SFP-560A3C
SFP-560A3C-FA

Process Manual

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Safety Precautions

This manual shows the following symbols for proper and safety operation of SFP-560A3C / FA polishing machine and for prevention of damages to the polishing machine. Below explains meanings of each symbol. Please read and have your understanding and follow the instructions indicated by the markings.

⚠ WARNING	Improper handling with negligence of this precaution may result in death or serious injury.
⚠ CAUTION	Improper handling with negligence of this precaution may result in injury or physical damage.

Examples of Symbols

This symbol refers to any caution (including danger and warning).
Example in the left shows “Warning or Precaution" for safety.

This symbol refers to any prohibition.
Example in the left shows “No disassembly.”

This symbol refers “Unplug the power cable from the outlet.”

WARNING

Never touch or gain access to moving parts, the arm of the fiber holder hand or finger during operation.
Otherwise, you may injure.

Do not touch the polishing machine during operation.
Do not replace polishing holder during operation.
Please unplug power cable after work.

Do not touch the operation panel or the switch with wet hand or
Do not connect or disconnect the power cable with wet hand.
Otherwise, you may get electric shock, accident or failure may occur.

Be sure to use specified voltage and connect grounding terminal (Class 3 or greater grounding). Otherwise, fire, electric shock, accident or failure may occur

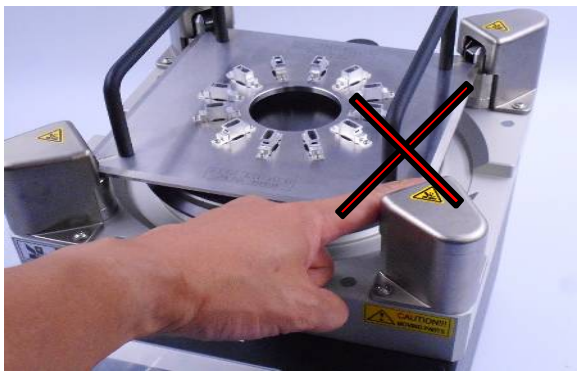
Turn off the power and unplug the cable from the outlet for the following cases. Otherwise, fire, electric shock, or accident may occur.

- When fuse is replaced (use 2A).

- When any abnormalities such as abnormal odor, smoke or abnormal noise are occurred.

WARNING

Do not touch Auto clamp when press Start
Do not touch Auto clamp during operation.
Do not remove cover during operation.
Do not touch inside cover during operation.



CAUTION

Never perform the following actions. Otherwise, fire, electric shock, accident or failure may occur.

- Please wear proper uniform and safety shoes when you work
- Please place the polishing machine on flat and rigid work table.
- Do not place any object on the polishing machine
- Do not place or leave the polishing machine outdoor or at the place here the polishing machine is exposed to water.
- Be careful not to fall the polishing machine in transport condition.
- Do not apply shock or drop the polishing machine.
- Do not place any objects on the power cable.
- Do not twist or pull the cable strongly.
- Do not operate the polishing machine in unmanned.
- Turn off the switch when leaving from the polishing machine.
- Keep away any flammable substances or explosives from the polishing machine.
- Do not place any objects within 30cm from the cooling fan.
- Do not put anything inside the polishing machine. This may cause accident or failure.
- To prevent corrosion, remove any liquid completely from the polishing machine and avoid using and keeping the polishing machine in humid condition.
- Do not blow air into the service trench. Water entering between the turntable, the support ring and the baseplate will cause serious damage to the polishing machine and require repair. Since there is no waterproof function due to the structure, wipe off the surrounding water with a waste cloth.
- Use compressed air that meets the requirements to the polishing machine. Check the operation manual for the required values.

Do not disassemble the polishing machine more than described in the manual.

Introduction

–Thank you for purchasing SFP-560A3C / FA Polishing Machine –

This manual covers polishing conditions and procedures with SFP-560A3C / FA Polishing Machine. The polishing conditions in this manual are standard and recommendable for the polishing applicable to our optical Zirconia ferrule. Polishing conditions need to be changed applying to each connector type, ferrule shape and material.

The SFP-560A3C / FA has Auto clamp function, and the polishing holder is clamped automatically. This function offers extra convenience in operation but also requires extra safety precaution. Please be sure to keep hands off from the Auto clamp when press Start as described on the WARNING on Page 3. Touching the Auto clamp with hands or fingers when press Start and during polishing may result in serious injury.
In case of emergency, press the Emergency button.

About polishing

Before polishing, also read Operating Manual and Maintenance Manual of SFP-560A3C / FA along with this manual.

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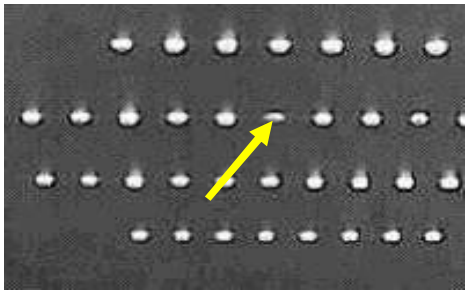
Before introducing polishing process. we would like to explain usage of polishing holder, polishing pad and polishing film and then explain polishing work.

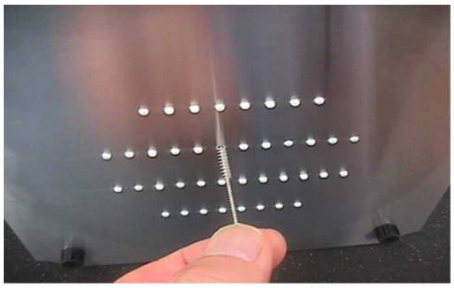
§1 Introduction of IPC Holder

Please make sure that there is no epoxy or debris left on ferrule side face.
These epoxy or debris may affect polishing performance because of changing spring pressure from IPC (Independent Pressure Control) system.
In addition, to clean ferrule insertion hole is necessary as regular maintenance to avoid debris to stick inside the hole.
Please use HCB-250 (for 2.5mm hole) or HCB-125 (for 1.25mm hole) brush with D.I WATER for cleaning. Instruction of the brush is described in the next page.
After brushing, blow compressed air to the cleaned insertion hole.

