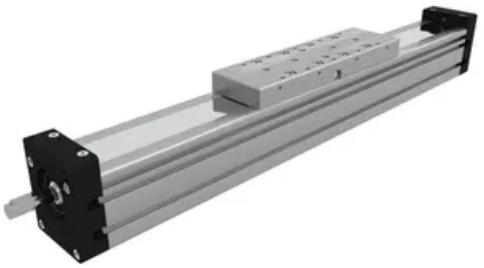
Linear Unit MTV 80

The MTV series describes linear units with precision ball screw drive, integrated guide rail and compact dimensions. The units use a precision ball screw, with tolerance class ISO7 (ISO5 on request), with reduced backlash of the ball nut. A corrosion-resistant protection strip, protects all the parts in the profile from dust and other contaminants.



To achieve higher speeds at the same stroke of the linear unit, the ball screw support system can be integrated. With this feature vibrations and deflections of the ball screw are reduced, therefore longer strokes are possible. The linear unit with integrated support system can have a higher axial load capacity. Ball screw supports are made of high quality plastic materials with high wear resistance properties. The system enables ball screw support in horizontal or vertical positioning of the linear unit.

A 2LR version of MTV linear unit is available, where two carriages are moving simultaneously in opposite directions. Both right- and left-handed precision ball screws are used, which are rigidly connected. The ball screw support system can also be integrated.

Dimensions in mm.

Modulus of Elasticity: E = 70000 N / mm2
Operating Temperature (°C): 0 ~ +60 For operating temperature out of the presented range, please contact Rollco.
Duty Cycle: 100%
Max. Acceleration (m/s²): 20

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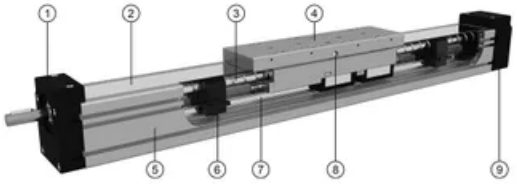
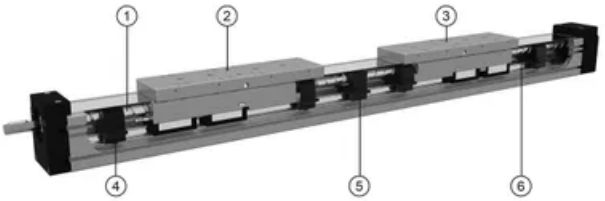


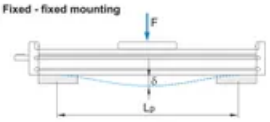
1. Drive block with floating bearing (MTV 110 - fixed bearing)
2. Corrosion-resistant protection strip
3. Ball screw tolerance ISO7 (ISO5 available on request)
4. Carriage with built in magnets
5. Aluminium profile - hard anodized
6. Screw support - SA
7. Integrated linear ball guideway
8. Central lubrication port, both sides
9. End block with fixed bearing (MTV 110 - floating bearing)



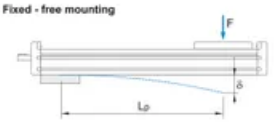
1. Right hand ball screw
2. Carriage with built in right hand ball nut
3. Carriage with built in left hand ball nut
4. Screw support - SA
5. Central screw support - fixed
6. Left hand ball screw

Deflection of the linear unit (standard)

Fixed - fixed mounting



Fixed - free mounting

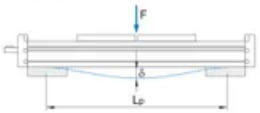


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

Deflection of the 2LR version

Fixed - fixed mounting

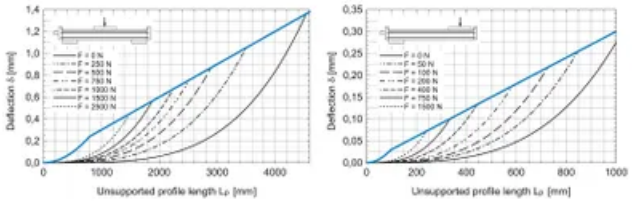


δ Maximum deflection of the linear unit [mm]
δmax Maximum permissible deflection of the linear unit [mm]
F Applied force [N]
Lp Unsupported profile length [mm]

The maximum permissible deflection δmax must not be exceeded. In the case that maximum deflection δ exceeds the maximum permissible deflection δmax additional profile supports are needed.

