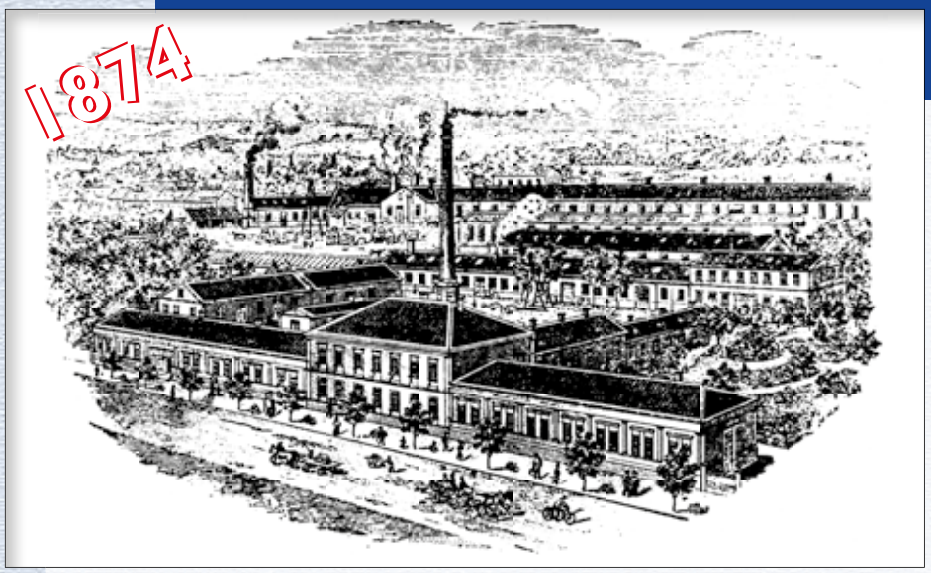
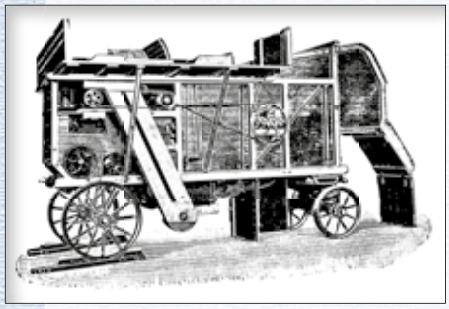
ELECTRIC ACTUATORS

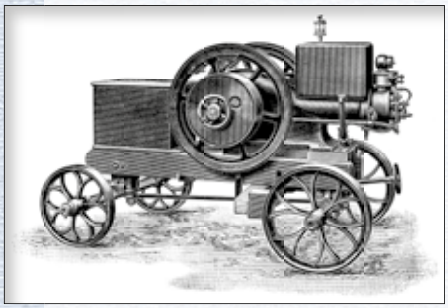
VIRTUES AND ADVANTAGES

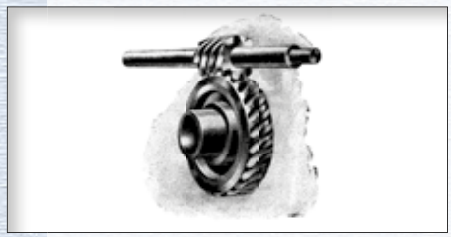
- planetary gear box
- high setting accuracy
- electronic equipment availability
- long service life

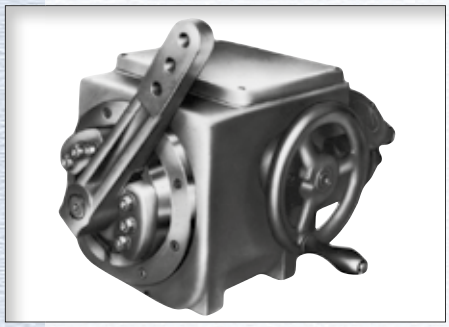
ZPA PEČKY, a.s.











The history of engineering production in Pečky dates back to 1874 when Jouza Brothers established a firm engaged in the production of agricultural machinery and foundry products. The firm expanded and its production program gradually encompassed gear wheels, ball bearings, lathes, drills, planing machines as well as gasoline and diesel engines and tractors.

The manufacturing program changed after World War II. After 1953 it was focused on control and measuring instruments, electric switchboards and electric actuators, which, in the course almost five previous decades, has been our traditional product.

On May 1, 1992, implementation of a privatization project gave rise to an independent corporation, ZPA Pečky a.s.

