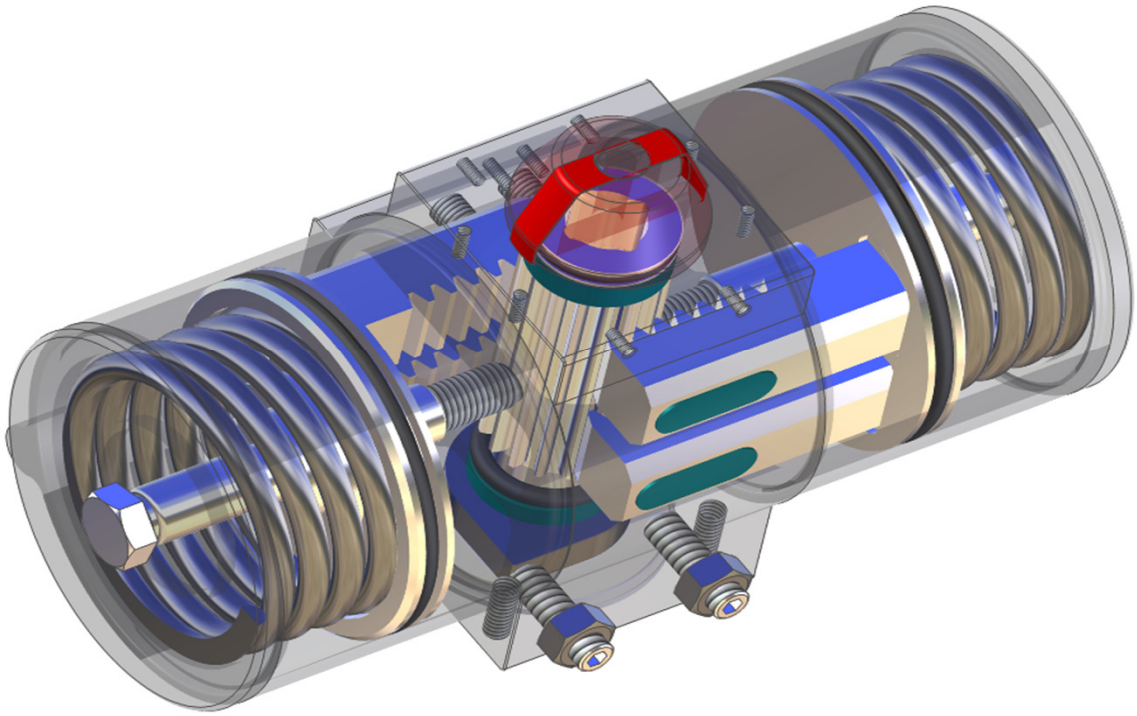
BA 1.1 - MRL

Pneumatic Actuators

Type MIG-KS-xx-D (double acting)
Type MIG-KS-xx-S (single acting)



Installation and assembly instructions

with operating manual and technical appendix

According to the EC Machinery Directive 2006/42/EC

Revision: 1 / 26.02.2015

Contents

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A) General

A1 *Explanation of symbols*

Advice is identified in this operating manual with the following symbols:

	**Danger / Warning** … refers to a direct dangerous situation that can lead to death or serious injury to persons if it is not avoided.
	**Advice** … refers to an instruction, which must be observed.
	**Information** … provides useful tips and recommendations

A2 Intended use

Pneumatic actuator type MIG-KS-xx-D (double action) and type MIG-KS-xx-S (single action) are intended for the following:

- Operation after connection of the solenoid valve to a control unit provided by the system
- Use with a gaseous control medium (generally compressed air) with control pressure according to the type label
- Ambient conditions between -20°C and +80°C (standard), or between -40°C and +140°C (special versions)
- For type MIG-KS-xx-D with a double action function, and type MIG-KS-xx-S with the "fail safe" function spring opening or spring closing
- To actuate fittings with a 90° pivoting motion (e.g. flaps and ball valves) with the electrical signals from the above-mentioned control unit in the positions <OPEN> and <CLOSED>.
- A correctly connected actuator must generally closed in a clockwise direction (when looking at the drive shaft on the fitting) and open in the opposite direction.

The output torque and characteristic curve of the actuator - refer to technical appendix - must be adapted to the fitting and the visual display must correctly shown the position of the fitting.

The compressed air must be filtered with a 40Pm mesh width (ISO 8573-1, class 5) to protect the solenoid valve.

An (optionally) installed assembly unit "position alarm" on the actuator serves the purpose of signalising the actuator position to the control unit on the system.

An (optionally) installed assembly unit "position transmitter" on the actuator serves the purpose of driving to intermediate positions on the fitting between <OPEN> and <CLOSED> and signalising this to the control unit on the system.

The actuator may only be taken into operation after observation of the following documents.

- The <manufacturer declarations on EC guidelines> included in the delivery
- This KLINGER SCHÖNEBERG assembly manual (included with delivery)

The safety advice in sections B1 and C1 must be observed when assembling and operating the actuator.

	Which connection plan is used depends on the intended use of the fitting and, for actuators with a "fail safe" function, the type of spring assembly on the actuator: the decision must be made by the planner/person ordering the actuator and selected accordingly. Refer to section B4 for standard connection plans for specific applications.

Note 1:
This manual is valid, preferably together with the instructions for the fitting, which the actuator is assembled on - the manual for this fitting should be followed as a priority.

Note 2:
The ordering party is responsible for allocating an individually supplied actuator to the fitting.
Appendix B of the construction norm EN15714 - 3 provides advice.

A3 Deviating use

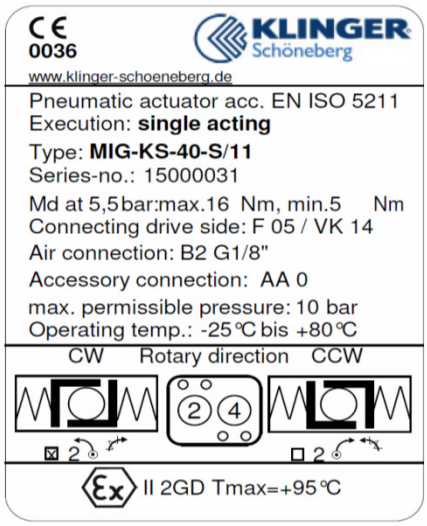
In consultation with the manufacturer KLINGER SCHÖNEBERG, the actuator can also be operated with media other than compressed air.

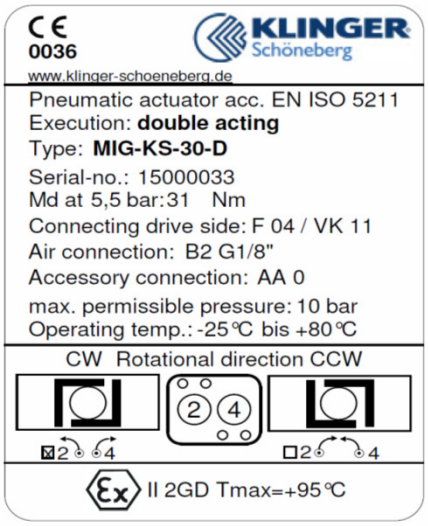
A4 Identification of the actuator

Each actuator is marked with a type label:

The type label on the actuator housing may not be covered over after assembly of the actuator on the fitting and after installation in the pipe section to ensure that the actuator remains identifiable.

Type plate Single acting Double acting





Danger	Exceeding the maximum pressure stated on the type label means a danger to subsequent operation.

