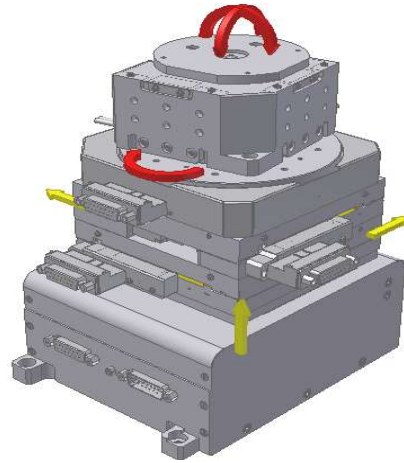
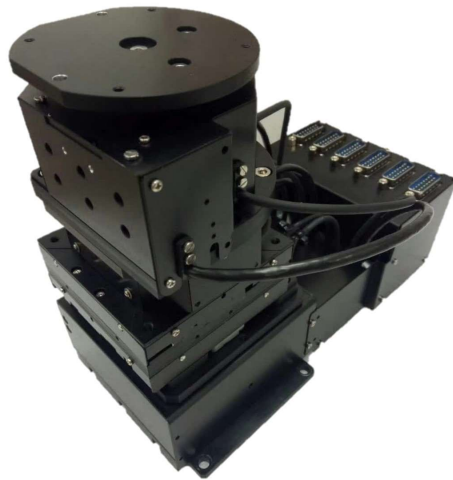




Miniature Nano Precision 6 DOF Positioning Stage



Version: 3.0

Date: 2023. 01. 01



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● Introduction

MT series of miniature nano precision stages provide the complete solution of 6 DOF accurate motion. This series include 4 modules as follows:

- Single axis linear motion stage
- Wedge lift vertical motion stage
- Rotational motion stage
- Common pivot center Pitch-Roll motion stage

Each module has various size for selection. They can be stacked together to form at most 6 degree of freedom motion stage. We also provide tailor made service, for example, modifying the stages for high vacuum application.

● Applications

- Pin insertion for Probe card assembly
- Active alignment (AA) equipment for camera module assembly
- Optical fiber alignment equipment
- Flexible panel bonding equipment
- Inspection equipment for semiconductor
- Biological inspection equipment

And other applications need high accuracy positioning but with very limit space.



● **MTSA Single axis linear motion stage**

- Zero cogging linear motor is employed to achieve zero backlash motion.
- Miniature linear ball bearing is adopted to eliminate the dust-proof and the creepy problem caused by conventional cross roller guide.
- The moderate attractive force of the linear motor can be used to preload the linear guide to achieve minimal stepping of 20 nm and the repeatability of $\pm 0.1 \mu\text{m}$.
- Miniature optical encoder and programmable resolution interpolator is used to ease application.
- Compact stage design makes mounting holes compatible to conventional hand tuning micro stage.

1. Model designation :

MTSA

Model

060

Frame

060
080
120

001

Resolution
001: 0.01 μm
002: 0.02 μm
005: 0.05 μm
010: 0.1 μm
050: 0.5 μm
100: 1 μm

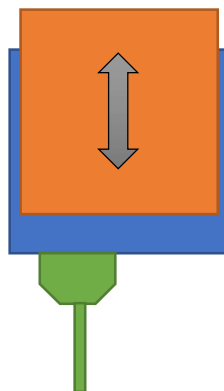
03

Cable length
10: 1000 mm
30: 3000 mm
50: 5000 mm

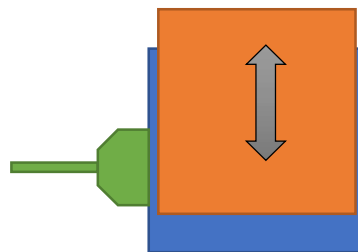
Which means the length of the extension cable length. The stage contains a pig-tail cable of 500 mm.

