ELECTRIC ACTUATOR

TM-SERIES

FOR 21ST CENTURY

Explosion proof

IP 68

Seibu Wonder

IT'S AN ACTUATOR FOR THE 21ST CENTURY

Accuracy, comprehensive functions, easy handling, environment free use, trouble free durability, simple construction - all these are what customers want for the actuator of next centruy. TM - series is the answer. 50years' experience of Seibu as a leading manufacturer of actuator and diligently in deliberated to give birth TM - series, the actuator of IP68 & Explosion proof as standard.

CONTENTS

Integral

Semi-integral

Basic unit

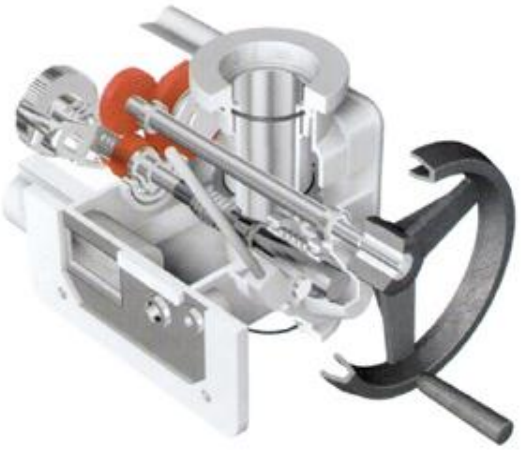
FEATURES

DOUBLE SEALED - IP68 & EXPLOSION PROOF AS STANDARD - ENVIRONMENT FREE USE

All the compartments of TM series are double sealed with a pair of V shape ring & O ring and have enough flame path according to IEC standard to ensure complete protection from dust, moisture (submersible to a depth of 6 meters for 48 hours) and flame.

MULTI - UNIT CONFIGURATION

All the compartments are independent of each other, but simple to assemble or disassemble, thus the expansion of function is easy.



INDEPENDENT HANDWHEEL SHAFT - ALL SIDE MOUNTED

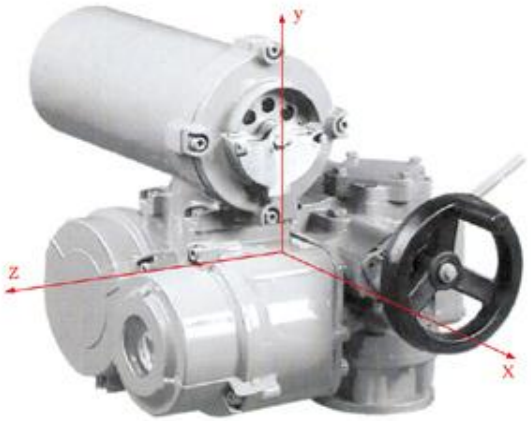
All TM series actuators have "independent handwheel shaft" engaged with the worm through an intermediate spur gear to prevent the manual drive parts from the damages often occur in the manual drive parts during the manual operation of the actuators of which handwheel shaft directly drive the worm. Also, the side mounted handwheel. On all TM series ensures easier manual operation than the top mounted. All of gear set lubricated by grease oil and runs long periods.

SIMPLIFIED & STANDARDIZED CIRCUITRY - CUSTOM CHIP EQUIPPED

Adapting custom chip on PCB. the circuitry is simplified and standardized to ensure the maximum reliability. All TM series actuators use the same control circuitry.

CUBIC ARRANGEMENT

All compartments are arranged in a cubic shape to minimize the dimension of actuator in x, y, z directions to avoid interference at the time of installation.



TM series ACTUATOR, more than "RELIABLE"

1. HIGH TORQUE/LOW INERTIA MOTOR rapidly reaches peak torque after starting and stops with little overrun when switched off. The embedded thermostat ensures accurate temperature sensing to keep the motor's thermal capacity maximum. The high torque motor designed (over 300% starting torque) to replace the Hammer blow device. Hammer blow device can be option if requirement.