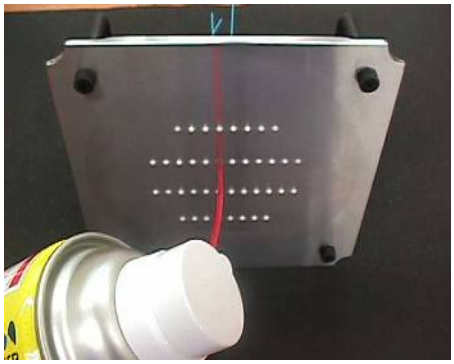
Ferrule is stuck due to contamination



Cleaning insertion hole with brush



Blow compressed air to the cleaned hole



* Cleaning Method Using HCB-250 / 125

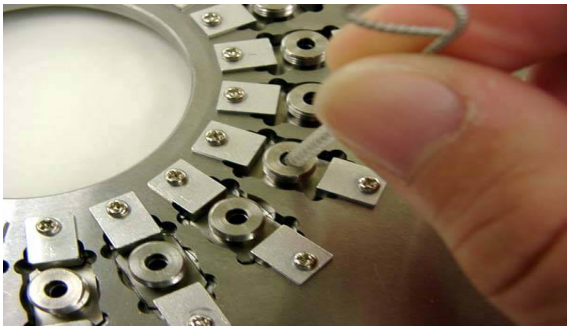
1) Insert the brush into the hole from upper side of the holder. (Pic. 1).

2) Keep inserting the brush to the other side (Pic. 2).

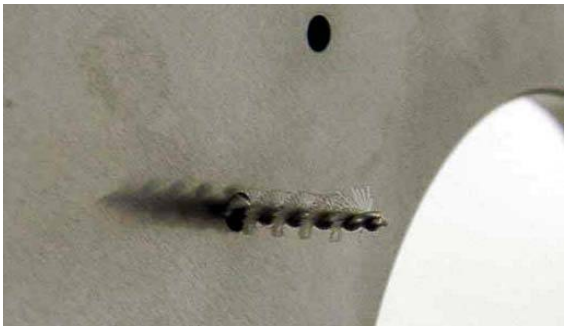
3) Repeat this cleaning method several times until the hole is cleaned up.

Try to put alcohol to the brush for cleaning if foreign substances are still adhered in spite of many trials.

Pic1



Pic2



Other Precautions

Remove water and contaminations on holder metal surface with lint-free tissue.

For part the tissue is not approachable, blow air instead.

Leaving the holder with water or contaminations without cleaning may generate rust.

Clean insertion hole with attached brush, P/N: HCB-250 or HCB-125 as introduced on the above and blow air after cleaning.

When you store the holder for a long time, apply anti-rust agent on the holder surface with lint-free tissue and store it in the provided holder container.

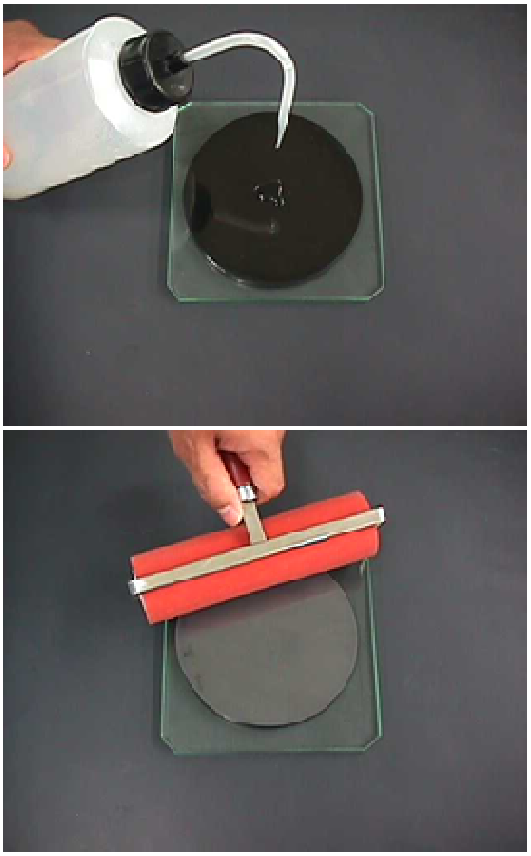
§2 Instruction of Polishing Film / Pad

2-1) Rubber pad (PR5X-500-**)

To avoid pealing problem during polishing, please follow the instruction below when you attach polishing film on rubber pad.

1) Place rubber pad on flat & solid object such as glass plate (Pic. 3).
2) Place a few drops of D.I WATER (Pic. 3) and wipe with lint-free tissue to remove moisture (Pic. 4).
3) Place polishing film on the rubber pad and remove bubbles between the pad and the film by roller (Pic. 5).

Pic3



Pic4

2-2) Sponge pad (PS5X-500-SR)

Sponge pad is necessary for adhesive removal step to polish with optimal grinding pressure to avoid fiber crack and damage. Thus, we recommend using PS5X-500-SR, which is sponge pad with tacky silicon rubber on one side. No need to use spray glue or both-sided tape to place GA5D film.

2-3) Rubber pad hardness check

Hardness of rubber pad needs to be checked periodically (once a month) as it gets harder after start using. Handy type hardness meter is recommended tool to measure hardness (P/N: FP-DM). Thickness of measured object shall be more than 12mm so that rubber pad shall be two-ply when measured. Hardness meter shall be placed on specimen as constant as possible in slow speed. As for recommended spec, hardness difference of same hardness pad used within same polishing process shall be less than Hs3.

§3 Service Life of Polishing Films

Polishing Films	Application	Service Life	Material	Particle
GA5D	Adhesive Removal, Rough Polishing (-AD:PSA backing, GC:1st polishing)	1-5	SiC	Large
GA5D-AD		1-5		
GC5D		1		
GF5D	Second polishing	1		
GH5D		1		
GI5D		1		
GK5D		1		Small
DA5D-30u	Rough Polishing	15-30	Diamond	Large
EDA5D-30U				
DR5D-9u	First polishing	15-30		
EDR5D-9U				
DG5D-5u	First polishing	15-30		
EDG5D-5U				
DH5D-3u	Second polishing	15-30		
EDH5D-3U				
DI5D-1.5u	Second polishing	15-30		
EDI5D-1.5U				
DJ5D-1u	Second polishing	15-30		Small
EDJ5D-1U				
AR5D	First polishing	1	Alumina	Large
AJ5D	Second polishing	1		
SF5D	Final polishing	1		Small
XF5D		5-10	Sio2	Fine
EF5D		1	CeO2	Fine
FM5D-SOAP-2		1	Sio2	Fine
CF5D	Cleaning	30	Polishing Buff	
BY5D	Polishing	3		

Note1: Service life of films may change depending on conditions of storage/usage

Note2: Wipe and clean the polishing films to remove polishing remaining and moisture after polishing and storage them in low humidity condition.

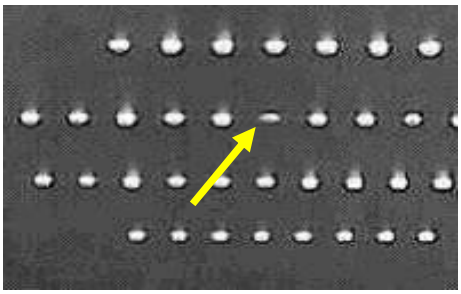
§4 Polishing

Polishing process is depending on each ferrule shape, material, and connector type.
The following explains general polishing instruction using SFP-560A3C / FA.