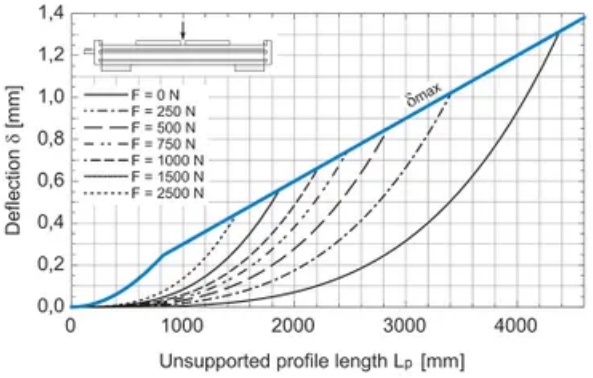
Deflection of the linear unit

MTV 80



Deflection of the 2LR version

MTV 80

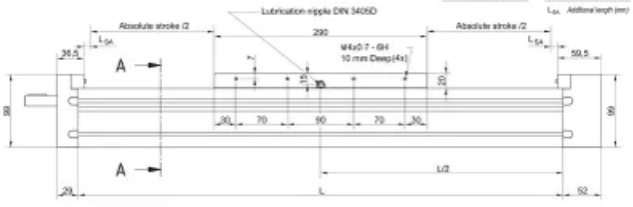


② *The linear units do not include any safetey stroke. Absolut stroke = Effective stroke + 2 x safety stroke.*

n	L_{SA}
0	0
2SA	39,5
4SA	59,5

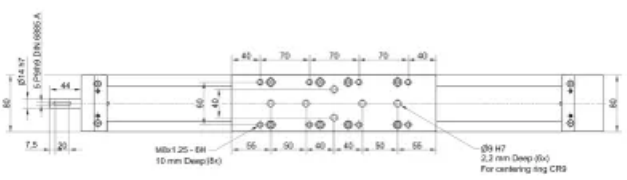
n	L_{SA}
6SA	98,5
8SA	121,5
10SA	152,5

L_{SA} Additional length [mm]



① *Journal with or without keyway.* ② *All dimensions in mm. Drawings scales are not equal.*

② *The linear units do not include any safetey stroke. Absolut stroke = Effective stroke + 2 x safety stroke.*



① *Journal with or without keyway.* ② *All dimensions in mm. Drawings scales are not equal.*

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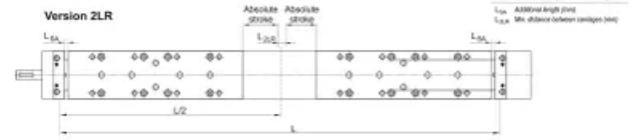
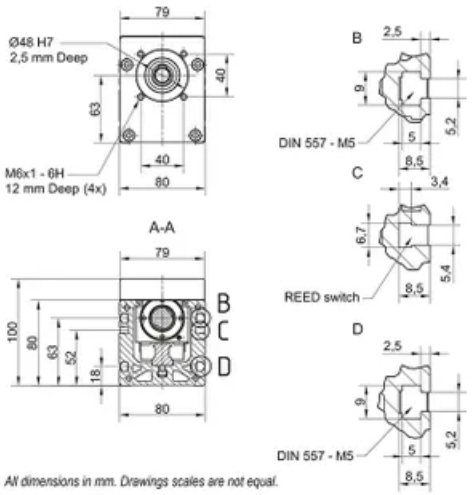
① The linear units do not include any safetey stroke.
Absolut stroke = Effective stroke + 2 x safety stroke.

0	0,0	0,0
2SA	28,5	48,0
4SA	99,5	118,0
6SA	90,5	172,0
8SA	121,5	234,0
10SA	152,0	296,0

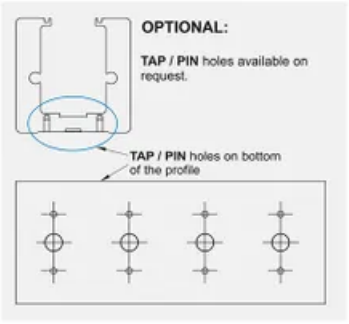
L_{SA} Additional length (mm)
L_{2LR} Min. distance between carriages (mm)



① Journal with or without keyway. ② All dimensions in mm. Drawings scales are not equal.