2.1 BASIC UNIT is used for the TM actuator which dose not need local control function.

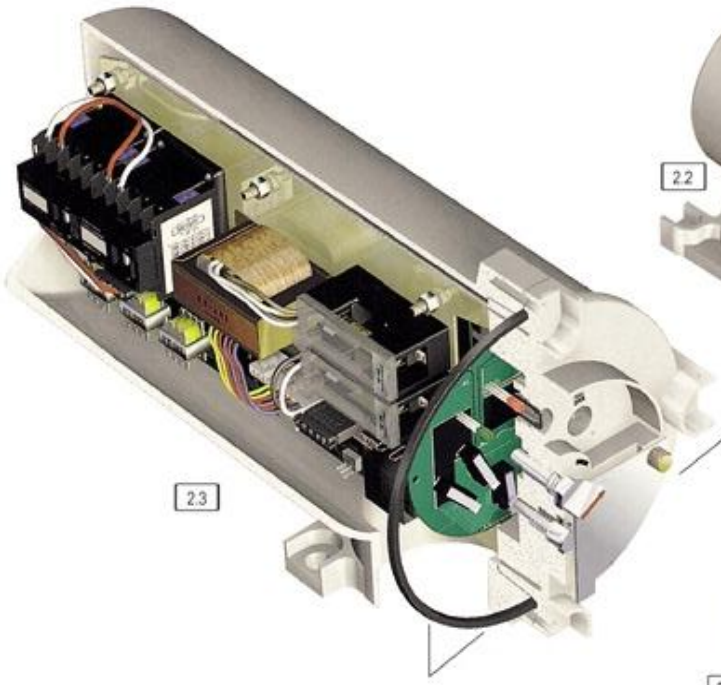
2.2 SEMI-INTEGRAL UNIT has push buttons for open/stop/close, LED lamps for full close/fault/full open signals and selector switch,but no control circuitry in.
This is for the customer who does not have the control circuitry locally, but wants local control using the remote control circuitry.

2.3 INTEGRAL UNIT has the control circuitry on top of the semi-integral unit including monitor relay, phase discriminator and photo-coupler as standard.
This provides complete local control without support from out side circuitry.
One of the 2.1,2.2 and 2.3 can be selected.

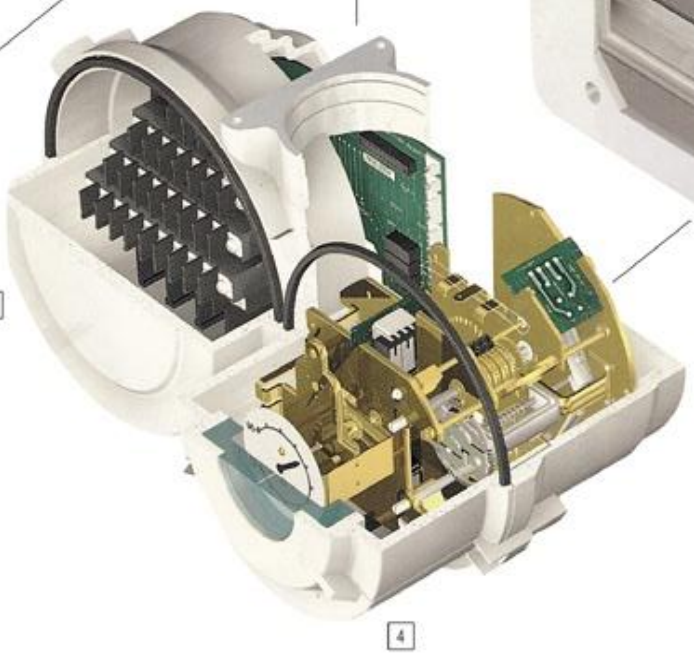
3. TERMINAL UNIT is separately double sealed with a series of V shape ring and O Ring to ensure the integrity of the components inside at the time the cover is removed for site wiring.

