MMC 20 CARTRIDGE WITH CONNECTOR MOUNTING INSTRUCTION

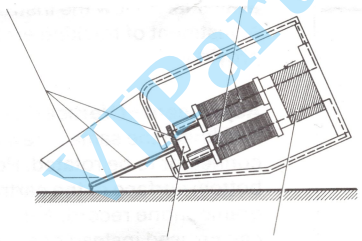
Bang & Olufsen

The MMC principle

Bang & Olufsen use the moving iron generating principle, in a particular geometry which we called the moving micro cross. An MMC cartridge is a transducer, which transforms mechanical energy to electrical energy.

The mechanical energy comes from movements of the stylus, cantilever, and generator element, supplied by information in the grove walls.

Electrical energy comes from the four coils, wound on each pole piece, connected in a push pull circuit. When the micro cross moves, the coils supply current to the amplifier input.



The moving part is suspended at one point, behind the micro cross. A specially formed butyle rubber block gives MMC cartridges the required compliance, which is virtuelly the same in all directions.

The magnetic energy begins at the permanent magnet, which supplies magnet flux to the four pole pieces, the micro cross and through the screen back to the magnet.

ETM, effective tip mass, is a mathematical concept for an equivalent mass placed at the stylus, and is the mass which the groove feels. This mass is calculated taking into account the stylus, cantilever, and generator element, and the value should be as low as possible, to obtain minimum record wear and linear frequency response in the upper end of the range.

Compliance, or elasticity, is the static value for the ease of movement of the stylus tip. The higher the value, the larger the compliance, but it is not always that the higher value is the better, because problems arise if the tone arm is not sufficiently light and easy to move. Compliance influences tracking ability in the bass and mid frequency regions.

Recommended stylus pressure or tracking force, is the static value of the force between the stylus tip and the record. It must be sufficiently large so that the stylus maintains contact with the groove walls at all times. The recommended value depends of the ETM value, the shape of the diamond, compliance, and the specification of the tonearm.

TECHNICAL SPECIFICATIONS	MMC 20S	MMC 20E	MMC 20EN	MMC 20CL
Stylus:	Spherical diamond	Elliptical diamond	Elliptical nude diamond	Contact line nude diamond
Radius of curvature:	15 µm	5 x 17 µm	5 x 17 µm	
Recommended tracking force:	15 mN/ 1.5 gram	15 mN/ 1.5 gram	12 mN/ 1.2 gram	10 mN/ 1 gram
Effective tip mass:	0.5 mg	0.5 mg	0.4 mg	0.3 mg
Compliance:	20 µm/mN	20 µm/mN	25 µm/mN	30 µm/mN
Frequency response:	20-20.000 Hz ±3 dB	20-20.000 Hz ±2.5 dB	20-20.000 Hz ±2 dB	20-20.000 Hz ±1 dB
Channel separation:	20 dB at 1000 Hz 15 dB 500 - 10.000 Hz	20 dB at 1000 Hz 15 dB 500 - 10.000 Hz	25 dB at 1000 Hz 20 dB 500 - 10.000 Hz	30 dB at 1000 Hz 20 dB 500 - 10.000 Hz
Channel difference:	<2 dB	<2 dB	<1.5 dB	<1 dB
Output voltage:	>0.6 mV/ cm/sec.	>0.6 mV/ cm/sec.	>0.6 mV/ cm/sec.	>0.6 mV/ cm/sec.
5 cm lat. RMS:	>2.12 mV	>2.12 mV	>2.12 mV	>2.12 mV
10 cm/sec. (DIN):	>8.5 mV	>8.5 mV	>8.5 mV	>8.5 mV
Total weight:	9.5 gram	9.5 gram	9.5 gram	9.5 gram

All specifications are minimum values.

Calibration conditions: **Load 47 kohms/220 pF.** **Temperature 22 - 24° C.**

If a record is warped, eccentric or otherwise defective, or if the pickup arm bearing friction is higher than 20 mg, or if the room temperature is well below calibration temperature or with a record which is cut at extremely high modulation levels it may be necessary to increase the stylus pressure.

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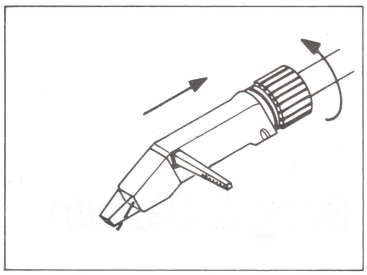
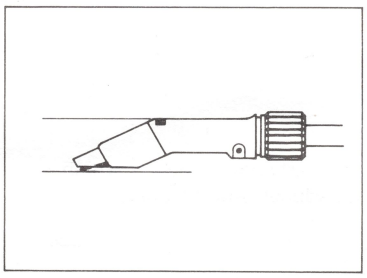
The MMC Connector

The MMC conector, type C, is designed for mounting MMC cartridges on universal tonearms.

