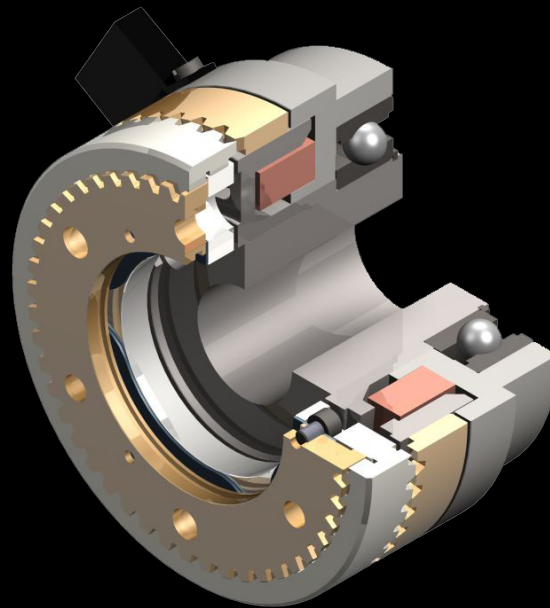


Mönninghoff

Electromagnetic torque limiter Type 546



CHAIN & DRIVES®
COMPLETE BEARINGS
& POWER TRANSMISSION

POWER > SPEED > TORQUE

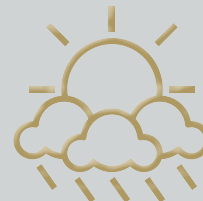
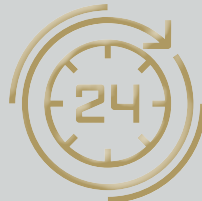
Electromagnetic torque limiter - Type 546

Special features

- the torque can be easily influenced by varying the voltage - an advantage over mechanical clutches
- specially developed overload tooth system
- quickly and reliably disengaging
- microscopic movements under critical conditions and hence wear are ruled out

Characteristics

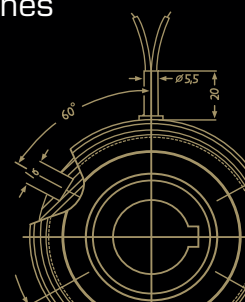
- high torque transfer despite compact dimensions
- with fixed-point
- state monitoring possible
- high range of temperatures
- easy control via direct current
- anti-magnetic toothing for optimized magnetic flux
- uncompromising need for safety and reliability
- integrated, easy-to-assemble system solution



Mönninghoff power transmission represents an infinite variant diversity that is applied by all areas of modern mechanical engineering.

Our technologies are mostly designed to operate under extreme conditions. We offer high precision products for medical robotics, fail-proof security for aerospace technology or synchronization solutions for the packaging or printing industry.

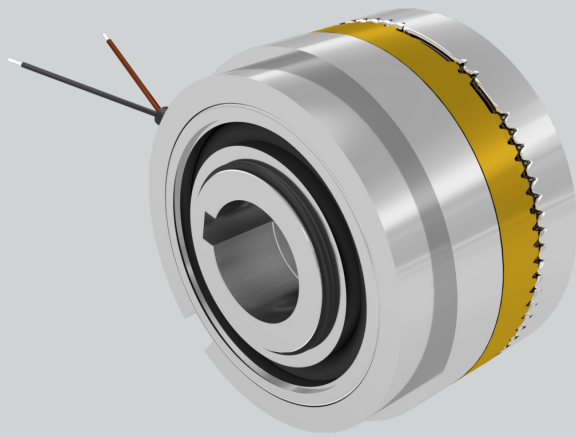
We thus address customers who have the highest standards for their own machines or systems. To them, we can offer highly complex, application-specific solutions.



Electromagnetic torque limiter - Type 546

Match code

Mönninghoff tooth clutches are indicated by the following match code:



546 . A . B . C

- A** clutch size
- B** design of stator
- C** design of armature

Other individual characteristics:

- tothing geometries
- voltage
- bore size with keyway
- overload torque

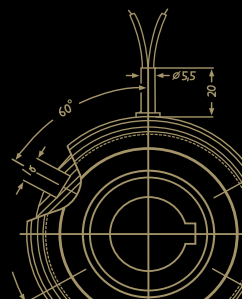
According to these characteristics, we design individual solutions concerning transmitted torque, engaging behavior or rotation speed.