A5 Transport and (intermediate) storage

	Actuators with additional electrical assemblies: In order to avoid corrosion damages to electrical components during storage, the unit should be stored at a constant room temperature.
	If an actuator is already assembled on the fitting: The transport advice and storage instructions in the fitting manual apply. In this case, the unit should be stored in closed rooms at a constant temperature.

The following must be observed for proper transportation of an individually supplied actuator:

- ° Pay attention to the symbols on the packaging when transporting the parcels.
- ° Leave the actuator in the original packaging up until use (assembly on the fitting).
- ° Only place the actuator down on the flat side; any assembled accessories (e.g. solenoid valve/end switch) must be on the top or side.
- ° Protect the actuator against any dirt and moisture.
- ° If necessary, use retainer straps (and not chains) as transport aids.

	When hanging up a strap, make sure that it is not tied to the additional assembly. Protect the actuator against any damage during transportation.
	Only for special drives with installed (manual emergency actuation) gears: Due to the fact that the gears are generally heavier than the actuator, the retainer straps can also be attached to the gear housing (but not on the hand wheel!).

B Actuator attachment to the fitting and connection of additional assemblies

	This manual contains safety advice on foreseeable risks when assembling the actuator on a fitting. It is the responsibility of the user to supplement these instructions with other risks specific to the fitting. Observation of all requirements for this system is required.

The connection of any supplied electrical/eletro-pneumatic additional assemblies is described in the supplied documents.

These documents are valid in addition to this manual.

B1 Safety advice for assembly and connection

	Assembly and pneumatic/electrical connection of an actuator to the operator's system(s) many only be carried out by qualified personnel. The word qualified, in terms of this manual, refers to persons who are familiar with pneumatic components due to their training, specialist knowledge and professional experience and who can correctly assess and correctly carry out the work given to them and who can identify possible dangers and address them. Knowledge of the typical properties of rotary actuators is also necessary for assembly and the assembly and connection should, if necessary, take place in consultation with qualified colleagues. Actuators are not "step ladders": external loads must be kept away from the fitting, actuator and supply lines.
 **risk of crushing!**	Commissioning the actuator, which is assembled on a fitting, is only permitted once the fitting is enclosed from both sides by a section of pipe or apparatus. Any actuation before this means a risk of crushing and the is exclusively the responsibility of the user.

B2 Interfaces

Compliance of the following interfaces must be ensured by the ordering party:

a) Actuator/fitting flange connection: with dimensions according to ISO 5211 (actuator and/or fitting can have multiple drill holes!),

b) Fitting/drill hole drive shaft, inner square in actuator

► The shape (=square) must correspond

► The fitting manufacturer must have specified the right dimensions and tolerances on the fitting shaft.

c) If accessories (e.g. solenoid valve/end switch) have not be supplied by KLINGER SCHÖNEBERG, the ordering party must ensure compliance of the functions / interfaces of actuator accessories and VDI/VDE 3845 is definitive.

B3 Attachment of individually supplied actuators on the fitting

Put the actuator in the <CLOSED> or <OPEN> position - depending on the position of the fitting - using

° the (provisional) compressed air supply, attach the fitting and centre it.
The position of the actuator on the fitting can be freely chosen and determined on-site.

° The screw connection must be tightened so much that the torque is transferred via frictional resistance - refer to below table. Tighten the screws crosswise.

Flange size	F04	F05	F07	F10	F12	F14	F16
Torque with (Nm)	5-6 Nm	8-10 Nm	20-23 Nm	44-48 Nm	78-85 Nm	190-210 Nm	370-390 Nm

The position indicator must have been/be adjusted to suit the position of the fitting:

° ► Indicator transverse to the pipeline axis: fitting is closed,

° ► Indicator parallel to the pipeline axis: fitting is open,

 Danger	An incorrect position indication means a danger to subsequent operation.

B4 Connection to the compressed air supply

	At the beginning of assembly, make sure that the system data control pressure, control voltage and frequency correspond with the technical data for all assemblies, which are shown on the type labels of actuator and additional assemblies.

Non-binding recommendation for supply line cross-diameter:

Size MIG-KS-XX	30-D-S to 80-D-S	120-D-S to 150-D-S	200-D-S to 270-D-S	380-D-S to 510-D-S	740-D-S to 920-D-S	1300-D-S to 1600-D-S
Recommended supply line nominal width (up to 6m in length)	6 mm	6 mm	6 mm	8 mm	8 mm	10 mm
Possible stroke time	0.2 sec	0.3 sec	0.4 sec	0.5 sec	1.0 sec	1.0 sec

Advice:

The shortest possible switch time according to this table is a guide value for standard double action actuators without attached fittings and with optimum supply and removal of the control medium.

This value can extend after assembly of the actuator on the fitting.

Control diagrams for

► Double action actuators MIG-KS-xx-D are illustrated in figure 1

► And single action actuators with spring withdrawal MIG-xx-S in figure 2.

Refer to the solenoid valve instructions for additional details.

The connection diagrams according to VDI/VDE 3845 (Namur) are equipped with a G ¼" thread.

Figure 1

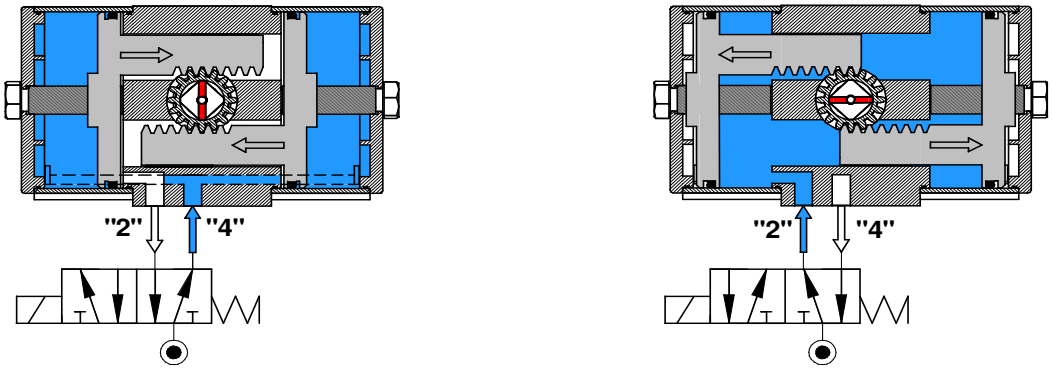
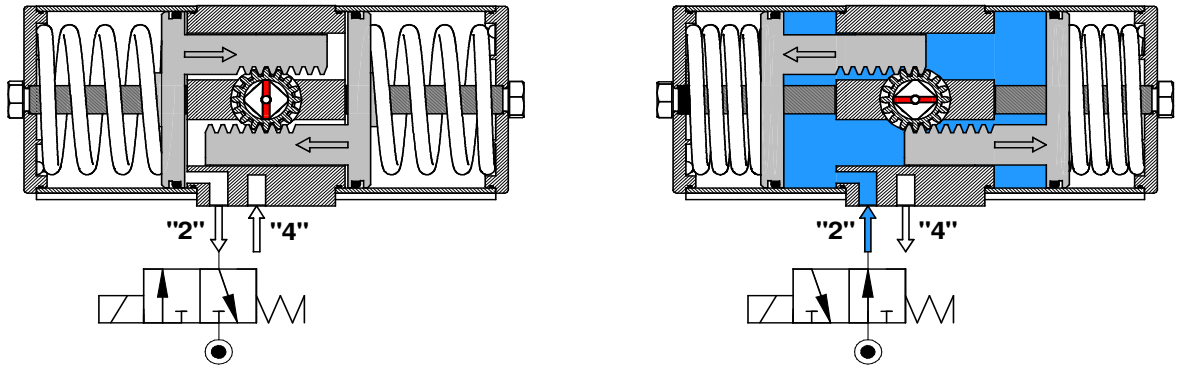


Figure 2



!	On the standard version actuator, the supply of control air through connection **"2"** must actuate in an anti-clockwise direction and supply through connection **"4"** in a clockwise direction. Spring withdrawing actuators can only be supplied through connection **"2"** - see figure 2

B5 As required: connection of electrical/pneumatic additional assemblies to the control

The supplied instruction(s) from the component manufacturer must be observed when connecting such assemblies.

