M300 SERIES: 3.00mm PITCH POWER CONNECTORS

MAY 2021

1. DESCRIPTION OF CONNECTOR AND INTENDED APPLICATION

The M300 connector series is a range of 3mm pitch male and female rectangular, fully shrouded, unsealed connectors. The range covers Single Row and Double Row connectors, capable of board-to-board, cable-to-board and cable-to-cable configurations. All female connectors have recessed contacts, and available in Cable and Vertical PC Tail versions. Male connectors use Ø1mm contacts to achieve up to 10A per contacts, and are available in Cable and Vertical PC Tail versions.

The connectors are gold plated for high performance and long service life, with a hard acid gold at 98% purity. Cable contacts are barrel-crimp style, and are replaceable in the housing. The cable housings have a low-profile potting wall to allow for back-potting - this provides additional strain relief and some sealing.

The M300 Connectors are designed as a 5-10A Power connector for High-Reliability applications. Connector housings are fitted with jackscrews for secure interconnection.

2. RATINGS

2.1. MATERIALS

All materials are listed on individual drawings.

Female Contacts	
Contact Clip	Beryllium Copper
Contact Shell	Brass
Male Contacts	Brass
Housing	30% Glass Filled Thermoplastic
Housing Flame Retardent Rating	UL94 V-0
Locking Hardware	Stainless Steel

2.2. ELECTRICAL CHARACTERISTICS

EIA-364-70A: Temperature Rise Versus Current, Method 2

All Contacts with 18 AWG wire and 30°C rise	10A max
All Contacts with 22 AWG wire and 30°C rise	5A max

EIA-364-23B: Low Level Contact Resitance ..... 6mΩ max

EIA-364-20-C: Withstanding Voltage Method B

Condition I Sea Level (913/1050mb)	1800V min DC or AC Peak
Condition IV 21,336M/70,000ft (44mb max)	450V min DC or AC Peak

Working Voltage (1/3 of Withstanding Voltage)

Condition I Sea Level (913/1050mb)	600V max DC or AC Peak
Condition IV 21,336M/70,000ft (44mb max)	150V max DC or AC Peak

EIA-364-21C: Insulation Resistance ..... 100 MΩ min at 100V DC

2.3. ENVIRONMENTAL CHARACTERISTICS

Environmental Classification ..... 65/175/56 days at 90%RH

EIA-364-31B: Humidity, Condition D Method II ... 56 Days, 90% RH at 40°C

EIA-364-17B: Temperature Life, Method A ..... 175°C, 1000 Hours

EIA-364-32C: Thermal Shock, Condition V ..... -65°C to +175°C Temperature Range

EIA-364-28D: Vibration, Condition II ..... 10Hz to 500Hz, 1.52mm, 98.1m/s^2 (10G), 9 Hours

BS EN 60068-2-27 (EIA-364-27B): Shock ..... 981m/s^2 (100G), 6ms, 3 Axis

BS EN 60068-2-27 (EIA-364-27B): Bump ..... 390m/s^2 (40G), 6ms, 3 Axis, Total 4,000 Bumps

EIA-364-01B: Acceleration, Condition A ..... 490m/s^2 (50G), 5 minutes, 3 Axis

2.4. MECHANICAL CHARACTERISTICS

EIA-364-09C: Durability.....1000 operations

EIA-364-13C: Mating and Unmating Force, Method B
Mating force per contact .....9.0N max
Unmating force per contact.....1.0N min

EIA-364-05B: Contact Insertion and Removal Force in Housing
Insertion force per Cable contact.....75N max
Removal force per contact .....15N min
Cable contact replacement in housing .....5 times min

2.5. WIRE TERMINATION RANGE – CABLE CRIMP PRODUCTS ONLY

Wire Type (recommended)..... BS 3G 210 type A or MIL-16878E type E
Wire Type (possible alternatives)..... Mil-W-16878/4E type E, UL AWN 1213, NEMA HP3-EXBFBE
Insulation Strip Length..... 2mm

EIA-364-08B: Crimp Tensile Strength

Conductor					Crimp Tool Setting No.	Max Insulation Dia. mm	Hand Crimp Tool: M2252/2-01 Positioner: Z80-058	Minimum Pull-Out Force
Size	Stranding	Diameter	Area	Circular MIL Area				
AWG	No. x Ømm	mm	Mm^2	CMA				N
18	19 x 0.25	1.28	0.96	1840	8	1.80		140
20	19 x 0.20	1.00	0.60	1178		1.80		80
22	19 x 0.15	0.75	0.34	663		1.40		50

