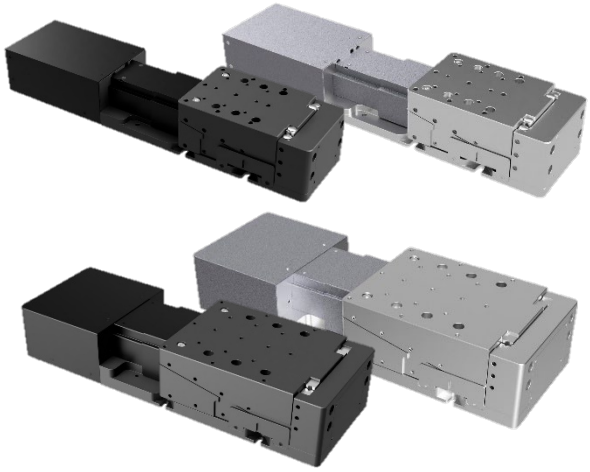
10nm Low-Profile
ZF Axis Feedback Stage NFS-ZFW

A low-profile horizontal surface Z-axis stage with a wedge mechanism as the stage elevation structure. In addition, an optical glass scale is built in to achieve high position reproducibility and high resolution. Scale resolution is 10 nm.

- The overall height of the stage has been reduced to a low profile by using a wedge mechanism moving guide that combines a crossed roller guide (with a slip-stop structure) and ball spline.
- Even when the motor is de-energized, the stage can hold a loaded object as long as the load is within the load capacity value.
- A plugin for the "Autoconfig" function is equipped for user convenience.
- The material can be selected from aluminum or stainless steel. The stage size can be selected from 60x60mm or 100x100mm, and the travel is 5mm for all sizes.



Guide

- Use a controller (SHRC-203) compatible with Feedback Stage (NFS series).

Attention

- When operating, use in an environment with minimal temperature fluctuation. (Recommended: 23±1℃)
- Use the product in an environment with as little vibration as possible. Or use it in an anti-vibration environment.
- Use in an environment free of oil mist. Otherwise, the glass scale may become contaminated and scale errors may occur.
- Contact our Sales if you intend to mount a workpiece larger than the size of the table surface.

10nm Low-Profile ZF Axis Feedback Stage NFS-ZFW Series Lineup List

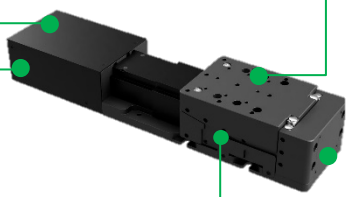
Part Number	Stage Size	Travel	Load Capacity	Travel Mechanism (reduction ratio)	Positioning Slide	Primary material/ Finish	Weight
NFS60-5PAZFW	60x60mm	5mm	58.8N (6.0kgf)	Wedge method (1 : 5)	Crossed roller	Aluminum/ Black anodized	1.5kg
NFS60-5PSZFW	60x60mm	5mm	58.8N (6.0kgf)	Wedge method (1 : 5)	Crossed roller	Stainless steel/ None (Blasting)	2.5kg
NFS100-5PAZFW	100x100mm	5mm	98N (10.0kgf)	Wedge method (1 : 5)	Crossed roller	Aluminum/ Black anodized	3.6kg
NFS100-5PSZFW	100x100mm	5mm	98N (10.0kgf)	Wedge method (1 : 5)	Crossed roller	Stainless steel/ None (Blasting)	7.6kg

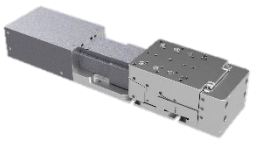
NFS-ZFW Features at Glance

Appearance:
The motor is covered to be compliant with CE.
Design succeeding the OSMS-ZFW series.

Table available in 2 sizes
・60x60mm
・100x100mm

Two main materials to choose from
Aluminum (Finish: Black anodized)
Stainless steel (Finish: Blasting)





Motor: 5-phase stepper motor
Equipped with 5-phase stepping motor
Can be driven by dedicated controller (SHRC-203)
Motor cable and scale cable required

