Shock Guard TGK Series (Former MYTORQ 630 Series)

Features

A multifunctional product combining a ball-type overload protection device and a pneumatic clutch function.

Pneumatic torque adjustment mechanism

Adjusting the air pressure in the regulator lets you remotely adjust the torque during operation.

High accuracy

Backlash is minimal.

Pneumatic clutch on–off mechanism

Can also be used as an on–off clutch via remote control.

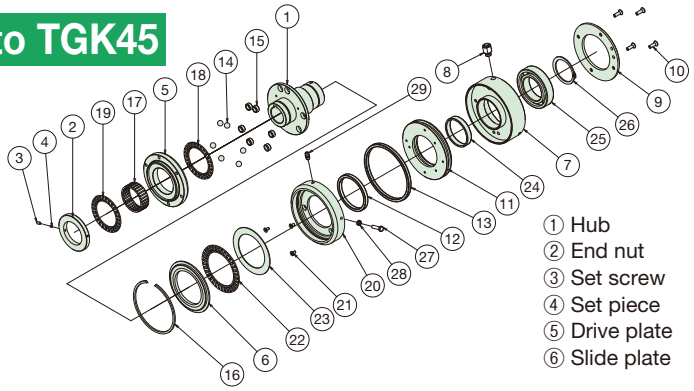
One-position design

The balls and pockets, which transfer the torque, are arranged in a unique way in which they engage in only one position.

TGK	
Type 2	Type A sprockets and pulleys can be directly mounted.
Type 5	The Echt-Flex coupling provides an angular tolerance. Parallelism errors are not allowed.
Type 7	The Echt-Flex coupling provides angular and parallelism tolerances.

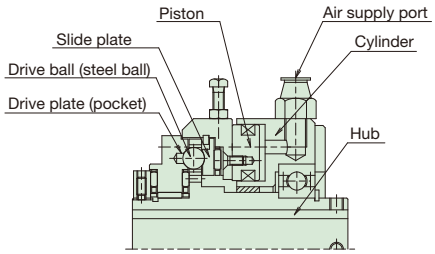
Structure and Operating Principles

TGK20 to TGK45



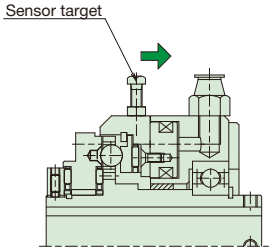
① Hub
② End nut
③ Set screw
④ Set piece
⑤ Drive plate
⑥ Slide plate
⑦ Cylinder
⑧ Pipe joint
⑨ Cylinder cover
⑩ Hex cap countersunk screw
⑪ Piston
⑫ Seal A
⑬ Seal B
⑭ Drive ball (steel ball A)
⑮ Bush
⑯ Snap ring A
⑰ Radial bearing
⑱⑲ Thrust bearing A
⑳ Housing
㉑ Hex cap countersunk screw
㉒ Thrust bearing B
㉓ Thrust race
㉔ Dry bearing
㉕ Ball bearing
㉖ Snap ring B
㉗ Sensor target
㉘ Hex nut
㉙ Grease nipple

During normal operation (engagement)



Torque is transmitted from the hub → drive balls → drive plate on the output side (or vice versa).
Sprockets and timing pulleys are bolted directly to this drive plate.
The hub flange has several holes to hold the drive balls.
There are pockets on the drive plate where the drive balls are pressured by coil springs via the thrust race to transmit the torque.
When air is supplied to the cylinder through the air supply port, the piston moves toward the drive plate. The drive balls are pushed over the slide plate. Thus, the driving force is transmitted.
The torque can be changed according to the load during operation. The torque can also be changed automatically by creating a pressure change system using a timer or controller. By using such a system, it is possible to switch between a low operating torque and a high torque corresponding to the starting torque, so that the torque can be set to the optimum value for the machine.

During overload (tripping)



When an overload occurs, the drive balls push the carriage back against the air pressure toward the cylinder. The balls then pop out of the pockets and begin to idle. At this time, the sensor target moves toward the cylinder. The amount of sensor travel is sensed by a limit switch. By removing the air from the cylinder to eliminate the force on the drive balls, the driving force is completely released, and the machine is protected.

● Clutch mechanism

To disconnect the drive source for adjustment or maintenance of the machine, stop feeding air and remove the air from the cylinder. The housing and slide plate are then pushed back toward the cylinder by the built-in spring. This causes the drive balls to come out of the pockets on the drive plate for disengagement. The drive plate has a bearing inside, so there is no problem even if the drive plate is left idle for a long period.