At present, our Division 1 produces MODACT® actuators intended for the actuation of valves, also ball, butterfly and gate, of all types even in environments with gas or fume explosion hazard.

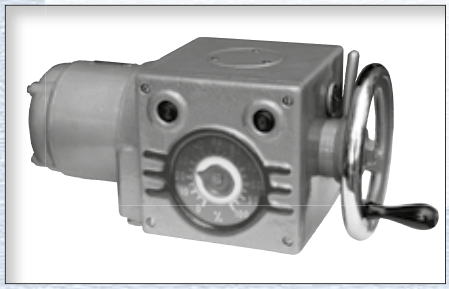
Wide range of types opens extensive application possibilities for our actuators in control and regulation circuits of technological processes.

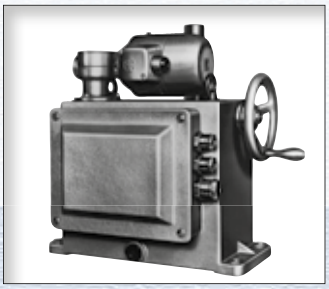
Our manufacturing program includes rotary single-turn and multi-turn actuators for direct mounting on valves or lever-type actuators with closing torques from 8 to 4000 Nm, linear actuators with axial forces from 11.5 to 63 kN.

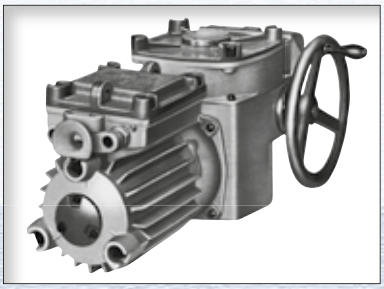
Our special features are MOA and MOA OC actuators intended for operation under extreme conditions in nuclear power plants.

Modular concept of MODACT actuators made it possible to simplify and unify numerous actuator elements and to achieve long service life and high service reliability of these units. Contributor to this development was our own design and development base which gave rise to several unique solutions - epicyclic gear case design permitting manual actuation even with electromotor running, torque switch interlocking, low hysteresis and non-linearity of position transducers or high setting accuracy of position and torque switches.

Safe operation of our actuators is secured by enclosure of types IP 55, IP 65 and IP 67.







A new feature of our actuators is electronic circuitry with microprocessors allowing higher actuation accuracy and higher plant reliability to be achieved with less demanding commissioning and adjustment operations. This circuitry is also equipped with permanently operating self-diagnostic facility, which greatly simplifies fault detection in control circuitry.

Commercial designation of these actuators is MODACT Control.

Greatest care is dedicated to quality control in all phases of production because quality is one of the most important aspects influencing market success of the product.

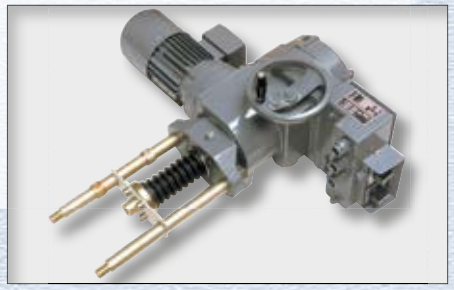
This is why we decided to introduce a quality control system in all activities of our company. Culmination of this effort was successful certification audit and acquisition of EN ISO 9001 Certificate from RW TÜV Institution in Essen in March 1995. Renewal audit in 2006 was successful and validity of the Certificate was prolonged until 2015.

These were the first steps in our effort the objective of which is a reliable product and, consequently, a satisfied customer.

We provide guarantee and post-guarantee services for our products.

We offer the following services: installation of actuators on customer premises, adjustment, repairs, adaptations, revisions and external maintenance.

Based on market requirements we established a network of service organizations for the territory of Czech and Slovak Republics employing trained personnel to perform the activities mentioned.