① All dimensions in mm. Drawings scales are not equal.



Mounting the drive

- by the **MOTOR SIDE DRIVE - MSD**
- by the **MOTOR ADAPTER WITH COUPLING**

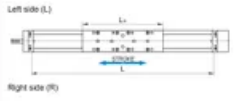
Defining of the linear unit length

Standard version

L = Effective stroke + 2 x Safety stroke + Lv + 2 x Lss + 15 mm

Ltotal = L + 81 mm

Lv = 290 mm

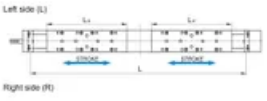


Version 2LR

L = 2 x (Effective stroke + 2 x Safety stroke) + 2 x Lv + 2 x Lss + Lss.s + 15mm

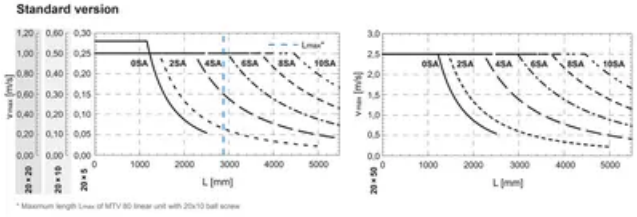
Ltotal = L + 81 mm

Lv = 290 mm



Maximum travel speed as a function of the profile length (vmax - L curves)

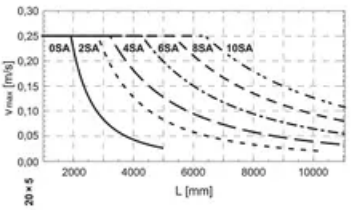
Standard version



* Maximum length Lmax of MTV 80 linear unit with 20x10 ball screw

Maximum travel speed as a function of the profile length (vmax - L curves)

2LR version



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Exceptions for standard version

Linear Unit	Number of SA nSA	Max length Lmax (mm)	Max stroke (mm)
MTV80	0	2500	2183
	2	5010	4648

Stated values in the table apply only for horizontally orientated unit.

Linear Unit	Ball screw (d x l)	Max length Lmax (mm)	Max stroke (mm)
MTV 80	20 X 10	2880	2563

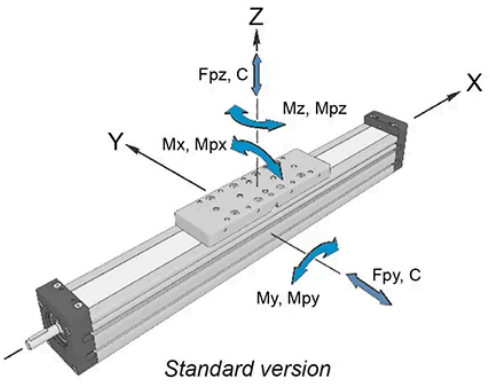
Exceptions for maximum length and stroke!

Exceptions for 2LR version

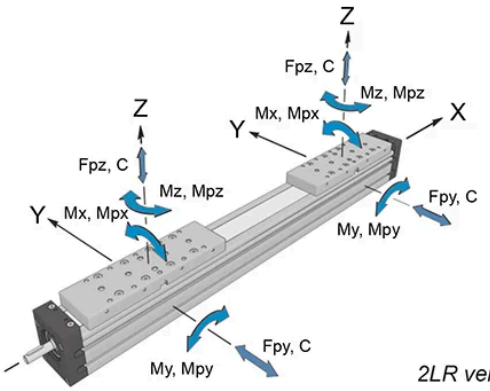
Linear Unit	Number of SA nSA	Max length Lmax (mm)	Max stroke (mm)
MTV80 2LR	0	4973	2183
	2	10200	4750

Exceptions for maximum length and stroke!

General Data



Standard version



2LR version

For lengths/stroke over the stated value please contact us. Values for max. stroke are not valid for screw support SA. For the case of the SA the equation of defining the linear unit length (for particular size of the linear units) needs to be used.