● Resetting (clutching) procedure

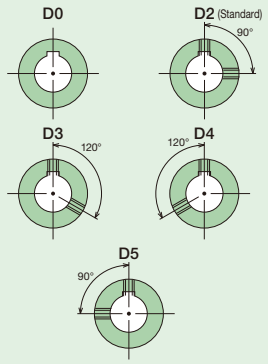
When air is supplied through the air supply port and the operation is restarted, the balls will automatically return to their original positions within a single revolution. In the event of an overload, if air is still supplied and the TGK Series continues to rotate, it will repeatedly reset. Therefore, it is recommended to use a limit switch or a similar device to detect an overload and stop the air supply.

Model Numbering Example

New model numbering As of April 2, 2018

■ Single-unit type

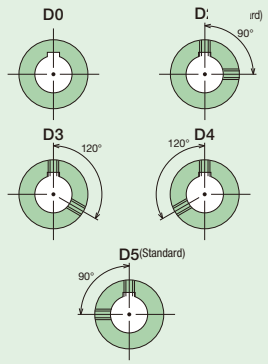
TGK20-A2-TH20JD2

Series	Size	Pneumatic pressure	Type	Shock Guard side	Bore tolerance	Bore dia. (1 mm increments)	Keyway tolerance	Set screw position (seen from adjustment nut side)
TGK	20 30 45	A: Pneumatic pressure	2: Type 2	T	F : F7 G : G7 H : H7	Size Min. to max 20 : 10 to 20 30 : 12 to 30 45 : 22 to 45	J: New JIS Js9 P: New JIS P9 F: Old JIS F7	

Note: TGK Series is not sold with pilot bores.

■ Coupling type

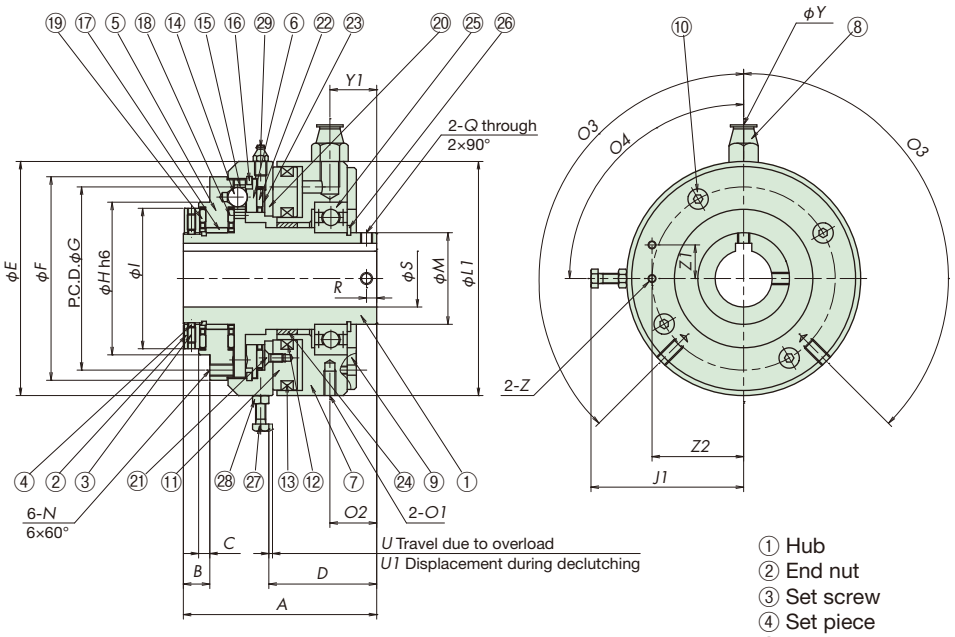
TGK20-A5-TH20JD2XCH30JD2

Series Size Pneumatic pressure	Type	Shock Guard side	Bore tolerance, bore dia., set screw position	Coupling side	Bore tolerance	Bore dia. (1 mm increments)	Keyway tolerance	Set screw position (seen from coupling hub end)
Same as single-unit type	5: Type 5 7: Type 7	T	Same as single-unit type	C	F : F7 G : G7 H : H7	Size Min. to max 20 : 17 to 42 30 : 17 to 60 45 : 27 to 74	J: New JIS Js9 P: New JIS P9 F: Old JIS F7	

Transmission Capacity and Dimensions

■ TGK20-A2 / TGK30-A2 / TGK45-A2

Type 2



① Hub
② End nut
③ Set screw
④ Set piece
⑤ Drive plate
⑥ Slide plate
⑦ Cylinder
⑧ Pipe joint
⑨ Cylinder cover
⑩ Hex cap countersunk screw
⑪ Piston
⑫ Seal A
⑬ Seal B
⑭ Drive ball (steel ball A)
⑮ Bush
⑯ Snap ring A
⑰ Radial bearing
⑱⑲ Thrust bearing A
⑳ Housing
㉑ Hex cap countersunk screw
㉒ Thrust bearing B
㉓ Thrust race
㉔ Dry bearing
㉕ Ball bearing
㉖ Snap ring B
㉗ Sensor target
㉘ Hex nut
㉙ Grease nipple