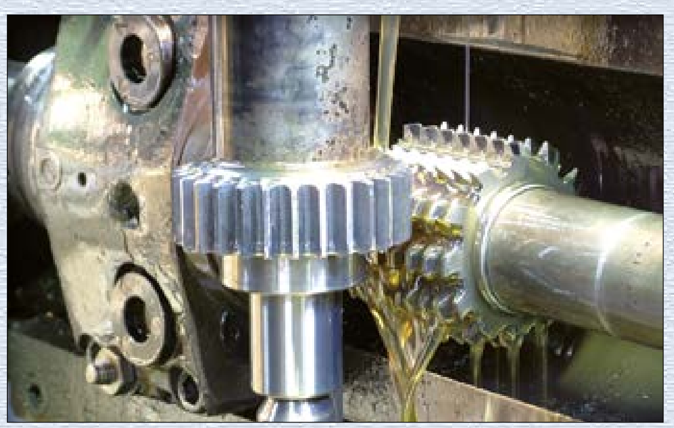
ACTUATOR TYPE			KP MINI		KP MIDI	MOK				
TYPE NUMBER			52 997	52 998	52 999	52 325	52 326	52 327	52 328	52 329
Tripping torque		[Nm]	30	30	35	16-80	63-125	125-250	250-500	500-1000
Tripping force		[kN]								
Adjusting time		[s/90°]	30-60	30-60	13	10-80	10-80	20-160	20-80	40-160
Adjusting speed		[min^{-1}]								
		[mm/min]								
Working stroke		[°]	90	90	320	90	90	90	90	90
		[rev.]								
		[mm]								
Supply voltage		1 x 230 V, 50 Hz								
		24 V, 50 Hz								
		1 x 110 V, 50 Hz								
		3 x 230 / 400 V, 50 Hz								
Control		on-off								
		threeposition								
		continuous								
		PROFIBUS								
Position sensing	resistance transmitter	(R)								
	absolute									
	current transmitter	(I)								
Position interrupt										
Tourque-initated interrupt										
Manual actuation										
Explosion-proof design						I	I	I	I	I
Type of enclosure			IP 67	IP 67	IP 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67
Weight-depending on design (Al/cast iron) and on motor		[kg]	4	4	2	7,5	13	13-21	26-27	43-45
Remark								I zone 2, type of protection "n"		

MOKA					MOKED					MOKP Ex			MOKPED Ex		
52 325	52 326	52 327	52 328	52 329	52 325	52 326	52 327	52 328	52 329	52 320	52 321	52 322	52 320	52 321	52 322
16-80	63-125	125-250	250-500	500-1000	16-80	63-125	125-250	250-500	500-1000	16-100	63-250	250-600	16-100	63-250	250-600
10-80	10-80	20-160	20-80	40-160	10-80	10-80	20-160	20-80	40-160	10-80	10-80	10-160	10-80	10-80	10-160
90	90	90	90	90	90	90	90	90	90	90-160	90-160	90-160	90-160	90-160	90-160
IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 65, 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
7,5	13	13 - 21	26 - 27	43 - 45	7,5	13	13 - 21	26 - 27	43 - 45	10	18,5	31	9,7	18,5	31

ACTUATOR TYPE		MOP	MOPED	MON						
TYPE NUMBER		52 039	52 039	52 030	52 031	52 032	52 033	52 034	52 035	52 036
Tripping torque	[Nm]	10-60	10-60	20-200	63-160	160-400	250-500	320-1000	630-2000	1000-4000
Tripping force	[kN]									
Adjusting time	[s/90°]									
Adjusting speed	[min^{-1}]	9-40	9-40	7-80	7-145	7-145	16-100	16-63	45-100	20-40
	[mm/min]									
Working stroke	[°]									
	[rev.]	1,5-38	1,5-2880	2-250	2-250	2-250	2-240	2-240	2-240	1-100
	[mm]									
Supply voltage	1 x 230 V, 50 Hz	■	■							
	24 V, 50 Hz									
	1 x 110 V, 50 Hz									
	3 x 230 / 400 V, 50 Hz	■	■	■	■	■	■	■	■	■
Control	on-off	■	■	■	■	■	■	■	■	■
	threeposition	■	■	■	■	■	■ (2)	■ (2)	■ (2)	■ (2)
	continuous									
	PROFIBUS		■							
Position sensing	resistance transmitter (R)	■		■	■	■	■	■	■	■
	absolute		■							
	current transmitter (I)	■		■	■	■	■	■	■	■
Position interrupt		■	■	■	■	■	■	■	■	■
Tourque-initated interrupt		■	■	■	■	■	■	■	■	■
Manual actuation		■	■	■	■	■	■	■	■	■
Explosion-proof design										
Type of enclosure		IP 67	IP 67	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Weight-depending on design (Al/cast iron) and on motor	[kg]	17	17	27-29	41- 54	45-58	90-97	97-109	211-217	304-315
Remark							(2) – without electronic brake			

