MULTIMODE CONNECTORIZED LASER DIODE FAMILY

(with index guided laser of 5.6 mm)

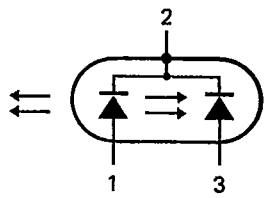
The CQF23/D series are laser receptacles designed for short distance optical communication through multimode fibres. Each device has a diameter of 8.0 mm and contains an AlGaAs compact disc laser diode, a coupling graded index lens and a stainless steel housing including a fibre-optic adapter. The receptacle delivers a maximum output power of 2.2 mW and emits light at a wavelength of 790 nm. It has been designed for coupling to a graded index fibre of 50/125 microns. The AlGaAs laser diode has been built in a hermetically sealed ϕ 5.6 mm optical package. Within this family several different types of connectors (FC, SMA, ST etc) and outlines are available. A survey of options is given in Table 1. The preferred options are CQF23/D21, CQF23/D22 and CQF23/D23.

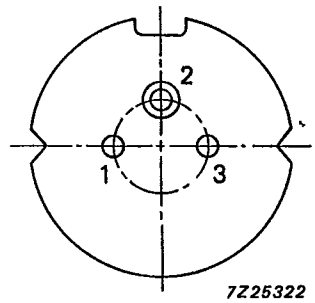
QUICK REFERENCE DATA (T_{case} = 25 °C)

Operating current at an output power of P_o = 2 mW at the end of a 1 m fibre	I_{op}	typ.	55 mA
Wavelength at peak emission	λ_p	typ.	790 nm

Pinning *

1 = Laser anode
2 = Common case
3 = Monitor diode anode





bottom view

Table 1 Survey of options

CQF23/D. .	Mounting description	Connector type	Mechanical data see Fig.
11	No flange	FC	3
12	No flange	SMA	4
13	No flange	ST	5
14	No flange	Pigtail (50/125)	6
21**	2-hole flange	FC	7
22**	2-hole flange	SMA	8
23**	2-hole flange	ST	9
24	2-hole flange	Pigtail (50/125)	10
41	Mounting block	FC	11
42	Mounting block	SMA	12
43	Mounting block	ST	13
44	Mounting block	Pigtail (50/125)	14
52	Potentiometer	SMA	15

* Pinning information applies to all types.
** Preferred options.

MAXIMUM RATINGS

T_{case} = 25 °C ± 2 °C unless otherwise specified.

Limiting values in accordance with the Absolute Maximum System (IEC 134)

CW optical output power	P_o	max.	2.2 mW
Laser diode reverse voltage	V_R	max.	2.0 V
Monitor diode reverse voltage	V_{RM}	max.	30 V
Monitor diode forward current	I_M	max.	10 mA
Operating temperature range (T_{case})	T_{op}		−10 to +60 °C
Storage temperature range (T_{amb})	T_{stg}		−40 to +85 °C

CHARACTERISTICS

T_{case} = 25 °C ± 2 °C and P_o = 2 mW
at the end of a 1 m fibre unless otherwise stated.

		min.	typ.	max.	
Electrical					
Operating current	I_{op}		55	85	mA
Operating voltage	V_{op}		1.8	2.5	V
Differential efficiency (from 1.8 to 2.2 mW)	η	0.08	0.2	0.4	mW/mA
Monitor current at V_{RM} = 15 V	I_M	200	700	1200	μA
Monitor dark current at V_{RM} = 15 V	I_D			100	nA
Monitor capacitance at V_{RM} = 15 V	C		5	7.5	pF
Optical					
Wavelength at peak emission	λ_p	780	790	800	nm
Spectral width (FWHM)	$\Delta\lambda$			2.0	nm
Modulation band width (−3 dB) (modulation index m = 0.1)			500		MHz
RIN intensity noise	RIN	−90			dB
Rise and fall time (10 to 90%) pulse conditions: pulsed output power 0 to 2 mW, current pulse width 2 ns, rise, fall times 0.2 ns	t_r, t_f			0.5	ns
Tracking Error (T_{case} = 0 °C to 60 °C) (with respect to output power at T_{case} = 25 °C)	T.E	−10		10	%

SAFETY PRECAUTIONS

Aluminum gallium arsenide laser diodes emit infrared radiation which is invisible to the human eye. Extreme care must be taken to prevent the beam from being viewed either directly or through external optics or mirrors.
Viewing laser light, particularly a collimated or focused beam may cause severe permanent eye damage. The use of protective goggles is strongly recommended while operating these devices. An infrared viewer or phosphor card may be used for aligning the beam.

This product conforms to all applicable standards of DHHS regulations 21CFR sub-chapter J, at the date of manufacture and falls within international safety class 3B.

Due to the small size of these devices, the required warning label is affixed to the box containing the laser diodes. The warning label for single packed devices is shown in Fig.1 and for multiple packed devices in Fig.2.