Unit: mm

Model no.	Torque range N·m	Max. rpm*1	Pneumatic pressure MPa	Shock Guard *S*			*A*	*B*	*C*	*D*	*E*	*F*	*G* P.C.D.	*H* h6	*I*
				Pilot bore dia.	Min. bore dia.	Max. bore dia.									
TGK20-A2	15 to 65	340	0.14 to 0.55	8	10	20	79	11	3.5	45.5	88	80	70	57	51
TGK30-A2	30 to 147	230	0.14 to 0.55	10	12	30	95	13	5.5	53	115	100	90	75	69
TGK45-A2	90 to 392	430	0.14 to 0.55	20	22	45	124	15.5	7	74.4	159	140	125	100	94

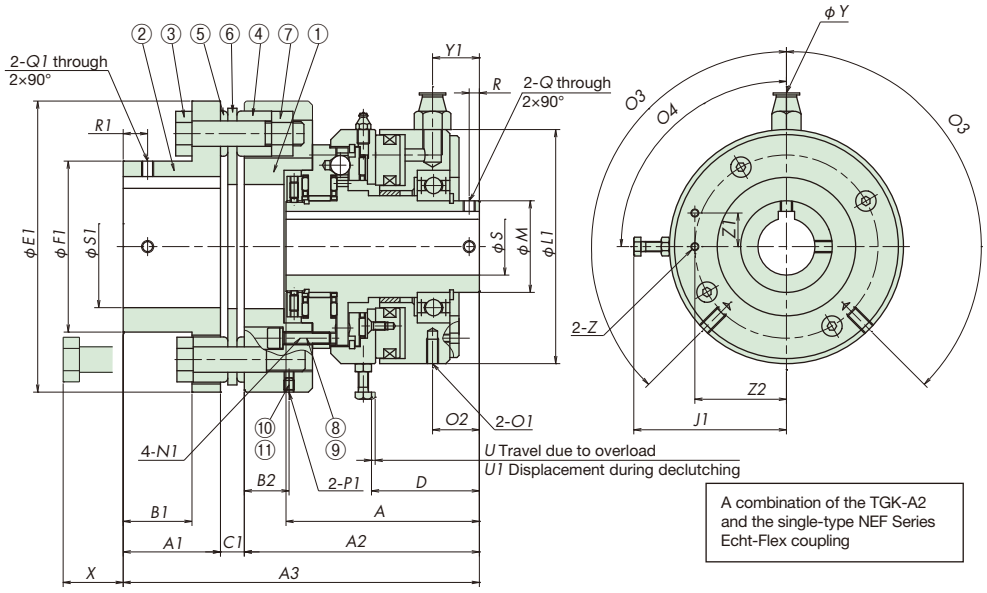
Model no.	*J1*	*L1*	*M*	*N* Screw dia. × depth	*O1* Screw dia. × depth	*O2*	*O3*	*O4*	*Q* Screw dia.*2	*R**2	*U*	*U1*	Air supply port *Y**3	*Y1*
TGK20-A2	61	88	30	M5×9	M5×10	21	135°	90°	M5	5	1.2	1.8	4	21
TGK30-A2	75	115	45	M6×11	M6×12	23	135°	90°	M6	5	1.8	2.0	8	23
TGK45-A2	98	159	60	M8×13	M8×15	34	120°	90°	M8	8	2.2	2.9	8	34

Model no.	*Z*		*Z1*	*Z2*	Mass*4 kg	Moment of inertia*4 kg·m²	Allowable radial load N
	Screw dia. × depth	Counterbore dia. × depth					
TGK20-A2	M4×10	φ5×3.5	15	35	2.3	0.00061	6200
TGK30-A2	M4×10	φ5×4.5	16.5	45	4.6	0.00201	9500
TGK45-A2	M5×10	φ6×5	20	65	11.2	0.00854	12700

*1. Contact a Tsubaki representative for use at speeds higher than the maximum rpm.
*2. Tapped holes for set screws are not processed. Dimensions are for reference only.
*3. Y represents the outer diameter of the applicable tube.
*4. Mass and moment of inertia are based on the maximum bore diameter.
Note: When installing a pulley or sprocket, use high-tensile bolts (G10.9 or higher) and determine the length carefully so that the bolts are not buried deeper than the mounting tapped hole depth *N*.
The air supply port is a pipe joint applicable to both nylon and urethane tubes.
A limit switch installation example is shown on page 74.