4-1) Ferrule installation check

When ferrules are mounted to polishing holder, please make sure that the tips of ferrules protrude uniformly from the bottom of the holder.

Improper ferrule protrusion influences the quality of polishing.
Confirm the protrusion of the ferrules after mounting and re-mount the ferrule if its protrusion length is larger or shorter than others.
Especially, the ferrule of short protrusion is carefully checked because there might be adhesive on the side of the ferrule or contamination in polishing holder that influences polishing result.
Before re-mount, clean the ferrule and insertion hole well and mount it to the holder



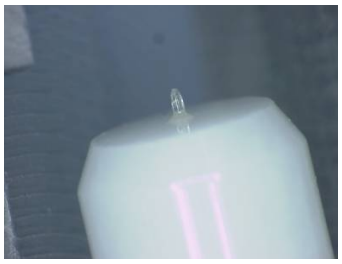
Ferrule is stuck due to contamination or adhesive around ferrule O/D

4.2) Adhesive removal step

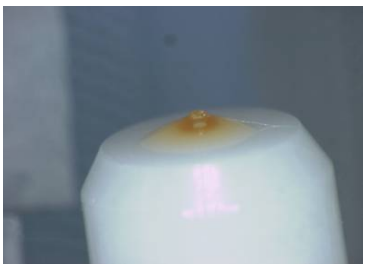
Sponge pad is necessary for adhesive removal step especially polishing requires high pressure such as PC D2.5mm ferrule polishing. It is because use of sponge pad in adhesive removal step helps to prevent fiber crack and damages from excessive pressure. But at the same time, adhesive removal process shall be done until adhesive is completely removed. If there is adhesive left on ferrule endface, it might lead to polishing film breakage or affect to polished endface geometry.

Therefore, use of PS5X-500-SR is recommended to remove adhesive that provides optimal polishing pressure.

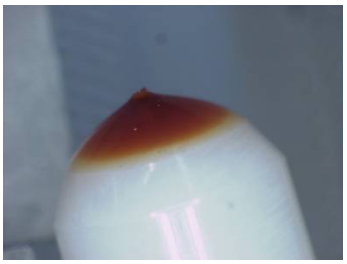
Example: Amount of adhesive



Not enough



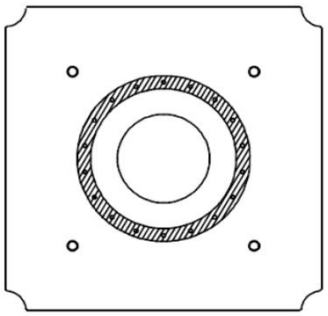
Decent amount



Too much

4-3) Cleaning of polishing holder

Polishing particles stuck in polishing holder from former polishing step may damage polishing film and create scratches on ferrule endface at the latter polishing step. Thus, after every polishing step, please make sure to wipe the bottom side of polishing holder with D.I WATER and lint-free tissue especially the area around the ferrule endface shown as the shaded part in the bottom figure.

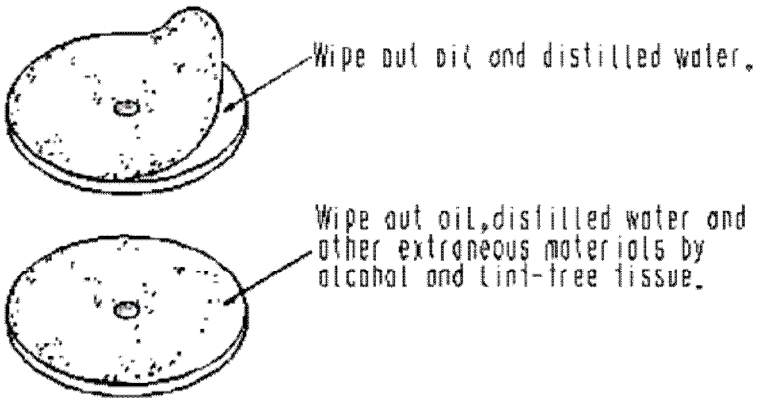


4-4) Cleaning of polishing film and polishing pad

Polishing film with service life of more than once shall be wiped and cleaned with D.I. water and lint-free tissue after every use. Because remained polished residue may influence polishing result.

In addition, if polishing liquid is found in between the polishing pad and the film, clean the area and keep it free from extraneous materials. Because such liquid in the area may accelerate the polishing film peeling during polishing and influence in polishing result or damage polishing film.

The following figure shows the area focusing on cleaning.