Recommended values of loads

All the data of static and dynamic moments and load capacities are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0).

Designation	Carriage Length Lv (mm)	Dynamic Load Capacity C (N)	Static Load Capacity C0 (N)	Dynamic Moment Mx (Nm)	Dynamic Moment My (Nm)
MTV 80 - 20 x 5	290	34200	60000	370	1470
MTV 80 2LR - 20 x 5	290	34200	60000	370	1470
MTV 80 - 20 x 10	290	34200	60000	370	1470
MTV 80 - 20 x 20	290	34200	60000	370	1470
MTV 80 - 20 x 50	290	34200	60000	370	1470

Designation	Dynamic Moment Mz (Nm)	Max. Permissible Loads Forces Fpy (N)	Max. Permissible Loads Forces Fpz (N)	Max. Permissible Loads Moments Mpy (Nm)	Max. Permissible Loads Moments Mpz (Nm)	Max. Length Lmax (mm)
MTV 80 - 20 x 5	1470	8930	15070	500	384	5480
MTV 80 2LR - 20 x 5	1470	8930	15070	500	384	11055
MTV 80 - 20 x 10	1470	8930	15070	500	384	5480

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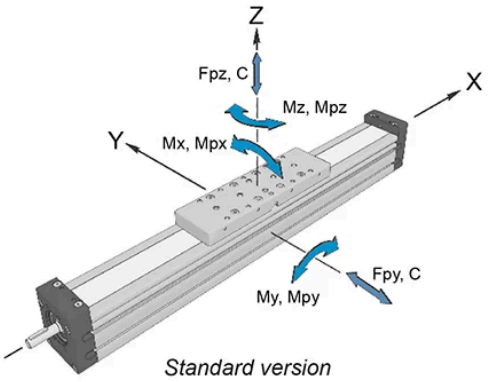
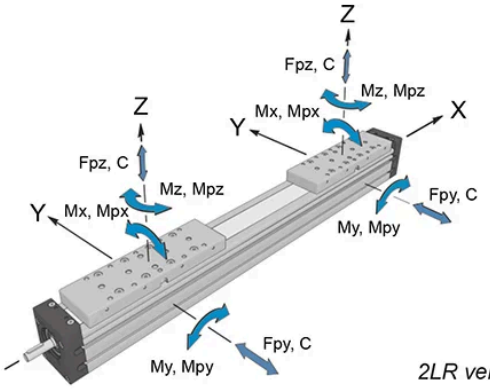
Designation	Dynamic Moment Mz (Nm)	Max. Permissible Loads Forces Fpy (N)	Max. Permissible Loads Forces Fpz (N)	Max. Permissible Loads Moments Mpy (Nm)	Max. Permissible Loads Moments Mpz (Nm)	Max. Length Lmax (mm)
MTV 80 - 20 x 20	1470	8930	15070	500	384	5480
MTV 80 - 20 x 50	1470	8930	15070	500	384	5480

Designation	Max. Stroke (mm)	Min. Stroke (mm)
MTV 80 - 20 x 5	5163	55
MTV 80 2LR - 20 x 5	5224	55
MTV 80 - 20 x 10	5163	55
MTV 80 - 20 x 20	5163	55
MTV 80 - 20 x 50	5163	55

Drive Data



Standard version



2LR version

- With SA or 2LR version the max. rotation speed is limited to 3000 rev/min.
- Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit. For travel speed over the stated value, please contact Rollco.
- For the ball nut with the preload of 2%, please contact Rollco.
- In the case of 2RL version the axial load is total axial load of both carriages.
- For minimum stroke below the stated value, please contact Rollco.

Max. acceleration (m/s2): 20*

For acceleration over the stated value, please contact Rollco.

Reduced effective diameter at journal with keyway decreases values of max. drive torque.