SHRC-203

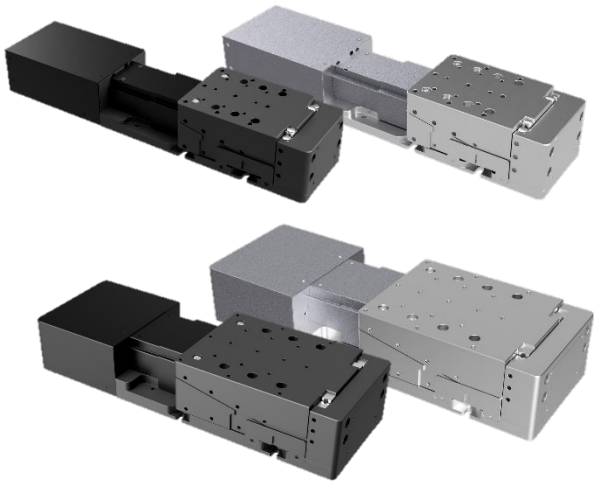
D15H12A-RC-3

DM15HD14A-RC-3

Low profile and Compact Design

Same travel of 5mm as 2 sizes

NFS-ZFW



- The material can be selected from aluminum or stainless steel.
- The stage size can be selected from 60x60mm or 100x100mm, and the travel is 5mm for all sizes.
- Scale resolution is 10 nm.

Part Number	Material	Finish	Weight
NFS60-5PAZFW	Aluminum	Black Anodized	1.5kg
NFS60-5PSZFW	Stainless steel	None (Blasting)	2.5kg
NFS100-5PAZFW	Aluminum	Black Anodized	3.6kg
NFS100-5PSZFW	Stainless steel	None (Blasting)	7.6kg

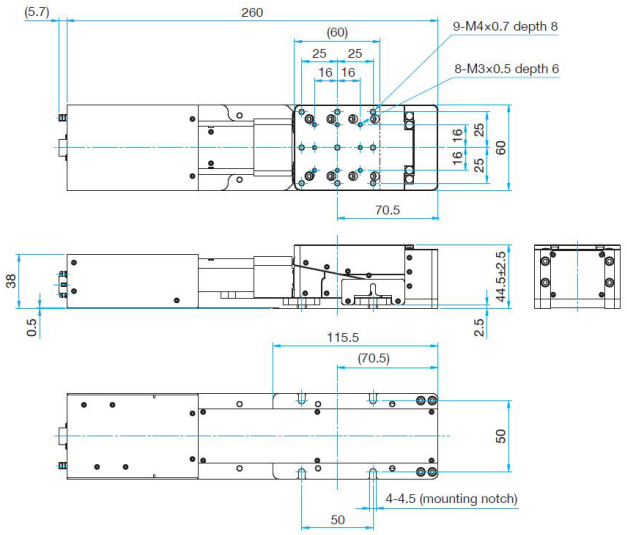
Specifications				
Part Number	Primary material（Aluminum）: NFS**-5P**A**		**NFS60-5PAZFW**	**NFS100-5PAZFW**
	Primary material（Stainless steel）:NFS**-5P**S**		**NFS60-5PSZFW**	**NFS100-5PSZFW**
Mechanical Specifications	Travel [mm]		5	5
	Stage Size [mm]		60x60	100x100
	Feed Screw [mm]		Ball screw diameter ϕ6 Lead 1	Ball screw diameter ϕ6 Lead 1
	Positioning Slide		Crossed roller	Crossed roller
	Travel Mechanism (reduction ratio)		Wedge method (1 : 5)	
	Stage Material		A: Aluminum / S: Stainless steel	
	Finish		A:Black Anodized / S: None (Blasting)	
	Weight [kg]		1.5 / 2.5	3.6 / 7.6
Accuracy Specifications	Resolution*1	Full [μm/pulse]	0.4	0.4
		40 divisions[μm/pulse] *1	0.01	0.01
	MAX Speed [mm/sec]		3	3
	Micro-range Bi-directional Repeatability [nm] *3		±20	±20
	Positional Repeatability [μm] *2		0.2	0.2
	Least Increment Step Test (MIN)) [nm]		30	30
	Load Capacity [N]		58.8 (6.0kgf)	98 (10.0kgf)
	Moment Stiffness	Pitch ["/N・cm]	1.5	0.05
		Yaw ["/N・cm]	1	0.05
		Roll ["/N・cm]	1.5	0.05
	Lost Motion [μm]		1	1
	Parallelism [μm]		50	80
	Perpendicularity of Motion [μm]		15	5
Motor/Sensor Specifications				
Motor	Type		5-phase stepping motor 0.3A/phase	5-phase stepping motor 0.5A/phase
	Motor Part Number		PK525HPB-C4 (□28mm) (Oriental Motor Co., Ltd.)	PK545NBW (□42mm) (Oriental Motor Co., Ltd.)
Encoder	Scale Resolution [nm]		10	
Compatible Cable/Driver/Controller				
Compatible Cable	Driver Cable		D15H12A-RC-3	
	Encoder Cable		DM15HD14A-RC-3	
Control System	Compatible Driver		—	
	Compatible Controller		SHRC-203	

*1 Resolution is automatically set by "AutoConfig" when SHRC controller is connected.
*2 Values when the multi-point error compensation function is enabled.
*3 Micro-range Bi-directional Repeatability is a test to measure repetitive positioning accuracy (ISO) in a micro range.