Note: Pull-Out Force Guidelines change depending on Industry recognised standards:
UL 486A are 18AWG = 89.0N, 20AWG = 57.9N and 22AWG = 35.6N
VW 60330 are 18AWG = 85.0N, 20AWG = 60.0N and 22AWG = 50.0N
SAE USCAR-21 are 18AWG = 88.9N, 20AWG = 75.2N and 22AWG = 49.8N
IEC 60352-2 are 18AWG = 101.3N, 20AWG = 73.1N and 22AWG = 51.2N
NASA-STD-8739-4 are 18AWG = 142.0N, 20AWG = 93.4N and 22AWG = 57.8N
SAE AS7928/MIL-T-7928 are 18AWG = 169.0N, 20AWG = 84.5N and 22AWG = 67.2N

2.6. CRIMPING AND ASSEMBLY METHODS

For information on crimping contacts, refer to Tooling Instruction Sheet IS-01 – Hand Crimp Tool M22520/2-01.

For information on assembling and removing contacts from connector housing, refer to Tooling Instruction Sheet IS-40 – Assembly Tool Z300-902.

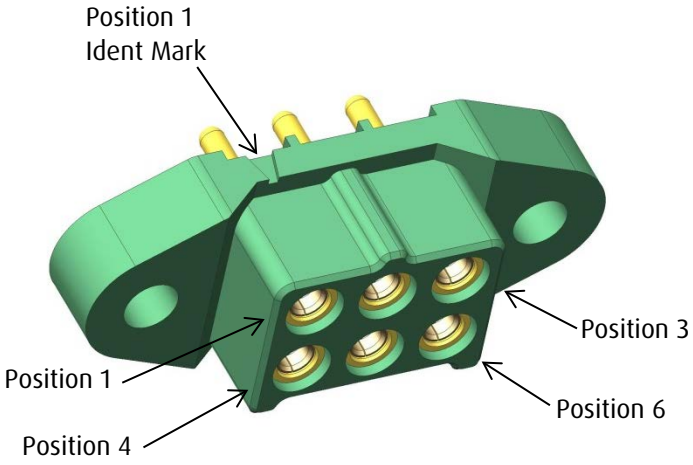
Visit www.harwin.com/harwintv for a full instruction video.

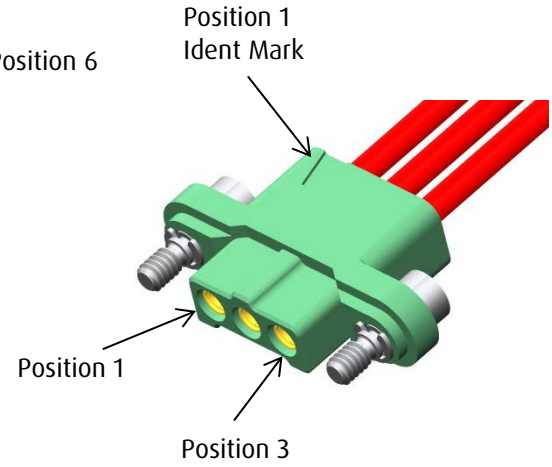
Recommended potting compound is EPOXIES 50-3122

