product and Range of Application

Type/Design	DN	Product Number	
ERU Knife Gate Valve K1	50-350	4657....	PN10
ERU Knife Gate Valve K1 with regulating orifice	50-350	4623....	PN10
ERU Knife Gate Valve K1	400-600	4607....	PN4
ERU Knife Gate Valve K1 with regulating orifice	400-600	4608....	PN4

Product No.	Nominal size DN	Nominal pressure PN	Hydr. test pressure in bars for Body	Seat	Max. admissible working pressure in bars at a working temperature of max. 70° C
4657, 4623	50 - 350	10	15	10	10
4607, 4608	400-600	4	6	4	4

If EPDM profile seals are used for the ERU Knife Gate Valves K1, the parts of EPDM must not get in contact with oil or grease, as the EPDM would swell.
For a recommended lubricant see section "Maintenance".

ERU Knife Gate Valves K1 of this design are suitable for "ON-OFF" operation.
For explicit regulating service, special designs have to be used, e.g. design with regulating orifice.

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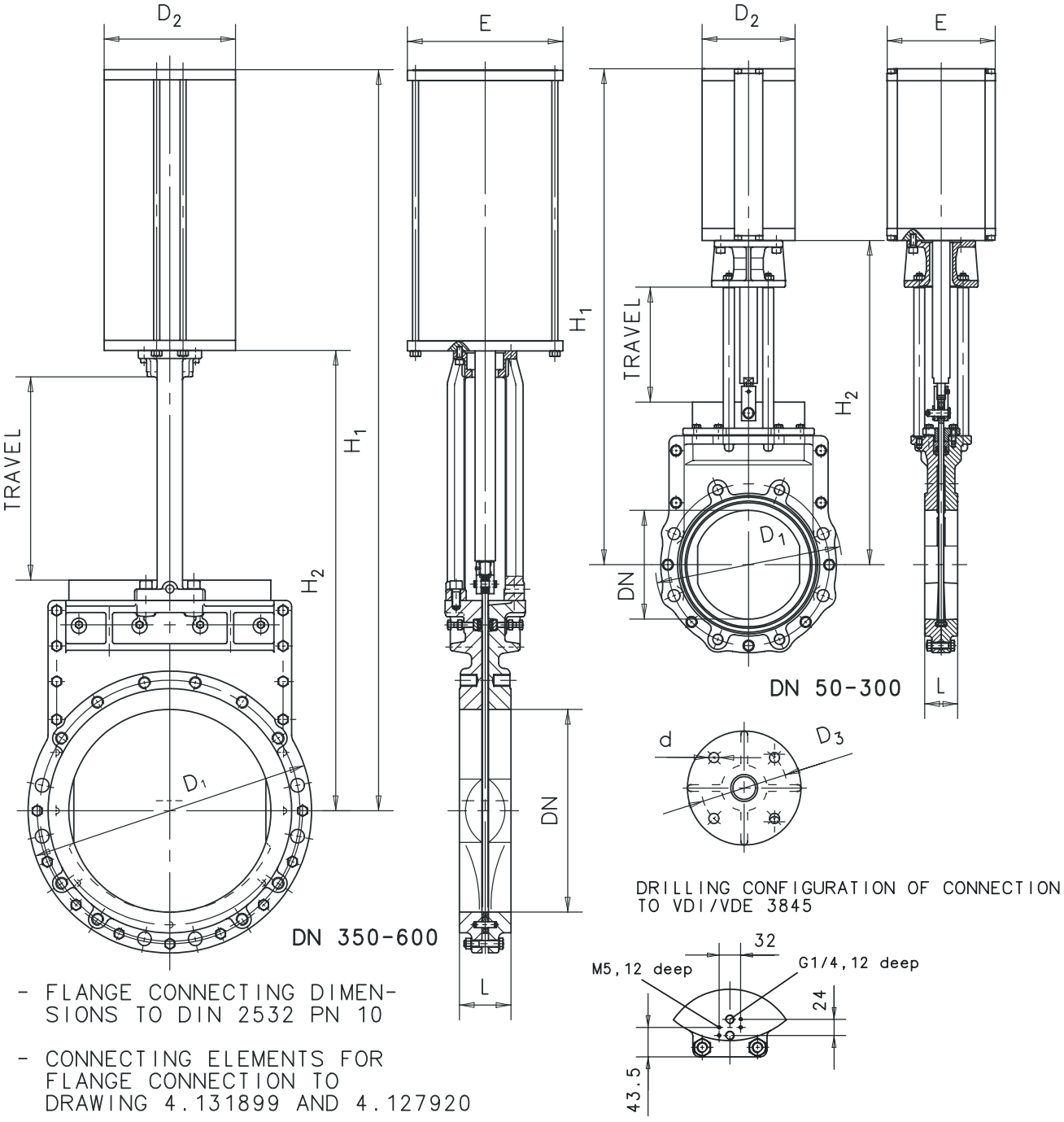
3 Design Features – Technical Data