Our engineers can assist with finding an application-specific clutch at any time. Together, we can develop individual and innovative solutions for extreme operating conditions.

Ordering example

Mönninghoff tooth clutch
Type 546.25.4.7

Tothing	overload/single
Voltage	24 Vdc
Bore size d	50 mm H7, keyway acc. to DIN 6885/1
T_K	300 Nm -10%



Electromagnetic torque limiter - Type 546

Clutch size

When dimensioning a Mönninghoff tooth clutch, several technical preconditions should be considered:

- for the selection of the right size, not only the peak load but also the dynamic behavior of the drive have to be taken into account
- tooth clutches - contrary to friction clutches - must never be overloaded and safety factors must be considered
- generally, the selection of the right clutch is based on torque:

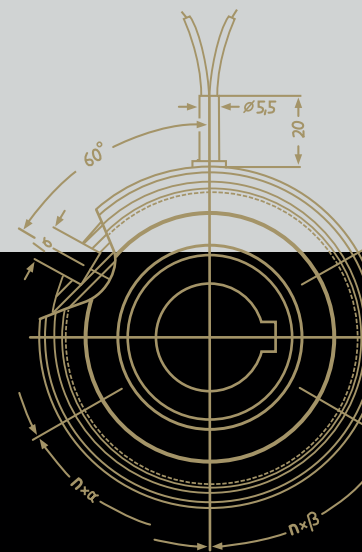
$$M = 9550 \frac{P}{n} \cdot K \text{ [Nm]}$$

$$M = (M_L + M_B) \cdot K \text{ [Nm]}$$

- the transmittable torque of the clutch must always be higher than the largest possible occurring torque:

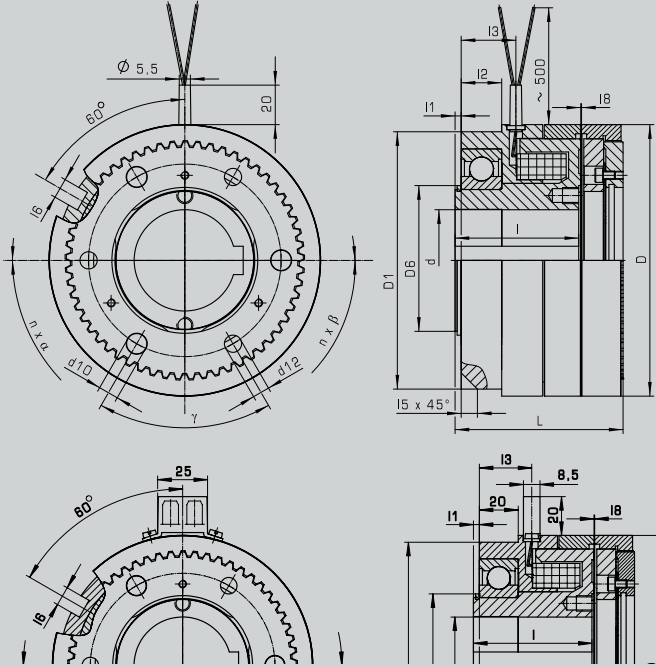
$$\text{Requirement } M_{\ddot{U}} > M$$

- P = power of motor [kW]
 n = rotating speed [min^{-1}]
 K = safety factor 1,5 ... 2,5
 M = required torque
 M_L = load torque
 M_B = acceleration torque
 $M_{\ddot{U}}$ = nominal torque of clutch (see enclosed chart)