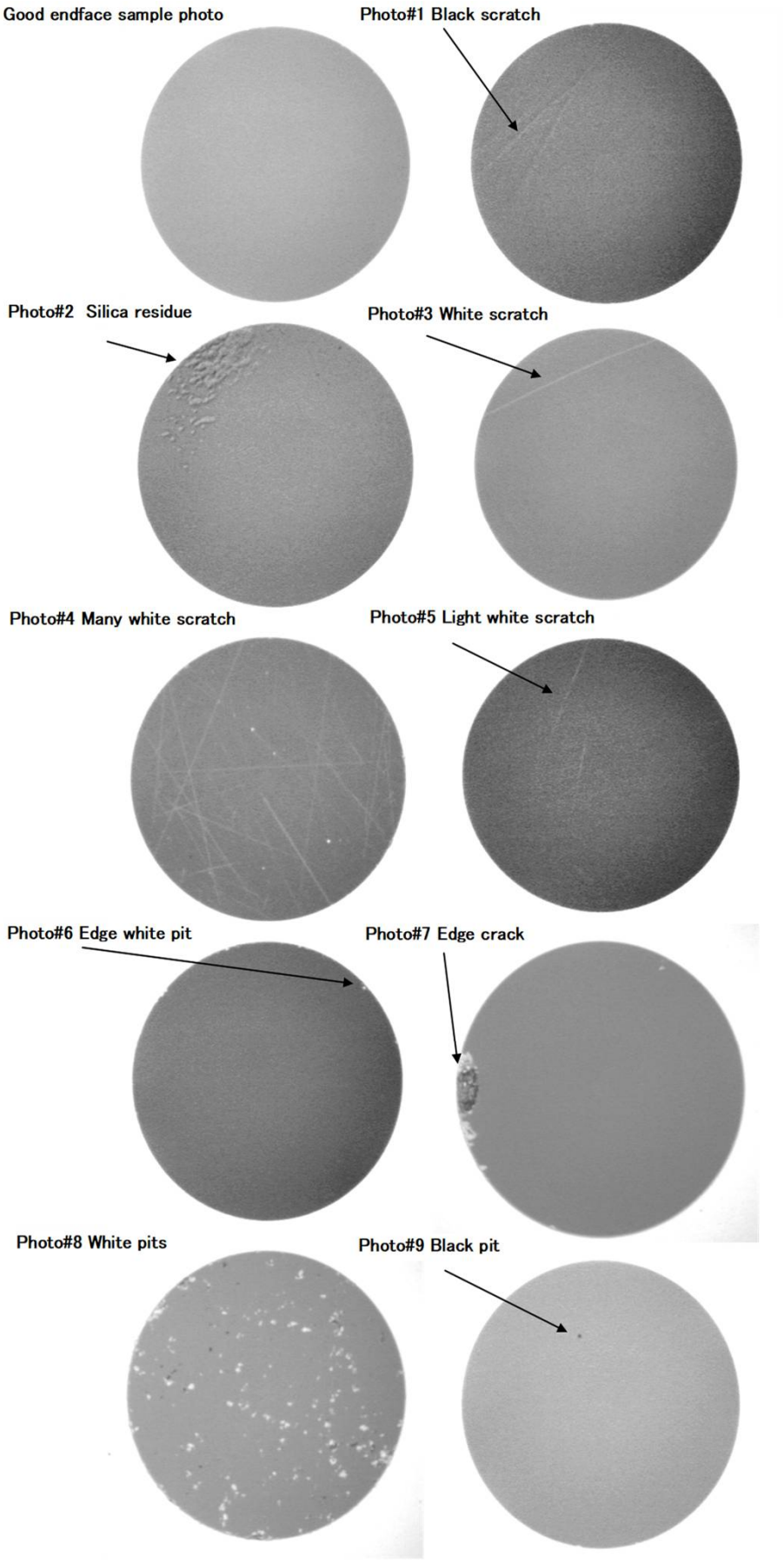
4.5 Re-polishing

The ferrule needs to be re-polished if it has scratch or crack on ferrule endface after polishing. Below explains each endface mode and re-polishing procedures.

Possible Cause and Counteraction for Each Fiber Endface Characteristics Defect Mode

* Below content is based on Seikoh Giken SFP-550, PH55 series IPC type holder and standard polishing process
* Photo # of below chart corresponds to endface photos of next page.

Photo #	Endface Mode	Possible Cause	Counteraction against Polishing Process	How to re-polish the scratched samples
1	Black Scratch	When polishing liquid is not enough amount, silica particle might create scratch.	When you apply polishing liquid, please make sure to apply it on entire surface of XF5D film (but too much amount). When you re-polish, start from XF5D step.	Re-polish from XF5D step
2	Silica Residue	If polishing liquid contain much of electrolyte, it might cause silica residue attaching on endface.	Please make sure to use deionized water as polishing liquid. When you re-polish, start with XF5D step.	Re-polish from XF5D step
3	White Scratch	1. If polished particle is not completely cleaned & removed and dropped on XF5D film at final polishing step, it might create scratch on endface.	1. Please conduct enough cleaning on ferrule endface and polishing holder bottom surface after each polishing step.	Re-polish from XF5D step
		2. Even if there is no scratch after final polishing step, cleaning with lens cleaner or buff film before endface inspection might create new scratch.	2 After XF5D step, soak lint-free tissue with purified water and wipe & remove polished residue / particles.	Re-polish from XF5D step
4	Many White Scratches	This type of scratch is occurred when polishing pressure is not enough or low at XF5D final polishing step. Example of the case is when IPC is not working properly due to stuck of polished residue / particle in holder ferrule insertion hole or when tension is applied to fiber during polishing (with pulling force in upward).	Clean ferrule insertion hole and make sure smooth ferrule motion is secured. And please be careful not to have tension in fiber during polishing.	Re-polish from XF5D step
5	Light White Scratch	Same as the above 3-1. Or not enough polishing time or expire of XF5D service life.	Same as the above 3-1 or extend polishing time for XF5D step or replace XF5D film with new one.	Re-polish from XF5D step
6	Edge White Pit	Expired service life of DJ5D-1U is considered as a cause. As the film is used up, ability to polish endface (grinding capability) is decreased.	Replace DJ5D-1u film with new one	Re-polish from DJ5D-1U step or XF5D step depending on size of the scratch
7	Edge Crack	This is caused when fiber is cracked during adhesive removal step.	If amount of adhesive is more than enough or not enough, it causes damage in fiber. Thus amount of adhesive is properly managed.	Re-polish from DR5D-9U step
8	White Pit	Same as the above 6	Same as the above 6	Re-polish from DJ5D-1U step or XF5D step depending on size of the scratch
9	Black Pit	Same as the above 6	Same as the above 6	Re-polish from DJ5D-1U step or XF5D step depending on size of the scratch


Good endface sample photo
Photo#1 Black scratch
Photo#2 Silica residue
Photo#3 White scratch
Photo#4 Many white scratch
Photo#5 Light white scratch
Photo#6 Edge white pit
Photo#7 Edge crack
Photo#8 White pits
Photo#9 Black pit

§5 Polishing Process with IPC Mode

5-1. D 2.5mm Pre-radius Ferrule, HPC Convex Polishing

Polishing Holder (Standard IPC Holder)

PH55-FF-20 or 24 (D 2.5mm Ferrule)

PH55-FP-20 or 24 (FC Plug)

PH55-CP-20 or 24 (SC Plug)

PH55-SP-20 or 24 (ST Plug)

PH55-EF-18-HS or PH55-EF-24-H (E2000 Ferrule H&S type, Snap-in)

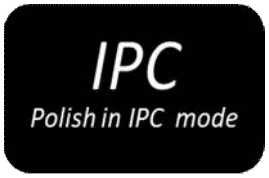
PH55-EF-18-RS or PH55-EF-24-R (E2000 Ferrule R&M type, Snap-in)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PS5X-500-SR	GA5D (5)	D.I WATER	20 [0]	110 [1]
First Polishing	PR5X-500-80	DR5D-9u (30)	D.I WATER	20 [0]	110 [1]
Second Polishing	PR5X-500-80	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-80	XF5D (7)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-2. D 1.25mm Ferrule, HPC Convex Polishing (High Pressure Type)



Polishing Holder (Standard IPC Holder)

PH55-PL-24HP (LC Plug, High pressure type)

PH55-PL-32DHP (LC Simplex & Duplex Plug, High pressure type)

Ferrule pedestal: Diameter 0.6mm

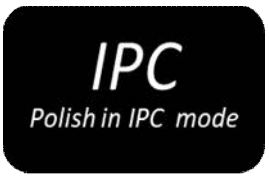
Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-90	GA5D (10)	D.I WATER	20 [0]	110 [1]
First Polishing	PR5X-500-90	DH5D-3u (30)	D.I WATER	20 [0]	110 [1]
Second Polishing	PR5X-500-90	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-85	XF5D (10)	D.I WATER	40 [0]	110 [1]