A

Cable exit direction
A: along moving direction
B: perpendicular to moving direction



Type A exit



Type B exit



2. Specification :

Mechanical parameters	Units	MTSA060	MTSA080	MTSA120
Total stroke	mm	19	19	38
Effective stroke	mm	16	16	36
Straightness	um	<1	<1	<1
Flatness	um	<3	<3	<3
Repeatability	um	±0.1	±0.1	±0.1
Accuracy*	um	<0.5	<0.5	<0.5
Moving mass	g	177	190	640
Total mass	g	275	377	1000
Electrical parameters	單位	MTSA060	MTSA080	MTSA120
Peak force	Nt	8.1	16	30
Conti. force	Nt	2.7	4	10
Peak current	A	0.75	2	3
Conti. current	A	0.25	0.5	1
Force constant	Nt/Apeak	10.8	8.1	10.8
Back EMF	Vpeak (per phase) /m/s	3.6	2.7	3.6
Resistance (line-to-line)	ohm	33	11	8.2
Inductance (line-to-line)	mH	1.3	0.44	0.3
Pole pair length	Mm	9.6	9.6	9.6
Motor voltage	V	24	24	24

3. Pin definition :

Connector of motor/limit
Dsub9 male

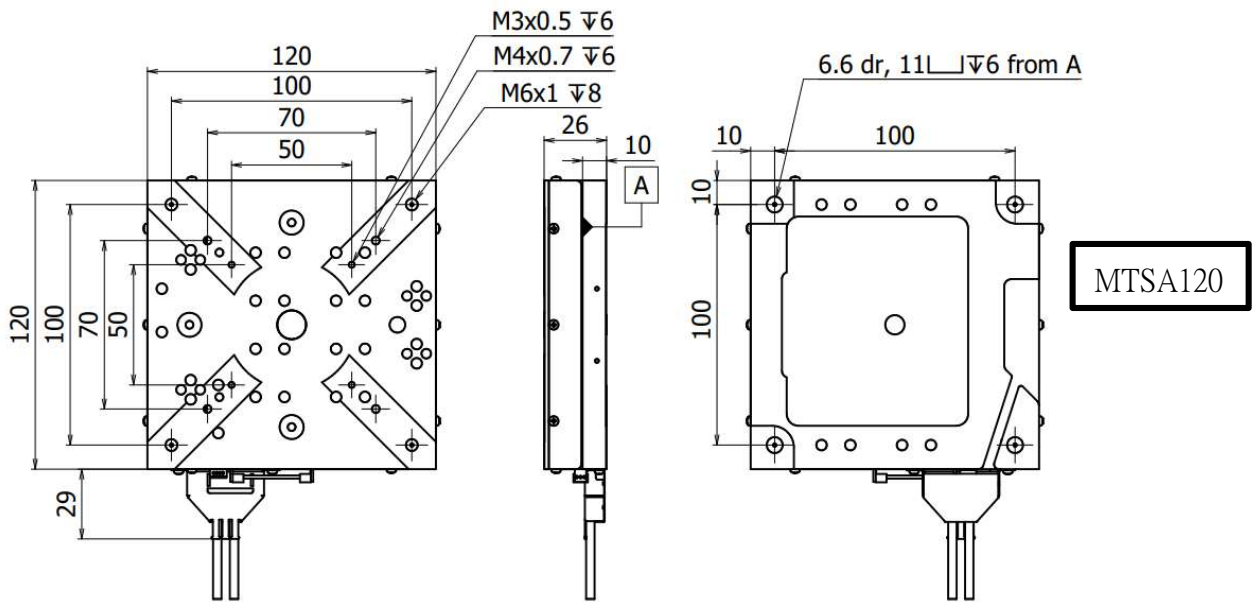
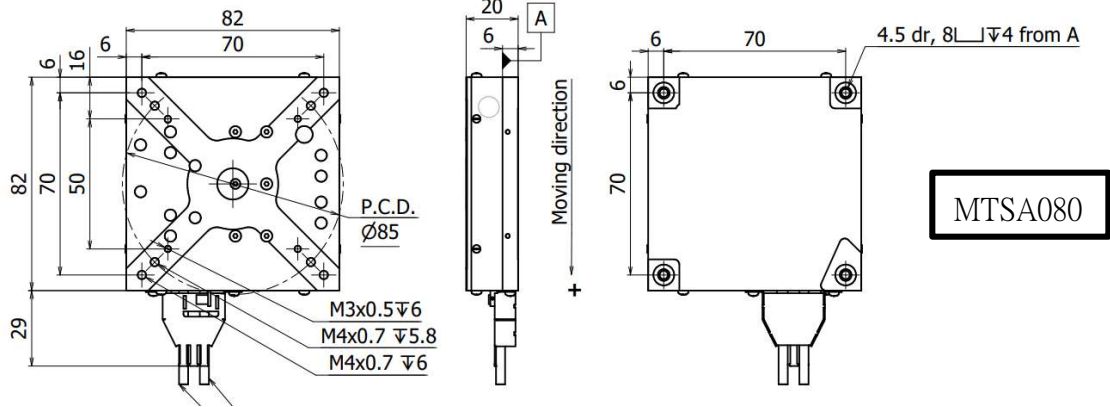
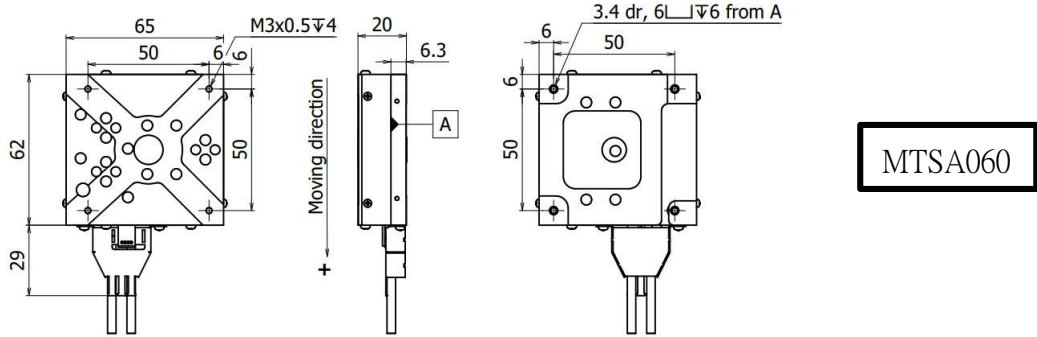
Connector of encoder
Dsub15 male