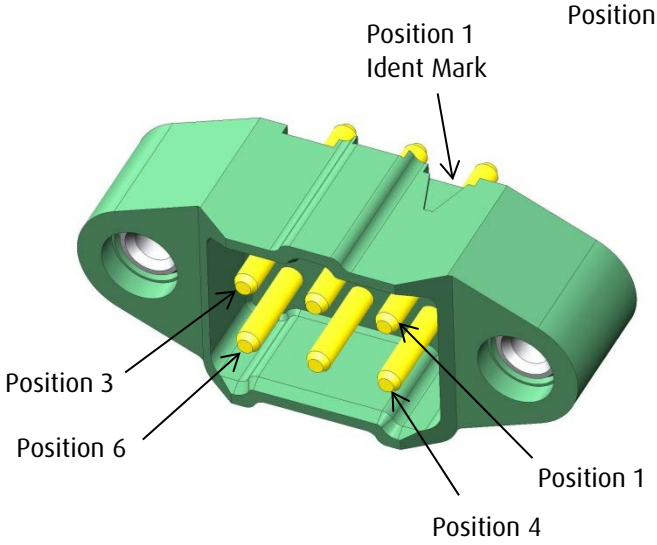
APPENDIX 1

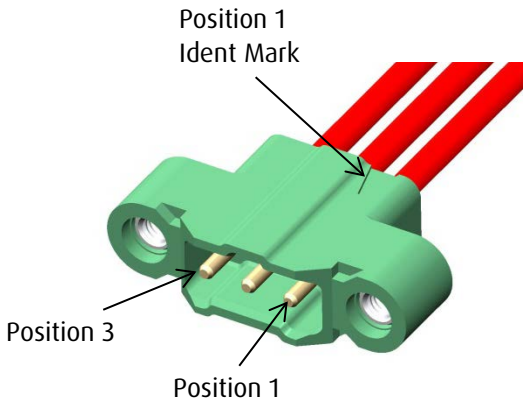
Contact Numbering of Positions

Position 1 identification mark is present on all connectors.