2.1

2.2



2.3



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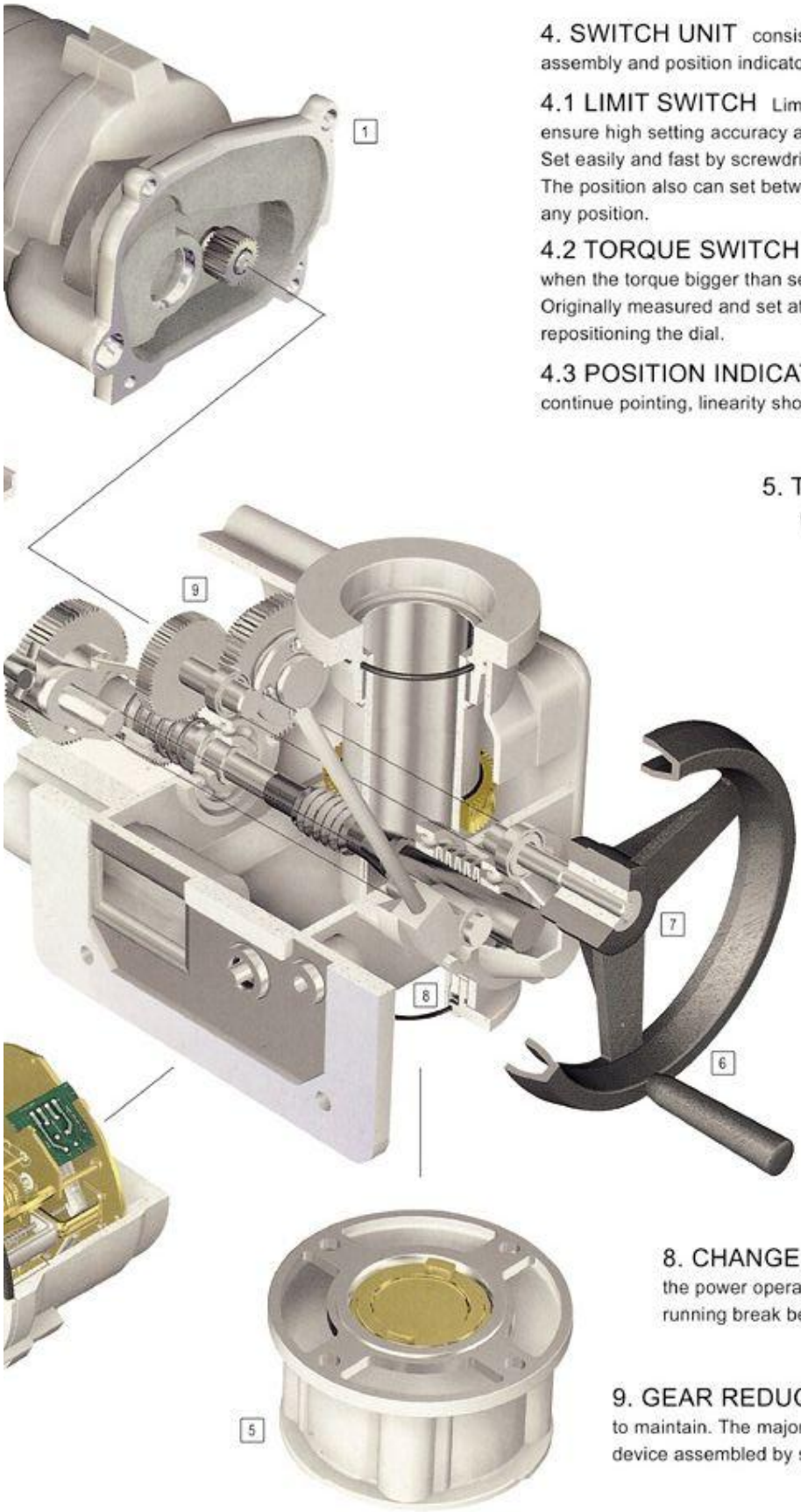


4. SWITCH UNIT consists of limit switch assembly, torque switch assembly and position indicator.

4.1 LIMIT SWITCH Limit switch is driven by a counter gear train to ensure high setting accuracy and reliability at any predetermined position. Set easily and fast by screwdriver.
The position also can set between full open and full close travel procedures any position.