MONJ			MOP						
52 030	52 031	52 032	52 030	52 031	52 032	52 033	52 034	52 035	52 036
20-110	63-160	160-250	20-125	63-160	160-250	250-500	320-630	630-1200	1000 -2500
25-50	40-145	40, 80	7-80	7-145	7-145	16-100	16-63	45-100	20-40
2-250	2-250	2-250	2-250	2-250	2-250	2-240	2-240	2-240	1-100
■	■	■							
			■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■ (2)	■ (2)	■ (2)	■ (2)
■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■
■	■	■	■	■	■	■	■	■	■
IP 55	IP 55	IP 55	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
27-28	41-51	45-49	27-28	41-54	45-54	90-97	97-99	206-211	304-309

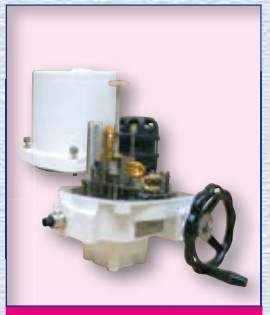
■ (2) – without electronic brake



ACTUATOR TYPE			MONED							MONEDJ			MOPED						
TYPE NUMBER			52 030	52 031	52 032	52 033	52 034	52 035	52 036	52 030	52 031	52 032	52 030	52 031	52 032	52 033	52 034	52 035	52 036
Tripping torque		[Nm]	20-200	63-160	160-400	250-500	320-1000	630 -2000	1000 -4000	20-110	63-160	160-250	20-125	63-160	160-250	250-500	320-630	630-1200	1000 -2500
Tripping force		[kN]																	
Adjusting time		[s/90°]																	
Adjusting speed		[min^{-1}]	7-80	7-145	7-145	16-100	16-63	45-100	20-40	25-50	40-145	40, 80	7-80	7-145	7-145	16-100	16-63	45-100	20-40
		[mm/min]																	
Working stroke		[°]																	
		[rev.]	2-2010	2-1420	2-1420	2-1090	2-1090	2-1090	2-470	2-2010	2-1420	2-1420	2-2010	2-1420	2-1420	2-1090	2-1090	2-1090	2-470
		[mm]																	
Supply voltage		1 x 230 V, 50 Hz								■	■	■							
		24 V, 50 Hz																	
		1 x 110 V, 50 Hz																	
		3 x 230 / 400 V, 50 Hz	■	■	■	■	■	■	■				■	■	■	■	■	■	■
Control		on-off	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
		threeposition	■	■	■	■ (2)	■ (2)	■ (2)	■ (2)	■	■	■	■	■	■	■ (2)	■ (2)	■ (2)	■ (2)
		continuous	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
		PROFIBUS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Position sensing	resistance transmitter	(R)																	
	absolute		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	current transmitter	(I)																	
Position interrupt			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Tourque-initated interrupt			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Manual actuation			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Explosion-proof design																			
Type of enclosure			IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
Weight-depending on design (Al/cast iron) and on motor		[kg]	27-29	41- 54	45-58	90-97	97-109	211-217	304-315	27-28	41-51	45-49	27-28	41-54	45-54	90-97	97-99	206-211	304-309
Remark					(2) – without electronic brake										(2) – without electronic brake				