Outline Drawing

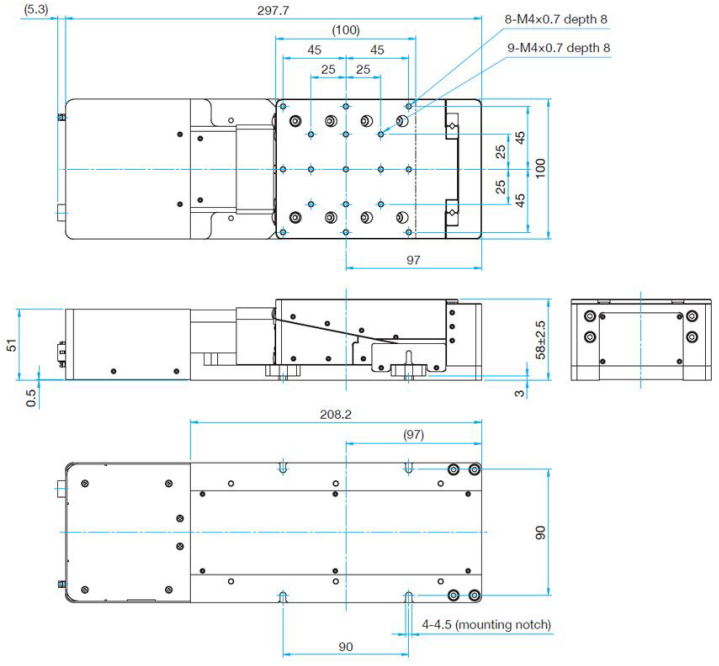
NFS60-5PAZFW/NFS60-5PSZFW

Low head hexagon socket head cap screw M4×6…4 screws



NFS100-5PAZFW/NFS100-5PSZFW

Low head hexagon socket head cap screw M4×8…4 screws



Cable for NFS Feedback Stage

RoHS

Various cables for use with the NFS Feedback Stage are available.
D15H12A-RC-3 is a Motor Cable to connect NFS series and 3 Axis Stage Controller (SHRC-203).
DM15HD14A-RC-3 is a Scale Cable to connect NFS series and 3 Axis Stage Controller (SHRC-203).

Wiring Diagram

D15H12A-RC-3

Controller side(15pin)
Connector：17JE-23150-02(D1)
Hood ：17JE-15H-1A4-CF
(Plug type)
DDK Ltd.

PinNo	Signal Name
1	Motor Blue
2	Motor Red
3	Motor Orange
4	Motor Green
5	Motor Black
6	GND
7	ORG
8	Vs (+24V)
9	ACONF
10	NC
11	LS (+) CW side lim
12	LS (–) CCW side lim
13	GND
14	NEAR
15	+24V
CASE	

1 Blue
1 White
2 Yellow
2 Brown
3 Green
3 Black
4 Red
4 Gray
5 Purple
5 Orange
6 Blue
6 Brown

Stage side(12pin)
Connector：HR10A-10P-12SC(73)
(Socket type)
Hirose Electric Co., Ltd.

PinNo	Signal Name
1	Motor Blue
2	Motor Red
3	Motor Orange
4	Motor Green
5	Motor Black
6	GND
7	ORG
8	Vs (+24V)
9	ACONF
10	LS (+) CW side lim
11	LS (–) CCW side lim
12	NEAR
CASE	

DM15HD14A-RC-3

Controller side(15pin)
Connector：D02-M15PG-N-F0
Hood ：DE-C8-J9-F4-1R
(Plug type)
Japan Aviation Electronics Industry, Ltd.

PinNo	Signal Name
1	GND
2	GND
3	+5V
4	+5V
5	N.C
6	N.C
7	N.C
8	N.C
9	Alarm–
10	A+
11	A–
12	B+
13	B–
14	N.C
15	FG
CASE	

1 Blue
2 Yellow
1 White
2 Brown
3 Green
4 Red
4 Gray
5 Purple
5 Orange
3 Black

Stage side(14pin)
Connector：HDR-E14FSG1+
Hood ：HDR-E14LPHP+
(Socket type)
HTK Ltd.

PinNo	Signal Name
1	GND
2	GND
3	+5V
4	+5V
5	N.C
6	N.C
7	N.C
8	N.C
9	Alarm–
10	A+
11	A–
12	B+
13	B–
14	FG
CASE	

Specifications

Part Number	D15H12A-RC-3	DM15HD14A-RC-3
Product Name	Motor Cable	Scale Cable
Cable Length [m]	3	3

3 Axis Stage Controller SHRC-203

Controller capable of controlling a wide range of high-resolution stages from an open-loop Motorized Stage with 5-phase stepping motor to a 1 nm Feedback Stage.