Electromagnetic torque limiter - Type 546

Design of stator 3 & 4, bearing mounted



Type 3:
with flying leads

Type 4:
with plug and socket

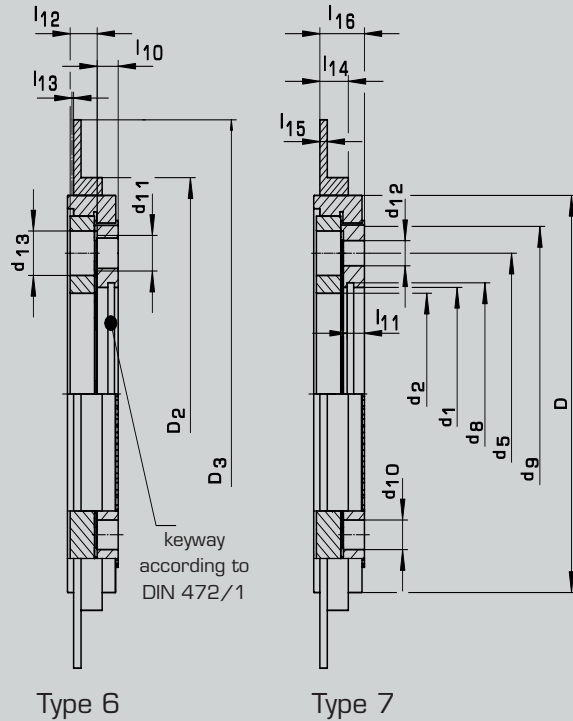
Technical data for bearing mounted types

Size		13	15	21	23	25	31	32
torque	M_0 [Nm]	25	50	100	250	500	1000	2200
max. speed dry running	n [min^{-1}]	1500	1500	1500	1500	1500	1500	1500
max. speed oil running	n [min^{-1}]	3000	3000	2500	2500	2500	2300	2000
input power	P_{20} [W]	19	21	27	36	57	80	114
inertia	rotor	0,15	0,37	0,87	2,06	4,88	11,2	28,7
	armature 6 & 7	0,13	0,62	1,25	3,58	7,33	17,86	45,89
total weight	armature 6 & 7	0,88	1,60	2,62	4,23	7,23	11,67	16,71
min. bore, keyway acc. to DIN 6885/1	d H7	10	10	20	25	30	40	50
max. bore, keyway acc. to DIN 6885/-		17/2	25/2	35/2	42/2	55/2	70/3	85/3
dimensions	D	67	82	95	114	134	166	195
	D_1	58	75	88	105	127	152	175
	d_5	46	60	70	80	95	120	150
	d_6	25	35	45	55	70	85	100
	L	49	55	63	69	83	93,5	110
	$l - 0,1$	39	42	45	50	61	66	80
	l_1	2,5	3,5	3	3	3	3,5	4
	l_2	11	12	14	18	20	22	24
	l_3	16,7	18	20	24	27	31	38,5
	l_5	5	6	6	6	8	10	10
l_6	6	8	10	10	10	12	12	
$l_8 \pm 0,1$		0,3	0,3	0,4	0,4	0,4	0,5	0,5



Electromagnetic torque limiter - Type 546

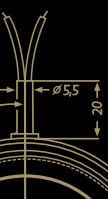
Design of armatures



- Type 6 with three threads and three pin bores for mounting, with additional indicator plate for condition monitoring
- Type 7 with three through holes and three pin bores for mounting, with additional indicator plate for condition monitoring

Technical data for armatures

Size		12	13	15	21	23	25	31	32
dimensions	D [mm]	57	67	82	95	114	134	166	195
	D ₂	—	74	90	107	126	146	178	215
	D ₃	—	90	115	130	165	185	218	250
	d ₁ H7	26	32	42	52	62	72	90	100
	d ₂	22,5	31	36,5	46	55	68	80	95
	d ₅	36	46	60	70	80	95	120	150
	d ₈ DIN 472 page 1	27,2	33,7	44,5	55	65	75	93,5	103,5
locating pin	d ₁₀	—	4,5	4,5	5,5	7,8	9,5	9,5	11,5
	n x β [degree]	—	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°
armature 6	d ₁₁	M 4	M 5	M 6	M 8	M 8	M 12	M 12	M 12
	n x α [degree]	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	6 x 60°	6 x 60°
armature 7	d ₁₂	4,8	4,8	5,8	6,8	6,8	8,5	8,5	10,5
	n x α [degree]	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	6 x 60°	6 x 60°
armature play	d ₁₃	8,5	8,5	10	12	12	15	15	19
	y [degree]	—	60°	60°	60°	60°	60°	30°	30°
l - O, 1	l ₁₀	21,5	24,5	26	27,5	30,5	38	40,5	52
	l ₁₁	3	3,5	4,8	6	6,5	8,4	11,4	11,7
	l ₁₂	2,6	2,7	4,05	5	5,5	7	8,5	9,5
	l ₁₃	4,3	4,8	6,1	8,7	9	11	13,1	14
	l ₁₄	0,75	1,00	1,1	1,3	1,4	1,65	2,1	2,4
	l ₁₅	—	6	8,5	10	10	11,5	11,5	16
armature play	l ₁₆	—	2	2,5	3	3	3	3	6
	l ₁₆	—	7,5	10,8	13,5	14	18	23	23,5