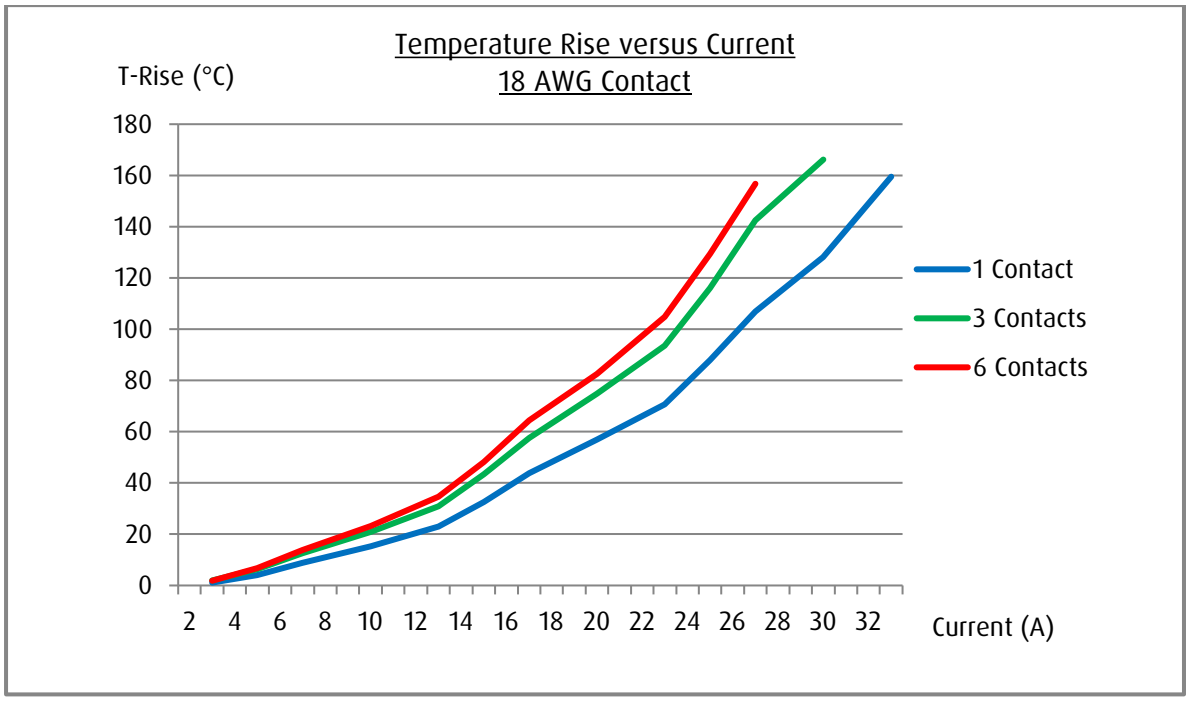


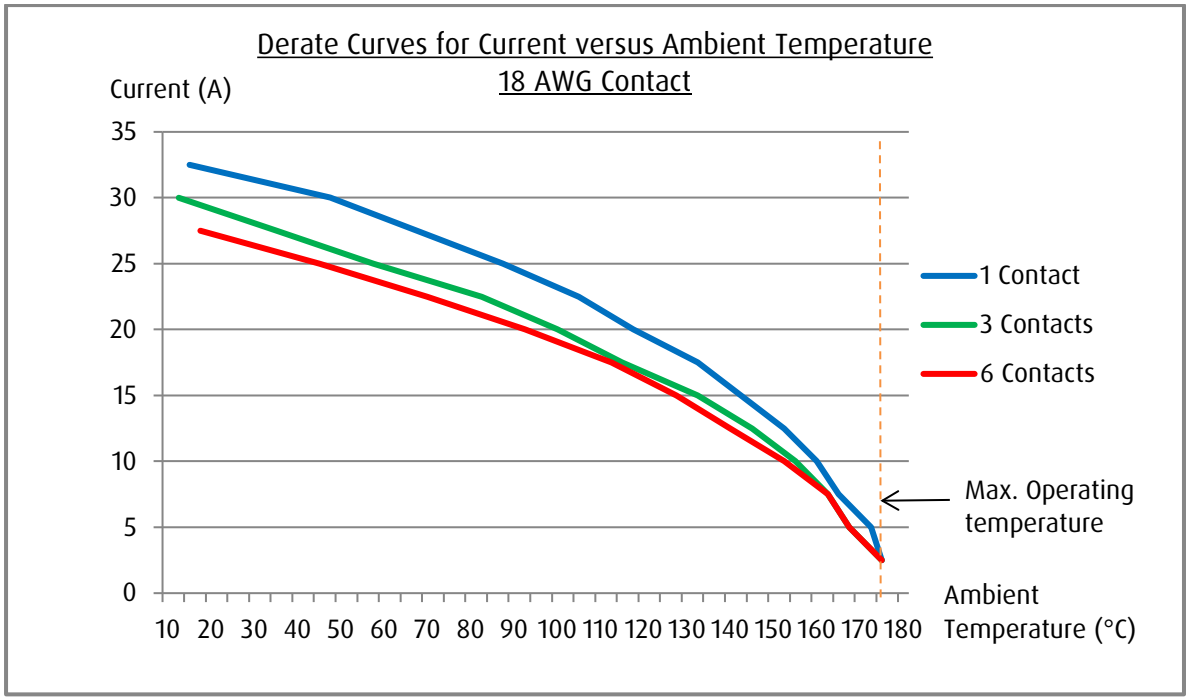


APPENDIX 2

EIA-364-70A Method 2 - Power Derating Curves

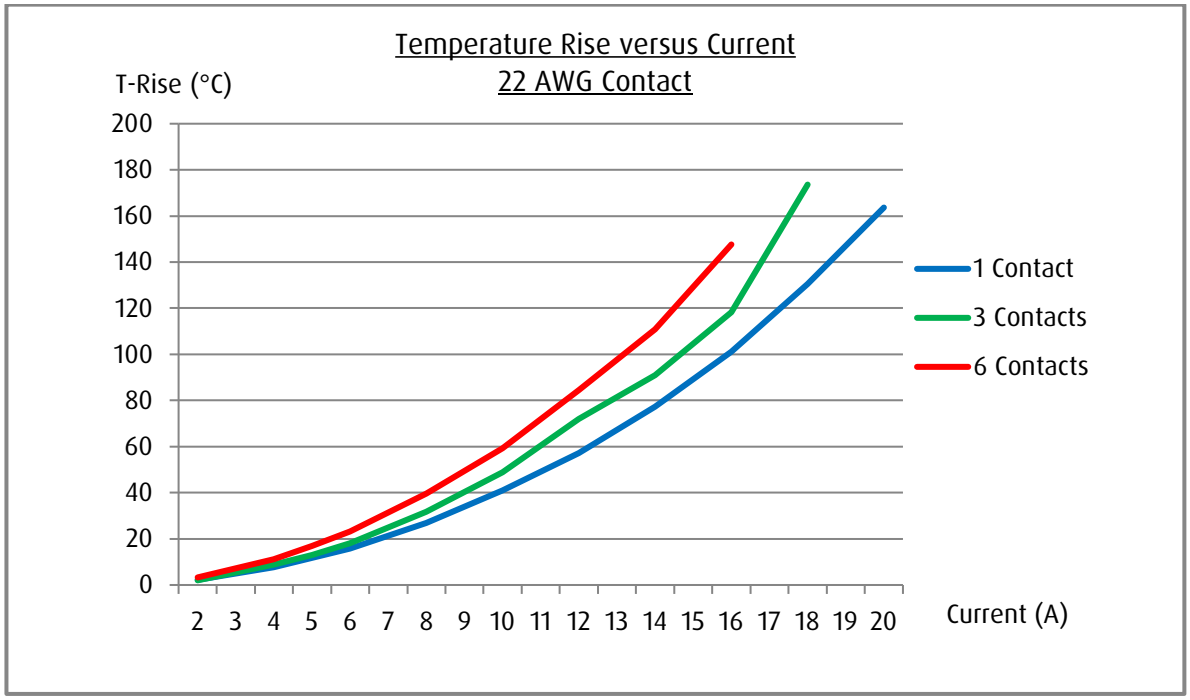
Tested in typical laboratary conditions. Curves are the result of average taken from the results of three samples of single row conectors and three samples of dual row connectors. Six contact curve is produced from dual row connectors only.