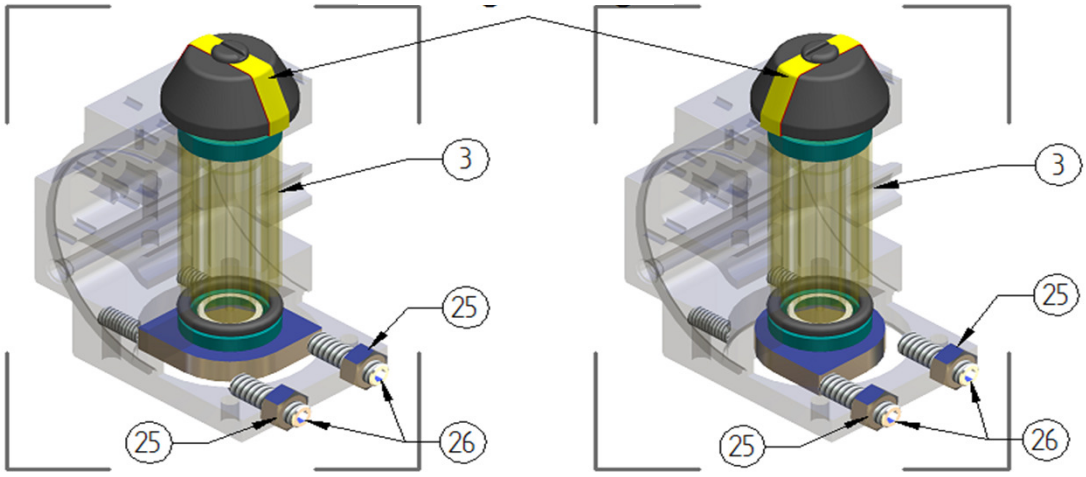
B6 All actuators: adjustment of the basic setting

This section should only be used if the fitting manufacturer has not precisely adjusted the positions <CLOSED> and <OPEN>.

The end stop in the actuator is adjusted to the position <open/CLOSED> in the factory: if required: adjust the stop screws.

Danger	The end positions should be set when without any pressure applied!

Position indicator



° Loosen both counter nuts (**25**) and unscrew the end stop screws (**26**) with three turns.

° Change the end positions by turning the drive shaft (**3**) until the visible indicator on the shaft corresponds with the end positions on the fitting.

° Screw in the end stop screws (**26**) on both sides until the resistance felt and then tighten the counter nuts (**25**).

B7 Test run: test steps to finish assembly and connection

In order to ensure the correct function of the actuators for automatic operation, the following must be checked after assembly

° Does the position indicator on the actuator and the position of the fitting correspond?
If not, the position of the indicator must be adjusted.

 **Danger**	An incorrect position response (and incorrect visual display) means a danger to subsequent operation.

° Is the "on-site" control pressure sufficient?
At least the control pressure, which corresponds with the initial pressure of the actuator, should exist directly on the solenoid valve to ensure "jerk-free" actuations by the fitting under operating conditions.

° Has the solenoid valve been correctly connected?
With the control pressure applied but loss of the control signal (check: e.g. pull the plug out), the fitting must drive to the position specified by the ordering party:

Actuator type	Type name	The fitting must be,
a double action	MIG-KS-xx-D	unless specified otherwise in the order: Driven to "CLOSED" position.
Spring closing	MIG-KS-xx-S	Driven to "CLOSED" position.
Spring opening	MIG-KS-xx-S	Driven to "OPEN" safety position.

If this is not right, the control and/or solenoid valve switching must be corrected accordingly. Remedy: see section C3: troubleshooting.

° Is the actuator/fitting connection tightened properly?
No relative movements between the fitting, assembly bridge (if available) and the pneumatic actuator should be able to be identified. Tighten all screws on the flange connection if necessary - refer to table in section B3.

° Testing the actuation function and indicator:
With the control pressure applied, the fitting must drive to the corresponding end position with the control commands "CLOSED" and "OPEN". The visual indicator on the actuator (and on the fitting if applicable) must show this correctly.
If this is not right, the control of the actuator and/or position of the indicator must be corrected accordingly.

(If assembly is available) check the electrical position response:

° The electrical signal display "OPEN" and "CLOSED" (in the system switch controls) should be compared with the visual indicator on the fitting. The signal and indicator must correspond.
If this is not right, the control and/or adjustment of the position alarm must be checked. The installation instructions from the component manufacturer must be observed.

B8 Extra info: dismantling the actuator

The same safety regulations as for the pipeline system, compressed air supply and (electrical/electro-pneumatic) control system must be observed.

Then proceed with the following steps:

- ° Mark the allocation of the actuator position to the fitting position document it for subsequent assembly.
- ° Safely disconnect the compressed air supply and depressurise the fitting if necessary.
- ° Disconnect the compressed air supply and control connections.
- ° Loosen the flange connection on the fitting/actuator and lift the actuator from the fitting.

C Operating Manual

The manufacturer must prepare a comprehensive risk analysis according to MRL 2006/42/EC.
KLINGER SCHÖNEBERG thereby provides the following document:

- ° This assembly and operating manual,
- ° The initially enclosed declaration on EC guidelines.

	For industrial use, this manual contains safety advice on foreseeable risks when using the actuator. It is the responsibility of the user to supplement these instructions with other risks specific to the fitting.

C1 Safety advice for operation

	° The function of a pneumatic actuator assembled on a fitting must correspond with the <intended use> described in section A2. ° The conditions of use must match the mark on the actuator type label. An actuator in the standard version should exclusively be operated within the approved temperature limits. ° All work on the actuator may only be carried out by qualified personnel. The word qualified, in terms of this manual, refers to persons who, due to their training, knowledge and professional experience, can carry out the work given to them correctly, can identify possible dangers and address them.
 **risk of crushing!**	Actuation of the the actuator, which is assembled on a fitting, is only permitted as long as the fitting is enclosed from both sides by a section of pipe or apparatus. Any actuation before this means a risk of crushing and the is exclusively the responsibility of the user.

C2 Automatic mode/manual mode

If the actuator is correctly connected in accordance with section B, it runs automatically and is designed for permanent operation in accordance with EN15714-3, table 1.

	° The actuator requires a permanent supply of compressed air for a stable function in pneumatic operation. ° <Fail-safe> actuators drive the fitting into the determined CLOSED or OPEN position if the compressed air supply is interrupted (or switched off).

C3 Troubleshooting

The following safety advice for assembly and repair work should be observed before carrying our troubleshooting measures. Troubleshooting measures may only be carried our by trained our by trained personnel.

The tools used must correspond with the relevant regulations and be in perfect condition.