Note 1: Polishing time is 10 sec (0.2min) up to 5th round and 20 sec (0.35min) after 5th round

Note 2: Standard diamond films are fully compatible with E-series diamond film:

Note 3: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-3. D 1.25mm Ferrule, HPC Convex Polishing



Polishing Holder (Standard IPC Holder)

PH55-FLM-24 (LC / MU Ferrule, Coupling nut type)

PH55-FLM-16 (LC / MU Ferrule, Post-type)

PH55-PM-24 (MU Plug)

PH55-PL-24 (LC Plug)

Ferrule pedestal: Diameter 0.6mm

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-90	GA5D (10)	D.I WATER	10 [10]	110 [1]
First Polishing	PR5X-500-85	DH5D-3u (30)	D.I WATER	20 [0]	110 [1]
Second Polishing	PR5X-500-85	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-85	XF5D (10)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-4. D 2.5mm Step Ferrule 8-deg APC Polishing (w/o Tuning)

Polishing Holder (Standard IPC Holder)

Holder P/N	Connector Type	APC Type	Pedestal Diameter	Key Width
PH55-FF8A-18-1.3	APC Ferrule	Step	1.4mm	1.3mm
PH55-FF8A-18-1.5	APC Ferrule	Step	1.4mm	1.5mm
PH55-FP8R-18-I or 24	FC/APC Plug	Step	1.4mm	2.00mm
PH55-FP8N-18-I or 24	FC/APC Plug	Step	1.4mm	2.14mm
PH55-CP8A-18 or 24	SC/APC Plug	Step	1.4mm	----------

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-75	GA5D (1)	D.I WATER	40 [0]	110 [1]
First Polishing	PR5X-500-75	DA5D-30u (30)	D.I WATER	40 [20]	110 [1]
Second Polishing	PR5X-500-75	DR5D-9u (30)	D.I WATER	40 [0]	110 [1]
Third Polishing	PR5X-500-75	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-75	XF5D (10)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-5. D 2.5mm Conical Ferrule 8-deg APC Polishing (w/o Tuning)

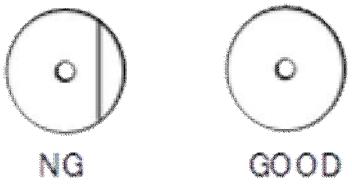
Polishing Holder (Standard IPC Holder)

Holder P/N	Connector Type	APC Type	Pedestal Diameter	Key Width	Chamfer Angle(deg.)
PH55-FF8C-18-1.3	APC Ferrule	Conical	1.0mm	1.3mm	30 or 35
PH55-FF8C-18-1.5	APC Ferrule	Conical	1.0mm	1.5mm	30 or 35
PH55-FP8RC-18-I or 24	FC/APC Plug	Conical	1.0mm	2.00mm	30 or 35
PH55-FP8NC-18-I or 24	FC/APC Plug	Conical	1.0mm	2.14mm	30 or 35
PH55-CP8C-18 or 24	SC/APC Plug	Conical	1.0mm	----------	30 or 35

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-80	GA5D (1)	D.I WATER	40 [0]	110 [1]
First Polishing	PR5X-500-80	DR5D-9u (15)	D.I WATER	40 [20]	110 [1]
Second Polishing	PR5X-500-80	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-80	XF5D (10)	D.I WATER	40 [0]	110 [1]

Note 1: Please adjust polishing time until forming angle completely.

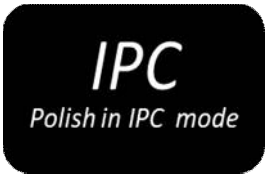
Figure 1 (ferrule endface after DR5D-9u step)



Note 2: Standard diamond films are fully compatible with E-series diamond film:

Note 3: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-6. LC / MU Plug and E2000 Ferrule 8-deg APC Polishing (w/o Tuning)



Polishing Holder (Standard IPC Holder)

PH55-PL8A-20-B (LC/APC Plug)

PH55-PL8A-20HP-B (LC/APC Plug, High Pressure Type)

PH55-PM8A-20 (MU/APC Plug)

PH55-EF8A-18-H or PH55-EF8A-24-H (E2000 Ferrule H&S type, Snap-in)

PH55-EF8A-18-R or PH55-EF8A-24-R (E2000 Ferrule R&M type, Snap-in)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-70	GA5D (5)	D.I WATER	40 [0]	110 [1]
First Polishing	PR5X-500-70	DR5D-9u (30)	D.I WATER	20 [0]	110 [1]
Second Polishing	PR5X-500-70	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-70	XF5D (10)	D.I WATER	40 [0]	110 [1]

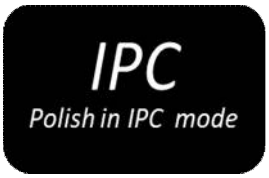
Note 1: Continue polishing until convex is completely formed

Note 2: Though outer diameter of E2000 APC ferrule is 2.5mm, its polishing process is this D1.25mm APC process because pedestal diameter of E2000 APC ferrule is 0.5mm.

Note 3: Standard diamond films are fully compatible with E-series diamond film:

Note 4: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-7. MDC / SN connector PC Polishing



Polishing Holder (Mega-axis IPC Holder)

PH55-MDC-24 (MDC Plug)

PH55-SN-24 (SN Plug)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-90	GA5D (10)	D.I WATER	40 [0]	110 [1]
First Polishing	PR5X-500-90	DR5D-9u (20)	D.I WATER	40 [0]	110 [1]
Second Polishing	PR5X-500-90	DJ5D-1u (20)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-90	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-8. MDC / SN connector APC Polishing

Polishing Holder (Mega-axis IPC Holder)

PH55-MDC8A-24 (MDC Plug)

PH55-SN8A-24 (SN Plug)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-490-SR3	GA5D (3)	D.I WATER	20 [0]	110 [1]
First Polishing	PR5X-500-90	DR5D-9u (20)	D.I WATER	30 [0]	110 [1]
Second Polishing	PR5X-500-90	DJ5D-1u (15)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-90	XF5D (5)	D.I WATER	40 [0]	110 [1]

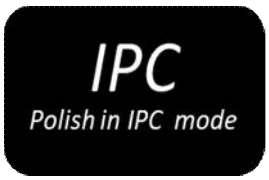
Note 1: Continue polishing until convex is completely formed

Note 2: Standard diamond films are fully compatible with E-series diamond film:

Note 3: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

Polishing Process for Mega-axis IPC Holder

5-9. D 2.5mm Pre-radius Ferrule, HPC Convex Polishing



Polishing Holder (Mega-axis IPC Holder)
PH55-FF-40 (D 2.5mm Ferrule)
PH55-CP-32 (SC Plug)
PH55-SP-28 (ST Plug)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PS5X-500-SR	GA5D (5)	D.I WATER	30 [0]	110 [1]
First Polishing	PR5X-500-75	DR5D-9u (30)	D.I WATER	30 [0]	110 [1]
Second Polishing	PR5X-500-75	DJ5D-1u (15)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-75	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-10. D 1.25mm Ferrule, HPC Convex Polishing (High Pressure)

Polishing Holder (Mega-axis IPC Holder)

PH55-PL-48DHP (LC Simplex & Duplex Plug, High pressure type)

PH55-PL-54DHP (LC Simplex & Duplex Plug, High pressure type)

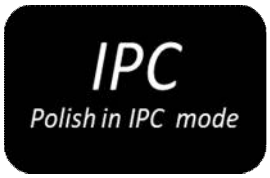
Ferrule pedestal: Diameter 0.6mm

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-90	GA5D (10)	D.I WATER	30 [0]	110 [1]
First Polishing	PR5X-500-90	DH5D-3u (20)	D.I WATER	40 [0]	110 [1]
Second Polishing	PR5X-500-90	DJ5D-1u (20)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-85	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-11. D 1.25mm Ferrule, HPC Convex Polishing



Polishing Holder (Mega-axis IPC Holder)

PH55-PM-40 (MU Plug)

PH55-FLM-40 (LC / MU Ferrule) *

PH55-PL-40 (LC Plug)

PH55-PL-48 (LC Plug)

*Note: For PH55-FLM-40 holder, please insert 4 spacers in between the holder plate and the spring plate at each bolt hole. (0.6mm spacer for LC ferrule and 0.1mm spacer for MU ferrule). These spacers come with the holder.

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-90	GA5D (10)	D.I WATER	30 [0]	110 [1]
First Polishing	PR5X-500-85	DH5D-3u (20)	D.I WATER	40 [0]	110 [1]
Second Polishing	PR5X-500-85	DJ5D-1u (20)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-85	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-12. D 2.5mm Step Ferrule 8-deg APC Polishing (w/o Tuning)

Polishing Holder (Mega-axis IPC Holder)

Holder P/N	Connector Type	APC Type	Pedestal Diameter	Key Width
PH55-FF8A-40-1.3	APC Ferrule	Step	1.4mm	1.3mm
PH55-FF8A-40-1.5	APC Ferrule	Step	1.4mm	1.5mm
PH55-CP8A-32	SC/APC Plug	Step	1.4mm	----------

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-75	GA5D (1)	D.I WATER	40 [0]	110 [1]
First Polishing	PR5X-500-75	DA5D-30u (30)	D.I WATER	40 [20]	110 [1]
Second Polishing	PR5X-500-75	DR5D-9u (30)	D.I WATER	40 [0]	110 [1]
Third Polishing	PR5X-500-75	DJ5D-1u (15)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-75	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-13. D 2.5mm Conical Ferrule 8-deg APC Polishing (w/o Tuning)

Polishing Holder (Mega-axis IPC Holder)

Holder P/N	Connector Type	APC Type	Pedestal Diameter	Key Width	Chamfer Angle(deg.)
PH55-FF8C-40-1.3	APC Ferrule	Conical	1.0mm	1.3mm	30 or 35
PH55-FF8C-40-1.5	APC Ferrule	Conical	1.0mm	1.5mm	30 or 35
PH55-CP8C-32	SC/APC Plug	Conical	1.0mm	-------	30 or 35

Turntable speed: 110rpm (revolution)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-80	GA5D (1)	D.I WATER	40 [0]	110 [1]
First Polishing	PR5X-500-80	DR5D-9u (15)	D.I WATER	40 [20]	110 [1]
Second Polishing	PR5X-500-80	DJ5D-1u (15)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-80	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

5-14. LC Plug and E2000 Ferrule 8-deg APC Polishing (w/o Tuning)

Polishing Holder (Mega-axis IPC Holder)

PH55-PL8A-48 (LC/APC Plug)

PH55-PL8A-48HP (LC/APC Plug, High pressure type)

PH55-PL8A-54HP (LC/APC Plug, High pressure type)

PH55-EF8A-40-R (E2000 Ferrule R&M type, Snap-in)

PH55-EF8A-40-H (E2000 Ferrule H&S type, Snap-in)

Polishing Step	Polishing Condition				
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [add time(sec)]	Speed(rpm) [Ramp Up(s)]
Adhesive Removal	PR5X-500-70	GA5D (3)	D.I WATER	20 [0]	110 [1]
First Polishing	PR5X-500-70	DR5D-9u (30)	D.I WATER	20 [0]	110 [1]
Second Polishing	PR5X-500-70	DJ5D-1u (15)	D.I WATER	40 [0]	110 [1]
Final Polishing	PR5X-500-70	XF5D (5)	D.I WATER	40 [0]	110 [1]

Note 1: Continue polishing until convex is completely formed

Note 2: Though outer diameter of E2000 APC ferrule is 2.5mm, its polishing process is this D1.25mm APC process because pedestal diameter of E2000 APC ferrule is 0.5mm.

Note 3: Standard diamond films are fully compatible with E-series diamond film:

Note 4: Polishing holder is automatically clamped as soon as Start is pressed and the clamping is released after polishing is done.

§6 Polishing Process with DPC Mode

6-1. MT/APC Flock Film PPS Flat Ferrule, S/M Fiber

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

12-axis (Press: 42N)	PH55-MT8A-12SQ1-B	(Quick loading type)
	PH55-MT8A-12S1	(Torque wrench type)
24-axis (Press: 84N)	PH55-MT8A-24QD	(Quick loading type)
	PH55-MT8A-24SQ1-B	(Quick loading type)
	PH55-MT8A-24S1	(Torque wrench type)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PG5X-490-SR3	GC5D (1)	D.I WATER	120 [0]	110 [1]	42 / 12-axis 84 / 24-axis [30]
First Polishing	PG5X-490-SR3	AR5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Second Polishing	PG5X-490-SR3	GH5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Final Polishing	PG5X-490-SR3	FM5D-SOAP-2 (1)	D.I WATER	150 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]

Note 1: By use of PL50 polishing liquid instead of D.I water in the GC5D and GH5D steps, stable endface visual quality can be obtained and also damage to the polishing film can be reduced.

Note 2: If you use pre-angled MT/APC ferrule , then polishing time for the Adhesive removal step is 90 sec.

Note 3: Please adjust polishing time for the Adhesive removal step depending on amount of Epoxy on endface.