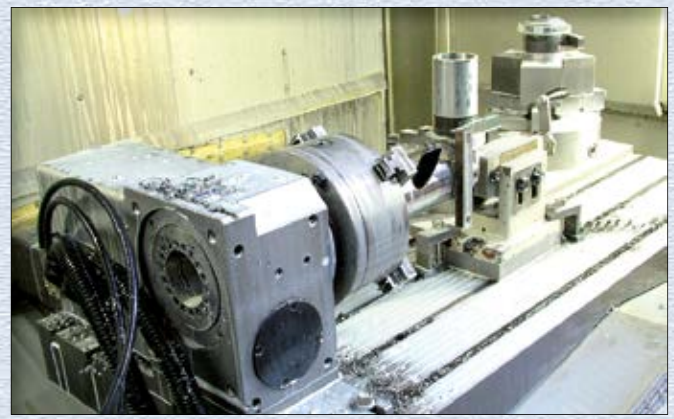






MO EEx						MOED EEx						MOA						MOA	MOA
52 120	52 121	52 122	52 123	52 124	52 125	52 120	52 121	52 122	52 123	52 124	52 125	52 020	52 021	52 022	52 024	52 025	52 026	52 027	52 029
20-125	63-160	160 -250	250 -500	320 -630	630 -1100	20-125	63-160	160 -250	250 -500	320 -630	630 -1100	20-63	63-160	160 -250	160 -630	630 -1250	1250 -2000	10-20	10-30
11-40	16-125	10-80	16-100	16-63	30-100	11-40	16-125	10-80	16-100	16-63	30-100	9-40	9-100	9-80	16-100	45-63	32	3	9-40
2-250 (2-620)	2-250 (2-620)	2-250 (2-620)	2-240 (2-470)	2-240 (2-470)	2-240 (2-470)	2-1980	2-1400	2-1400	2-1080	2-1080	2-1080	2-250	2-250	2-250	2-240	2-240	1-100	1-7	1,5-38
IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55, 65	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 67	IP 67
47 - 49	57 - 80	57 - 80	112 - 150	108 - 150	239 - 248	47 - 49	57 - 80	57 - 80	112 - 150	108 - 150	239 - 248	35-37	65-68	68	128-131	210 -212	318	8,2	17



worm gearbox

planet gearbox

ACTUATOR TYPE			MOA OC				MOA OC				MOA OC	MPR			MPS						
TYPE NUMBER			52 070	52 071	52 072	52 074	52 070	52 071	52 072	52 074	52 079	52 221	52 222	52 223	52 260	52 261	52 262	52 263	52 264	52 265	52 266
Tripping torque		[Nm]	20-63	63-160	125-250	250-630	20-63	63-160	125-250	250-630	10-30	63-320	250 -1000	1000 -4000	20 -125	100 -160	160 -320	320 -630	630 -1250	1250 -2000	2500 -4000
Tripping force		[kN]																			
Adjusting time		[s/90°]										11-46	10-55	50-195	8-63	16-120	16-120	16-120	16-120	45	45
Adjusting speed		[min^{-1}]	16-100	40-100	40-100	40-120	16-40	25-100	25-70	33-95	9-40										
		[mm/min]																			
Working stroke		[°]										160	160	160	160	160	160	160	160	160	160
		[rev.]	2-250	2-250	2-250	2-250	2-250	2-250	2-250	2-240	1,5-38										
		[mm]																			
Supply voltage		1 x 230 V, 50 Hz																			
		24 V, 50 Hz																			
		1 x 110 V, 50 Hz																			
		3 x 230 / 400 V, 50 Hz																			
Control		on-off																			
		threeposition																			
		continuous																			
		PROFIBUS																			
Position sensing	resistance transmitter	(R)																			
	absolute																				
	current transmitter	(I)																			
Position interrupt																					
Tourque-initated interrupt																					
Manual actuation																					
Explosion-proof design																					
Type of enclosure			IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 67	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
Weight-depending on design (Al/cast iron) and on motor		[kg]	45-55	75-94	94-108	152 -212	30-34	64	64	93-111	19,4-21,6	62-67	104	282	26	70	70	120	120	267	267
Remark																					

MPSP							MPSED							MPSPED						
52 260	52 261	52 262	52 263	52 264	52 265	52 266	52 260	52 261	52 262	52 263	52 264	52 265	52 266	52 260	52 261	52 262	52 263	52 264	52 265	52 266
20 -125	100 -160	160 -320	320 -630	630 -1250	1250 -2000	2500 -4000	20 -125	100 -160	160 -320	320 -630	630 -1250	1250 -2000	2500 -4000	20 -125	100 -160	160 -320	320 -630	630 -1250	1250 -2000	2500 -4000
8-63	16-120	16-120	16-120	16-120	45	45	8-63	16-120	16-120	16-120	16-120	45	45	8-63	16-120	16-120	16-120	16-120	45	45
160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
26	70	70	120	120	267	267	26	70	70	120	120	267	267	26	70	70	120	120	267	267