The responsible operating department must give approval (release) before rotary actuator is dismantled for troubleshooting.
The following troubleshooting table describes a selection of common causes of error and measures for rectification:

Error	Cause of error	Addressing the error
Rotary actuator does not react	Voltage supply for control solenoid valve cut off	Provide voltage supply; Function test
	Control medium supply cut off	Control medium supply reinstate; Function test
	Control pressure before actuato low	Check control pressure (adjust if necessary), Function test
	Solenoid valve defective	Release solenoid valve and replace or repair; Function test

Rotary actuator will not adjust to the Move	Stop screws end positions	Adjust the stop screws; Function test
	Fitting defective (jammed)	See "troubleshooting" from the fitting manufacturer

D Technical appendix/planning documents

Advice:

This appendix is not part of the <installation and assembly manual>; it only provides additional information.

The actuator must be adapted by the planned/ordering party to

► the fitting it is assembled on

► as well as the system's compressed air supply and the control system.

Important technical details are listed as follows.

D1 Standard version of actuators

D1-1 Adaptation to the fitting

Pneumatic rotary actuators type MIG-KS-xx-D (double action) and type MIG-KS-xx-S (with closing or opening spring) can be assembled on all fittings with a pivoting motion (90°), which have a setup flange according to EN ISO 5211.

D1-2 Initial actuator torque

The initial torques of rotary actuators stated in section D5 are nominal torques. They are achieved with a compressed air supply with nominal pressure of 5.5 bar.

	The output torque changes with the control pressure currently affecting the actuator. ► Overpressures up to 10 bar are covered by the actuator design, ► Working pressures must be considered by the planner/ordering party when selecting the actuator size – see also D 1.4 below.

D1-3 Rotary direction of actuator

It is defined, in accordance with construction norm EN 15714-3, that the fitting closes in a clockwise direction. This must be realised on-site by correctly connecting the solenoid valve to the voltage supply and control – see also section B4 – the solenoid valve documentation must provide the necessary information.

D1-4 Fitting allocation

The fundamental influential factors for the necessary actuation torque are determined by the fitting (nominal width), operating pressure and the medium. The necessary actuation torque results for the fitting, under consideration of these parameters, which is to be specified by the fitting manufacturer. It is advisable to add a safety margin to this value for designing the actuator.

D1-5 Self-disabling at standstill

► All double action rotary actuators only have a self-disabling function with a control pressure applied

► and all <fail-safe> actuators with springs in the end positions of the actuator torque according to the technical data in section D3.

The hydraulic torque of the medium generally cannot influence the position of the shut-off unit.

D1-6 Permanent hold

The design of the actuator according to EN 15714-3, table 1, is the specification for the type test of the actuator in permanent testing at 30% of the nominal power under laboratory conditions.
It depends on the operating conditions - especially the pressure and cleanliness of compressed air - whether and when actuator maintenance is required:

	It is generally the case that the maintenance interval of an actuator is considerably longer than the maintenance intervals of the fitting: ► If maintenance takes place for the fitting, the correct function of the actuator should at least be checked and ensured.

D1-7 Manual emergency actuation

A manual emergency actuation with additional gears with freewheel is not a standard for pneumatic actuators.

D1-8 Installation position

The installation position of the fitting/rotary actuator can be freely chosen.

► Arrangement above the fitting is the usual position for an actuator
► The construction of the fitting may restrict the possible installation positions
► With a horizontal position of the fitting shaft on an actuator with additional manual gears, the system planner or fitting manufacturer must decide whether an actuator exercises an unauthorised torsional torque on the fitting and/or pipeline and whether it needs support.

D1-9 Corrosion protection

In accordance with the norm EN 15714-3 for pneumatic actuators, this corresponds with corrosion category C4.

D2 Optional additional equipment

D2-1 Solenoid valve

A solenoid valve can be supplied on customer request and directly attached - the brand, voltage and current (DC or AC) must be specified for the valve.

D2-2 End switches (for position report)

2 (or more) end switches can be supplied on customer request for the response of "OPEN" and "CLOSED" and directly attached – the brand, voltage and current (DC or AC) must be specified for the end switches.

D2-3 Manual emergency actuation (with additional gears)

Additional gears for manual actuation of the rotary actuator can be attached on customer request.

Technical features of the actuator
Type MIG-KS-xx-D - double acting MIG-KS-xx-S – single acting

Double action torque in Nm

Actuator Type	Md (Nm) at pressure (bar)														
	1.5 bar	2 bar	2.5 bar	3 bar	3.5 bar	4 bar	4.2 bar	4.5 bar	5 bar	5.5 bar	6 bar	7 bar	8 bar	9 bar	10 bar
MIG-KS-30-D	8	11	14	17	19	22	23	24	27	31	34	39	44	49	55
MIG-KS-40-D	10	14	17	21	24	28	29	30	34	38	42	49	56	63	70
MIG-KS-60-D	15	22	27	33	39	44	46	49	55	60	66	77	88	99	110
MIG-KS-80-D	23	30	37	45	53	60	62	66	74	81	89	103	117	131	146
MIG-KS-120-D	33	44	55	66	77	88	92	99	110	126	138	161	184	207	230
MIG-KS-150-D	41	55	69	83	97	111	115	124	138	157	172	200	228	256	285
MIG-KS-200-D	64	86	107	129	151	172	180	193	215	236	258	301	344	387	430
MIG-KS-270-D	76	103	129	155	181	207	216	232	258	284	310	361	412	463	515
MIG-KS-380-D	111	148	185	222	259	296	310	333	370	403	440	513	586	659	732
MIG-KS-510-D	148	198	246	297	346	396	414	444	494	542	592	690	788	886	985
MIG-KS-740-D	212	283	354	425	497	567	595	638	709	780	851	992	1133	1274	1416
MIG-KS-920-D	266	355	444	533	621	710	745	798	887	975	1064	1241	1418	1595	1772
MIG-KS-1300-D	397	529	661	794	926	1058	1110	1189	1322	1454	1587	1851	2115	2379	2643
MIG-KS-1600-D	476	635	794	953	1111	1270	1333	1428	1587	1746	1905	2222	2539	2856	3173

Single action torque in Nm

Actuator Type	Spring set No.	Spring force Md (Nm) max	min	Md (Nm) at pressure (bar) 2.5 bar max	min	3 bar max	min	3.5 bar max	min	4 bar max	min	4.2 bar max	min	4.5 bar max	min	5 bar max	min	5.5 bar max	min	6 bar max	min	7 bar max	min	8 bar max	min
*	1	4	3	11	10	14	13	17	16	20	18	21	20	22	21	25	24	28	27	31	30	36	35	42	41
*	2	6	5	10	8	12	11	15	13	18	16	19	17	21	19	24	22	26	25	29	28	35	33	41	39
*	3	8	6	**8**	**6**	11	9	14	11	17	14	18	15	19	17	22	20	25	23	28	25	33	31	39	37
*	4	10	8	7	4	**9**	**6**	**12**	**9**	15	12	16	13	18	15	21	18	23	21	26	23	32	29	38	35
*	5	13	9	5	2	8	4	**11**	**7**	**14**	**10**	15	11	16	13	19	16	22	18	25	21	30	27	36	33
MIG-KS-30-S*	6	15	11			6	2	9	5	12	8	**13**	**9**	**15**	**11**	18	14	20	16	23	19	29	25	35	30
*	7	17	12					8	3	11	6	12	7	13	9	**16**	**11**	**19**	**14**	22	17	27	23	33	28
*	8	19	14							9	4	10	5	12	7	15	9	17	12	**20**	**15**	26	21	32	26
*	9	21	15									9	3	10	4	13	7	16	10	**19**	**13**	**24**	**19**	30	24
*	10	23	17													12	5	14	8	17	11	**23**	**16**	29	22
*	11	25	18															13	6	16	9	21	14	**27**	**20**