Drawing 3E 63404
ERU Knife Gate Valve K1 with FESTO COPAC Actuator



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Dimensioned table (for drawing 3E 63404)

* IN CASE SUPPLY PRESSURE IS BELOW 4 BARS.

	DN	CYL. TYPE	L	D_1	D_2	D_3	ISO 5210	E	H_1	H_2	d	TRAVEL
	50	DLP-80-50-(A)-ERHARD	43	165	87	70	F07	108	461	311	9	50
	65	DLP-80-65-(A)-ERHARD	46	185	87	70	F07	108	501	336	9	65
	80	DLP-100-80-(A)-ERHARD	46	200	108	70	F07	131	550	366	9	80
	100	DLP-100-100-(A)-ERHARD	52	220	108	70	F07	131	603	399	9	100
	100	DLP-125-100-(A)-ERHARD	52	220	135	102	F10	163	613	399	12	100
	125	DLP-100-125-(A)-ERHARD	56	250	108	70	F07	131	668	439	9	125
	125	DLP-125-125-(A)-ERHARD	56	250	135	102	F10	163	678	439	12	125
	150	DLP-125-150-(A)-ERHARD	56	285	135	102	F10	163	755	491	12	150
	150	DLP-160-150-(A)-ERHARD	56	285	170	102	F10	199	755	491	12	150
	200	DLP-160-200-(A)-ERHARD	60	340	170	102	F10	199	905	591	12	200
*	200	DLP-250-200-(A)-ERHARD	60	340	260	102	F10	308	945	591	12	200
	250	DLP-160-250-(A)-ERHARD	68	395	170	102	F10	199	1076	712	12	250
*	250	DLP-250-250-(A)-ERHARD	68	395	260	102	F10	308	1116	712	12	250
	300	DLP-160-300-(A)-ERHARD	78	445	170	102	F10	199	1235	821	12	300
*	300	DLP-250-300-(A)-ERHARD	78	445	260	102	F10	308	1275	821	12	300
	350	DLP-250-350-(A)-ERHARD	78	505	260	102	F10	308	1312	808	12	350
	400	DLP-250-400-(A)-ERHARD	102	561	260	102	F10	308	1462	908	12	400
	500	DLP-250-500-(A)-ERHARD	127	670	260	102	F10	308	1772	1118	12	500
	600	DLP-320-600-(A)-ERHARD	154	780	332	140	F14	378	2083	1322	18	600

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4 Performance and Mode of Operation

ERU Knife Gate Valves K1 are wafer-type single-door gate valves with short face-to-face dimension. A special type of these valves, e.g. with regulating orifice, is also suitable for regulating purposes. The solid gate slides in a long gate guide between two body components. It seals on its periphery against a rubber-resilient, steel-reinforced, enclosed U-shaped sealing element. Where the gate leaves the body, tightness to the outside is ensured by a resiliently prestressed profile seal which can be readjusted. For reducing wear and tear of the profile seal and the actuating elements the prestress can be reduced to the dimension required for the actual operating pressure.
The Gate Valves were tested for tightness and resistance to DIN EN 12266 and DIN EN 1074 at the manufacturer's plant. They are designed for flow acting from any direction.
The pressurized piston moves the gate in OPEN-CLOSED direction by means of the piston rod.
The limit positions are limited by piston stops in the cylinder. The piston actuator is suitable for the supply medium: filtered and oiled compressed air or filtered and compressed air without oil.
Note: if oiled air is used, the actuator must continue to be supplied with oiled air, too (the original lubricant is flushed out by the oil).