Note 4: Pressure per ferrule is 3.5N . Total pressure value is determined by 3.5N x Holder capacity. For example for 24-axis holder (3.5N x 24 = 84N).

Note 5: "Fix mode" is not used.

6-2. MT/PC Flock Film PPS Flat Ferrule, M/M Fiber

DPC
Polish in DPC mode

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

12-axis (Press: 42N)	PH55-MT-12SQ1-B	(Quick loading type)
	PH55-MT-12S1	(Torque wrench type)
24-axis (Press: 84N)	PH55-MT-24SQ1-B	(Quick loading type)
	PH55-MT-24S1	(Torque wrench type)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PG5X-490-SR3	GC5D (1)	D.I WATER	90 [0]	110 [1]	42 / 12-axis 84 / 24-axis [30]
First Polishing	PG5X-490-SR3	AR5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Second Polishing	PG5X-490-SR3	GH5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Final Polishing	PG5X-490-SR3	FM5D-SOAP-2 (1)	D.I WATER	180 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]

Note 1: By use of PL50 polishing liquid instead of D.I water in the GC5D and GH5D steps, stable endface visual quality can be obtained and also damage to the polishing film can be reduced.

Note 2: Please adjust polishing time for the Adhesive removal step depending on amount of Epoxy on endface.

Note 3: Pressure per ferrule is 3.5N . Total pressure value is determined by 3.5N x Holder capacity. For example for 24-axis holder (3.5N x 24 = 84N).

Note 4: "Fix mode" is not used.

6-3. MT/APC Slurry PPS Flat Ferrule, S/M Fiber

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

12-axis (Press: 42N)	PH55-MT8A-12SQ1-B	(Quick loading type)
	PH55-MT8A-12S1	(Torque wrench type)
24-axis (Press: 84N)	PH55-MT8A-24QD	(Quick loading type)
	PH55-MT8A-24SQ1-B	(Quick loading type)
	PH55-MT8A-24S1	(Torque wrench type)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PG5X-490-SR3	GC5D (1)	D.I WATER	120 [0]	110 [1]	42 / 12-axis 84 / 24-axis [30]
First Polishing	PG5X-490-SR3	AR5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Second Polishing	PG5X-490-SR3	GI5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Final Polishing	PG5X-490-SR3	BY5D (5)	KJAZM 18701G (3ml)	150 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]

Note 1: By use of PL50 polishing liquid instead of D.I water in the GC5D and GH5D steps, stable endface visual quality can be obtained and also damage to the polishing film can be reduced.

Note 2: If you use pre-angled MT/APC ferrule , then polishing time for the Adhesive removal step is 90 sec.

Note 3: Please adjust polishing time for the Adhesive removal step depending on amount of Epoxy on endface.

Note 4: Pressure per ferrule is 3.5N . Total pressure value is determined by 3.5N x Holder capacity. For example for 24-axis holder (3.5N x 24 = 84N).

Note 5: "Fix mode" is not used.

6-4. MT/PC Slurry PPS Flat Ferrule, M/M Fiber

DPC
Polish in DPC mode

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

12-axis (Press: 42N)	PH55-MT-12SQ1-B	(Quick loading type)
	PH55-MT-12S1	(Torque wrench type)
24-axis (Press: 84N)	PH55-MT-24SQ1-B	(Quick loading type)
	PH55-MT-24S1	(Torque wrench type)

Turntable speed: 110rpm (revolution)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PG5X-490-SR3	GC5D (1)	D.I WATER	90 [0]	110 [1]	42 / 12-axis 84 / 24-axis [30]
First Polishing	PG5X-490-SR3	AR5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Second Polishing	PG5X-490-SR3	GI5D (1)	D.I WATER	60 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Third Polishing	PG5X-490-SR3	BY5D (5)	KJAZM 18701G (3ml)	150 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]
Final Polishing	PG5X-490-SR3	FM5D-SOAP-2 (1)	D.I WATER	180 [0]	110 [1]	42 / 12-axis 84 / 24-axis [0]

Note 1: By use of PL50 polishing liquid instead of D.I water in the GC5D and GH5D steps, stable endface visual quality can be obtained and also damage to the polishing film can be reduced.

Note 2: Please adjust polishing time for the Adhesive removal step depending on amount of Epoxy on endface.

Note 3: Pressure per ferrule is 3.5N . Total pressure value is determined by 3.5N x Holder capacity. For example for 24-axis holder (3.5N x 24 = 84N).

Note 4: "Fix mode" is not used.

§7 Polishing Process with DPC Mode for Single Fiber

7-1:LC/PC Duplex HPC Convex Polishing (Fixed type holder)

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

PH55-PL-32DFX (LC/PC Plug , Fixed type holder)

PH55-PL-48DFX (LC/PC Plug , Fixed type holder)

Ferrule pedestal : Diameter 0.6mm

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PR5X-500-85	GA5D (5)	D.I WATER	20 [0]	110 [1]	25.6 / 32-axis 38.4 / 48-axis [20]
First Polishing	PR5X-500-85	DH5D-3u (30)	D.I WATER	40 [0]	110 [1]	25.6 / 32-axis 38.4 / 48-axis [0]
Second Polishing	PR5X-500-85	DJ5D-1u (30)	D.I WATER	40 [0]	110 [1]	25.6 / 32-axis 38.4 / 48-axis [0]
Final Polishing	PR5X-500-85	XF5D (10)	D.I WATER	40 [0]	110 [1]	25.6 / 32-axis 38.4 / 48-axis [0]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: "Fix mode" is not used.

7-2:LC/APC Plug APC Polishing (Fixed type holder)

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

PH55-PL8A-24FX (Simplex LC/APC Plug, Fixed type holder)

PH55-PL8A-32DFX-POR (Seikoh Giken Uniboot LC/APC Plug , Fixed type holder)

PH55-PL8A-48FX (Simplex LC/APC Plug, Fixed type holder)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PR5X-500-75	GA5D (5)	D.I WATER	20 [0]	110 [1]	28.8 / 24-axis 38.4 / 32-axis 57.6 / 48-axis [20]
First Polishing	PR5X-500-75	DR5D-9u (20)	D.I WATER	20 [0]	110 [1]	28.8 / 24-axis 38.4 / 32-axis 57.6 / 48-axis [0]
Second Polishing	PR5X-500-75	DJ5D-1u (20)	D.I WATER	40 [0]	110 [1]	28.8 / 24-axis 38.4 / 32-axis 57.6 / 48-axis [0]
Final Polishing	PR5X-500-75	XF5D (10)	D.I WATER	40 [0]	110 [1]	28.8 / 24-axis 38.4 / 32-axis 57.6 / 48-axis [0]

Note 1: Continue polishing until angle is completely formed

Note 2: Standard diamond films are fully compatible with E-series diamond film:

Note 3: "Fix mode" is not used.