Actuator Type	Spring set No.	Spring force Md (Nm) max	min	Md (Nm) at pressure (bar) 2.5 bar max	min	3 bar max	min	3.5 bar max	min	4 bar max	min	4.2 bar max	min	4,5 bar max	min	5 bar max	min	5.5 bar max	min	6 bar max	min	7 bar max	min	8 bar max	min
*	1	5	4	13	12	17	15	20	18	23	22	25	23	27	25	30	28	34	32	37	35	44	42	50	49
*	2	8	5	11	9	15	12	18	16	22	19	23	20	25	22	28	26	32	29	35	33	42	39	49	46
*	3	11	7	**10**	**6**	**13**	**10**	16	13	20	16	21	18	23	20	27	23	30	26	33	30	40	37	47	43
*	4	13	9	8	4	**11**	**7**	**15**	**10**	18	14	19	15	21	17	25	20	28	24	32	27	38	34	45	41
*	5	16	11			9	4	13	8	**16**	**11**	**18**	**12**	20	14	23	18	26	21	30	25	36	31	43	38
MIG-KS-40-S*	6	19	13					11	5	14	8	**16**	**10**	**18**	**12**	**21**	**15**	25	19	28	22	35	29	41	35
*	7	21	14							13	6	14	7	16	9	19	12	**23**	**16**	26	19	33	26	40	33
*	8	24	16									12	4	14	6	18	10	21	13	**24**	**17**	31	23	38	30
*	9	27	18											12	4	16	7	19	11	**23**	**14**	**29**	**21**	36	27
*	10	29	20													14	4	17	8	21	11	**27**	**18**	**34**	**25**
*	11	32	22															16	5	19	9	26	15	**32**	**22**

Actuator Type	Spring set No.	Spring force Md (Nm) max	min	Md (Nm) at pressure (bar) 2.5 bar max	min	3 bar max	min	3.5 bar max	min	4 bar max	min	4.2 bar max	min	4.5 bar max	min	5 bar max	min	5.5 bar max	min	6 bar max	min	7 bar max	min	8 bar max	min
*	1	8	6	22	19	27	25	33	30	38	36	40	38	44	41	49	47	55	52	60	58	71	69	82	80
*	2	12	9	19	15	24	21	30	26	35	32	38	34	41	37	46	43	52	48	57	54	68	65	79	76
*	3	16	12	**16**	**11**	21	17	27	22	32	28	35	30	38	33	43	39	49	44	54	50	65	61	76	72
*	4	20	15	13	7	**18**	**13**	**24**	**18**	29	24	32	26	35	29	40	35	46	40	51	46	62	57	73	68
*	5	24	17			16	9	**21**	**14**	**27**	**20**	29	22	32	25	38	31	43	36	49	42	60	53	71	64
MIG-KS-60-S*	6	28	20					18	10	24	16	**26**	**18**	**29**	**21**	35	27	40	32	46	38	57	49	68	60
*	7	32	23					15	6	21	12	23	14	26	17	**32**	**23**	37	28	43	34	54	45	65	56
*	8	36	26							18	8	20	10	23	13	29	19	**34**	**24**	40	30	51	41	62	52
*	9	40	29									17	6	20	9	26	15	31	20	**37**	**26**	**48**	**37**	59	48
*	10	44	32											18	5	23	11	29	16	34	22	**45**	**33**	56	44
*	11	49	35													20	6	26	12	31	17	**42**	**28**	**53**	**39**

Single action torque in Nm

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	11	8	29	25	36	33	44	40	51	47	54	50	58	55	66	62	73	69	80	77	95	92	110	106
*	2	17	12	25	20	32	27	40	35	47	42	50	45	54	49	62	57	69	64	76	71	91	86	106	101
*	3	22	16	**21**	**14**	28	22	36	29	43	36	46	39	50	44	58	51	65	58	72	66	87	80	102	95
*	4	28	19	17	9	**25**	**16**	**32**	**23**	39	31	42	34	47	38	54	45	61	53	69	60	83	75	98	89
*	5	33	23			21	11	28	18	**35**	**25**	38	28	43	33	50	40	57	47	65	55	79	69	94	84
MIG-KS-80-S*	6	39	27					24	12	32	20	**35**	**23**	**39**	**27**	46	34	54	42	61	49	76	64	90	78
*	7	45	31							28	14	31	17	35	21	**42**	**29**	**50**	**36**	57	43	72	58	86	73
*	8	50	35									27	12	31	16	39	23	46	31	**53**	**38**	68	53	83	67
*	9	56	39											27	10	35	18	42	25	**49**	**32**	**64**	**47**	79	62
*	10	61	43													31	12	38	19	45	27	**60**	**41**	75	56
*	11	67	46															34	14	42	21	**56**	**36**	**71**	**51**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	17	12	46	41	57	53	69	64	81	76	85	81	92	88	104	99	116	111	127	123	151	146	174	169
*	2	25	18	40	33	51	44	63	56	75	68	79	72	86	79	98	91	110	103	121	114	144	137	168	161
*	3	34	24	**34**	**24**	45	36	57	48	69	59	73	64	80	71	92	82	103	94	115	106	138	129	162	152
*	4	42	31	28	16	**39**	**27**	**51**	**39**	62	51	67	55	74	62	86	74	97	86	109	97	132	120	155	144
*	5	51	37	21	7	33	19	**45**	**31**	**56**	**42**	61	47	68	54	80	65	91	77	103	89	126	112	149	135
MIG-KS-120-S*	6	59	43			27	10	38	22	50	34	**55**	**38**	**62**	**45**	73	57	85	69	97	80	120	103	143	127
*	7	68	49					32	14	44	25	49	30	56	37	**67**	**48**	79	60	90	72	114	95	137	118
*	8	76	55					26	5	38	17	43	21	49	28	61	40	**73**	**52**	84	63	108	87	131	110
*	9	85	61							32	8	36	13	43	20	55	32	67	43	**78**	**55**	**102**	**78**	125	101
*	10	93	67											37	11	49	23	61	35	72	46	**95**	**70**	119	93
*	11	102	74													43	15	54	26	66	38	89	61	**113**	**84**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	22	15	57	51	72	65	86	80	101	94	107	100	115	109	130	124	145	138	159	153	188	182	217	211
*	2	33	23	50	40	64	55	79	69	93	84	99	89	108	98	122	113	137	127	151	142	181	171	210	200
*	3	44	31	**42**	**29**	57	44	71	58	86	73	92	79	100	87	115	102	129	116	144	131	173	160	202	189
*	4	55	38	34	18	**49**	**33**	**63**	**47**	78	62	84	68	93	76	107	91	122	105	136	120	165	149	194	178
*	5	65	46	27	7	41	22	56	36	**70**	**51**	76	57	85	65	99	80	114	94	128	109	158	138	187	167
MIG-KS-150-S*	6	76	54			34	11	48	25	63	40	**68**	**46**	**77**	**54**	92	69	106	84	121	98	150	127	179	156
*	7	87	61					40	14	55	29	61	35	69	43	**84**	**58**	99	73	113	87	142	116	171	145
*	8	98	69					33	4	47	18	53	24	62	33	76	47	**91**	**62**	**105**	**76**	135	105	164	134
*	9	109	77							40	7	46	13	54	22	69	36	83	51	**98**	**65**	**127**	**95**	156	124
*	10	120	84											47	11	61	25	76	40	90	55	**119**	**84**	148	113
*	11	131	92													53	14	68	29	82	44	**112**	**73**	**141**	**102**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	34	24	90	80	112	102	135	125	158	148	167	157	180	171	203	193	226	216	249	239	294	284	340	330
*	2	51	36	78	63	100	86	123	108	146	131	155	140	168	154	191	177	214	199	237	222	282	267	328	313
*	3	67	48	**66**	**46**	88	69	111	92	134	114	143	124	156	137	179	160	202	183	225	205	270	251	316	296
*	4	84	60	54	29	**76**	**52**	**99**	**75**	122	98	131	107	144	120	167	143	190	166	213	188	258	234	304	279
*	5	101	72	42	13	64	35	87	58	**110**	**81**	119	90	132	103	155	126	178	149	201	172	246	217	291	263
MIG-KS-200-S*	6	118	84			52	18	75	41	98	64	**107**	**73**	**120**	**87**	143	109	166	132	189	155	234	200	279	246
*	7	135	96					63	24	86	47	95	56	108	70	**131**	**92**	154	115	177	138	222	183	267	229
*	8	152	108							74	30	83	39	96	53	119	76	**142**	**98**	**165**	**121**	210	166	255	212
*	9	168	120							62	13	71	23	84	36	107	59	130	82	**153**	**104**	**198**	**150**	243	195
*	10	185	132											72	19	95	42	118	65	141	87	**186**	**133**	231	178
*	11	202	144													83	25	106	48	129	70	**174**	**116**	**219**	**161**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	41	29	108	96	135	123	162	150	189	177	200	188	217	205	244	232	271	259	298	287	353	341	407	396
*	2	61	43	93	76	120	103	148	130	175	157	186	168	202	185	229	212	257	239	284	266	338	321	393	375
*	3	81	58	**79**	**55**	106	83	133	110	161	137	171	148	188	164	215	192	242	219	270	246	324	301	379	355
*	4	101	72	64	35	**92**	**62**	**119**	**90**	146	117	157	128	173	144	201	171	228	199	255	226	310	280	364	335
*	5	121	86	50	15	77	42	**104**	**70**	**132**	**97**	143	108	159	124	186	151	213	179	241	206	295	260	350	315
MIG-KS-270-S*	6	142	101			63	22	90	49	117	76	**128**	**87**	**145**	**104**	172	131	199	158	226	185	281	240	335	295
*	7	162	115					76	29	103	56	114	67	130	83	**157**	**111**	185	138	212	165	266	220	321	274
*	8	182	130							89	36	99	47	116	63	143	91	**170**	**118**	**198**	**145**	252	200	307	254
*	9	202	144							74	16	85	27	101	43	129	70	156	98	**183**	**125**	**238**	**179**	292	234
*	10	223	158											87	23	114	50	141	77	169	105	**223**	**159**	278	214
*	11	243	173													100	30	127	57	154	84	209	139	**263**	**193**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	58	41	154	138	193	177	232	216	271	255	287	271	310	294	350	333	389	372	428	411	506	490	584	568
*	2	86	62	133	109	173	148	212	187	251	226	266	242	290	265	329	304	368	344	407	383	485	461	563	539
*	3	115	83	**113**	**80**	152	119	191	158	230	197	246	213	269	237	308	276	347	315	386	354	465	432	543	510
*	4	144	103	92	51	**131**	**91**	170	130	209	169	225	184	249	208	288	247	327	286	366	325	444	403	522	481
*	5	173	124	72	23	111	62	**150**	**101**	**189**	**140**	205	155	228	179	267	218	306	257	345	296	424	374	502	452
MIG-KS-380-S*	6	202	144			90	33	129	72	168	111	**184**	**127**	**207**	**150**	247	189	286	228	325	267	403	346	481	424
*	7	230	165					109	43	148	82	163	98	187	121	**226**	**160**	265	199	304	239	382	317	460	395
*	8	259	186					88	14	127	53	143	69	166	93	205	132	**244**	**171**	**283**	**210**	362	288	440	366
*	9	288	206							106	25	122	40	146	64	185	103	224	142	**263**	**181**	**341**	**259**	419	337
*	10	317	227									101	12	125	35	164	74	203	113	242	152	**320**	**230**	398	309
*	11	346	247													143	45	182	84	222	123	**300**	**202**	**378**	**280**