4.2 TORQUE SWITCH Torque switch automatically stops the motor when the torque bigger than set value is applied to the output shaft of actuator. Originally measured and set at the time of delivery and adjustable at site by repositioning the dial.

4.3 POSITION INDICATOR Position indicator of wide angle 0~100% continue pointing, linearity shows the exact position of valve in percentage.

5. THRUST UNIT Thrust unit of spheroidal graphite cast iron consist of thrust bearing and 2 types of drive bush. Threaded bush for Rising valve and bore with key bush for Non-Rising valve. Detachable to allow easy installation.

6. HANDWHEEL Handwheel is side-mounted for all TM series to allow easy manual operation.

7. HANDWHEEL SHAFT
Handwheel shaft engaged with the worm through an intermediate spur gear to prevent the manual drive parts from the damages may occur during manual operation. more different gear ratios can be provided as per the customer's preference for the torque and numbers of turn of handwheel. If manual operate moment restriction, please contact us. we will choice appropriate gear ratios for you, can be accord your requirements. Automatic operate & Manual operate can't operate at same time.

8. CHANGE LEVER Change lever operation easily shift the power operation to manual operation even when the motor is running break between motor and gear motivity transmitting.

9. GEAR REDUCTION Double gear reduction device. easy to maintain. The major gears has been heat treatment. Power driven device assembled by spur gear set and wormgear.

SPECIFICATION

STANDARD

POWER SOURCE
60Hz(50Hz), 3ph, 220/380.440,460,480V

MOTOR
Class F without brake, Thermostat embedded and workable within ±10% of the rated voltage.
Standard rating : 15 minutes.
Over 60 times per hour inch operation rating.

LIMIT SWITCH
Counter gear driven, Open : 1a1b x 1.
Close : 1a1b x 1, AC250V 5A/DC 125V 0.4A
(2a2b.4a.4b. option)

TORQUE SWITCH
Adjustable at site. Open : 1ab x 1,
Close : 1ab x 1, AC250V 5A/DC 125V 0.4A
(1a1b.2a.2b. option)

ENCLOSURE
IP68, IEC 529.1989, 2nd edition and
Exd GroupII B-T4, IEC 79-1, 1990

TEMPERATURE
-25°C~+80°C For other temperature range, refer to us.

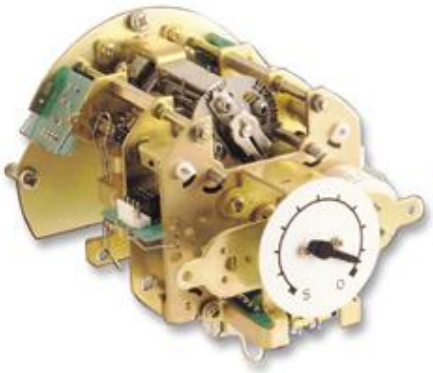
MANUAL OPERATION
Auto-return is standard. Power
to manual operation by change lever shifting.
All handwheels side mounted.

CONDUIT ENTRY
1xPF 1 1/2" and 2xPF 1"
for power and control wire..

STANDARD COAT
Vinyl resin wash primer plus
polyurethane resin paint for final coat.

VIBRATION
Max applicable levels : In the frequency range of 10~40Hz, **plant induced vibration/seismic:** standard TM series : 1G, integral unit: 0.5G.

Shock : 30G. For the application to the side of vibration expected, it is recommended to consult us for the mounting and conupling method.



Limit, torque switch & indicator a'ssy

Terminal

DESIGN LIFE
Min. 10,000 cycles of 0 ⟷ 100% travel provided regular maintenance performed as per the operation manual.

POSITION INDICATOR
Gear driven and shows the
valve position in percentage.