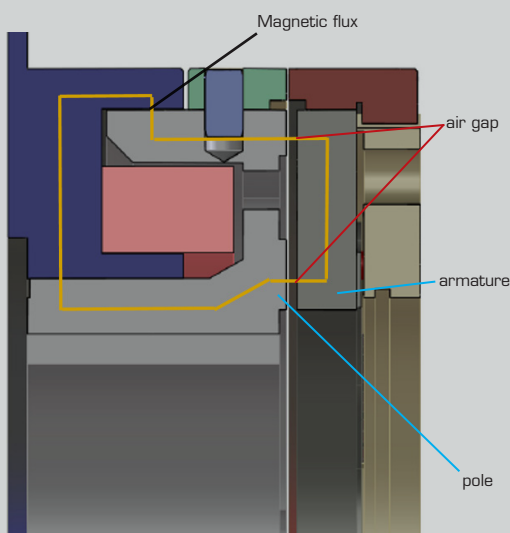


Electromagnetic torque limiter - Type 546

Toothform

An overload tooth system specially developed for this application reduces the influence of friction on the tooth flanks and enable the two halves of the clutch to be pressed apart against the magnetic force

- as the air gap between the pole surface and the armature plate increases, the axial force of the magnet is reduced and allows for a safe switch off when reaching the preset overload torque



Magnetic flux



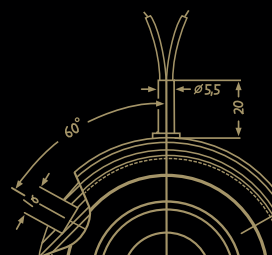
Magnetic force across the size of the air gap

Toothing

Overload toothing with fixed point



- transmits torque in both directions with little backlash
- larger flank angle
- a small tolerance range of the previously set torque is ensured by the fixed point



Electromagnetic torque limiter - Type 546

Current and voltage variation

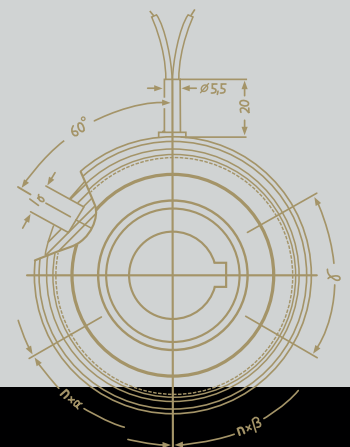
The torque of electromagnetic toothed clutches can be very easily influenced by varying the voltage or current. For example, in this way the torque required when a machine is starting up, which is higher than the level of torque required in the steady state, can be influenced by electrical means - an advantage over mechanical clutches.

Current Control

- + consistent rated torque over the total operation time
- ballast for current control necessary

Voltage control

- + easier
- variation of the rated torque over the total operation time (temperature-dependent)