Single action torque in Nm

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	78	55	205	183	258	235	310	287	362	339	383	360	414	391	466	443	518	495	570	547	674	652	779	756
*	2	116	83	178	144	230	196	282	248	334	300	355	321	386	353	439	405	491	457	543	509	647	613	751	717
*	3	155	110	**150**	**106**	203	158	255	210	307	262	328	283	359	314	411	366	463	418	515	470	619	574	724	679
*	4	194	138	123	67	**175**	**119**	**227**	**171**	279	223	300	244	331	275	383	327	436	379	488	431	592	536	696	640
*	5	232	165	96	29	148	81	**200**	**133**	**252**	**185**	273	206	304	237	356	289	408	341	460	393	565	498	669	602
MIG-KS-510-S*	6	271	192			120	42	172	94	225	146	**245**	**167**	**277**	**198**	329	250	381	302	433	354	537	459	641	563
*	7	310	220					145	55	197	107	218	128	249	159	**301**	**211**	**353**	**263**	405	315	510	420	614	524
*	8	348	247					117	16	169	68	190	89	222	121	274	173	**326**	**225**	**378**	**277**	482	381	586	485
*	9	387	275							142	30	163	51	194	82	246	134	298	186	**350**	**238**	**455**	**342**	559	447
*	10	426	302											167	43	219	95	271	147	323	199	**427**	**304**	531	408
*	11	465	330													191	56	243	108	295	160	**400**	**265**	**504**	**369**