TERMINAL
Terminal in double sealed compartment.
All connection to printed circuit board via pins & sockets.
Control : 47 points with M4 screws,
rating AC250V/5A
Power : 3 points with M6 screws,
rating AC660V/63A

SPACE HEATER
Space heater of thermister type(PTC-5)
embedded inside the switch unit
Capacity : 5~40W 100~240V
Constant temperature expend 5W.
Resistance : 0.3~1.8KΩ

STANDARD BILL OF MATERIALS for major parts

Part	Material	CNS/JIS No	ASTM No
Gear case Common case Switch unit case	Al. alloy die casting	H3156 H5302	B-85
Thrust unit	Spheroidal graphite iron casting	B2118 G5502	A-536
Stem bush	Copper alloy	H3124 H3250	B-133
Worm	Chromium molyb -denum	G3068 G4105	A-148
Worm wheel	High strength Brass casting	G3068 H5102	B-584
Grease	Lithium grease	K5041 K2220	ISO.LXBCA (MULIS)

OPTION

POWER SOURCE Single phase or DC.

MOTOR Class H insulation and/or with brake.
Option rating: 30 minutes.

MANUAL-RETURN
Manual return type actuator: TH-series(with an interlock switch).

LOCAL CONTROL UNIT:
Integral unit as Standard, consist of push button switches:close/stop/open, Selector switch: remote/off/local, LED lamps : full close/fault/full open, in open or close operate the open/close LED flicker show open or close direction in middle position of valve LED lamps light up or quench can be select. reversing contactor, phase discriminator, for phase failure & automatic phase rotation correction. instantaneous reversal protection. monitor relay and photo-coupler, Arrester embedded. The reversing contactors for the motor control have mechanical and electric / electronical interlocks.
Semi-integral unit as standard, consist of push button switches: close/stop/open, selector switch: remote/off/local and LED lamps: full close/fault/full open.

MIDDLE POSITION LIMIT SWITCH can be add to two sets, use as spare limit switch or use as over travel protect (1a1b or 2a2b or 4a.4b AC250V 5A/DC125V 0.4A).

POTENTIOMETER
500Ω and 1KΩ available Max. input voltage: 25V, Linearity 0.5%, Rated power consumption: 0.8W, temperature: -50°C~75°C for other temperature refer to us.

TRANSMITTER
Input AC 110/220V±10%, output DC 4-20 mA Accuracy±0.5% FS, Adjusting range: zero±20%, span±20%, Arrester embedded.

PROPORTIONAL CONTROLLER
AC 110/220V±10%, Control signal in/out: DC 4-20mA, output relay solid state relay, Accuracy:±0.5%FS, Adjusting range : zero±15%, span±15%,dead band (offset) 0.1-7.5% and delay timer 0-4.5 sec, timer control relay: control function can be programmable by key.

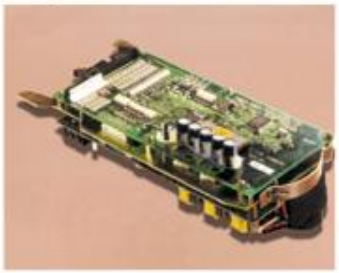
OPTIONAL COAT
For the polluted area, extra coat, on top of the standard coat, may be required refer to us.

FEATURES OF COMMUNICATION
Electrical interface: modbus RS485 two wire.
Total length of the bus: depends on Baudrate and the type of the cable.
Nnmber of participants: max 127 participants.

OTHERS
When the valve was blockade, motor can be protect by motor split second reversal automatically (integral type)