DEVELOPMENT DATA

OPERATING AND HANDLING PRECAUTIONS

Semiconductor laser diodes in general are easily damaged by overdriving and electrical transients. Electrically, the laser diode is a very reliable device and can easily withstand current surges of several amperes. Optically, however, the laser diode is more susceptible to damage because of the extremely high optical flux density passing through both facets, while in operation. By overdriving or transients to the laser diode, even for pulses in the nanosecond region, the optical flux density can rise to unacceptable values (10 to 100 MW/cm^2), causing gradual or catastrophic degradation of the laser diode facets. Current transients should therefore be carefully avoided; they can substantially decrease the laser diode life time and may cause irreparable damage. Before connecting the laser diode to the supply circuit, make sure that there are no transients which could make the laser diode output exceed the maximum rating for radiant flux or forward current.

The following precautions should be taken to avoid failure or damage to the device:

- Workers and work benches should be grounded at all times when working with laser diodes.
- All equipment, including power supplies, soldering irons, etc. must be grounded to a common stable earth ground.
- Power supplies should be well regulated and free of transients.
- Drive circuits should include a "slow start and stop" feature to suppress turn-on/turn-off transients.
- High quality and high reliability components should be used throughout the drive circuits.
- Drive circuit connections should be made either by soldering or by high reliability connectors. Clip leads such as alligator clips are not recommended.
- It is recommended that these devices are driven by an Automatic Power Control (APC) circuit using the built-in monitor photodiode in a feedback loop to maintain constant optical power output over the full operating temperature range and throughout the life of the device.
- Always store laser diodes in static free containers or use short circuit connector.
- Never connect or disconnect any components, or external equipment such as voltmeters, to or from the drive circuit while the power is on.
- Avoid touching the glass window. If necessary, clean gently with a cotton swab dampened with alcohol.

Do not underestimate the sensitivity of these devices to damage from electrostatic discharge and short duration surge currents. If you have any questions regarding the handling and operation of these devices please contact your local Philips representative.

WARNING

The laser diode is extremely sensitive to electrostatic discharges. The anode and the cathode shall therefore always be shorted when the laser diode is disconnected.

OPERATIONAL HAZARD – SEMICONDUCTOR LASER DIODE

This laser diode emits radiation which is invisible to the human eye. When in use, do not look directly into the device. Direct viewing of laser diode emission at close range may cause eye damage, especially in conjunction with collimating lenses.

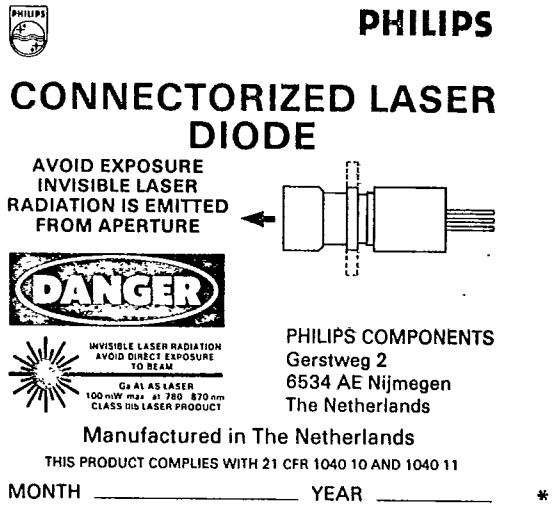


Fig.1.

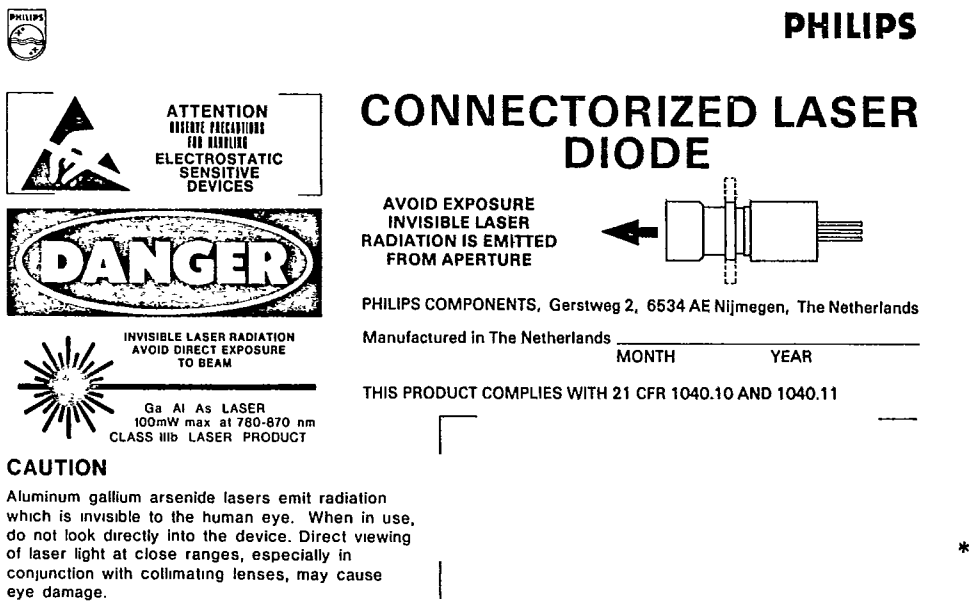


Fig.2.