Transmission Capacity and Dimensions

■ TGK20-A5 / TGK30-A5 / TGK45-A5 — Type 5



① Mounting adapter
② Coupling hub
③ Reamer bolt
④ Washer A
⑤ Washer B
⑥ Disk
⑦ U nut
⑧ Socket bolt
⑨ Spring washer
⑩ Set screw
⑪ Set piece

Unit: mm

Model no.	Torque range N·m	Max. rpm*1	Pneumatic pressure MPa	Shock Guard *S*			Coupling *S1*			*A*	*A1*	*A2*	*A3*	*B1*	*B2*	*C1*	*D*
				Pilot bore dia.	Min. bore dia.	Max. bore dia.	Pilot bore dia.	Min. bore dia.	Max. bore dia.								
TGK20-A5	15 to 65	340	0.14 to 0.55	8	10	20	15	17	42	79	33.5	88.3	133	24.5	14	11.2	45.5
TGK30-A5	30 to 147	230	0.14 to 0.55	10	12	30	15	17	60	95	47.8	115.5	175	33.8	22	11.7	53
TGK45-A5	90 to 392	430	0.14 to 0.55	20	22	45	25	27	74	124	57.2	137.5	211.5	43.2	17	16.8	74.4

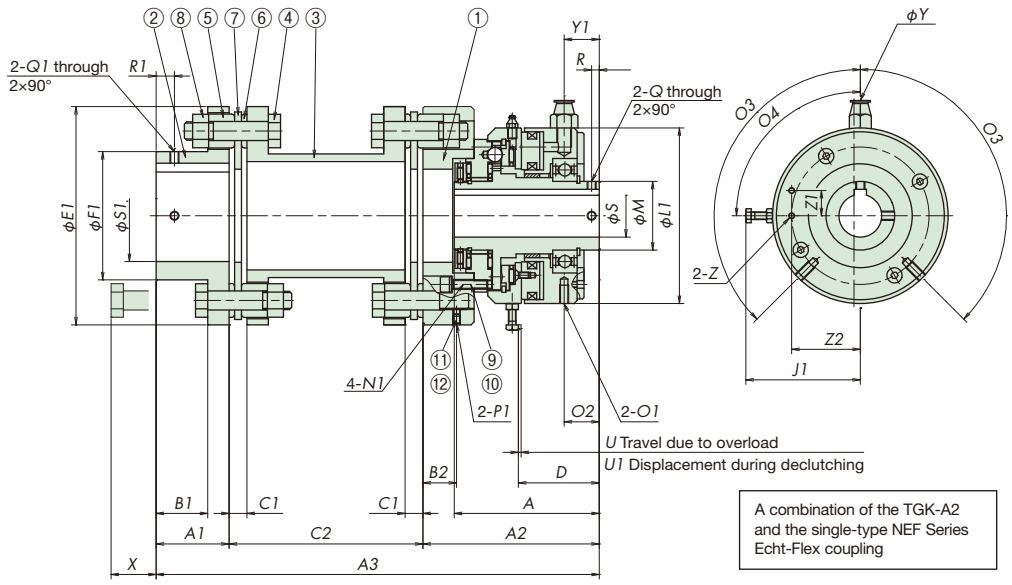
Model no.	*E1*	*F1*	*J1*	*L1*	*M*	*N1* Screw dia. × length	*O1* Screw dia. × depth	*O2*	*O3*	*O4*	*P1* Screw dia. × length	*Q* Screw dia.*2	*Q1* Screw dia.*2	*R**2	*R1**2	*U*	*U1*	Air supply port *Y**3	*Y1*
TGK20-A5	104	61	61	88	30	M5×20	M5×10	21	135°	90°	M4×6	M5	M5	5	8	1.2	1.8	4	21
TGK30-A5	143	84	75	115	45	M6×25	M6×12	23	135°	90°	M5×6	M6	M6	5	12	1.8	2.0	8	23
TGK45-A5	168	106	98	159	60	M8×25	M8×15	34	120°	90°	M5×6	M8	M8	8	15	2.2	2.9	8	34

Model no.	*Z*		*Z1*	*Z2*	Mass*4 kg	Moment of inertia*4 kg·m²	Coupling model no.	*X**5	Allowable misalignment*6	
	Screw dia. × depth	Counterbore dia. × depth							Angular (deg.)	Axial
TGK20-A5	M4×10	φ5×3.5	15	35	4.0	0.00282	NEF25S	21	1	±1.4
TGK30-A5	M4×10	φ5×4.5	16.5	45	9.4	0.0144	NEF80S	29.5	1	±1.8
TGK45-A5	M5×10	φ6×5	20	65	17.8	0.0323	NEF130S	20	1	±2.5

*1. Contact a Tsubaki representative for use at speeds higher than the maximum rpm.
*2. Tapped holes for set screws are not processed. Dimensions are for reference only.
*3. Y represents the outer diameter of the applicable tube.
*4. Mass and moment of inertia are based on the maximum bore diameter.
*5. Space required for the insertion of a reamer bolt.
*6. The allowable misalignment is the value when the other two misalignments are zero.
Note: The air supply port is a pipe joint applicable to both nylon and urethane tubes.
A limit switch installation example is shown on page 74.
Parallelism errors are not allowed.