Motor/Limit switch connector		
Name	Pin	Function
IOA	4	Motor A phase
IOB	5	Motor B phase
IOC	9	Motor C phase
EX24V	1	Limit Power +
EX0V	7	Limit Power -
PL	2	Positive limit
NL	6	Negative limit

Encoder connector					
Name	Pin No	Function	Name	Pin No	Function
5V	7.8	Power+	B+	13	B phase +
0V	2.9	Power-	B-	5	B phase -
A+	14	A phase +	Z+	12	Index +
A-	6	A phase -	Z-	4	Index -
SD	case	Shield			



4. Dimensions :

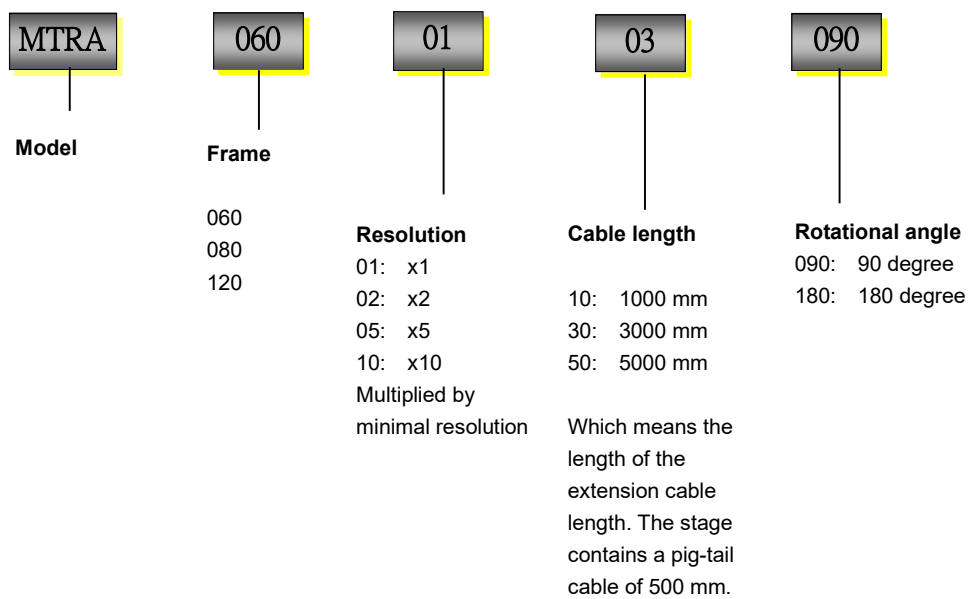




● **MTRA Rotational motion stage**

- Zero cogging rotary motor is employed to achieve zero backlash motion.
- Slim design with special bearing to achieve high rigidity and excellent flatness.
- Finite rotation stroke with the maximal angle of 180 degree.
- Miniature optical encoder and programmable resolution interpolator is used to ease application.