ACTUATOR TYPE			MTP	MTPED	MTN		MTNED		MTP		MTPED	
TYPE NUMBER			52 441	52 441	52 442	52 443	52 442	52 443	52 442	52 443	52 442	52 443
Tripping torque		[Nm]										
Tripping force		[kN]	5-25	5-25	11,5-25	25-63	11,5-25	25-63	11,5-25	25-63	11,5-25	25-63
Adjusting time		[s/90°]										
Adjusting speed		[min^{-1}]										
		[mm/min]	45-200	45-200	27-125	45-155	27-125	45-155	27-125	45-155	27-125	45-155
Working stroke		[°]										
		[rev.]										
		[mm]	10-100	10-100	10-100	20-120	10-100	20-120	10-100	20-120	10-100	20-120
Supply voltage		1 x 230 V, 50 Hz	■	■								
		24 V, 50 Hz										
		1 x 110 V, 50 Hz										
		3 x 230 / 400 V, 50 Hz	■	■	■	■	■	■	■	■	■	■
Control		on-off	■	■	■	■	■	■	■	■	■	■
		threeposition	■	■	■	■	■	■	■	■	■	■
		continuous										
		PROFIBUS		■			■	■			■	■
Position sensing	resistance transmitter	(R)	■		■	■			■	■		
	absolute			■			■	■			■	■
	current transmitter	(I)	■		■	■			■	■		
Position interrupt			■	■	■	■	■	■	■	■	■	■
Tourque-initated interrupt			■	■	■	■	■	■	■	■	■	■
Manual actuation			■	■	■	■	■	■	■	■	■	■
Explosion-proof design												
Type of enclosure			IP 67	IP 67	IP 55	IP 55	IP 55	IP 55	IP 67	IP 67	IP 67	IP 67
Weight-depending on design (Al/cast iron) and on motor		[kg]	22	22	33-45	60-81	33-45	60-81	33-45	60-78	33-45	60-78
Remark												

VALVING, GEAR CASES

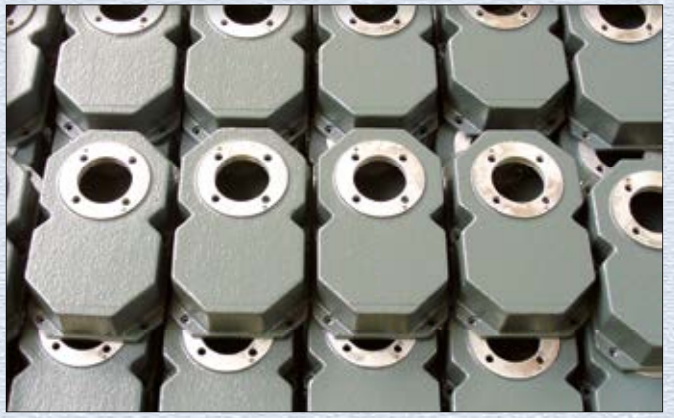
Applicability of our actuators can be increased by combining multi-turn actuators with gear cases supplied by MASTERGEAR.

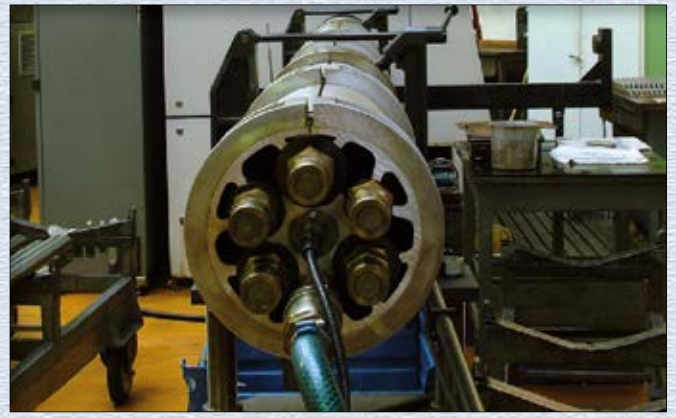
Where the actuator closing torque is not sufficient any more, the closing torque value can be increased to as much as 250,000 Nm for single-turn (flaps, ball valves) and 16,000 Nm for multi-turn (valves of all kinds) valving. Equal torque range can be covered with gear cases designed for manual actuation only.

As regards type range, sturdy construction and top quality workmanship, MASTERGEAR gear cases meet even the most stringent service requirements. Due to anticorrosive finish of clean metal surfaces, epoxy varnish coating and multiple lip seal the MP-series gear cases are moisture-tight up to IP 67 and ensure excellent resistance to environmental effects. With all models axial needle bearings in combination with integrated worm and worm shaft ensure increase in maximum attainable factor and optimum efficiency.

By customers request we are ready to suggest optimum size and type of valve – and gear case, if necessary – as regards both service requirements and price.

We assemble the unit and set it to required parameters so that assemblage and time-consuming adjustment under operating conditions on site becomes unnecessary.





DESCRIPTION OF ELECTRONIC SENSOR AND REGULATOR OF POSITION OF ACTUATORS

DMS2 is an electronic system of contactless magnetic scanning of position and torque of actuators.