- Stage controller with built-in driver for 5-phase stepping motors, capable of 3-axis full closed-loop to open-loop control independently for each axis.
- External control via USB/GP-IB/Ethernet interface, manual operation via front panel or handy terminal (JS-301, JB-401, JD-101, MD-400), and automatic control via internal program (8 banks) are available.
- Full closed loop control is available when used with Precision Motorized Stages with Built-in Compact Scale.

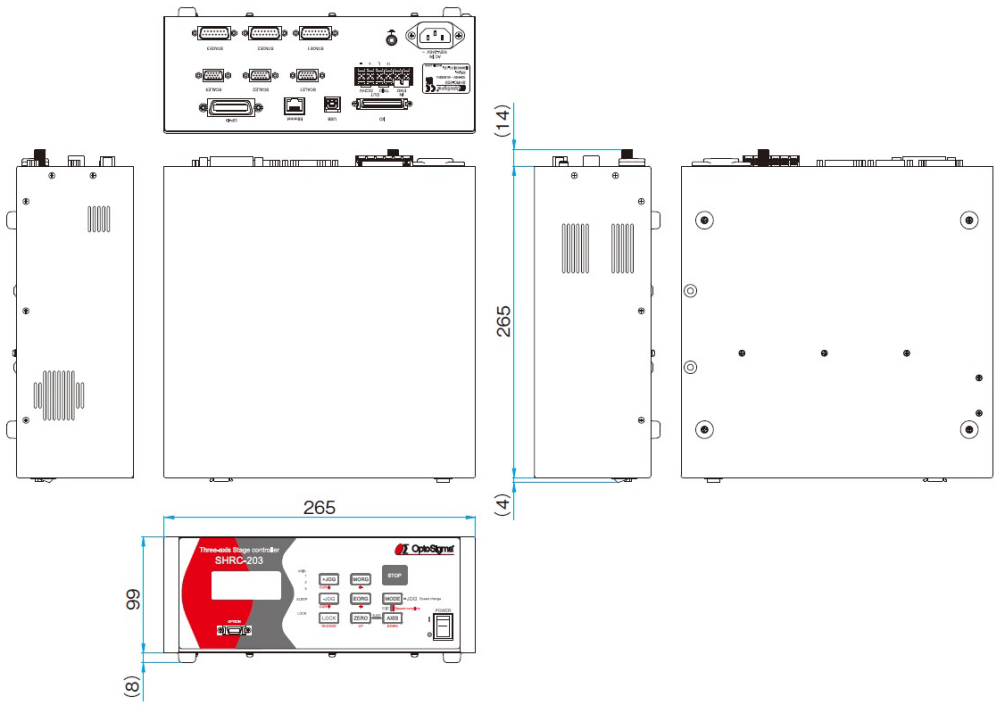
Guide

- Sample programs are available for download on our website.
  - SG Sample 32/64 bit for Windows®

Part Number	**SHRC-203**
Product Name	3 Axis Stage Controller

Outline Drawing

SHRC-203



Specifications	
General Specifications	
Power Voltage	AC100 - 240V±10% 50/60Hz
Power Consumption	2A
Operating Temperature	5 - 40℃
Storage Temperature	-20 - 60℃
Ambient Humidity	20 - 80%RH (without condensation)
Weight	4.6kg
External Dimensions (W×H×D)	265×99×265mm

Performance Specifications	
Coordinate Indication Range	±999,999,999
Max. Travel to Set	-2147483648 - +2147483647 phase
Max. Driving Speed	1,000,000pps
Min. Driving Speed	1pps
Acceleration/Deceleration Time	1 - 1,000ms
Micro-step (Max. Division)	8,000
Driving Current	0.3 - 1.4A/phase

Control Command	
Controller Function	○
Number of Control Axis	3 axis
Stored Program Control	○
Feedback Control	GS
Circular Interpolation Control	○
Linear Interpolation Control	○
Machine Origin Return	○
Theoretical Origin Setting	○
Relative Position Drive	○
Absolute Position Drive	○
Jog Operation	○
Position Appointment	-
Deceleration stop	○
Emergency Stop	○
Speed Setting	○
Driver Function	Micro-step
Motor Free/Hold	○

Interface	
GP-IB	○
RS232C	-
USB	○
Ethernet	○

I/O Specification	
Origin Sensor	○
Proximity Sensor	○
CW (+) Limit	○
CCW(−) Limit	○
General Purpose Input	6 point
General Purpose Output	6 point
Control Input	18 point
Control Output	5 point
Trigger Output	○

Optional	
CJ-200A	-
JS-301	○
JB-401	○
JD-101	○
SJT-02	-
MD-400	○