Transmission Capacity and Dimensions

■ TGK20-A7 / TGK30-A7 / TGK45-A7 — Type 7



A combination of the TGK-A2 and the single-type NEF Series Echt-Flex coupling

① Mounting adapter
② Coupling hub
③ Long spacer
④ Reamer bolt
⑤ Washer A
⑥ Washer B
⑦ Disk
⑧ U nut
⑨ Socket bolt
⑩ Spring washer
⑪ Set screw
⑫ Set piece

Unit: mm

Model no.	Torque range N·m	Max. rpm*1	Pneumatic pressure MPa	Shock Guard S			Coupling S1			A	A1	A2	A3	B1	B2	C1	C2	D
				Pilot bore dia.	Min. bore dia.	Max. bore dia.	Pilot bore dia.	Min. bore dia.	Max. bore dia.									
TGK20-A7	15 to 65	340	0.14 to 0.55	8	10	20	15	17	42	79	33.5	88.3	221.8	24.5	14	11.2	100	45.5
TGK30-A7	30 to 147	230	0.14 to 0.55	10	12	30	15	17	60	95	47.8	115.5	290.3	33.8	22	11.7	127	53
TGK45-A7	90 to 392	430	0.14 to 0.55	20	22	45	25	27	74	124	57.2	137.5	334.7	43.2	17	16.8	140	74.4

Model no.	E1	F1	J1	L1	M	N1 Screw dia. × length	O1 Screw dia. × depth	O2	O3	O4	P1 Screw dia. × length	Q Screw dia.*2	Q1 Screw dia.*2	R*2	R1*2	U	U1	Air supply port Y*3	Y1
TGK20-A7	104	61	61	88	30	M5×20	M5×10	21	135°	90°	M4×6	M5	M5	5	8	1.2	1.8	4	21
TGK30-A7	143	84	75	115	45	M6×25	M6×12	23	135°	90°	M5×6	M6	M6	5	12	1.8	2.0	8	23
TGK45-A7	168	106	98	159	60	M8×25	M8×15	34	120°	90°	M5×6	M8	M8	8	15	2.2	2.9	8	34

Model no.	Z		Z1	Z2	Mass*4 kg	Moment of inertia*4 kg·m²	Coupling model no.	X*5	Allowable misalignment*6		
	Screw dia. × depth	Counterbore dia. × depth							Angular (deg.)	Parallel	Axial
TGK20-A7	M4×10	φ5×3.5	15	35	5.5	0.00503	NEF25W	21	2	1.6	±2.8
TGK30-A7	M4×10	φ5×4.5	16.5	45	13.2	0.0256	NEF80W	29.5	2	2.0	±3.6
TGK45-A7	M5×10	φ6×5	20	65	22.9	0.0537	NEF130W	20	2	2.2	±5.0

*1. Contact a Tsubaki representative for use at speeds higher than the maximum rpm.
*2. Tapped holes for set screws are not processed. Dimensions are for reference only.
*3. Y represents the outer diameter of the applicable tube.
*4. Mass and moment of inertia are based on the maximum bore diameter.
*5. Space required for the insertion of a reamer bolt.
*6. The allowable misalignment is the value when the other two misalignments are zero.
Note: The air supply port is a pipe joint applicable to both nylon and urethane tubes.
A limit switch installation example is shown on page 74.

