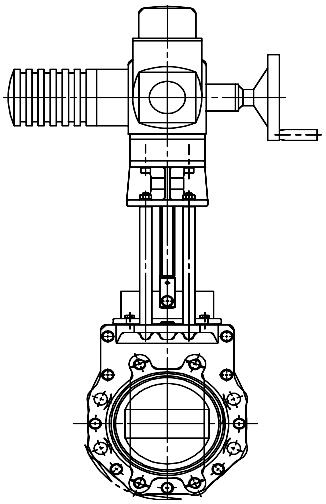
Operating Instructions

ERHARD ERU Knife Gate Valve K1

DN 50 - 300

Electric Actuator



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

1 Safety

Access to the range of movement of the gate of ERU Knife Gate Valves with electric actuator has to be restricted by protective devices. Effective protective devices have to be installed by the user.
On request, we will supply suitable protective guards.

2 Description of Product and Range of Application

Type/Design	Product Number	
ERU Knife Gate Valve K1	4657	PN 10
ERU Knife Gate Valve K1 with regulating orifice	4623	PN 10

Design with electric actuator

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

Product No.	Nominal diameter 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
4655, 4656 4657, 4623	50 - 300 50 – 300	10 10	15 15	10 10	10 10

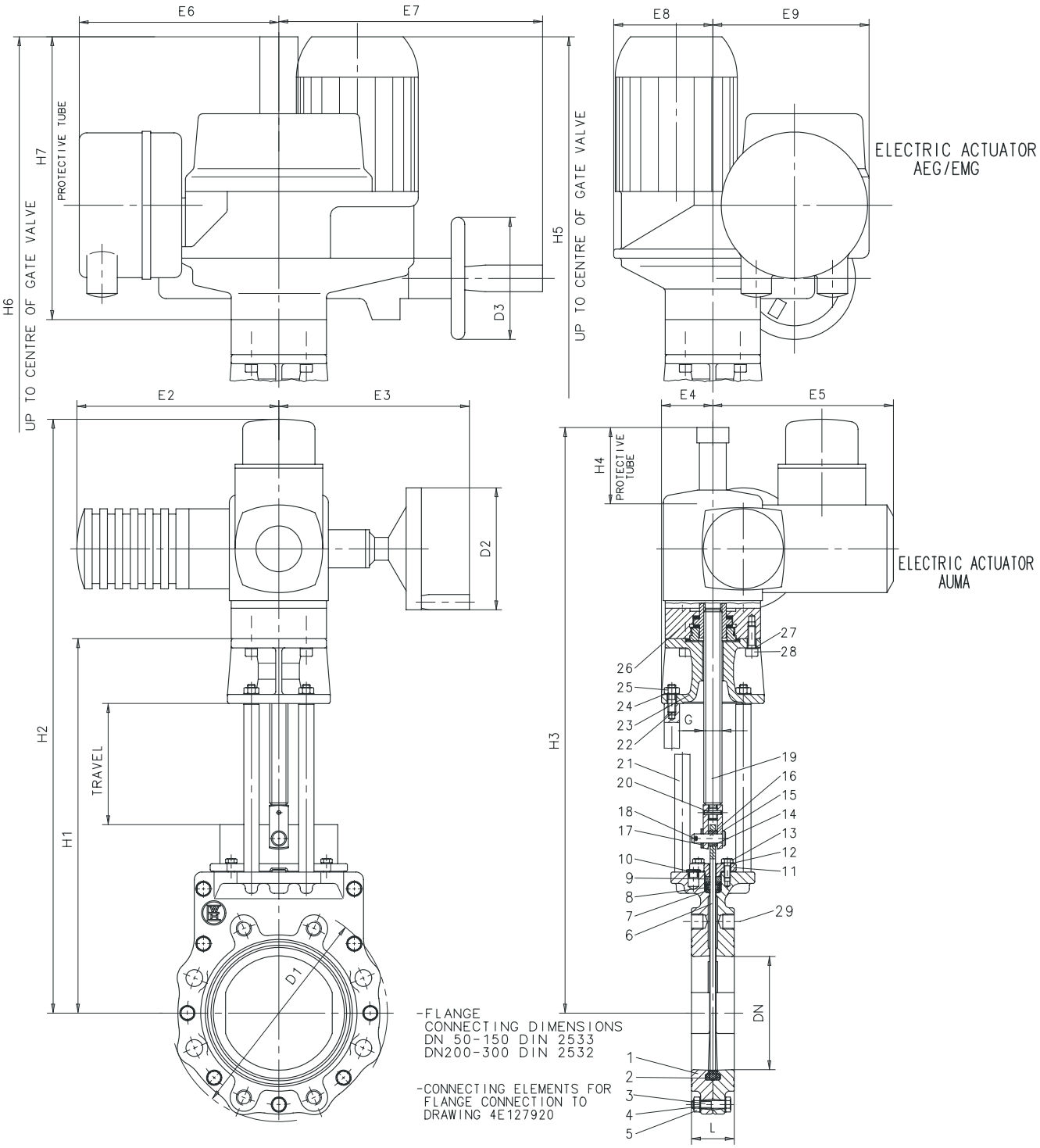
If EPDM profile seals are used for the ERU Knife Gate Valves K1, the parts of EPDM must not get in contact with oil or grease, as the EPDM would swell.
For a recommended lubricant see section "Maintenance".