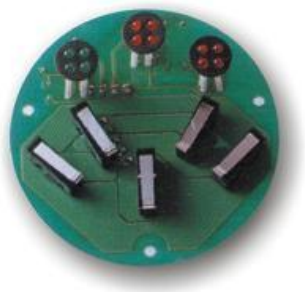
Integral unit


Proportional controller


Control circuit


Potentiometer & transmitter


Semi-integral unit



ACTUATOR SIZING INFORMATION

SPEED-TORQUE DATA

Model	rpm at 60Hz / 50Hz	14.8 / 12.4	19.3 / 16.1	25.4 / 21.2	33.4 / 27.8	44.5 / 37.3	58.0 / 48.2	76.2 / 63.7	100.3 / 83.5
	Motor,KW	Max.setting torque,		kgf.m					
	Pole：4P			Nm					
TM-01	0.2	12.8	9.9	7.5	5.7	5.0	3.8	2.9	2.2
		125.4	97.0	73.5	55.9	49.0	37.2	28.4	21.5
	0.4	15.0	15.0	15.0	13.2	11.5	8.9	6.7	5.1
		147.0	147.0	147.0	129.4	112.7	87.2	65.7	50.0
	0.75	15.0	15.0	15.0	15.0	15.0	14.0	10.6	8.1
		147.0	147.0	147.0	147.0	147.0	137.2	103.9	79.4
TM-04	0.4	34.6	26.6	20.2	15.4	13.2	10.1	7.7	5.9
		339.1	260.7	198.0	150.9	129.4	99.0	75.5	57.8
	0.75	54.5	41.9	31.8	24.2	20.8	15.9	12.1	9.2
		534.1	410.6	311.6	237.2	203.8	155.8	118.6	90.2
	1.5	56.0	56.0	56.0	51.9	40.2	34.2	26.0	19.8
		548.8	548.8	548.8	508.6	394.0	335.2	254.8	194.0
	2.2	56.0	56.0	56.0	56.0	54.0	46.7	35.4	27.0
		548.8	548.8	548.8	548.8	529.2	457.7	346.9	264.6
TM-07	1.5	86.0	86.0	68.2	51.9	44.5	34.2	26.0	19.8
		842.8	842.8	668.4	508.6	436.1	335.2	254.8	194.0
	2.2	86.0	86.0	86.0	70.9	60.7	46.7	35.4	27.0
		842.8	842.8	842.8	694.8	594.9	457.7	346.9	264.6
	3.7	86.0	86.0	86.0	86.0	85.6	65.7	49.8	38.0
		842.8	842.8	842.8	842.8	838.9	643.9	488.0	372.4
	5.5	86.0	86.0	86.0	86.0	86.0	86.0	86.0	67.7
		842.8	842.8	842.8	842.8	842.8	842.8	842.8	663.5
TM-1	2.2	159.4	122.5	93.0	70.9	60.7	46.7	35.4	27.0
		1562.1	1200.5	911.4	694.8	594.9	457.7	346.9	264.6
	3.7	184.0	172.8	131.3	100.1	85.6	65.8	50.0	38.1
		1803.2	1693.4	1,286.7	981.0	838.9	644.8	490.0	373.4
	5.5		184.0	184.0	177.3		116.7	88.6	67.7
			1803.2	1,803.2	1,737.5		1,143.6	868.3	663.5
	7.5				184.0		159.1	120.8	92.0
					1,803.2		1,559.1	1,183.8	901.6

.Data above are for 220V,3ph,60Hz input power.For other voltages,refer to us.

.If the torque values is empty, also can be offered for option.

MECHANICAL DATA

Allowable torque	Allowable thrust	Allowable stem dia.,mm.bore	Handwheel	Flange dia	
Kgf-m Nm	Ton KN	key threaded mm	dia.m	ISO No tap PCD/size pilot dia.,mm	
15.0 147	7 68.6	34 40	≤ 33.4rpm (η=0.3) ratio：16.8:1 25.3:1(option) ≥ 44.5rpm (η=0.35) ratio：5.6:1 15.3:1(option) dia.: 0.245m (rad.: 0.1225m)	dia ISO No tap PCD bolt pilot dia.	125mm F10 102 4-M10 70mm
56.0 548.8	13 127.4	50 58	≤33.4rpm (η=0.35) ratio：40:1 62.4：1(option) ≥44.5rpm (η=0.4) ratio：13.3:1 20.8:1(option) 29.1:1(option) dia.: 0.245m (rad.: 0.1225m) (0.355m option)	dia ISO No tap PCD bolt pilot dia.	175mm F14 140 4-M16 100mm
86.0 842.8	16 156.8	60 72	≤33.4rpm (η=0.35) ratio：45.9:1 72.3：1(option) ≤44.5rpm (η=0.4) ratio：15.3:1 24.1:1(option) dia.:0.355m (rad.: 0.1775m) (0.45m option)	dia ISO No tap PCD bolt pilot dia.	210mm F16 165 4-M20 130mm
184.0 1803.2	27 264.6	80 95	≤33.4rpm (η=0.35) ratio：71.1:1 73.9:1(option) 142.2:1(option) ≥44.5rpm (η=0.4) ratio：23.7:1 24.6:1(option) 71.1:1(option) dia.:0.45m (rad.: 0.225m) (0.55m option)	dia ISO No tap PCD bolt pilot dia.	300mm F25 254 8-M16 200mm