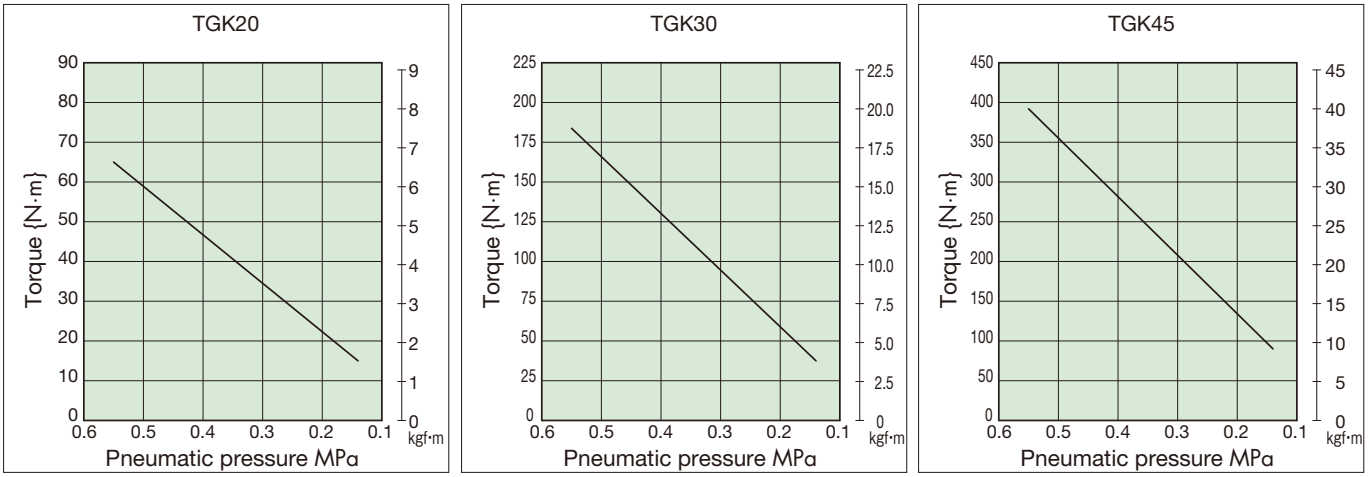
Torque Adjustments

Torque adjustment can be accurately performed by referring to the Torque Correlation Charts and adjusting the pneumatic pressure to the desired torque using the regulator (pressure regulator) to send air to the TGK cylinder. Also, the operating torque can be changed by changing the pneumatic pressure even while the machine is operating.
Operating pneumatic pressure: 0.14 to 0.55 MPa

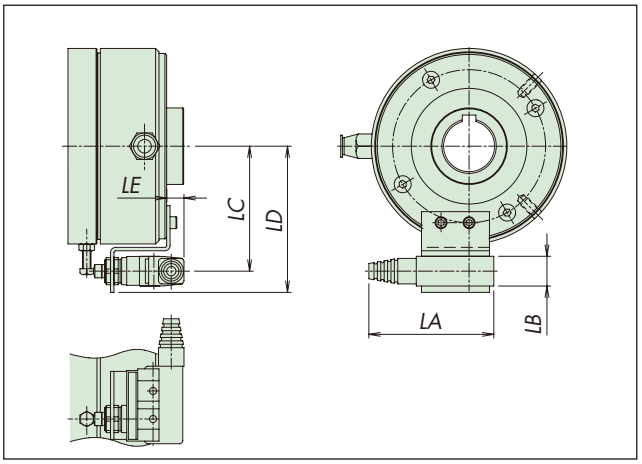
Note: Make sure that the air supply pressure does not drop below the set pressure.

Size	Min. torque N·m	Max. torque N·m
TGK20	15.0	65.0
TGK30	30.0	147
TGK45	90.0	392

Torque Correlation Charts



Limit Switch Installation Example (Optional)

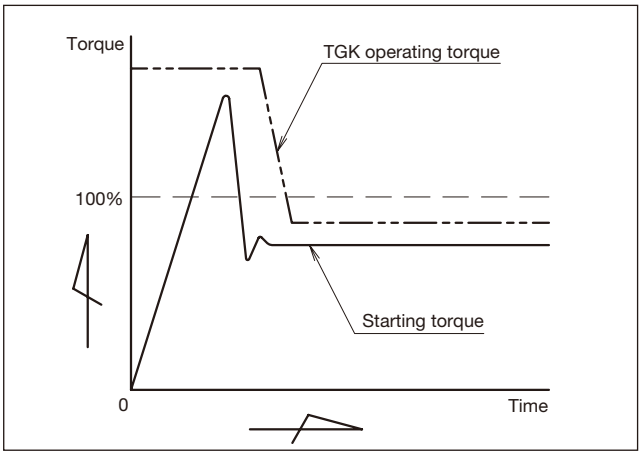


TGK Series with built-in limit switch available upon request.

Size	*LA*	*LB*	*LC*	*LD*	*LE*	Limit switch model no. (Omron)
TGK20	73.5	17.5	59	71.5	16.2	SHL-Q55
TGK30	73.5	17.5	73.5	86	10.2	
TGK45	73.5	17.5	95.5	108.5	–	

Air Control System

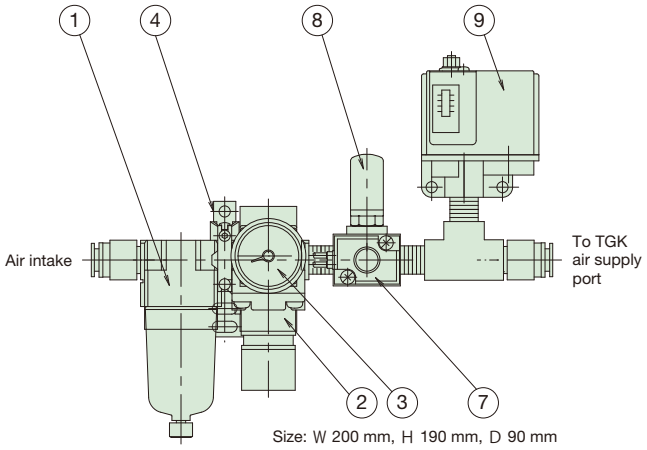
Traditional overload protectors have a fixed operating torque that cannot be adjusted during operation. However, the TGK Series has a unique feature that allows the operating torque to be changed during operation by adjusting the pneumatic pressure. This feature makes it possible to protect the machine by setting the torque higher than the starting torque only at start-up and then adjusting it to the optimum value at a later time. (Refer to the figure on the right.)