1. Model designation :





2. Specification :

Mechanical parameters	Units	MTRA060	MTRA080	MTRA120
Total stroke	degree	100/190	100/190	100/190
Effective stroke	degree	90/180	90/180	90/180
Resolution	arcsec	0.13307	0.1006	0.0687
Concentricity deviation	um	±2	±2.5	±3.5
Flatness deviation	um	±3	±3.5	±4.5
Repeatability	arcsec	±0.3	±0.3	±0.3
Accuracy	arcsec	<±2.5	<±2	<±2
Rotor inertia	Kg-mm ²	49	181	850
Total mass	g	250	433	920
Electrical parameters	Units	MTRA060	MTRA080	MTRA120
Peak torque	Nt-m	0.45	0.78	1.71
Conti. torque	Nt	0.15	0.26	0.57
Peak current	A	1.5	1.5	1.5
Conti. current	A	0.5	0.5	0.5
Torque constant	Nt-m/Apeak	0.3	0.52	10.8
Back EMF	Vpeak (per phase) /rad/s	0.1	2.7	3.6
Resistance (line-to-line)	ohm	7.1	9.4	14
Inductance (line-to-line)	mH	2.3	5.8	13
Number of poles		12	16	24
Motor voltage	V	24	24	24

3. Pin definition :

Connector of Motor/limit
Dsub9 male

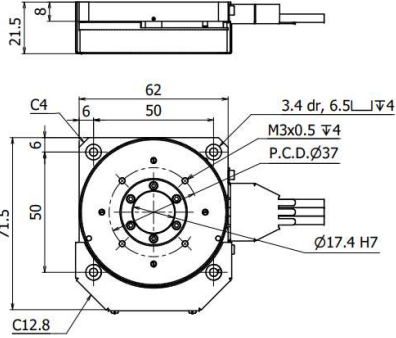
Connector of encoder
Dsub15 male

Motor/Limit switch connector		
Name	Pin	Function
IOA	4	Motor A phase
IOB	5	Motor B phase
IOC	9	Motor C phase
EX24V	1	Limit Power +
EX0V	7	Limit Power -
PL	2	Positive limit
NL	6	Negative limit

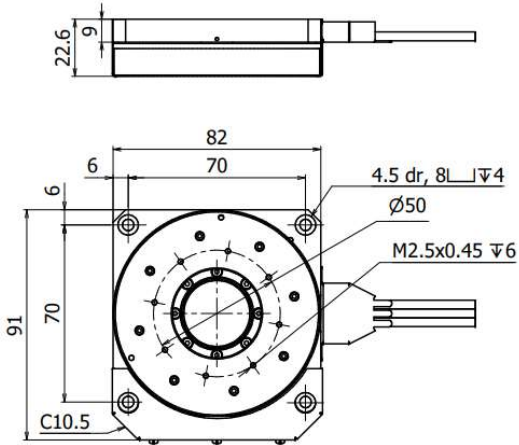
Encoder connector					
Name	Pin No	Function	Name	Pin No	Function
5V	7.8	Power+	B+	13	B phase +
0V	2.9	Power-	B-	5	B phase -
A+	14	A phase +	Z+	12	Index +
A-	6	A phase -	Z-	4	Index -
SD	case	Shield			



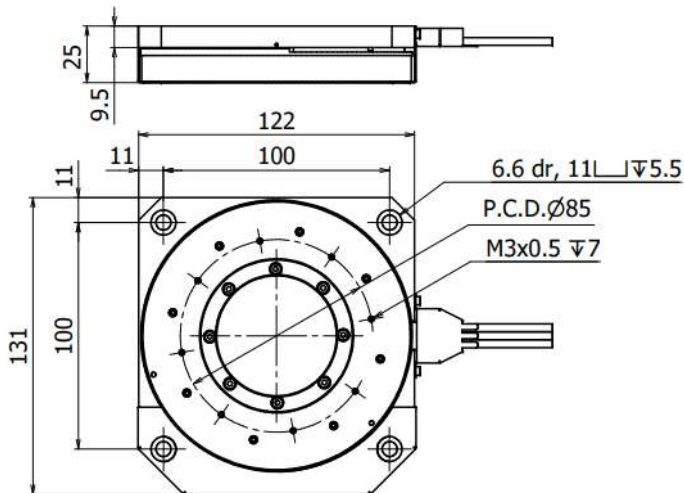
4. Dimensions :