* Quantity, type number, code number and code of week of production are indicated on separate label.

MECHANICAL DATA

Dimensions in mm

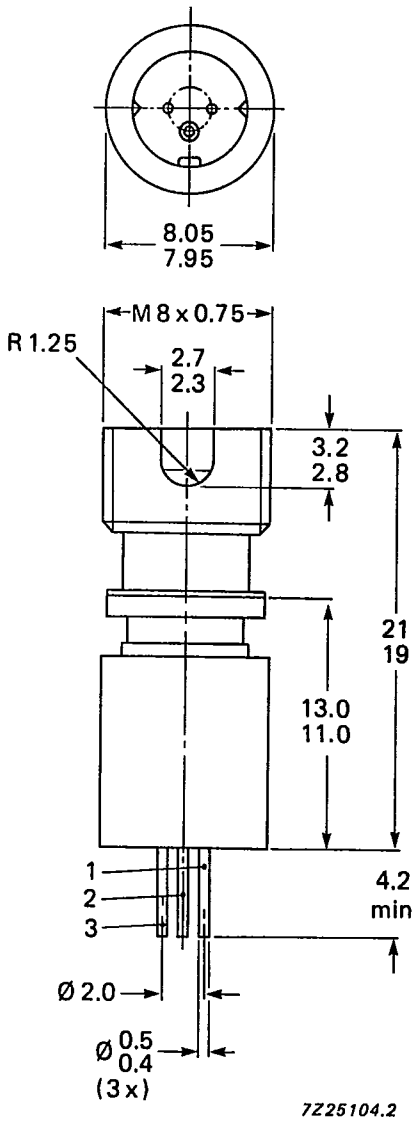


Fig.3 CQF23/D11; FC type connector (no flange).

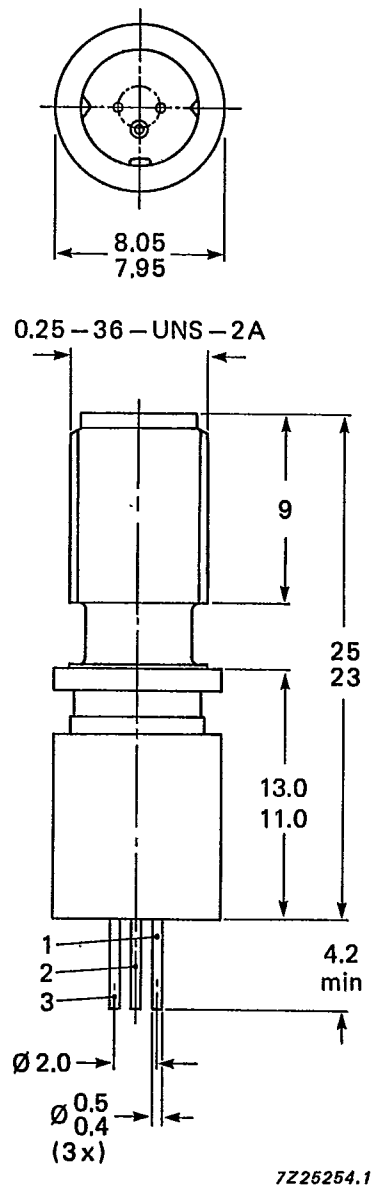


Fig.4 CQF23/D12; SMA type connector (no flange).

Dimensions in mm

DEVELOPMENT DATA

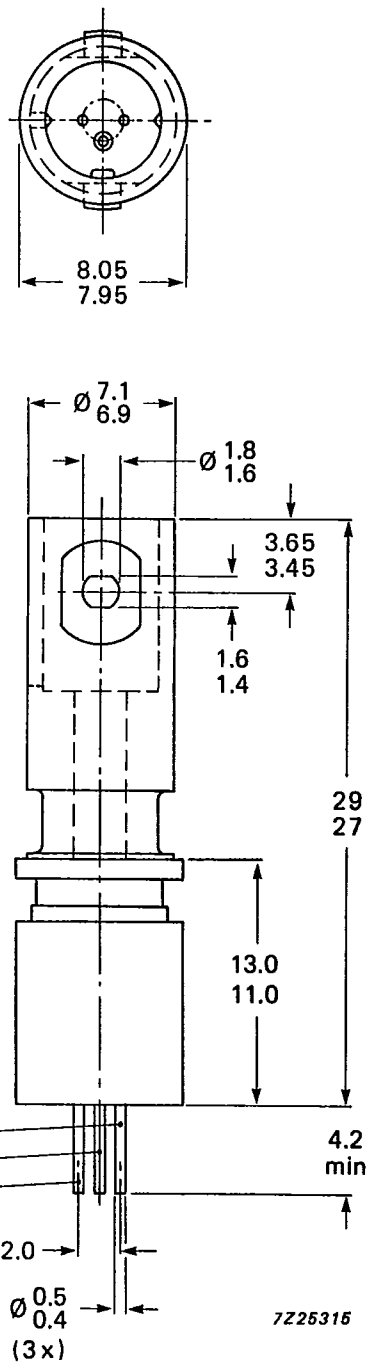


Fig.5 CQF23/D13; ST type connector (no flange)