Operating Limits of Standard Design

ERU Knife Gate Valve K1 DN50-600 PN10/4
Required supply pressures for piston actuators

DN	50	65	80	100		125		150		200		250		300		350	400	500	600
Cyl. Diameter	80	80	100	100	125	100	125	125	160	160	250	160	250	160	250	250	250	250	320
Working-Pressures Bars	Minimum supply pressures																		
4	3	3	4	3,5	3	3,5	3	4	2	4	2	6	3	5	3	3	5	5	5
6.0	3	3	4	5	4	5	4	5	3	5	3	7	4	6	4	4			
10.0	4	4	5	5	5	5	5	5	5	8	5	8	5	8	5	5			

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Air consumption at 6 bars supply pressure (theoretical values) in [Nl]

Opening	1.65	2.15	4.24	8	10	20.3	27	67	33.8	83.8	40.5	100.5	117.3	134	167.5	332.4
Closing	1.75	2.275	4.4	8.6	10.75	21.15	28.2	68.8	35.3	86	42.3	103.2	120.4	137.6	172	337.8

5 Storage

Store ERU Knife Gate Valves K1 in their closed position. Rubber-coated components, as e.g. the sealing element between the body parts, have to be protected against direct solar radiation. Avoid the effects of radiant heat, e.g. from heaters.

6 Installation into the Pipeline - Mounting

Remove all packing material from the valve. Prior to installation, check the pipeline for impurities and foreign bodies and clean it if necessary.

+ **There must be free access all around the valve for operation and maintenance.**

In case of flow media containing solid matters as e.g. sand etc. and installation into horizontal pipelines the stem or the piston rod should not be installed with an inclination of more than 30º towards the horizontal. Thus, free flushing of the travel range of the gate is possible.
In case of deviating installation positions, especially with suspended stem or piston rod, deposits around the gate have to be expected. This could lead to mal-functions which increase maintenance work.
During installation of the valve, the distance between the pipe flanges should exceed the valve face-to-face dimension by at least 20 mm. Thus, the raised faces will not be damaged and the gaskets can be inserted. Steel-reinforced rubber seals to DIN 2690 are recommended for use as flange gaskets, for slip-on flanges they are absolutely necessary (consider resistance to flow medium and temperature).
The mating pipe flanges must be plain-parallel and concentric.

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Tighten the connecting bolts evenly (without distortion) and crosswise. The pipeline mustn't by any means be pulled up to the valve.

If the distance between the flanges is too large for the valve, use thicker gaskets to cover the difference.

ERU Knife Gate Valves K1 are
- clamped between two flanges of the pipeline (wafer type) or
- screwed to the end flange of the pipeline as end-of-line valves.

The screwed connection with the pipeline is made from flange to flange by means of bolts in the through-going holes. For the threaded blind holes the screwed connection is made by means of stud bolts or bolts in the body components.

It is possible to roughly fasten the valve by means of the threaded holes.

The necessary connecting elements for the corresponding installation position are shown in drawing No. **(4E127 920).**

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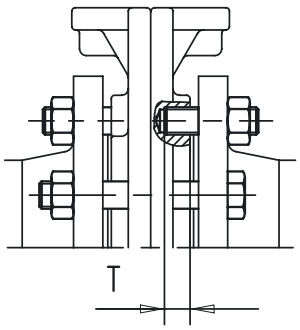
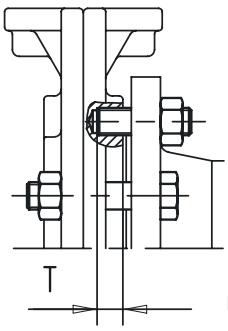
Connecting elements for flange connection (to drawing 4E127920)