Designation	Max. Rotational Speed (without SA) (rev/min)	Max. Travel Speed (without SA) (m/s)	Lead Constant (mm/rev)	Ball Screw (d x l)	Max. Repeatability Precision Standard ISO7
MTV 80 - 20 x 5	3300	0.28	5	20 × 5	±0.02
MTV 80 2LR - 20 x 5	3300	0.28	5	20 × 5	±0.02
MTV 80 - 20 x 10	3300	0.55	10	20 × 10	±0.02
MTV 80 - 20 x 20	3300	1.10	20	20 × 20	±0.02
MTV 80 - 20 x 50	3000	2.50	50	20 × 50	±0.02

Designation	Max. Repeatability Precision ISO5	Dynamic Load Capacity BS Ca (N)	Max. Axial Load Fx (N)	Max. Drive Torque Ma (Nm)	Planar Moment of Inertia Iy (cm^4)	Planar Moment of Inertia Iz (cm^4)
MTV 80 - 20 x 5	±0.01	14800	14800	11.9 with keyway / 13 without keyway	144.1	192.3

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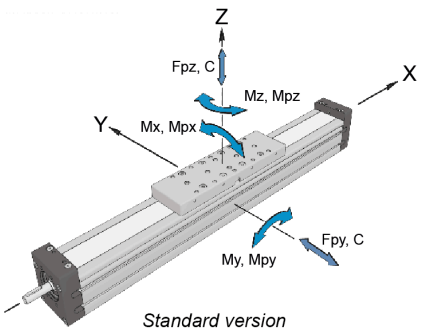
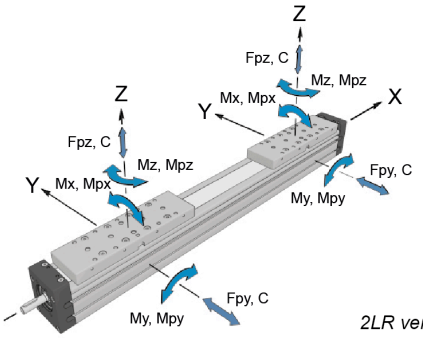
Designation	Max. Repeatability Precision ISO5	Dynamic Load Capacity BS Ca (N)	Max. Axial Load Fx (N)	Max. Drive Torque Ma (Nm)	Planar Moment of Inertia Iy (cm^4)	Planar Moment of Inertia Iz (cm^4)
MTV 80 2LR - 20 x 5	±0.01	14800	14800	11.9 with keyway / 13 without keyway	144.1	192.3
MTV 80 - 20 x 10	±0.01	15900	13850	11.9 with keyway / 24.5 without keyway	144.1	192.3
MTV 80 - 20 x 20	±0.01	16250	6930	11.9 with keyway / 24.5 without keyway	144.1	192.3
MTV 80 - 20 x 50	±0.01	13000	2770	11.9 with keyway / 24.5 without keyway	144.1	192.3

Mass and Mass Moment



Standard version



2LR version

The stated values are for strokes up to 500 mm. No load torque value increases with stroke elongation.

Mass calculation does not include mass of motor, reduction gear, switches and clamps.

Abs. stroke	Absolute stroke [mm]
A	Distance between carriages [mm]
nc	Number of carriages