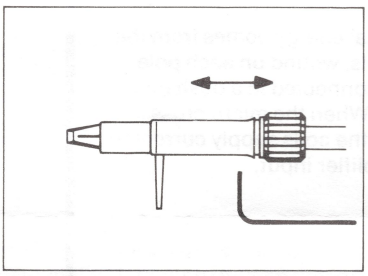
It is important that bearing frictions do not exceed 20 mg.



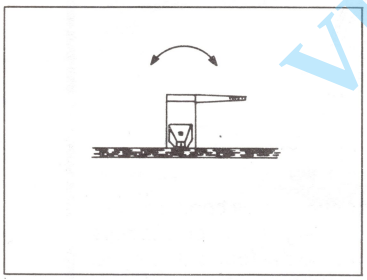
Mounting
Press the connector into the tonearm socket and turn the fixing nut clockwise until the connector is firmly in place.



Checking Vertical Tracking Angle
The top surface of the connector must be parallel to the gramophone record while playing. Follow the instructions for the tonearm for adjustment of tonearm height.

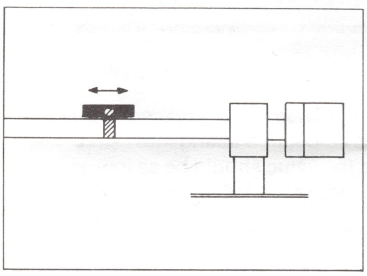


Adjustment of Overhang
Slackening the screw shown allows the position of the cartridge to be adjusted, so that stylus overhang is correctly set.
To slacken the screw by rotate it anti-clockwise using the key supplied.
The overhang is adjusted by moving the connector housing in or out as required, about 4 mm of adjustment being available. Follow the instructions for the tonearm for adjustment of tracking error, or use the adjustment jig if provided.



Adjustment of Vertical Tracking Angle
Slackning the same screw allows the cartridge with the connector to be rotated. Position the cartridge so that the bottom surface of the cartridge is parallel to the gramophone record. A thin mirror is an useful aid, which can be used instead of a record for better visual control.

Adjustment of Tracking Force
For correct tracking force, the tonearm counterweight must be correctly adjusted. Set the tracking force to zero, and move the counterweight until the arm balances. Follow the instructions for the tonearm.



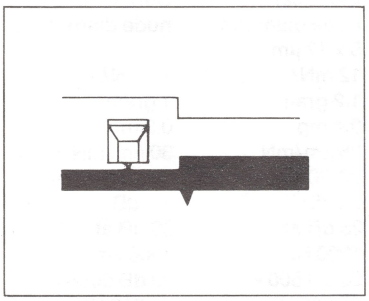
Extra balance weight
The weight of the MMC cartridge, together with this connector is only 9,5 gram.
If designed only for heavier cartridge, the counterweight will be too heavy to balance the tonearm when fitted with the MMC cartridge and connector.
In such cases the balancing weight should be used on the tonearm itself.

Tonearm with vertical tracking force adjustment combined with the counterweight

1. Move the counterweight so that it is as close as possible to the tonearm bearings.
2. Holding the counterweight firmly, adjust the vertical tracking force to 2 gram.
3. Move the counterweight including the vertical tracking force adjustment to 0 gram.
4. Clip the balancing weight to the tonearm tube at a point where the tonearm just balances.
5. Set vertical tracking force to the recommended value.

Tonearms with separate tracking force adjustment

1. Move the counterweight so that it is as close as possible to the tonearm bearings.
2. Set vertical tracking force to 0 gram.
3. Clip the balancing weight to the tonearm tube at a point where the tonearm just balances.
4. Set vertical tracking force to the recommended value.

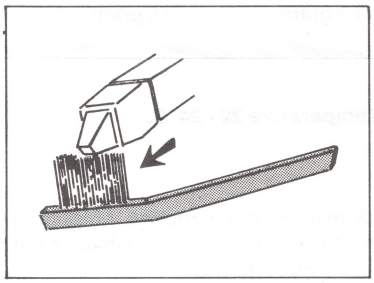


Use of stylus pressure gauge

A stylus pressure gauge is included among the accessories to enable you to check the stylus pressure. It is accurate to within 0.1 g.

The gauge is placed directly on the turntable mat, so that the measuring surface is at the same height as the surface of a record. The stylus should then be placed on the gauges center line, and moved along it until the underside of the gauge is parallel to gauges center line, and moved along it until the underside of the gauge is parallel to the mat. The stylus pressure can then be read off on the scale along-side the tip of the stylus.

Alternatively, the stylus tip is positioned on the centerline beside the desired stylus pressure on the scale, and the pick-up arm adjusted according to the manufactures instructions, until the gauge balances.



Use of cleaning brush

A cleaning brush, which is specially constructed for cleaning the stylus, is included with each pick-up unit.

To clean the stylus insert the brush under the metal part of the cartridge behind the exposed stylus assembly, and carefully brush forward, towards the clear protective housing.

WARNING

Brushing in the opposite direction or from side to side may damage the stylus assembly, and render your MMC 20 useless.