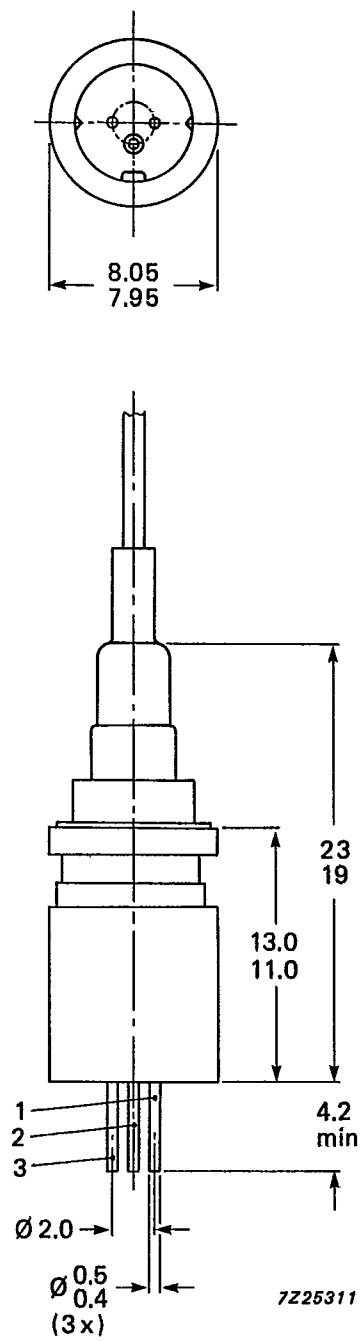
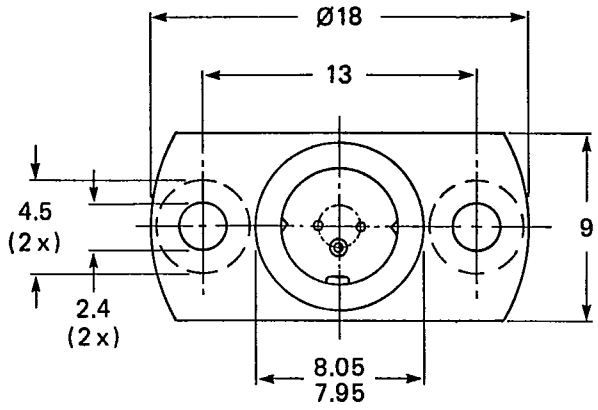
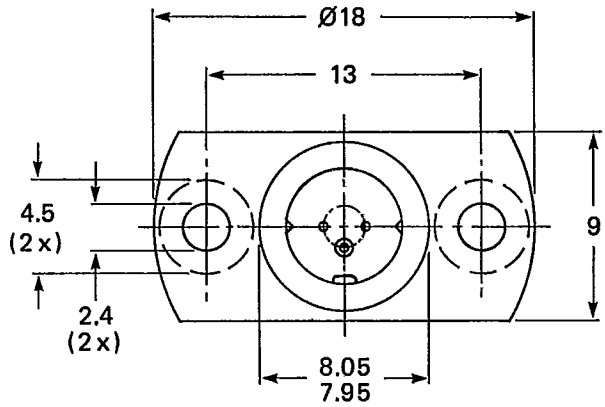


Fig.6 CQF23/D14; Pigtail (50/125) (no flange).

MECHANICAL DATA (continued)

Dimensions in mm





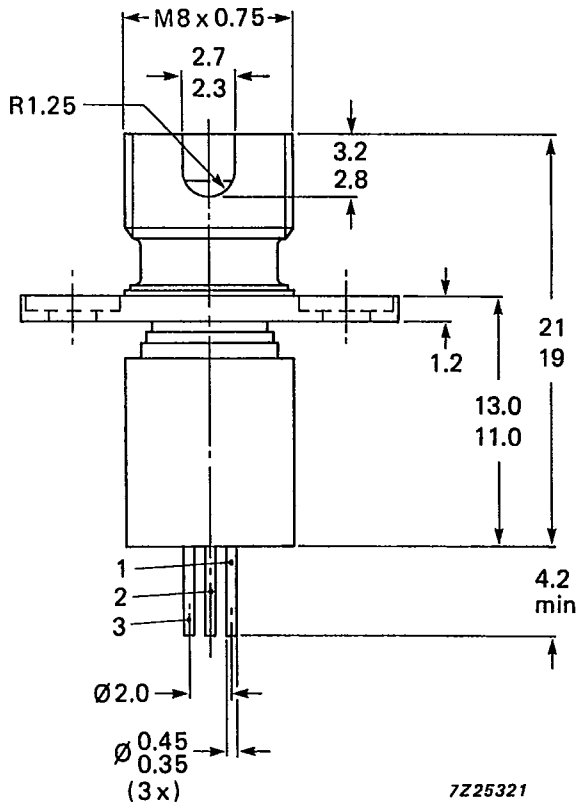


Fig.7 CQF23/D21; FC type connector (2-hole flange).