Main features of DMS2:

- Guaranteed long service life of sensors components that do not undergo any mechanical wear.
- Using of absolute position sensors without need of a backup power supply from battery.
- Complete control of run of the actuator at two- and threeposition regulation or connection to industrial bus bar Profibus.
- Well-arranged signalization of process and service data on an alphanumeric LCD display 2 x 12 characters.
- Auto-diagnostics of error messages on the LCD display, memory of latest defects and number of occurrences of respective defects.
- Setting of parameter by means of a PC program or local control.

Description of system components

Basic outfit:

The control unit is the main part of the system DMS2; it contains:

- Micro-controller
- Position sensors
- Two signalling LED
- Connectors for connecting the torque sensor, relay board and 2P inputs, power source board, communication adapter, LCD display, and local control.

The torque unit ensures scanning of torque by a contactless sensor.

The source unit includes:

- Two relays for electric motor control;
- The relay Ready has a change-over contact separately brought-out to the terminal board;
- The signalling relays 1 – 4 have one pole of the switching contact brought out to the terminal board. The second poles of the switching contacts of the relay 1 – 4 are interconnected and brought out to the terminal COM.

The unit provides for connecting the heating resistor and its control by a thermostat. The unit controls power switches of the electric motor (contactors or contactless switching). A dynamic brake can be connected to the unit.

Display unit: two-row display, 2 x 12 alphanumeric characters

Push-button unit: sensors of push-buttons *"Open", "Close", "Stop" and turning change-over switch "Local, Remote, Stop".*

Optional outfit ***(the actuator must include one of the following units):***

Unit of two-position and three-position control – it provides for controlling the actuator by setting to the position *"Open"* and *"Closed"* or by analog signal 0 (4) – 20 mA.

Unit of connection Profibus: it provides for controlling the actuator by the industrial bus bar Profibus.

The electronic control DMS2 monitors sequence and fall-out of supply voltage phases.

Bus bar PROFIBUS DP, general provisions

Exchange of information between automation systems and connected decentralized technological instruments is currently realized using serial industrial bus bars for the communication system. Many thousands of successful applications have unambiguously proved that using of the bus-bar technology can ensure saving of costs of up to 40 % in cabling, putting into operation and maintenance, in comparison with a standard technical solution. Just two wires are sufficient in transferring relevant information, such as input and output data, parameters and diagnostic data for technological instruments. While mutually incompatible industrial bus bars of various manufacturers were often used in the past, open standardi-zed systems are almost exclusively used currently. In this way, the user is becoming independent of individual suppliers and can choose the best and most price-favourable product from a wide assortment of products. PROFIBUS-DP is a leading open bus bar system in Europe that is used with success all round the world. Its application area covers production automation, process automation and automation of buildings. PROFIBUS-DP is an international, open standard of the industrial bus bar that has been standardized by the European standard EN 50 170. In this way, the investments of manufacturers and users are optimally protected and independence of manufacturers is fully guaranteed.

Basic properties

PROFIBUS-DP specifies technical and functional properties of the serial bus bar system that enables the distributed digital automation instruments to be mutually interconnected in a network. PROFIBUS-DP differentiates between the Master and Slave instruments. PROFIBUS-DP has been designed for a quick exchange of data on the lowest technological level. Here, central control stations, such as, for instance, programmable automatic stations (PLC) or industrial computers (IPC), communicate, via fast serial connection, with decentralized technological units, such as input/output instruments, valves and drives. Data are exchanged with these decentralized instruments periodically. Communication functions necessary for this are specified by basic functions of the bus bar PROFIBUS-DP according to the European standard EN 50 170.

Master instruments or control stations determine the data process on the bus bar and can transmit reports without external request. Within the protocol PROFIBUS, the master instruments (control stations) are also marked as active participant of the bus bar.

Slave instruments, such as, for instance, actuators, are peripheral instruments. Typical slave units are input/output instruments, valves, drives and measuring transducers. They have no permission to access the bus bar, i.e. they can only acknowledge received reports or send a report to the master instrument, based on the request thereof. Often, the slave instruments (units) are also marked as passive participants of the bus bare.

Basic functions of bus bar PROFIBUS DP

The control station (Master) reads periodically input information from the slave units (Slaves) and sends periodically output information to the slave units. In addition to this periodical transfer of data on the process status, the bus bar PROFIBUS-DP also offers powerful functions for the diagnostics and putting into operation. The data process is watched by monitoring functions of the control station and the slave units.