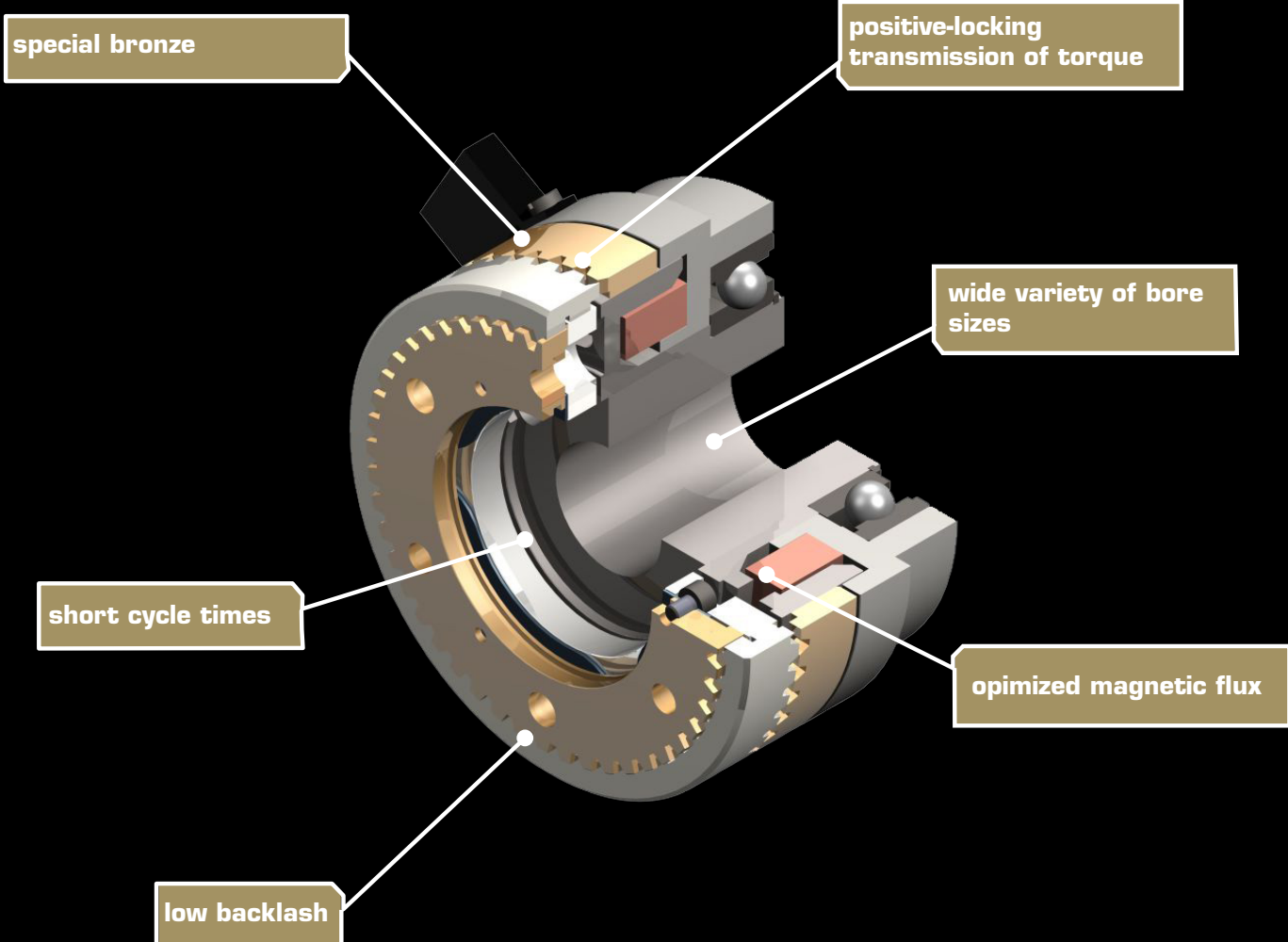


Voltage

- standard voltage is 24 Vdc
- special voltages possible
- operating current
- the permissible voltage tolerance is -10% to +5% according to VDE 0580
- in order to avoid induced voltage peaks, it is advisable to use varistors at unusually high switching frequency