Single Air Control System

This system is for simple torque adjustment.
Torque can be adjusted in the range of 0.14 MPa to 0.55 MPa.

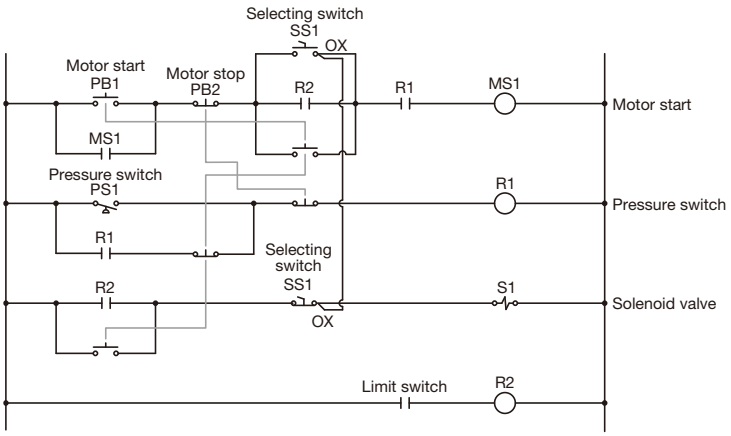
Air device configuration



Part no.	Device name	Reference: Model no. (SMC)
1	Air filter	AF20-02-A
2	Regulator	AR20-02-A
3	Pressure gauge	G36-10-01
4	Spacer with bracket	Y200T-A
5	–	–
6	–	–
7	3-port solenoid valve	VT307-1G1-02
8	Silencer	AN20-02
9	Pressure switch	IS3000-02

Electrical diagram

PB1	Motor start button
PB2	Motor stop button
SS1	Selecting switch
SS2	Pressure switch
S1	Solenoid valve



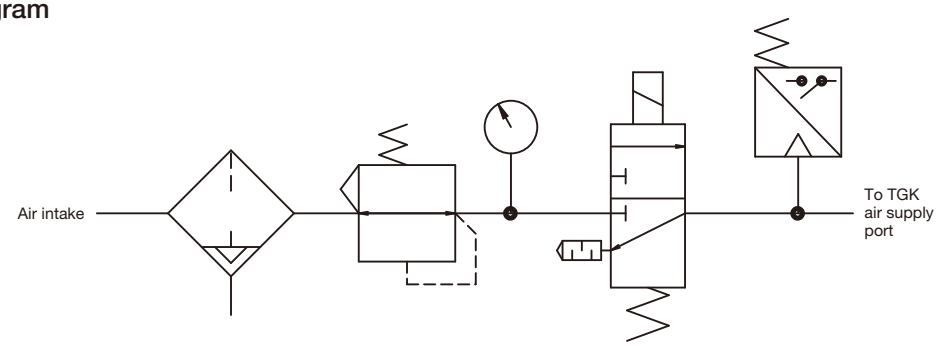
Basic operation

First, make sure the selector switch (SS1) is set to “Air ON” at startup. Press the motor start button (PB1) to start the motor, and the TGK Series will return to the “Clutch ON” state. The limit switch is turned on, motor self-holding is complete, and the motor will continue to rotate even if the motor start button (PB1) is released.

Note: The motor will not start if the motor start button (PB1) is pressed when the pressure switch is off.

The TGK Series sensor target moves at the same time as an overload occurs, and the amount of travel is detected by a limit switch or similar device.
When the limit switch is turned off, the solenoid valve (S1) switches to turn off the self-holding of the motor, and then the motor stops.
In the “Clutch OFF” state, this can be accomplished by turning the selector switch (SS1) to the “Air OFF” position. In the “Air OFF” state, the solenoid valve switches, the air supply to the TGK Series stops, the TGK Series goes to “Clutch OFF,” and the motor continues to rotate without the driving force being transferred to the driven side.

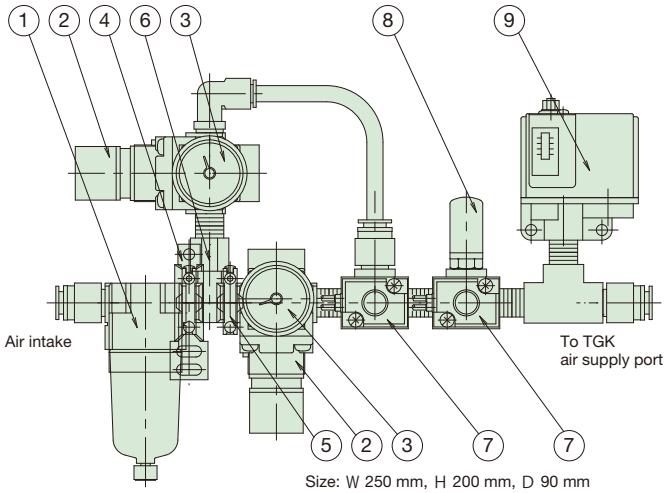
Electrical diagram



Dual Air Control System

This system uses two regulators. At the time of startup, the regulator set to the higher pressure feeds air to the TGK Series. A timer is used to count several seconds (1 to 10 seconds), and then the system switches to the regulator set to the lower pressure in order to set the torque to the optimal value. Such a system enables various automatic torque adjustments during operation.