WAFER TYPE

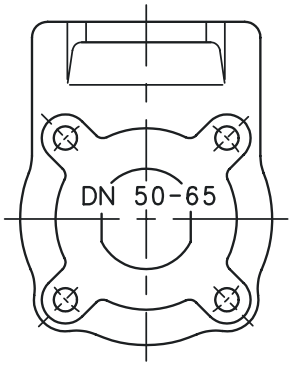


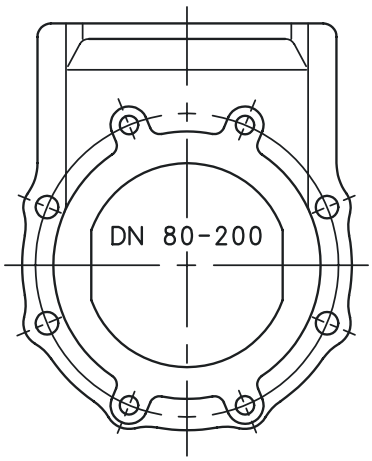
LUG TYPE

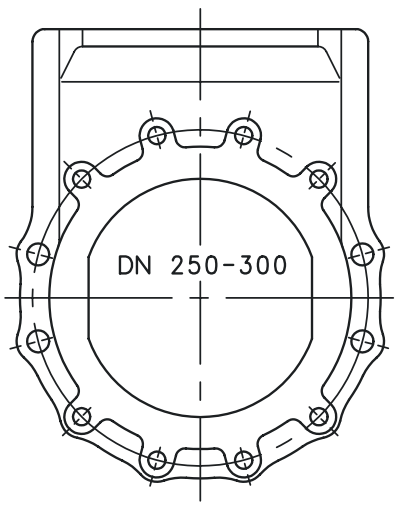


DN	FLANGES				WAFER TYPE VALVE									
	CONNECTING DIM.				THREADED HOLE○						THROUGH-GOING HOLE ○			
					DESIGN.1 *) OR DESIGN.2 *)									
					GUDGEON DIN939		HEX.NUT DIN EN 24034		HEX.BOLT DIN EN 24018		HEX.BOLT DIN EN 24016		HEX.NUT DIN EN 24034	
	DIN	PITCH CIRCLE ⌀	FLANGE OUTSIDE ⌀	DEPTH OF THREAD T	QTY	SIZE	QTY	SIZE	QTY	SIZE	QTY	SIZE	QTY	SIZE
50	2533	125	165	10	8	M16X25	8	M16	8	M16X30	-	-	-	-
65		145	185	12	8	M16X30	8	M16	8	M16X30	-	-	-	-
80		160	200	13	8	M16X30	8	M16	8	M16X35	4	M16X110	4	M16
100		180	220	15	8	M16X35	8	M16	8	M16X35	4	M16X120	4	M16
125		210	250	15	8	M16X35	8	M16	8	M16X40	4	M16X130	4	M16
150		240	285	15	8	M20X35	8	M20	8	M20X40	4	M20X130	4	M20
200	2532	295	340	16	8	M20X40	8	M20	8	M20X40	4	M20X140	4	M20
250		350	395	17	16	M20X40	16	M20	16	M20X45	4	M20X150	4	M20
300		400	445	20	16	M20X45	16	M20	16	M20X45	4	M20X160	4	M20
END-OF-LINE VALVE (LUG TYPE)														
50	2533	125	165	10	4	M16X25	4	M16	4	M16X30	-	-	-	-
65		145	185	12	4	M16X30	4	M16	4	M16X30	-	-	-	-
80		160	200	13	4	M16X30	4	M16	4	M16X35	4	M16X80	4	M16
100		180	220	15	4	M16X35	4	M16	4	M16X35	4	M16X80	4	M16
125		210	250	15	4	M16X35	4	M16	4	M16X40	4	M16X90	4	M16
150		240	285	15	4	M20X35	4	M20	4	M20X40	4	M20X90	4	M20
200	2532	295	340	16	4	M20X40	4	M20	4	M20X40	4	M20X100	4	M20
250		350	395	17	8	M20X40	8	M20	8	M20X45	4	M20X110	4	M20
300		400	445	20	8	M20X45	8	M20	8	M20X45	4	M20X120	4	M20

BOLT LENGTHS APPLY TO WELDING NECK FLANGES TO DIN2632 PN10
AND GASKET TO DIN2690, 3MM THICK







○ THREADED HOLE

○ THROUGH-GOING HOLE

*) FOR FASTENING THE GATE VALVE TO THE PIPELINE, WE RECOMMEND DESIGN 1 (GUDGEON AND NUT) FOR THREADED HOLES, AS THIS DESIGN USES THE WHOLE DEPTH OF THE THREAD.