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.

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

3 Design Features – Technical Data

Drawing 2E 39861
ERU Knife Gate Valve K1 with electric actuator



ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

Dimensioned table (for drawing No. 2E 39861)

1) PREFERRED SERIES FOR MODULATING ACTUATORS
2) PREFERRED SERIES FOR STANDARD ACTUATORS
3) EN558-1, BASIC SERIES 20
FORMER DIN 3202, PART 3, SERIES K1

1) PREFERRED SERIES FOR MODULATING ACTUATORS
2) PREFERRED SERIES FOR STANDARD ACTUATORS
3) EN558-1, BASIC SERIES 20
FORMER DIN 3202, PART 3, SERIES K1

DN	AEG/EMG EL.ACTUATOR TYPE	D3	E6	E7	E8	E9	H5	H6	H7	CLOSING - OPENING TIME IN SEC. NOS.OF REVOLUTION OF THE EL.ACTUATOR T/MIN 5	10	16	25[1]	32	40[2]	50	80
50	D30-A ISO 5210	125	268	280	106	180	627	-	-	150	75	47	30	23	19	15	10
65							652			195	98	61	39	30	24	20	12
80							682			240	120	75	48	38	30	24	15
100							715			300	150	94	60	47	38	30	19
125							755			375	188	117	75	59	47	38	23
150	D59-A ISO 5210	160					813	782	250	360	180	113	72	56	45	36	23
200							913	883		480	240	150	96	75	60	48	30
250							1034	1106	352	600	300	188	120	94	75	60	38
300							1143	1215		720	360	225	144	113	90	72	45

DN	AUMA EL.ACTUATOR TYPE	D2	E2	E3	E4	E5	H2	H3	H4	CLOSING - OPENING TIME IN SEC. NOS.OF REVOLUTION OF THE EL.ACTUATOR T/MIN 5.6	8	11	16	22[1]	32	45[2]	63	90
50	SA07.1-A ISO 5210	140	265	234	62	237	599	-	-	134	94	68	47	34	23	17	12	8
65							624			174	121	88	61	44	30	22	16	11
80							654			214	150	109	75	55	38	27	19	13
100							687			268	188	136	94	68	47	33	24	16
125							727			335	234	170	117	85	59	42	30	20
150	SA07.5-A ISO 5210	160		250	68		779	768	100	321	225	164	113	82	56	40	29	20
200							879	868		429	300	218	150	109	75	53	38	26
250					80		1000	1089	200	536	375	273	188	136	94	67	48	33
300							1109	1198		643	450	327	225	164	113	80	57	40

DN	D1	G THREAD	H1	L[3] F-T-F DIM.	TRAVEL	TURNS/ TRAVEL	SET TORQUE NM CLOSE	OPEN
50	165	TR20×4-LH	311	43	50	13	25	30
65	185		336	46	65	16		
80	200		366		80	20		
100	220		399	52	100	25		
125	250		439	56	125	31		
150	285	TR24×5-LH	491		150	30	55	60
200	341		591	60	200	40		
250	395	TR28×5-LH	712	68	250	50		
300	445		821	78	300	60		