Customer Service / Dimension

Parts flush of Stock

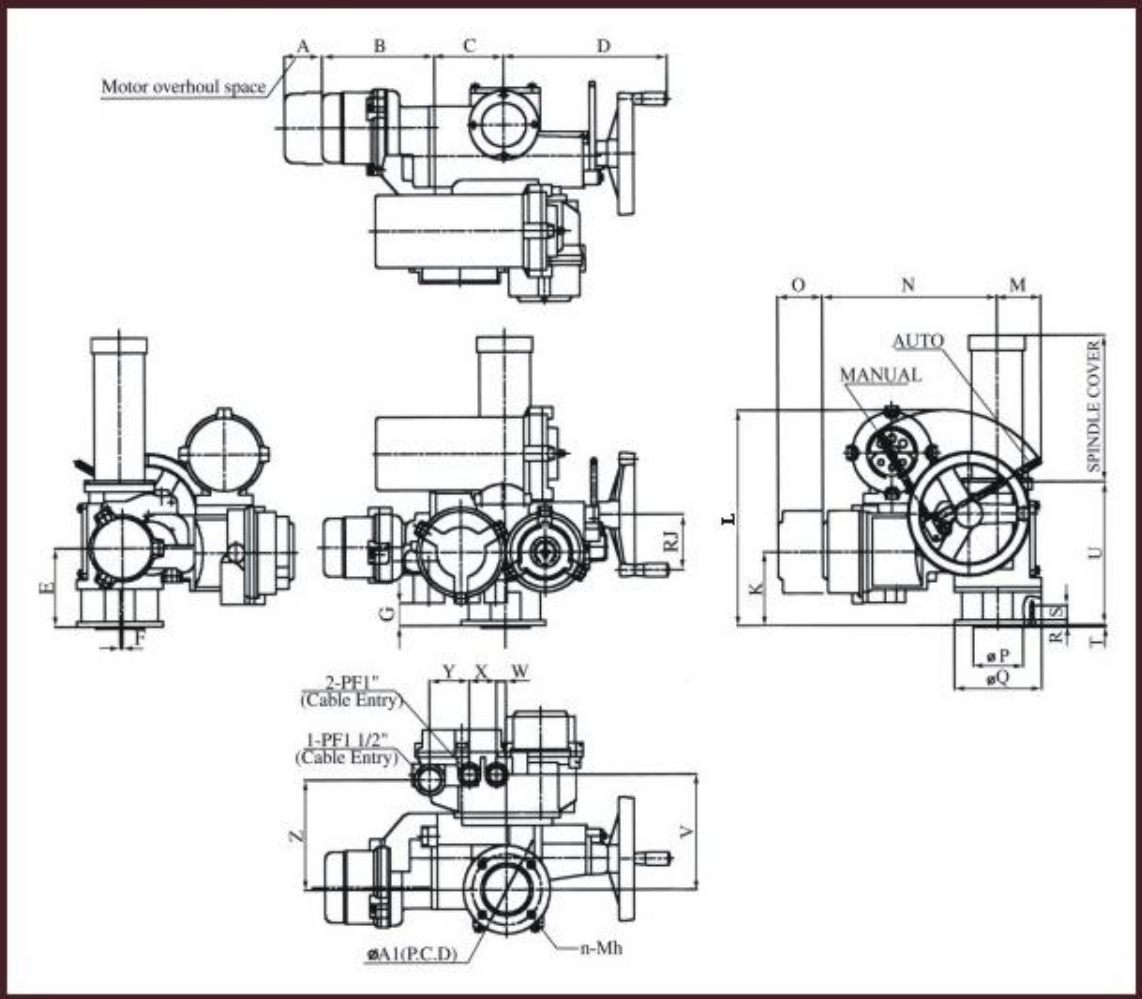
SIZING The performance of motor operated valve (MOV), water gate and damper depends on the proper sizing of actuator in terms of speed and torque. Also, economy is another must for proper sizing. We are ready to help customers with torque/thrust calculation, method of mounting, selection of optionals, etc. for proper sizing.