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7 Initial Operation

After installation, the valve has to be checked for smooth operation.

It has to be moved at the operating element over the whole travel (OPEN-CLOSED). In case of lower working pressures, after having carried out the pressure test of the pipeline, the profile seal can be released to be adapted to the effective working pressure. For this purpose, the bolts on the cover plate have to be loosened in an appropriate manner. By means of this measure you can reduce wear and tear of the components involved in the motion.

ATTENTION! The flow medium may penetrate. Wear safety clothing (safety goggles) in case of toxic or caustic media.

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8 Operation

Trouble	Possible Causes	Remedy
Leakage at the cover plate	Prestress too low	Readjustment of cover plate see paragraph “9 Maintenance“
	Wearing of the profile seal	Replace profile seal
	Contamination (deposit on the gate)	With valve in open position: clean and grease gate
Seat leakage	Contamination of the gate	With valve in open position: clean and grease gate
	Defective U-shaped sealing element	Replace sealing element
Excessive operating forces	Contamination (deposit) on the gate	With valve in open position: clean and grease gate
	Stem running dry	Regrease thread
Operation blocked	Residues of flow medium are hardened	Relieve pipe section from pressure. Clean and grease all accessible surfaces of gate and stem. Slacken cover plate. Slightly unscrew upper body bolts. Knock on the valve with a rubber mallet trying to operate the valve. If you are not successful: remove, dismantle, clean, replace damaged parts.
	Foreign bodies jammed in the seating zone	Move valve in OPEN position and repeat closing procedure

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9 Maintenance

For inspection or repair, the valve – or parts thereof - must not be removed unless the pipe section in which the valve is installed has been isolated and made pressureless. If work is carried out in the vicinity of the valves, which leads to soiling (concrete work, masonry, painting, sandblasting and the like), the valves must be covered effectively.

ERU Knife Gate Valves K1 have to be moved regularly at short intervals (every half year) over the whole travel (OPEN-CLOSED). Depending on the flow medium and the local conditions at the site of application, the maintenance interval must be reduced or may be extended. If the profile seal is found to be untight, retighten the hexagon bolts of the cover plate evenly. If it is no longer possible to retighten the cover plate, replace the sealing elements.

Check gate and stem regularly for contaminations, clean them if necessary and treat them with lubricant (rub in a thin layer).