Electromagnetic torque limiter - Type 546

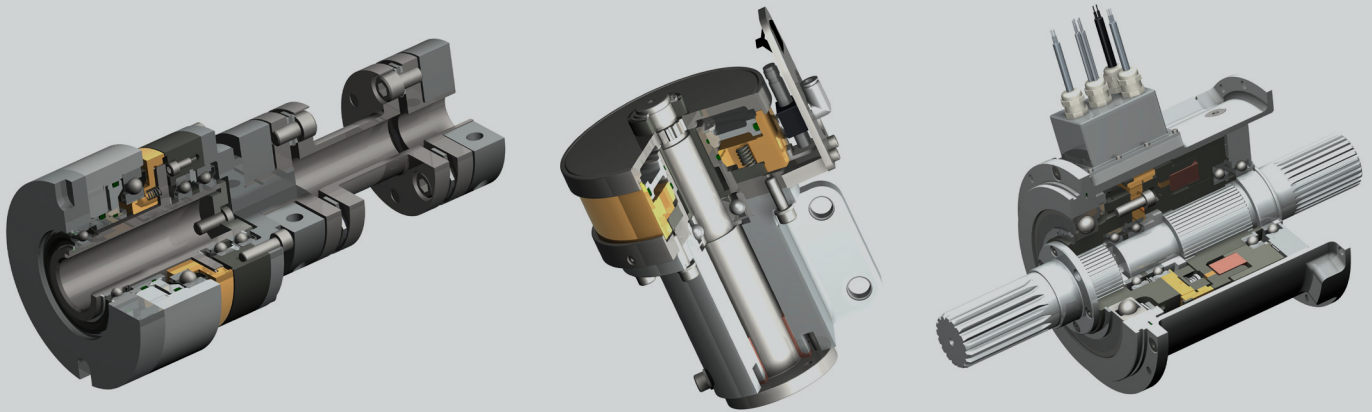
At a glance



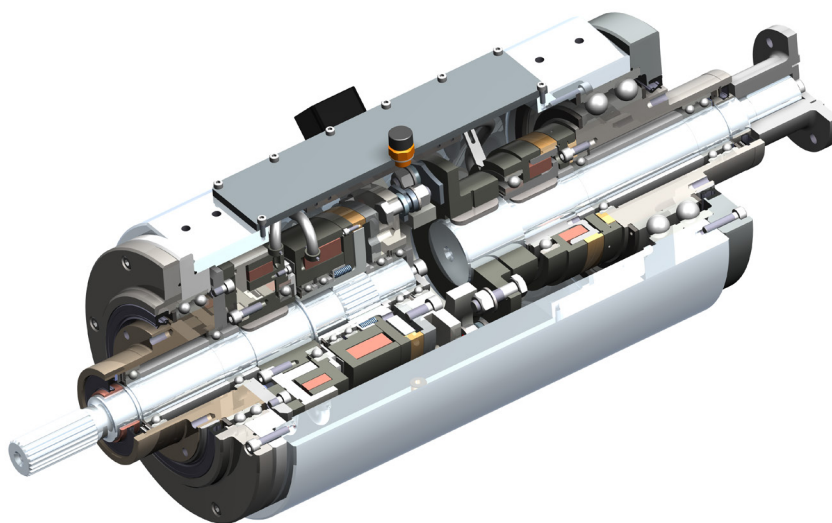
System solutions

You need more?

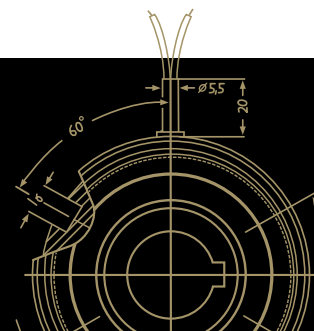
Mönninghoff clutches can be combined with a variety of many other power transmission elements. Such complex high-tech systems can solve any application-specific tasks and can fulfill any customer-specific wishes.



In many cases, a combination of different drive elements is needed to solve the applications particular problems and difficulties. Being not just supplier but technological partner to our customers, our extensive engineering is part of extraordinary and challenging power transmission projects.



**Our product is the know-how,
with hardware as an added bonus.**



Driven by excellence

Why Mönninghoff

- intensive dialog with our customers' engineers
- decades of experience and competence
- deep understanding for all areas of mechanical engineering
- highly modern and flexible machine park
- enthusiasm for quality
- flexibility, inventiveness and communication skills of our employees
- commitment to Germany and Bochum as industrial location



Helps you find a customer-specific power transmission solution for extraordinary circumstances.



For the competent processing and smooth handling of your orders and delivery dates.



Feels committed to protect and preserve the high value of your machine and to secure its availability.

CHAIN & DRIVES®

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