Air device configuration

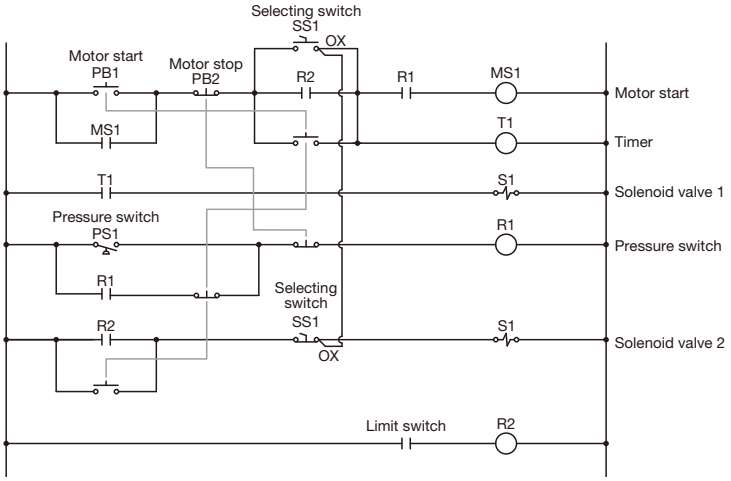


Size: W 250 mm, H 200 mm, D 90 mm

Part no.	Device name	Reference: Model no. (SMC)
1	Air filter	AF20-02-A
2	Regulator	AR20-02-A
3	Pressure gauge	G36-10-01
4	Spacer with bracket	Y200T-A
5	Spacer	Y200-A
6	T-spacer	Y210-02-A
7	3-port solenoid valve	VT307-1G1-02
8	Silencer	AN20-02
9	Pressure switch	IS3000-02

Electrical diagram

PB1	Motor start button
PB2	Motor stop button
SS1	Selecting switch
SS2	Pressure switch
S1	Solenoid valve 1
S2	Solenoid valve 2



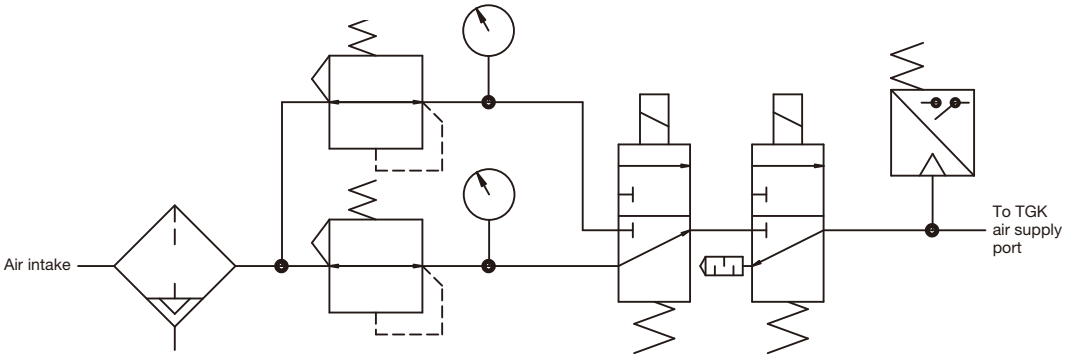
Basic operation

First, make sure the selector switch (SS1) is set to “Air ON” at startup. Press the motor start button (PB1) to start the motor, and the TGK Series will return to the “Clutch ON” state. The limit switch is turned on, motor self-holding is complete, and the motor will continue to rotate even if the motor start button (PB1) is released.

Note: The motor will not start if the motor start button (PB1) is pressed when the pressure switch is off.

The TGK Series sensor target moves at the same time as an overload occurs, and the amount of travel is detected by a limit switch or similar device.
When the limit switch is turned off, the solenoid valve (S1) switches to turn off the self-holding of the motor, and then the motor stops.
In the “Clutch OFF” state, this can be accomplished by turning the selector switch (SS1) to the “Air OFF” position. In the “Air OFF” state, the solenoid valve switches, the air supply to the TGK Series stops, the TGK Series goes to “Clutch OFF,” and the motor continues to rotate without the driving force being transferred to the driven side.

Electrical diagram



Innovation in Motion

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