Recommended lubricant: KLÜBERSYNTH VR69-252
company Klüber Lubrication, Munich

Spare parts and wearing parts according to: drawing 4E139741
4E139742

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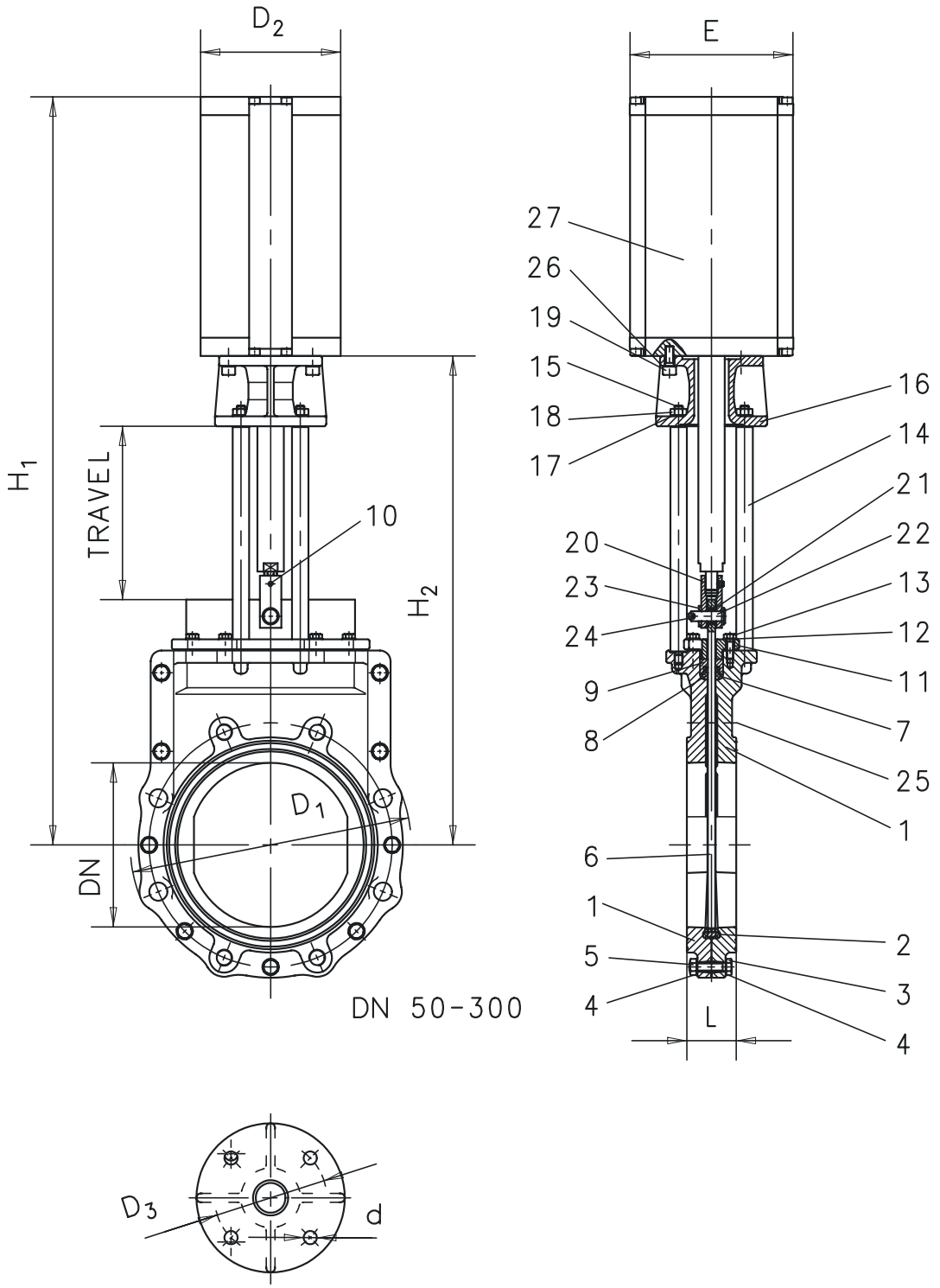
Drawing 4E139741
ERU Knife Gate Valve K1 with FESTO COPAC Cylinder



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Parts lists and set of spare parts (for drawing 4E139741)

1. Replace profile seal Set1 every 2 years
2. Replace U-shaped sealing element Set2 every 5 years

Item	Description	Set1	Set2
1	Body component		
2	Sealing element		X
3	Hexagon bolt		
4	Washer		
5	Hexagon nut		
6	Gate		
7	Profile seal	X	X
8	Guide tape	X	X
9	Compressor		
10	Threaded pin		
11	Cover plate		
12	Washer		
13	Hexagon bolt		
14	Stud bolt		
15	Gudgeon		
16	Bearing support		
17	Washer		
18	Hexagon nut		
19	Cylindrical bolt		
20	Fork nut		
21	Bush		
22	Bolt		
23	Washer		
24	Cotter pin		
25	Taper plug		
26	Washer		
27	FESTO Copac linear actuator		