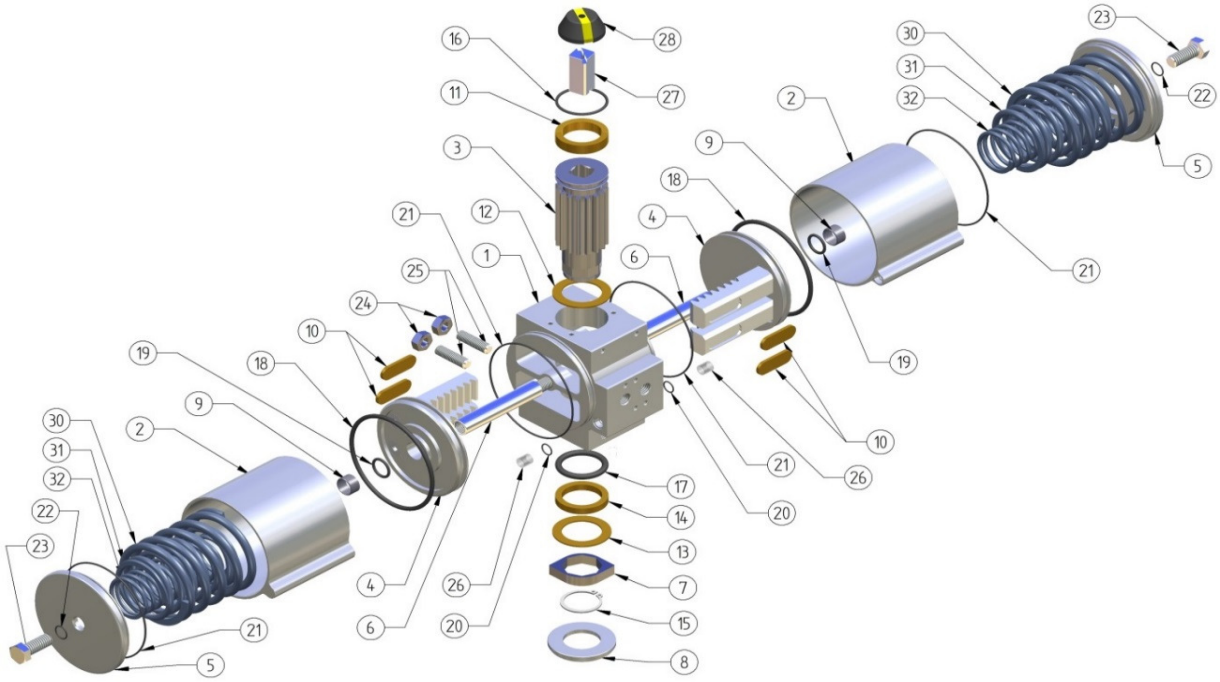
Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	112	79	296	263	370	338	445	412	520	487	550	517	595	562	670	637	745	712	820	787	970	937	1120	1087
*	2	168	119	256	206	331	281	406	356	481	431	511	461	556	506	631	581	705	656	780	731	930	881	1080	1030
*	3	224	158	**216**	**150**	291	225	366	300	441	375	471	405	516	450	591	525	666	600	741	675	891	824	1041	974
*	4	280	198	177	94	**252**	**169**	**327**	**244**	402	319	432	349	477	394	552	469	626	544	701	619	851	768	1001	918
*	5	336	237	138	38	213	113	288	188	**363**	**263**	**392**	**293**	437	338	512	413	587	488	662	563	812	713	962	862
MIG-KS-740-S*	6	392	276			173	57	248	132	323	207	353	237	**398**	**282**	473	357	548	432	623	507	772	657	922	806
*	7	448	316					209	76	283	151	313	181	358	226	**433**	**301**	**508**	**376**	583	451	733	601	883	750
*	8	504	355					169	20	244	95	274	125	319	170	394	245	**469**	**320**	**544**	**395**	693	544	843	694
*	9	561	395							204	39	234	69	279	114	354	188	429	263	**504**	**338**	**654**	**488**	804	638
*	10	617	434									195	13	240	58	315	133	390	207	465	282	**614**	**432**	764	582
*	11	673	474													275	77	350	151	425	226	**575**	**376**	**725**	**526**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	142	99	369	326	463	419	557	513	650	607	688	644	744	700	838	794	931	888	1025	981	1212	1169	1399	1356
*	2	226	157	311	242	404	336	498	429	592	523	629	560	685	617	779	710	873	804	966	898	1154	1085	1341	1272
*	3	310	216	252	158	**346**	**252**	439	346	533	439	571	477	627	533	720	627	814	720	908	814	1095	1001	1282	1189
*	4	381	265	203	87	296	181	**390**	**274**	484	368	521	406	577	462	671	555	765	649	858	743	1046	930	1233	1117
*	5	424	296	172	44	266	137	359	231	**453**	**325**	491	362	547	418	640	512	734	606	828	699	1015	887	1202	1074
MIG-KS-920-S*	6	496	345			216	66	310	160	404	253	**441**	**291**	**497**	**347**	591	441	685	534	778	628	966	815	1153	1003
*	7	567	395					261	89	354	182	392	220	448	276	**542**	**370**	635	463	729	557	916	744	1103	931
*	8	651	453							296	99	333	136	389	192	483	286	**577**	**380**	**670**	**473**	858	660	1045	848
*	9	734	512									275	52	331	109	424	202	518	296	**612**	**390**	**799**	**577**	986	764
*	10	805	561											281	37	375	131	469	225	562	318	**750**	**506**	**937**	**693**
*	11	877	611													326	60	419	153	513	247	700	434	**887**	**622**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	214	147	551	485	691	624	831	764	970	904	1026	960	1110	1043	1250	1183	1389	1323	1529	1463	1808	1742	2088	2021
*	2	317	221	478	381	617	521	757	660	897	800	953	856	1036	940	1176	1079	1316	1219	1456	1359	1735	1638	2014	1917
*	3	421	294	404	277	**544**	**417**	684	557	823	696	879	752	963	836	1103	976	1242	1115	1382	1255	1661	1534	1941	1814
*	4	528	368	331	170	470	310	**610**	**450**	750	589	806	645	889	729	1029	869	1169	1009	1309	1148	1588	1428	1867	1707
*	5	632	441			397	206	537	346	**676**	**486**	732	541	816	625	956	765	1095	905	1235	1044	1514	1324	1794	1603
MIG-KS-1300-S*	6	739	515					463	239	603	379	**659**	**435**	**742**	**518**	882	658	1022	798	1161	937	1441	1217	1720	1496
*	7	845	588							529	272	585	328	669	412	**808**	**551**	948	691	1088	831	1367	1110	1646	1389
*	8	949	662									512	224	595	308	735	448	**875**	**587**	**1014**	**727**	1294	1006	1573	1286
*	9	1053	735											522	204	662	344	801	483	**941**	**623**	**1220**	**902**	1500	1182
*	10	1160	809													588	237	728	377	867	516	**1147**	**796**	**1426**	**1075**
*	11	1267	882															654	270	794	410	1073	689	**1352**	**968**

Actuator Type	Spring set No.	Spring force Md (Nm) max	Spring force Md (Nm) min	Md (Nm) at pressure (bar) 2.5 bar max	2.5 bar min	3 bar max	3 bar min	3.5 bar max	3.5 bar min	4 bar max	4 bar min	4.2 bar max	4.2 bar min	4.5 bar max	4.5 bar min	5 bar max	5 bar min	5.5 bar max	5.5 bar min	6 bar max	6 bar min	7 bar max	7 bar min	8 bar max	8 bar min
*	1	256	177	661	582	829	750	997	918	1164	1085	1231	1152	1332	1253	1499	1420	1667	1588	1835	1756	2170	2091	2505	2426
*	2	382	265	573	456	741	624	909	792	1076	959	1143	1026	1244	1127	1411	1294	1579	1462	1747	1630	2082	1965	2417	2300
*	3	508	353	485	330	**653**	**498**	820	665	988	833	1055	900	1156	1001	1323	1168	1491	1336	1659	1503	1994	1839	2329	2174
*	4	636	441	397	202	565	370	**732**	**538**	900	705	967	772	1067	873	1235	1040	1403	1208	1570	1376	1905	1711	2241	2046
*	5	762	529			476	244	644	411	**811**	**579**	878	646	979	746	1147	914	1314	1082	1482	1249	1817	1584	2152	1920
MIG-KS-1600-S*	6	890	618					556	283	723	451	**790**	**518**	**891**	**619**	1058	786	1226	954	1394	1121	1729	1457	2064	1792
*	7	1018	706							635	323	702	390	802	491	**970**	**658**	1138	826	1305	994	1640	1329	1976	1664
*	8	1144	794									614	264	714	365	882	532	**1050**	**700**	**1217**	**868**	1552	1203	1888	1538
*	9	1270	882											626	239	794	406	961	574	**1129**	**741**	**1464**	**1077**	1800	1412
*	10	1398	971													706	278	873	446	1041	614	**1376**	**949**	**1711**	**1284**
*	11	1526	1059															785	318	952	486	1288	821	**1623**	**1156**

D3 Components and recommended spare parts



Pos.	Qty.	Part
1	1	Body
2	2	Cylinder pipe
3	1	Shaft
4	2	Piston
5	2	End cap
6	2	Guide bar
7	1	Stopper
8*	1	Centring disc DIN/ISO 5211
9*	2	Sliding bearing (piston inside)
10*	4	Guide bearing (piston/gear rack outside)
11*	2	Sliding bearing shell (shaft at top)
12*	1	Start-up disc (shaft at top)
13*	1	Start-up disc (shaft at bottom)
14*	1	Sliding bearing (shaft at bottom)
15*	1	Retainer ring (shaft at bottom)
16*	1	O-ring (shaft at top)
*	Spare parts recommended for maintenance	