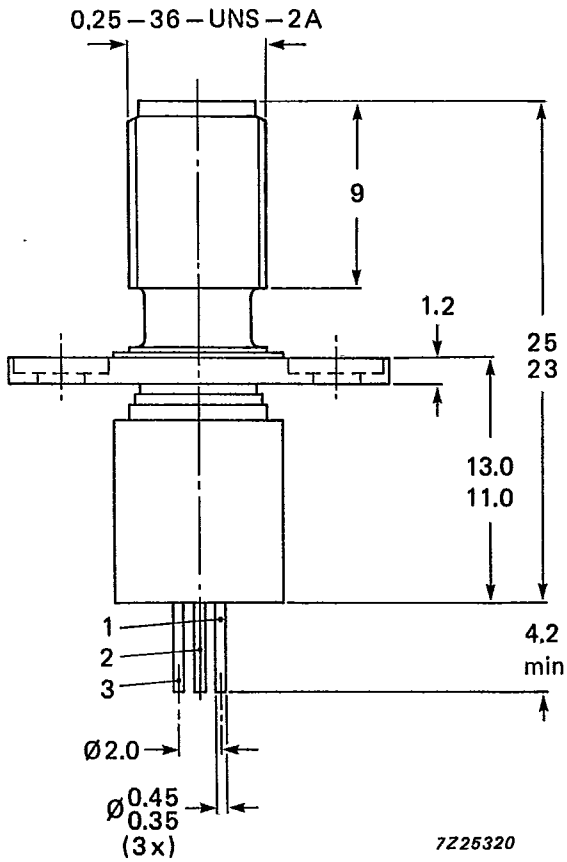
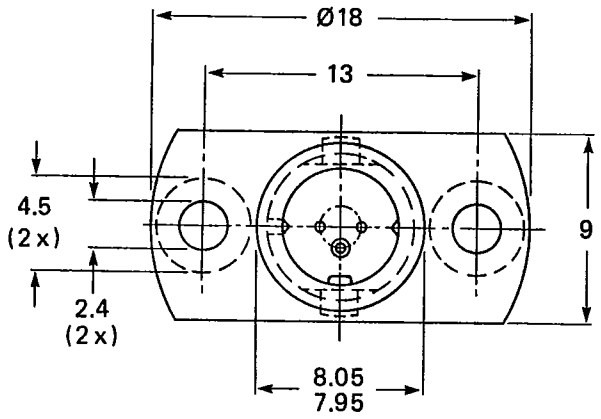
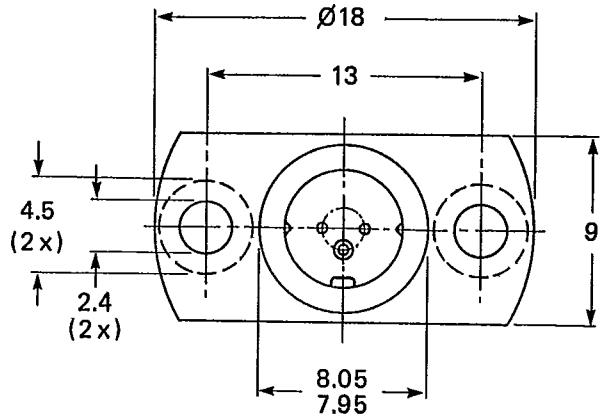


Fig.8 CQF23/D22; SMA type connector (2-hole flange).