SPARES SUPPLY shall be performed, as an individual part and/or as modules, in speedy manner.
Domestic area : in 3 days
Other area : in 3 days (shipment) after order

MOV SUPPLY Basically, we supply actuators to customers. But, when customer requires, we may supply valves, dampers and water gates with our actuators under our quality guarantee

RETROFIT/ATTACHMENT SUPPLY In case of retrofit or site installation of actuators, customers often need to have various kinds of actuator related attachments - mounting flanges, iron stands, levers, rods, metal fittings, etc. We are ready to help, from design stage to supply, customers acquire the attachements properly

Dimension



Model	A	B	C	D	E	F	G	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A1	n-Mh	Max.Stem Dia	
																											Bore and key	Threaded
TM-01	40	223	135	270	132	4	19	70	119	358	88	324	90	70	125	10	20	3	235	199	31	55	80	189	102	4-M10	ϕ 34	ϕ 40
TM-04	75	286	140	390	155	5	45	110	145	424	88	352	90	100	175	10	28	4	282	227	20	55	80	217	140	4-M16	ϕ 50	ϕ 58
TM-07	65	322	155	396	185	1	73	157	173	523	125	380	90	130	210	15	30	5	330	255	14	55	80	245	165	4-M20	ϕ 60	ϕ 72
TM-1	65	400	185	453	210	0	75	200	183	492	45	400	90	200	300	15	28	5	345	275	14	55	80	265	254	8-M16	ϕ 80	ϕ 95

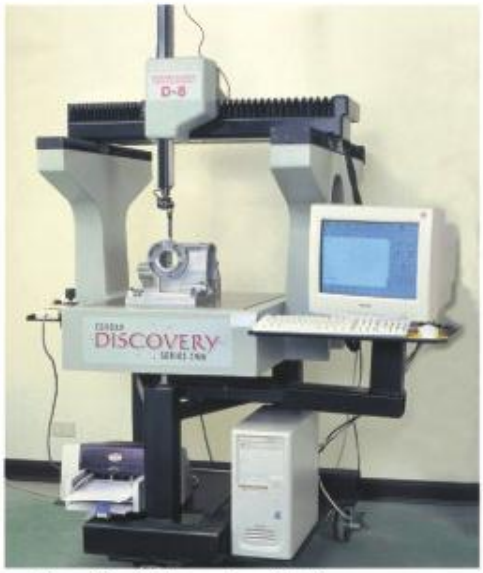
QUALITY CONTROL

All the processes from design through the delivery of actuators,including preinspecting of individual parts or modules, are performed in strict accordance with the Quality Assurance Procedures certified by 2000 years of ISO 9000 and Seibu Electric & Machinery Co., Ltd, technical licensor to Wonder Chance. Every actuator is tested finally before delivery and a test certificate is issued. Designed torque values, sleeve rpm, motor current, voltage, functions of limit and torque switches, hand/auto function are checked at the specially developed test console and recorded on the test certificate.

Design

Assembly & Test

Horizontal Machining Center



Coordinate Measuring Machine

CNC Lathe

Quality Control

OTHER PRODUCTS

SRE-SERIES

quarter turn, 25w-100w

LTKD/MD-SERIES

multi-turn,0.2-37kw

LTKD-W -SERIES

double spindle, 0.75-22kw

Seibu Wonder

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