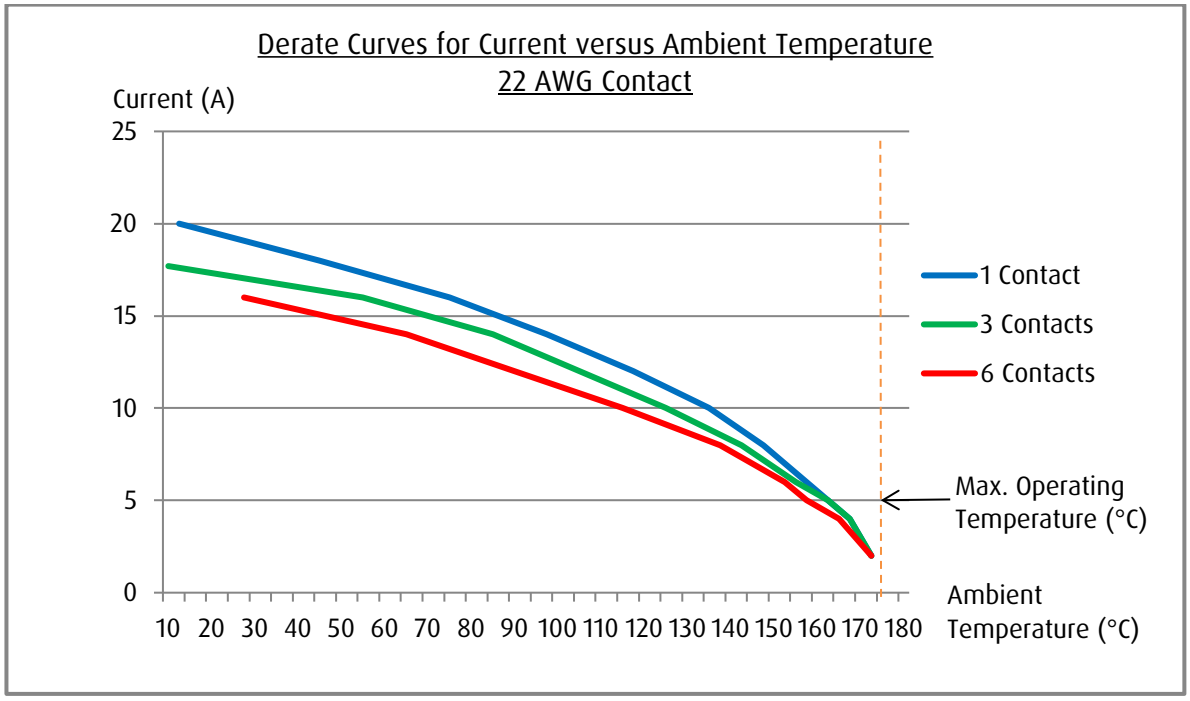




See next page for 22 AWG Contact Power Derating Curves.

APPENDIX 2 (continued)





APPENDIX 3

INSTRUCTIONS FOR THE USE OF CONNECTORS FITTED WITH JACKSCREWS

Connectors are fitted with jackscrews where it is considered necessary to provide mechanical assistance in ensuring a satisfactory engagement and separation of the connector. This may apply in cases where engagement and separation forces are so high as to prevent satisfactory hand engagement, or where access to connector is restricted. Jackscrews also provide a locking feature, preventing the connector from disengaging under adverse conditions.

In order to obtain maximum effectiveness from the jackscrew system, the following rules for their use should be observed.

1. On engaging the two halves of the connector after ensuring correct polarity, lightly push home the floating half until the jackscrews touch. Then, maintaining the pressure, turn one of the floating jackscrews clockwise, until it engages with the fixed screw. Repeat with the other screw.
2. Then screw in each jackscrew, ensuring even loading by applying a maximum of one turn to each screw in sequence until the connector is bottomed. This will be evident by a sudden increase in the torque required on the screw. This torque should not exceed 23cmN.

NB: Care to be taken when aligning male and female threads to avoid cross-threading and possible failure of parts.

3. On disengaging the two halves of the connector turn each of the floating jackscrews anti-clockwise. Again ensure even loading by turning each screw in sequence for a maximum of one turn until the jackscrew disengage. The connector can then be easily pulled apart.