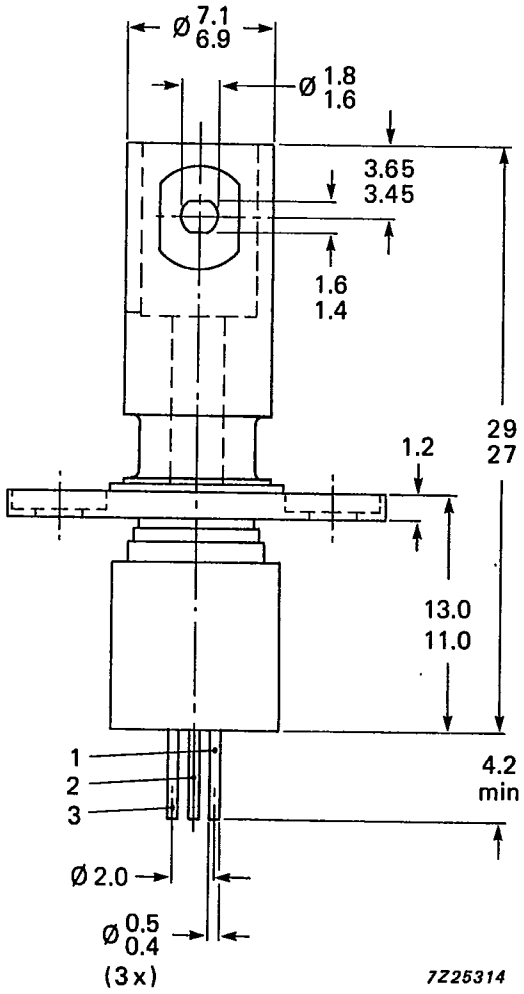
T-41-07

Dimensions in mm





DEVELOPMENT DATA



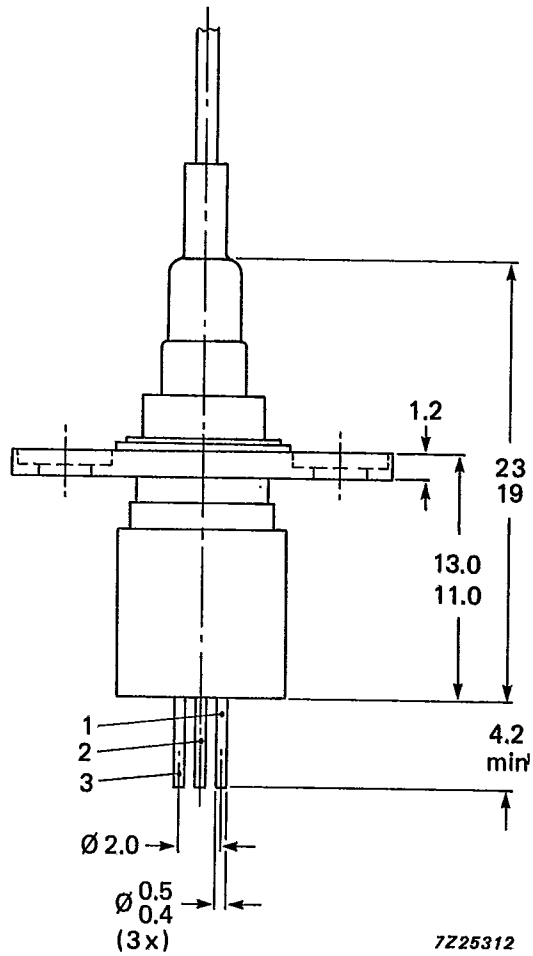
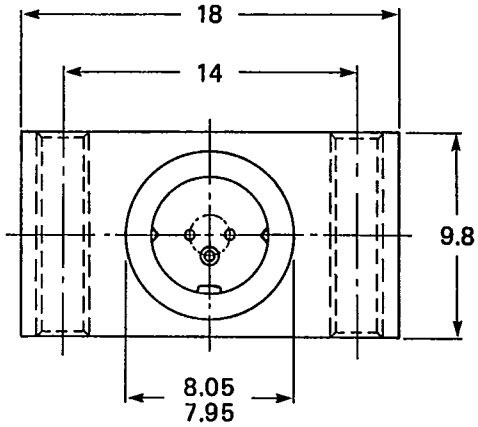


Fig.9 CQF23/D23; ST type connector (2-hole flange).

Fig.10 CQF23/D24; Pigtail (50/125) (2-hole flange).

MECHANICAL DATA (continued)

Dimensions in mm



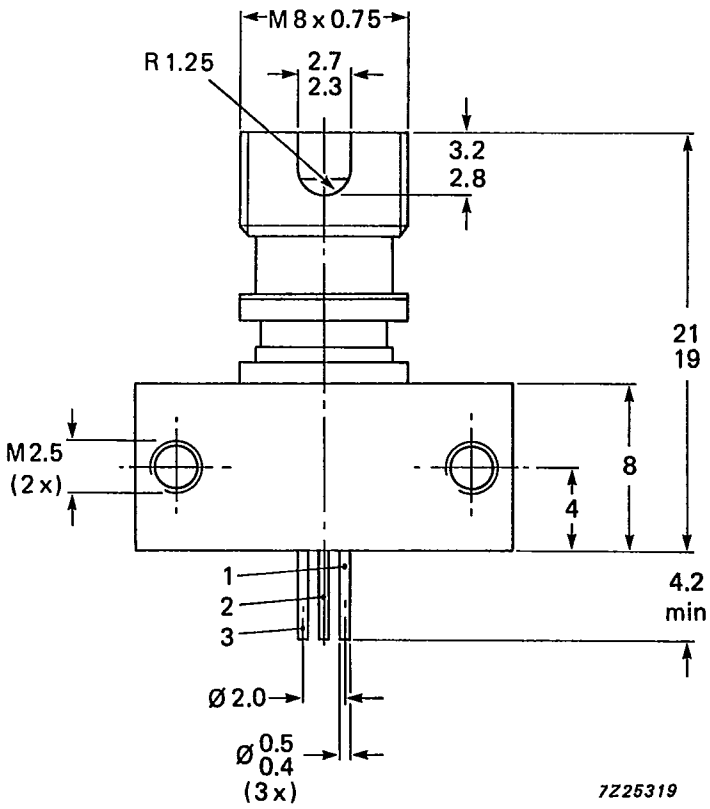
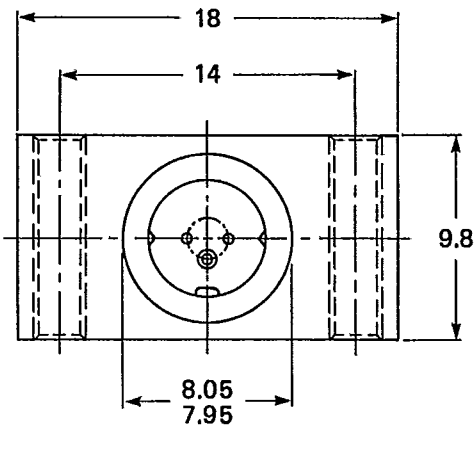


Fig.11 CQF23/D41; FC type connector (mounting block).