Pos.	Qty.	Part
17*	1	O-ring (shaft at bottom)
18*	2	O-ring (piston outside)
19*	2	O-ring (piston inside)
20*	2	O-ring (fixing sleeve)
21*	4	O-ring (end cap/housing outside)
22*	2	O-ring (end cap central)
23	2	Hexagonal bolt
24	2 (4)	Counter nut
25	2 (4)	Threaded pin (grub screw)
26	2	Fixing sleeve
27	1	VDI-VDE tappet
28	1	Visual display
30	2	Pressure spring (outside)
31	2	Pressure spring (central)
32	2	Pressure spring (inside)

D4 Advice on risks involved with permanent operation

° The actuator is designed for permanent operation, based on EN15714-3, table 1.
° The actuator is screw connected with the fitting in the interface according to ISO5211. Section B2 contains the necessary torque of the screw connection.
Actuators with a higher actuation frequency should be monitored at appropriate intervals (when maintaining the fitting at the latest) by visual inspection for a tight fit and tightened accordingly if required.
° The actuator is designed for actuation with compressed air according to section 1 <intended use>.

	The actuator shaft interface for the fitting must be adapted by the fitting manufacturer according to the specifications of EN 5211 in the choice of material and production tolerances to the frequency of switching cycles:
	The <CLOSED> position of the fitting is generally adjusted when assembling the actuator. This setting should not be changed as long as the fitting is tight. If adjustment is necessary, the assembly manual xxx section B6 and/or the corresponding fitting manual provides accurate information.

D5 Advice on other risks

° Securing the pre-tensed springs:
The type MIG-xx-S spring packages are secured, pre-tensed, with end caps with long fixing screws. It is essential that the springs are not subject to any corrosive control medium.

° Replacement of spring packages:
If necessary, spring packages of type MIG-KS-xx-S can be replaced if required due to the fitting torque requirements.

° Mechanical loads:
► Actuators are not "step ladders": external loads must be kept away from the fitting.
► The actuator is designed for static loads in the pipe system. Risks due to loads caused by vibrations in the system are not covered: permanent securing of screw connections on the actuator must be coordinated with the manufacturer KLINGER SCHÖNEBERG GmbH in such cases.

Declaration according to MRL (voluntary addition)

The manufacturer **KLINGER SCHÖNEBERG GmbH**
Heidelberger Straße 3
76676 Graben-Neudorf

declares that the pneumatic rotary actuators correspond with EC guidelines

Type MIG-KS-xx-D double action
Type MIG-KS-xx-S single action

are manufactured according to the following norms:

DIN EN ISO 5211	**Connections of rotary actuators to fittings**
DIN EN 15081	**Assembly sets for connections of rotary actuators to fittings**
VDI / VDE 3845	**Control element connection point**
EN 12100	**Safety of machines**
ISO 8573-1 class 3 and 5	**Quality of compressed air**

Product documents are available as follows:

Technical data sheets, xxxxxx

These products correspond with the following specified guidelines:

Machinery directive 2006/42 EC (MRL) [only applies in combination with a fitting.]

1. The products are a "component or partial machine" in terms of Art 2 g) of this guideline
2. The table overleaf lists whether and how requirements of this guideline should be fulfilled
3. This declaration is the assembly declaration in terms of this guideline

The following applies to compliance with the above-mentioned guidelines:

1. The user must comply with the <intended use> defined in the
   "installation and assembly manual" supplied with the delivery
   (xxxMRLxxxxx).
   Failure to observe this manual can - in relevant cases - release the manufacturer
   from product liability.
2. Commissioning the fitting (and the attached actuator if necessary) is not permitted
   until the conformity of the system in which the fitting is installed is declared by the responsible person
   with all of the applicable above-mentioned EC guidelines.
   A separate declaration is supplied for the above-mentioned actuator.
3. The manufacturer MIG GmbH has carried out and documented the necessary risk analyses.
   The commissioned employee for this available documentation is the
   QM officer at MIG GmbH.

Graben-Neudorf, on _____

The manufacturer	**KLINGER SCHÖNEBERG GmbH, Heidleberger Straße 3, 76676 Graben-Neudorf**
declares that the **pneumatic actuators MIG-KS-D/S** correspond with the following regulations:	
Requirements according to appendix I of the machinery directive 2006/42/EC	
1.1.1, g) Intended use	Refer to operating manual
1.1.2.,c) Warnings for incorrect use	Refer to operating manual
1.1.2.,c) Necessary safety equipment	Same as the pipe section in which the fitting is installed
1.1.2.,e) Accessories	No special tools for replacement of expendable parts necessary
1.1.3 Parts in contact with media	The material of parts in contact with media have been coordinated in advance of the delivery and are specified in both the type data sheet and in the MIG GmbH order confirmation. Performance of a corresponding risk analysis for resistance to the operating medium by the user is required.
1.1.5 Handling	Fulfilled by advice in the installation manual
1.2 and 1.2.11 control	at the responsibility of the user in consultation with the actuator installation manual
1.3.2 Breakage risk prevention	For function parts: ensured by intended use of the actuators
1.3.4 Sharp corners and edges	Requirements fulfilled
1.3.7/8 Injury due to moving parts	Requirement fulfilled with intended use. Maintenance and repair are only permitted with the actuator disabled and with the power supply to the actuator switched of
1.5.1-1.5.3 Power supply	Responsibility of the user - also refer to the installation manual for the actuator
1.5.5 Operating temperature	Warning advice against unauthorised excess: see operating manual, sectior <intended use>
1.5.7 Explosion	Explosion protection is necessary. Must be explicitly agreed in the purchase contract. In this case: Only for use as marked on the actuator.
1.5.13 Emission of dangerous substances	Not applicable
1.6.1 Maintenance	Refer to operating manual
1.7.3 Identification	See manufacturer documentation
1.7.4 Operating manual	This installation manual also contains advice on operating the actuator Necessary supplements for the operating manual for the <full machine> are the responsibility of the planner/user.
Appendix III	The actuator is not a <complete machine>: Therefore no CE mark for conformity with the machinery directive
Appendices IV, VIII-XI	Not applicable
According to EN 12100	
1. Area of application	The basis is decades of experience in the use of the actuator construction types stated on page 1. Note: It is essential for the user of the pipeline section, including the fittings used performs a customised risk analysis for the specific type of operation according to sections 4 to 6 of EN 12100 - it is not possible for the manufacturer Klinger Schöneberg to do so.
3.20,6.1 Inherently safe construction	The actuators are designed according to the principle of <inherently safe construction>
Analysis according to sections 4, 5, & 6	Experiences with the malfunctions and misuse documented by the manufacturer within the scope of cases of damage (doc no. ISO9001) have been used as a basis
5.3 Machine limits	Demarcation of the <incomplete machine> has been undertaken according to the <intended use: of the actuator.
5.4 Decommissioning and disposal	Not within the scope of responsibility of MIG GmbH.
6.2.2 Geometric factors	Due to the fact that the fitting & actuator cover the functional parts when used as intended this section is not applicable.
6.3 Technical protective equipment	Only required for accessories if applicable.
6.4.5 Operating manual	Due to the fact that fittings with an actuator work "automatically" according to the control commands, the aspects that are <typical to the actuator> are described in the operating manua and need to be provided to the manufacturer of the (pipeline) system
Risk analysis	The performed risk analysis according to MRL appendix VII, B) has been carried out by the manufacture MIG GmbH and documented according to MRL appendix VII,B).