Designation	Ball Screw (d x l)	Number of SA ^{n}SA	Mass of Linear Unit (kg)	Moved Mass (kg)	Mass Moment of Inertia (10^{-5} kg m^2)
MTV 80 - 20 x 5	20 × 5	0 ; 2 ; (4 ; 6 ; 8 ; 10)	8.2 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 8.9 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 9.7 + 0.4 × (nSA - 4) + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1)	3.00 + 3.00 × (nc - 1) ; 3.07 + 3.00 × (nc - 1) ; 3.21 + 0.035 × (nSA - 4) + 3.00 × (nc - 1)	5.6 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 0.19 × (nc - 1) ; 6.2 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 0.19 × (nc - 1) ; 7.0 + 0.4 × (nSA - 4) + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 0.19 × (nc - 1)
MTV 80 2LR - 20 x 5	20 × 5	0 ; 2 ; (4 ; 6 ; 8 ; 10)	14.6 + 0.0228 × (Abs. Stroke + (nc - 1) × A) + 6.0 × (nc - 1) ; 15.9 + 0.0228 × (Abs. Stroke + (nc - 1) × A) + 6.0 × (nc - 1) ; 17.6 + 0.8 × (nSA - 4) + 0.0228 × (Abs. Stroke + (nc - 1) × A) + 6.0 × (nc - 1)	6.00 + 6.00 × (nc - 1) ; 6.14 + 6.00 × (nc - 1) ; 6.42 + 0.07 × (nSA - 4) + 6.00 × (nc - 1)	9.5 + 0.0254 × (Abs. Stroke + (nc - 1) × A) + 0.38 × (nc - 1) ; 10.7 + 0.0254 × (Abs. Stroke + (nc - 1) × A) + 0.38 × (nc - 1) ; 12.3 + 0.8 × (nSA - 4) + 0.0254 × (Abs. Stroke + (nc - 1) × A) + 0.38 × (nc - 1)
MTV 80 - 20 x 10	20 × 10	0 ; 2 ; (4 ; 6 ; 8 ; 10)	8.2 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 8.9 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 9.7 + 0.4 × (nSA - 4) + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1)	3.00 + 3.00 × (nc - 1) ; 3.07 + 3.00 × (nc - 1) ; 3.21 + 0.035 × (nSA - 4) + 3.00 × (nc - 1)	6.2 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 0.76 × (nc - 1) ; 6.8 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 0.76 × (nc - 1) ; 7.6 + 0.4 × (nSA - 4) + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 0.76 × (nc - 1)
MTV 80 - 20 x 20	20 × 20	0 ; 2 ; (4 ; 6 ; 8 ; 10)	8.2 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 8.9 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 9.7 + 0.4 × (nSA - 4) + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1)	3.00 + 3.00 × (nc - 1) ; 3.07 + 3.00 × (nc - 1) ; 3.21 + 0.035 × (nSA - 4) + 3.00 × (nc - 1)	8.5 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 3.04 × (nc - 1) ; 9.1 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 3.04 × (nc - 1) ; 10.1 + 0.5 × (nSA - 4) + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 3.04 × (nc - 1)

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Designation	Ball Screw (d x l)	Number of SA ^{n}SA	Mass of Linear Unit (kg)	Moved Mass (kg)	Mass Moment of Inertia (10^{-5} kg m^2)
MTV 80 - 20 x 50	20 × 50	0 ; 2 ; (4 ; 6 ; 8 ; 10)	8.2 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 8.9 + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1) ; 9.7 + 0.4 × (nSA - 4) + 0.0114 × (Abs. Stroke + (nc - 1) × A) + 3.0 × (nc - 1)	3.00 + 3.00 × (nc - 1) ; 3.07 + 3.00 × (nc - 1) ; 3.21 + 0.035 × (nSA - 4) + 3.00 × (nc - 1)	24.4 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 19.00 × (nc - 1) ; 25.5 + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 19.00 × (nc - 1) ; 27.1 + 0.6 × (nSA - 4) + 0.0127 × (Abs. Stroke + (nc - 1) × A) + 19.00 × (nc - 1)

Designation	No Load Torque (Nm)	Planar Moment of Inertia ly (cm^4)	Planar Moment of Inertia lz (cm^4)
MTV 80 - 20 x 5	0.23 + 0.23 × (nc - 1) ; 0.26 + 0.23 × (nc - 1) ; 0.31 + 0.015 × (nSA - 4) + 0.23 × (nc - 1)	144.1	192.3
MTV 80 2LR - 20 x 5	0.46 + 0.46 × (nc - 1) ; 0.51 + 0.46 × (nc - 1) ; 0.62 + 0.03 × (nSA - 4) + 0.46 × (nc - 1)	144.1	192.3
MTV 80 - 20 x 10	0.25 + 0.25 × (nc - 1) ; 0.30 + 0.25 × (nc - 1) ; 0.41 + 0.025 × (nSA - 4) + 0.25 × (nc - 1)	144.1	192.3
MTV 80 - 20 x 20	0.30 + 0.30 × (nc - 1) ; 0.41 + 0.30 × (nc - 1) ; 0.62 + 0.055 × (nSA - 4) + 0.30 × (nc - 1)	144.1	192.3
MTV 80 - 20 x 50	0.70 + 0.70 × (nc - 1) ; 0.97 + 0.70 × (nc - 1) ; 1.50 + 0.135 × (nSA - 4) + 0.70 × (nc - 1)	144.1	192.3

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