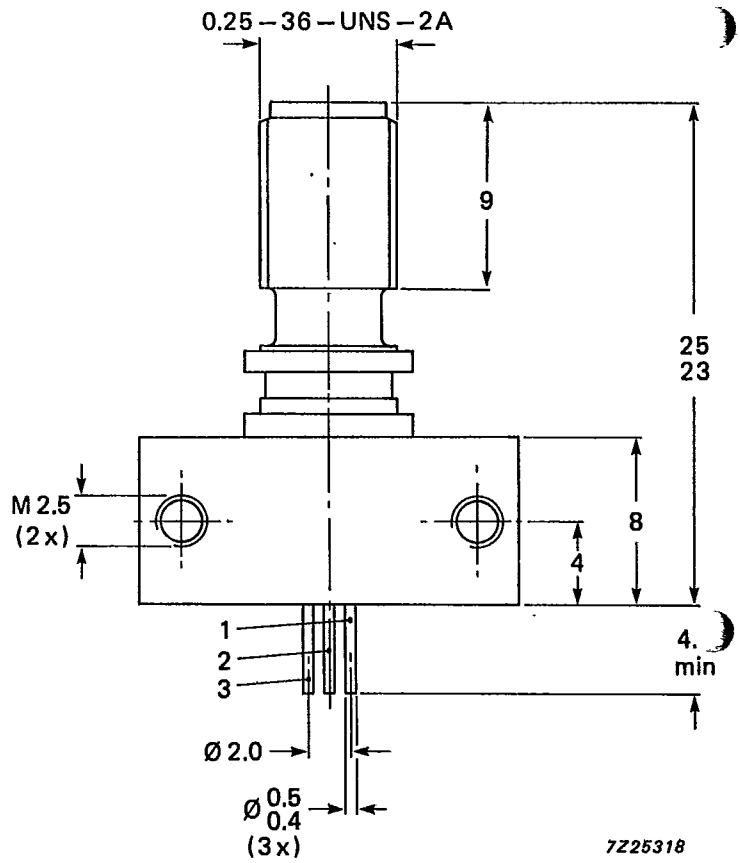
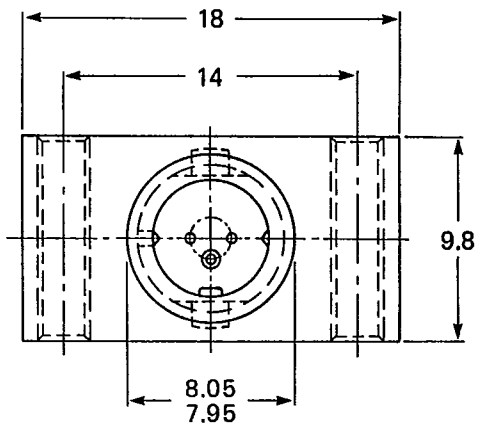
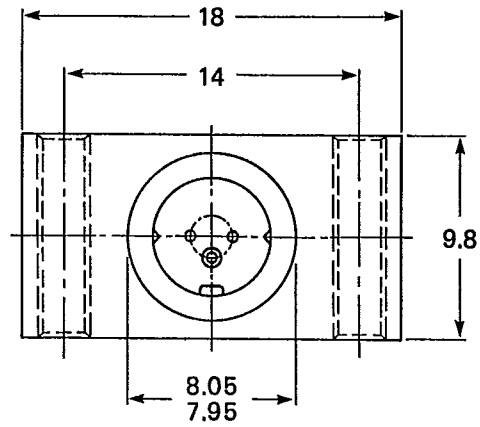


Fig.12 CQF23/D42; SMA type connector (mounting block).