MTRA060



MTRA080



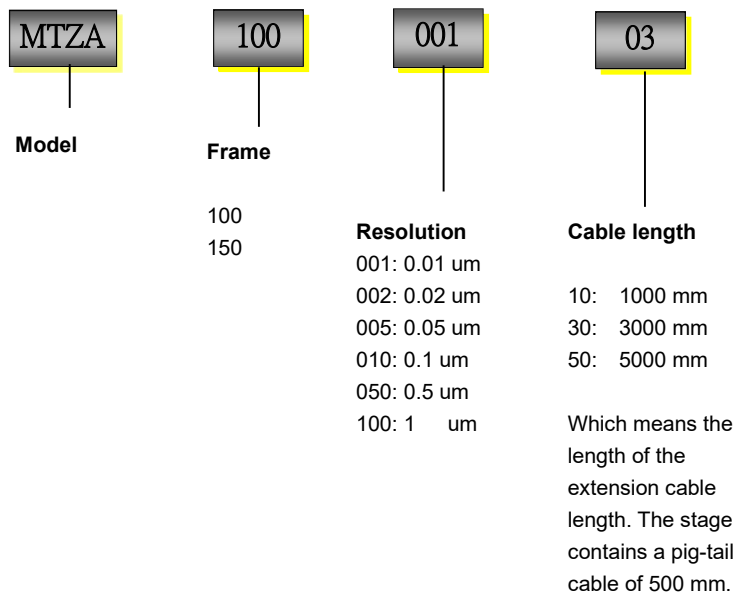
MTRA120



● **MTZA Wedge lift vertical motion stage**

- Wedge structure is used to magnify the lift force so that the center of gravity of payload is not offset from the thrust axis.
- Zero cogging linear motor is employed to achieve zero backlash motion.
- The moderate attractive force of the linear motor can be used to preload the linear guide to achieve minimal stepping of 20 nm and the repeatability of $\pm 0.1 \mu\text{m}$.
- Miniature optical encoder and programmable resolution interpolator is used to ease application.
- Usually used as the base stage to lift other axes above.

1. Model designation :





2. Specification :

Mechanical parameters	Units	MTZA100	MTZA150
Total stroke	mm	4	8
Effective stroke	mm	3	7
Straightness	um	<1	<1
Flatness	um	<3	<3
Repeatability	um	±0.1	±0.1
Accuracy	um	<0.5	<0.5
Moving mass	g	320	646
Total mass	g	958	2500
Electrical parameters	Units	MTZA100	MTZA150
Peak force	Nt	160	288
Conti. force	Nt	40	72
Peak current	A	4	8
Conti. current	A	1	2
Force constant	Nt/Apeak	40	33.7
Back EMF	Vpeak (per phase) /m/s	13.3	11.2
Resistance (line-to-line)	ohm	5.5	2.75
Inductance (line-to-line)	mH	0.22	0.11
Pole pair pitch	mm	1.6	1.6
Motor voltage	V	24	24