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

Parts lists and sets of spare parts (for drawing 2E 39861)

1.	Replace profile seal	Set1	every 2 years
2.	Replace U-shaped sealing element	Set2	every 5 years
3.	Replace stem	Set3	if necessary
4.	Replace stem nut	Set4	if necessary

Item	Description	Set1	Set2	Set3	Set4
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	Taper plug				
11	Cover plate				
12	Washer				
13	Hexagon bolt				
14	Bush				
15	Fork nut			X	X
16	Bolt				
17	Washer				
18	Cotter pin				
19	Stem			X	
20	Straight grooved pin				
21	Stud bolt				
22	Gudgeon				
23	Bearing support				
24	Washer				
25	Hexagon nut				
26	Electric multi-turn actuator				
27	Washer				
28	Cylindrical screw				
29	Taper plug				

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

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 EN12266 and DIN EN1074 at the manufacturer's plant. They are designed for flow acting from any direction.

ERU Knife Gate Valves K1 are disconnected in a travel-dependent manner in closing and opening directions. The limit positions "OPEN" and "CLOSED" are signalled by the travel switches. Running against or jamming at the upper mechanical stop of the valve due to motor after-running is avoided. The torque switches serve as safety switches in opening and closing directions.

ERU Knife Gate Valves K1 are switched in a travel dependent manner in closing and opening directions.

4.1 Retrofitting of an Electric Multi-Turn Actuator

If the valve is supplied without incorporated electric actuator, the torque and travel switches have to be set as follows after mounting the electric actuator:

4.1.1. Move the valve manually in central position and check the direction of rotation of the motor by means of short switching impulses - if necessary, change the poles of the motor connection. The valve closes when turning the handwheel in clockwise direction.

4.1.2. Set the torque switches to the torques specified in the enclosed drawings.

4.1.3. Move the valve manually in open position against the upper mechanical limit stop. Then, move the handwheel by 10 turns in closing direction and adjust the "OPEN" travel switch.

4.1.4. Move the valve manually in closed position and adjust the "CLOSED" travel switch.

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

Electrical connection has to be effected according to Operating Instructions as well as wiring and terminal diagrams of the electric actuator's manufacturer (travel, torque and thermal switches, heating, motor). Before installation, the insulating resistance of the motor must be measured. If it is lower than 500 K-ohms, this shows that the winding is moist. The motor has to be removed in order to be dried up and it must be heated by means of a hot-air fan or in a heating chamber: max. admissible temperature 100°C.

4.2 Commissioning of the Electric Actuator

4.2.1. Move the ERU Knife Gate Valve K1 manually to central position.

4.2.2. Check the gate movement and thus the direction of rotation of the actuator by short electrical starting.

\+ **Valve is closing = CLOCKWISE direction of actuator rotation**

Valve is opening = ANTI-CLOCKWISE direction of actuator rotation

4.2.3 In case of wrong direction of rotation, change poles of motor connection.

4.2.4 Check direction of rotation by short electrical starting.

4.2.5 Check correct switching sequence of the torque switches in "Open-Close" direction by manual operation.

4.2.6. Change poles if necessary.

4.2.7. Move the valve over the whole travel only if the direction of rotation for closing the valve is CLOCKWISE.

\+ **In case of wrong direction of rotation, travel and torque switches are ineffective!**

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

4.3 Jogging Operation and Manual Emergency Operation

Note: before start-up spindle and spindle nut are to be greased. (recommended lubricant see section “Maintenance”)

A t t e n t i o n :

If a foreign body is jammed in when operating the valve, the torque switch for the corresponding direction responds and switches off the motor.
The time lag between response of the torque switch and disconnection of the motor from the network depends on the signal delay. If another closing order is given in the original direction, without having moved the valve sufficiently in the opposite direction, the torque will increase. If this procedure is repeated several times, the torque will accumulate. The valve and its operating elements are not designed for such an emergency and might be damaged.

+ We explicitly draw your attention to the fact that such "jogging operation" is inadmissible.