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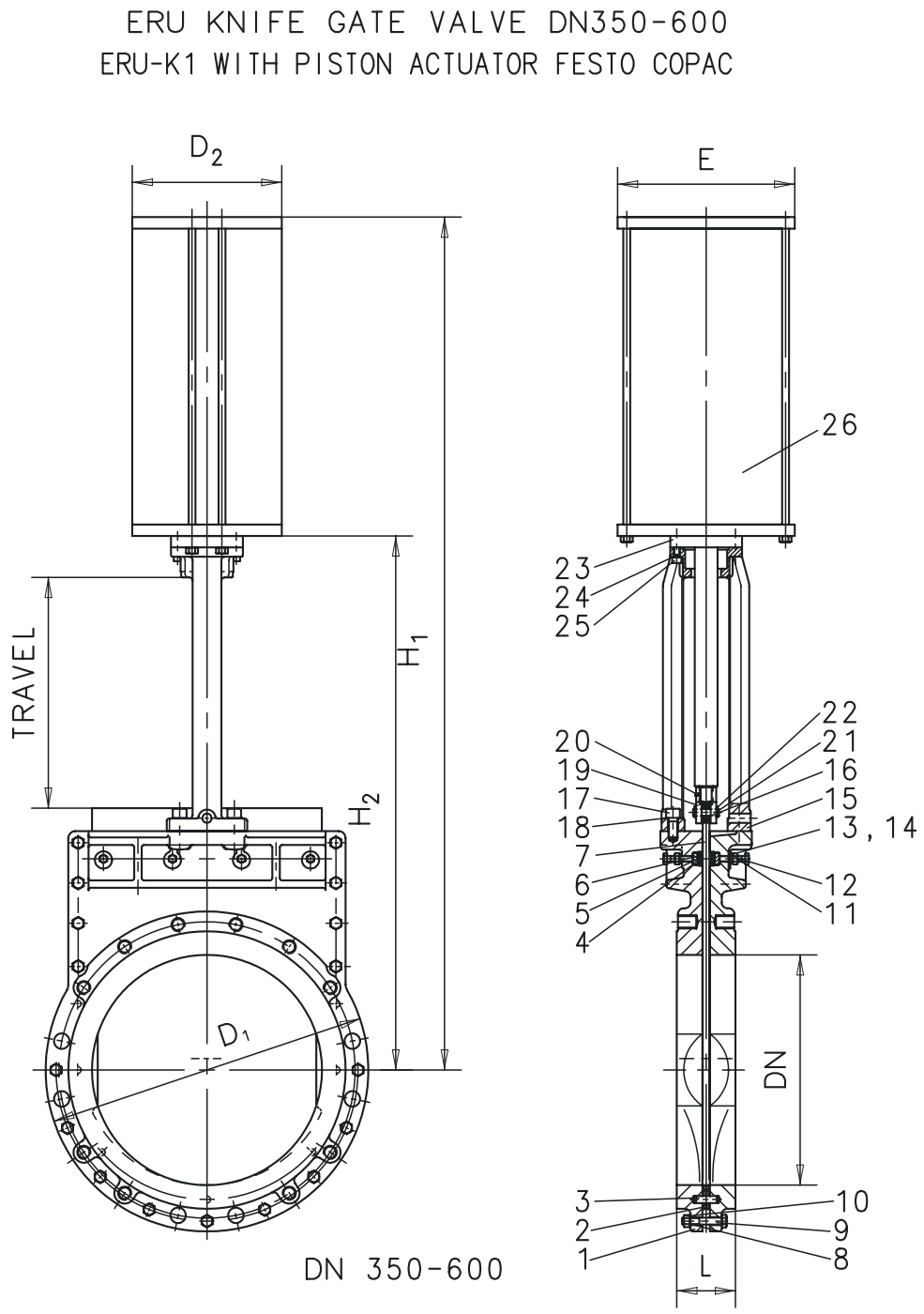
Drawing 4E139742

ERU Knife Gate Valve K1 with FESTO COPAC Cylinder



- FLANGE CONNECTING DIMENSIONS TO DIN 2532 PN 10
- CONNECTING ELEMENTS FOR FLANGE CONNECTION TO DRAWING 4E131899 AND 4E127920
- FACE-TO-FACE DIMENSION EN558-1, BASIC SERIES 20 FORMER DIN3202, PART 3, SERIES K1

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Parts lists and sets of spare parts (for drawing 4E139742)

1.	Replace profile seal	Set1	every 2 years
2.	Replace U-shaped sealing element	Set2	every 5 years

Item	Description	Set1	Set2
1	Body component		
2	Sealing element		X
3	Straight pin		
4	Compressor		
5	Packing cord square	X	X
6	Proflile rubber	X	X
7	Gate		
8	Washer		
9	Hexagon bolt		
10	Hexagon nut		
11	Hexagon bolt		
12	Hexagon nut		
13	Washer		
14	Threaded sealing ring		
15	Yoke		
16	Bush		
17	Cylindrical bolt		
18	Washer		
19	Fork nut		
20	Threaded pin		
21	Bolt		
22	Locking washer		
23	Intermediate flange		
24	Washer		
25	Cylindrical bolt		
26	FESTO Copac Linear actuator		

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