7-3. MDC / SN connector PC Polishing (Fixed type holder)

Polishing Holder (DPC Holder)

Input each holder's capacity and total pressure value of each step.

PH55-MDC-24FX (MDC Plug)

PH55-SN-24FX (SN Plug)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PG5X-490-SR3	GA5D (10)	D.I WATER	40 [0]	110 [1]	57.6 / 24-axis [20]
First Polishing	PR5X-500-85	DH5D-3u (20)	D.I WATER	40 [0]	110 [1]	38.4 / 24-axis [0]
Second Polishing	PR5X-500-85	DJ5D-1u (20)	D.I WATER	40 [0]	110 [1]	38.4 / 24-axis [0]
Final Polishing	PR5X-500-85	XF5D (5)	D.I WATER	40 [0]	110 [1]	38.4 / 24-axis [0]

Note 1: Continue polishing until angle is completely formed

Note 2: Standard diamond films are fully compatible with E-series diamond film:

Note 3: "Fix mode" is not used.

7-4. MDC / SN connector APC Polishing (Fixed type holder)

Polishing Holder (Mega-axis IPC Holder)

Input each holder's capacity and total pressure value of each step.

PH55-MDC8A-24FX (MDC Plug)

PH55-SN8A-24FX (SN Plug)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PG5X-490-SR3	GA5D (3)	D.I WATER	80 [0]	110 [1]	57.6 / 24-axis [20]
First Polishing	PR5X-500-85	DR5D-9u (15)	D.I WATER	30 [0]	110 [1]	57.6 / 24-axis [0]
Second Polishing	PR5X-500-85	DJ5D-1u (15)	D.I WATER	40 [0]	110 [1]	57.6 / 24-axis [0]
Final Polishing	PR5X-500-85	XF5D (5)	D.I WATER	40 [0]	110 [1]	57.6 / 24-axis [0]

Note 1: Continue polishing until angle is completely formed

Note 2: Standard diamond films are fully compatible with E-series diamond film:

Note 3: "Fix mode" is not used.

7-5：OptiTap, Slim connector (Fixed type holder)

Polishing Holder

PH55-OPT8C-18FX (OptiTap connector)

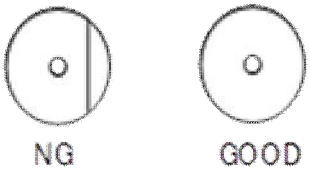
PH55-SLM8C-18FX (Slim connector)

Polishing Step	Polishing Condition					
	Polishing Pad	Polishing Film (service life)	Polishing Liquid	Polishing Time (sec) [Add time(sec)]	Speed(rpm) [Ramp Up time(s)]	Pressure(N) [Ramp Up time(s)]
Adhesive Removal	PR5X-500-80	GA5D (1)	D.I WATER	40 [0]	110 [1]	45 / 18-axis [20]
First Polishing	PR5X-500-80	DR5D-9u (20)	D.I WATER	60 [0] (Note 2)	110 [1]	45 / 18-axis [1]
Second Polishing	PR5X-500-80	DJ5D-1u (20)	D.I WATER	40 [0]	110 [1]	45 / 18-axis [1]
Final Polishing	PR5X-500-80	XF5D (5)	D.I WATER	40 [0]	110 [1]	45 / 18-axis [1]

Note 1: Standard diamond films are fully compatible with E-series diamond film:

Note 2: Continue polishing until angle is completely formed
If angle forming isn't completed, extend the polishing time.

Figure 1 (ferrule endface after DR5D-9u step)



§8. Appendix : Barcode List (Pad, Film, Holder)

8-1 : Polishing Pad and Film Barcode (code39)

PN	Barcode	PN	Barcode
PR5X-500-90	*PR5X-500-90*	PR5X-500-85	*PR5X-500-85*
PR5X-500-80	*PR5X-500-80*	PR5X-500-75	*PR5X-500-75*
PR5X-500-70	*PR5X-500-70*	PR5X-500-65	*PR5X-500-65*
PR5X-500-60	*PR5X-500-60*	PG5X-490-SR3	*PG5X-490-SR3*
PS5X-500-SR	*PS5X-500-SR*		
GA5D	*GA5D*	GC5D	*GC5D*
GH5D	*GH5D*	GI5D	*GI5D*
GK5D	*GK5D*	DA5D-30U	*DA5D-30U*
DR5D-9U	*DR5D-9U*	DH5D-3U	*DH5D-3U*
DJ5D-1U	*DJ5D-1U*	AR5D	*AR5D*
XF5D	*XF5D*	FM5D-SOAP-2	*FM5D-SOAP-2*
BY5D	*BY5D*	CF5D	*CF5D*
D.I WATER	*D.I WATER*	KJAZM18601(G)	*KJAZM18601*
KJAZM18701(G)	*KJAZM18701*	KJAZM02405(G)	*KJAZM02405*
PL50	*PL50*		

8-2 : Polishing Holder Barcode (code39)

PN	Barcode	PN	Barcode
(PH55-) CP-20	*CP-20*	(PH55-) PL-24	*PL-24*
(PH55-) PL-24HP	*PL-24HP*	(PH55-) CP8A-18	*CP8A-18*
(PH55-) CP8C-18	*CP8C-18*	(PH55-) PL8A-20HP-B	*PL8A-20HP-B*
(PH55-) MDC-24	*MDC-24*	(PH55-) SN-24	*SN-24*
(PH55-) CP-32	*CP-32*	(PH55-) PL-48	*PL-48*
(PH55-) PL-32DHP	*PL-32DHP*	(PH55-) PL-48DHP	*PL-48DHP*
(PH55-) PL-54DHP	*PL-54DHP*	(PH55-) CP8A-32	*CP8A-32*
(PH55-) CP8C-32	*CP8C-32*	(PH55-) PL8A-48HP	*PL-54DHP*
(PH55-) PL8A-54HP	*PL8A-54HP*	(PH55-) PL-32DFX	*PL-32DFX*
(PH55-) PL8A-32DFX-POR	*PL8A-32DFX-POR*	(PH55-) MDC-24FX	*MDC-24FX*
(PH55-) SN-24FX	*SN-24FX*	(PH55-) MDC8A-24FX	*MDC8A-24FX*
(PH55-) SN8A-24FX	*SN8A-24FX*	(PH55-) MT-12SQ1-B	*MT-12SQ1-B*
(PH55-) MT-24SQ1-B	*MT-24SQ1-B*	(PH55-) MT8A-12SQ1-B	*MT8A-12SQ1-B*
(PH55-) MT8A-24SQ1-B	*MT8A-24SQ1-B*	(PH55-) MT8A-24QD	*MT8A-24QD*