3. Pin definition :

Connector of motor/limit
Dsub9 male

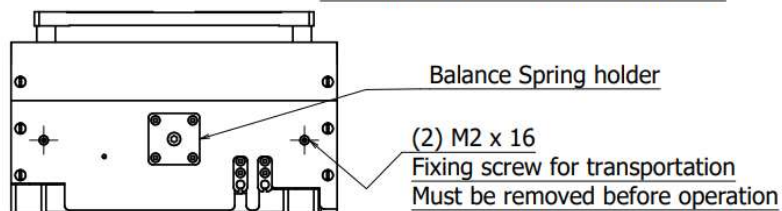
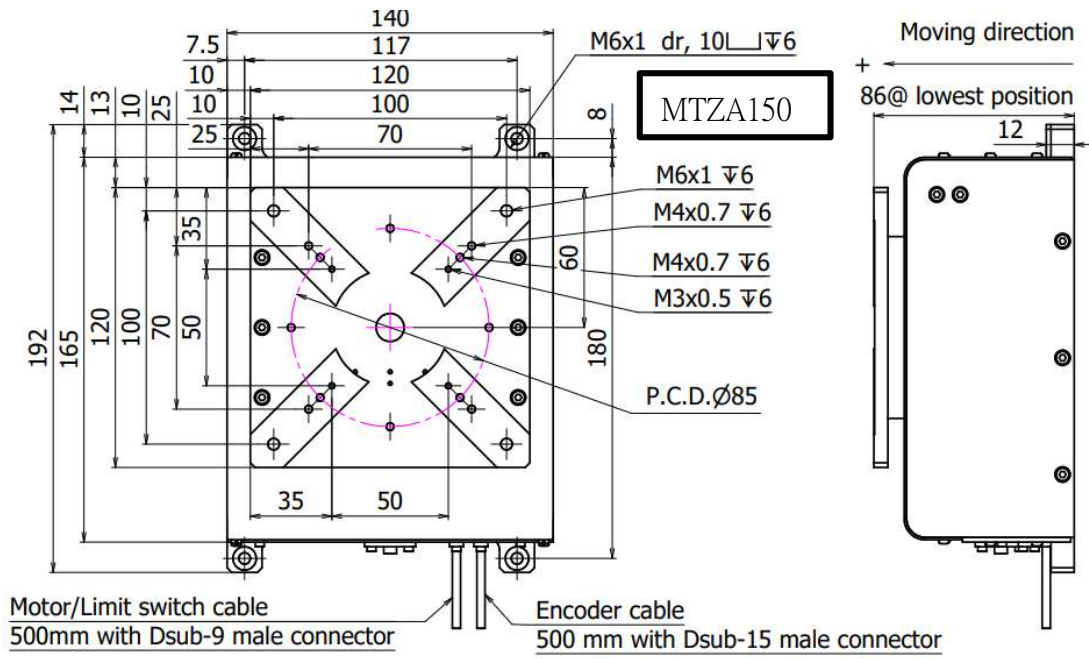
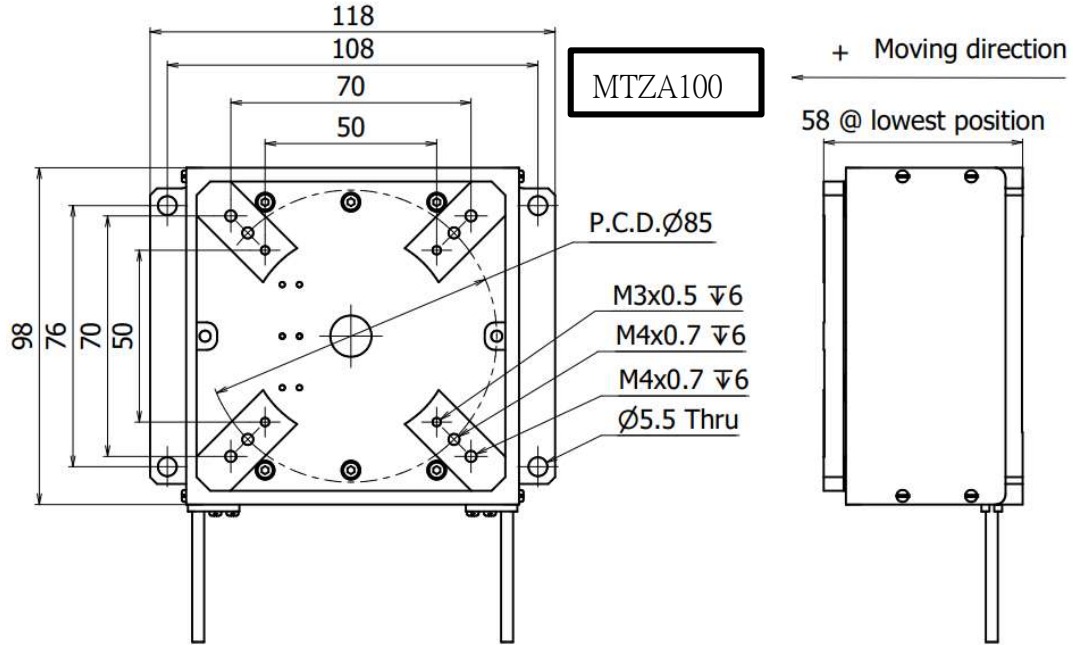
Connector of encoder
Dsub15 male