Functional possibilities

Periodical transfer of user's data between the control station (DP Master) and the slave units (DP-Slaves).

Dynamic activation and deactivation of individual slave units (DP-Slaves).

Testing of configuration of the slave units (DP-Slaves).

Synchronization of inputs and/or outputs.

Protection functions

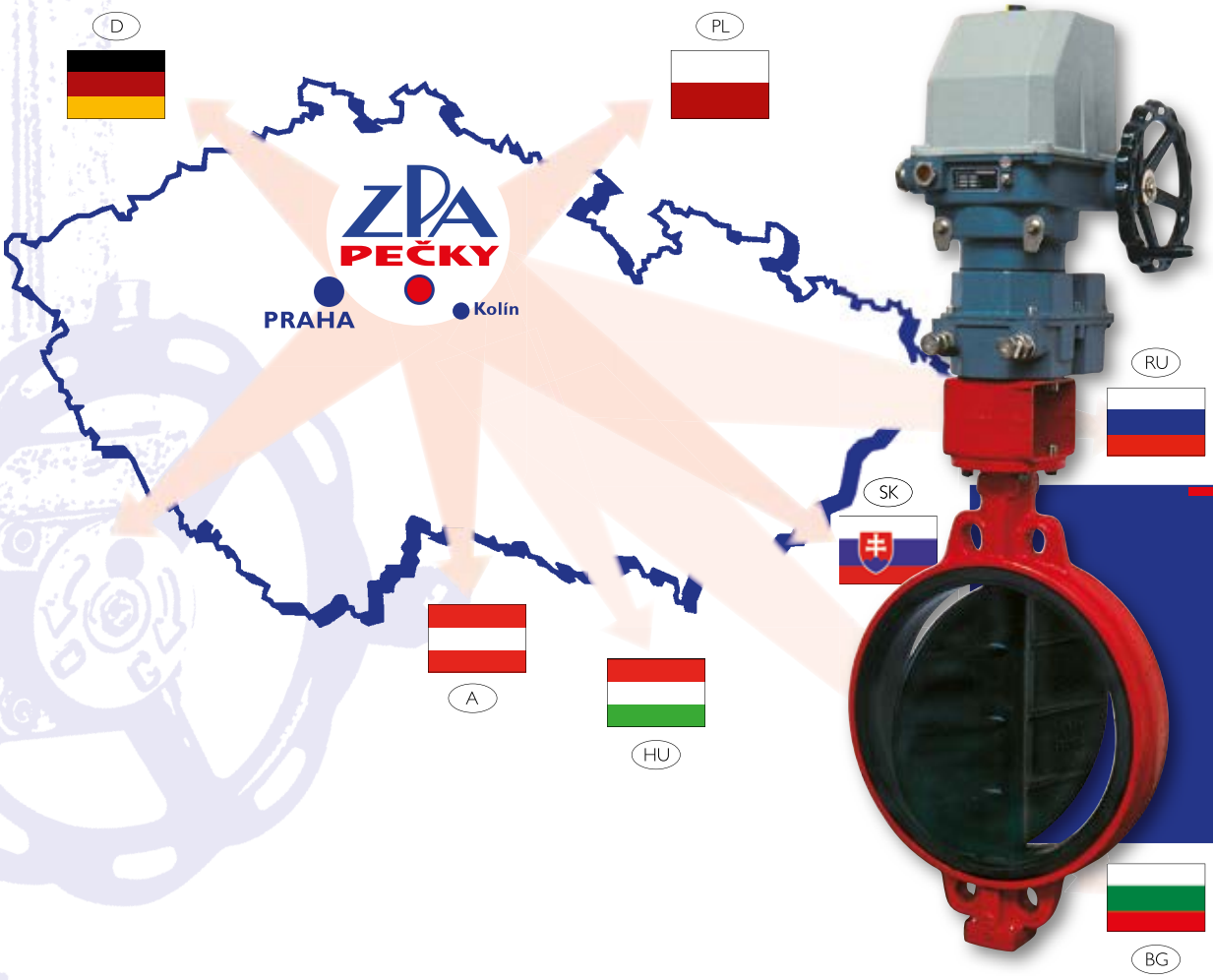
All reports are transferred with the Hamming distance HD = 4.

Watching responses of the slave units (DP-Slaves) (Watchdog).

Protection of access for input/output of the slave units (DP-Slaves).

Monitoring of the user's data operation with adjustable interval of monitoring to the control station (Master).

Adjustable safety behaviour.



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