Jogging operating is admissible under the following conditions:

If the torque switch responds in intermediate position, the valve must first be moved in the opposite direction until the torque switch completley returns to its original position. Only now the valve may be moved again in the direction in which the disturbance occurred. Proceeding this way, you will obtain torques corresponding to the torques set at the torque switch. Moreover, the foreign matter can come off and be flushed out of the seating zone.

Operation by emergency handwheel:

If the valve is operated by means of the handwheel of the electric actuator, the torque switches do not provide any safety function.

If a foreign body is jammed with the valve being in intermedite position, excessive operating force - particularly in case of high gear reduction - might be damaging to the drive components. Therefore, we draw your attention to the following fact:

If any resistance is detected during emergency handwheel operation, some turns must be made in the opposite direction before the handwheel is turned again in the direction in which the disturbance occurred (flush out the foreign body).

Continue operation with utmost care, in no case using excessive force. If need be, repeat flushing operation.

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

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

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.

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.

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

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.

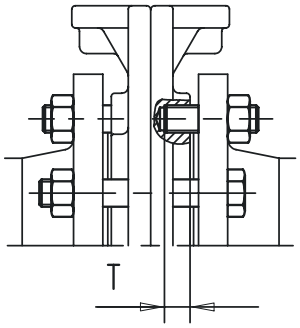
It is possible to roughly fasten the valve by means of the threaded holes.

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

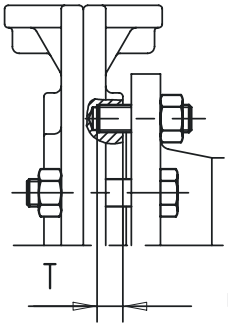
ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

Connecting elements for flange connection (to drawing 4E127920)

WAFER TYPE

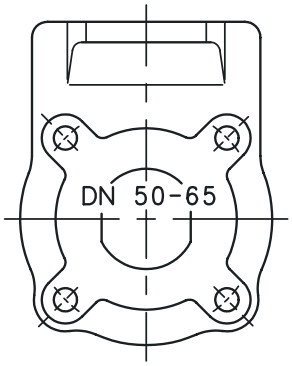


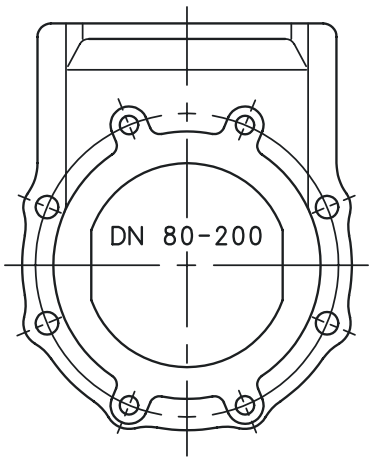
LUG TYPE

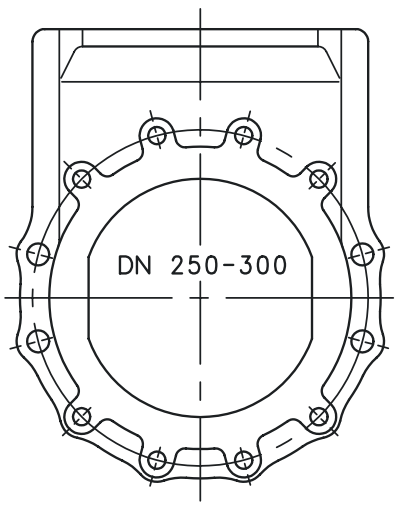


DN	FLANGES				WAFER TYPE VALVE									
	CONNECTING DIM.				THREADED HOLE○ DESIGN.1 *) OR DESIGN.2 *)						THROUGH-GOING HOLE ○			
	DIN	PITCH CIRCLE ⌀	FLANGE OUTSIDE ⌀	DEPTH OF THREAD T	GUDGEON DIN939		HEX.NUT DIN EN 24034		HEX.BOLT DIN EN 24018		HEX.BOLT DIN EN 24016		HEX.NUT DIN EN 24034	
					QTY	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.

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.

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

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de

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 **2E 39861**

ERHARD-Armaturen · D-89502 Heidenheim · Postfach 1280
☎ (07321) 320-0 (07321) 320 491 e-mail:info@erhard.de
Internet: http://www.erhard.de