Motor/Limit switch connector		
Name	Pin	Function
IOA	4	Motor A phase
IOB	5	Motor B phase
IOC	9	Motor C phase
EX24V	1	Limit Power +
EX0V	7	Limit Power -
PL	2	Positive limit
NL	6	Negative limit

Encoder connector					
Name	Pin No	Function	Name	Pin No	Function
5V	7.8	Power+	B+	13	B phase +
0V	2.9	Power-	B-	5	B phase -
A+	14	A phase +	Z+	12	Index +
A-	6	A phase -	Z-	4	Index -
SD	case	Shield			



4. Dimensions :

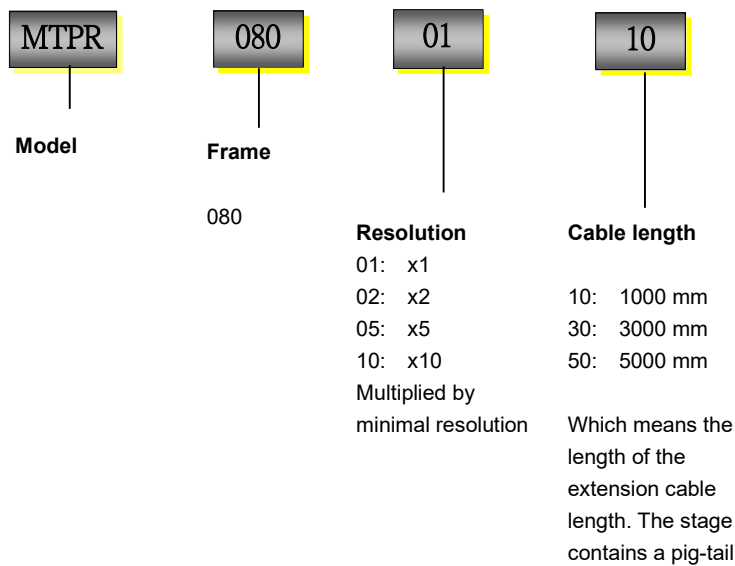




● **MTPR Common pivot center pitch-roll motion stage**

- Common pivot center structure is employed for both pitch and roll axes so that the calibration of motion center is simplified.
- Zero cogging linear motor is employed to achieve zero backlash motion.
- The effective pitch/roll angle is ± 5 degree
- Miniature optical encoder and programable resolution interpolator is used to ease application.

1. Model designation :





2. Specification :

Mechanical parameters	Units	MTPR080
Pitch/Roll total stroke	degree	±7
Pitch/Roll effective stroke	degree	±5
Resolution	arcsec	0.0987
Repeatability	arcsec	±0.3
Accuracy	arcsec	<±2.5
Rotor inertia	Kg-mm ²	26
Total mass	g	640
Electrical parameters	Units	MTPR080
Peak torque	Nt-m	0.52
Conti. torque	Nt	0.13
Peak current	A	2
Conti. current	A	0.5
Torque constant	Nt-m/Apeak	0.26
Back EMF	Vpeak (per phase) /rad/s	0.08
Resistance (line-to-line)	ohm	33
Inductance (line-to-line)	mH	1.3
Pole pair pitch	mm	9.6
Motor voltage	V	24

3. Pin definition :

Connector of motor/limit
Dsub9 male

Connector of encoder
Dsub15 male

Motor/Limit switch connector		
Name	Pin	Function
IOA	4	Motor A phase
IOB	5	Motor B phase
IOC	9	Motor C phase
EX24V	1	Limit Power +
EX0V	7	Limit Power -
PL	2	Positive limit
NL	6	Negative limit

Encoder connector					
Name	Pin No	Function	Name	Pin No	Function
5V	7.8	Power+	B+	13	B phase +
0V	2.9	Power-	B-	5	B phase -
A+	14	A phase +	Z+	12	Index +
A-	6	A phase -	Z-	4	Index -
SD	case	Shield			



4. Dimensions