Dimensions in mm





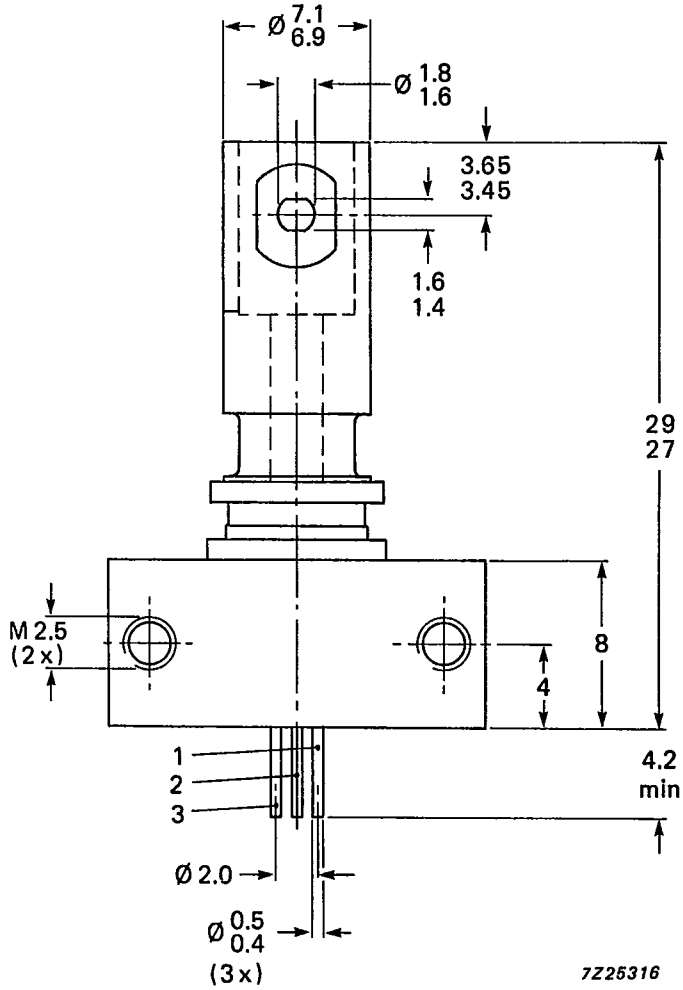


Fig.13 CQF23/D43; ST type connector (mounting block).

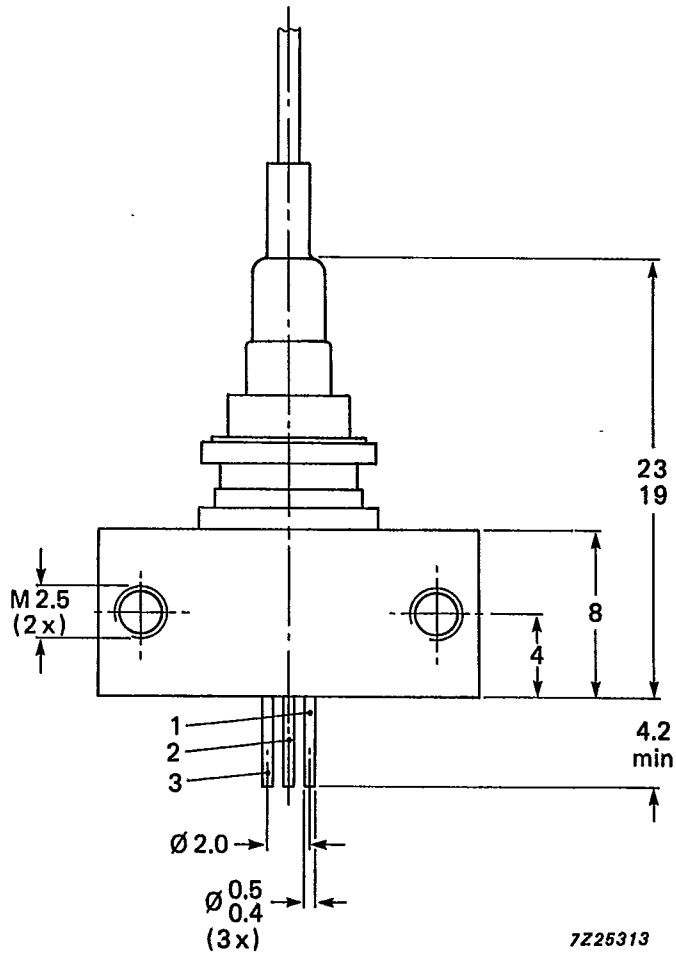


Fig.14 CQF23/D44; Pigtail (50/125) (mounting block).

MECHANICAL DATA (continued)

Dimensions in mm

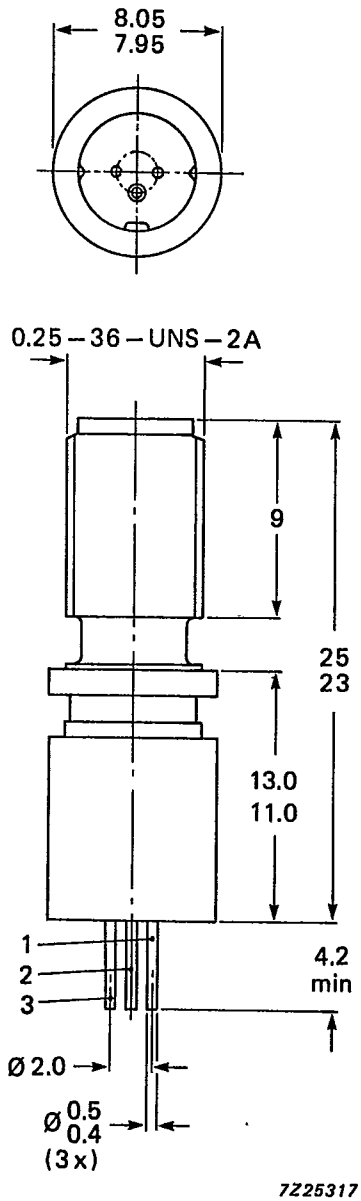


Fig.15 CQF23/D52; SMA type connector (potentiometer).