

DEVELOPMENT DATA

This data sheet contains advance information and specifications are subject to change without notice.

PHILIPS INTERNATIONAL

A Note T-41-07

MULTIMODE CONNECTORIZED LASER DIODE FAMILY

(with gain guided laser of 5.6 mm)

The CQF25A/D, CQF25B/D and CQF25C/D are laser receptacles designed for short distance optical communication through multimode fibres. Each device has a diameter of 8.0 mm and contains a gain guided AlGaAs laser diode, a coupling graded index lens and a stainless steel housing including a fibre-optic adapter. The receptacles deliver a maximum output power of 2.5 mW and emit light at wavelengths of 820, 850 and 875 nm respectively for the CQF25A/D, CQF25B/D and CQF25C/D. They have been designed for coupling to a graded index fibre of 50/125 microns. The AlGaAs laser diodes have been built in hermetically sealed ϕ 5.6 mm optical packages. Within this family, several different types of connectors (FC, SMA, ST etc) and outlines are available. A survey of options for each device is given in Table 1. The preferred options are CQF25A/D21, CQF25A/D22 and CQF25A/D23.

QUICK REFERENCE DATA ($T_{case} = 25^\circ C$)

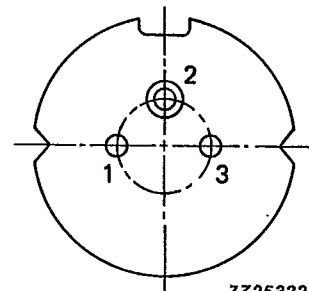
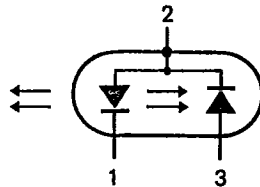
Operating current at an output power of
 $P_o = 2$ mW at the end of a 1 m fibre

		I_{op}	typ.	90 mA
Wavelength at peak emission	CQF25A/D	λ_p	typ.	820 nm
	CQF25B/D	λ_p	typ.	850 nm
	CQF25C/D	λ_p	typ.	875 nm

DISCRETE SEMICONDUCTORS
tab 2

Pinning*

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



7225322
bottom view

Table 1 Survey of options

CQF25A/D. CQF25B/D. CQF25C/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.

9397 197 90142



MAXIMUM RATINGS

$T_{case} = 25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ unless otherwise specified

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

CW optical output power	P_o	max.	2.5 mW
Laser diode reverse voltage	V_R	max.	1.0 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 $^{\circ}\text{C}$
Storage temperature range (T_{amb})	T_{stg}		-40 to + 85 $^{\circ}\text{C}$

CHARACTERISTICS

$T_{case} = 25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and $P_o = 2\text{ mW}$ at the end of a 1 m fibre unless otherwise stated.

Electrical

		min.	typ.	max.
Operating current	I_{op}		90	150 mA
Operating voltage	V_{op}		2.0	2.5 V
Differential efficiency (from 1.8 to 2.2 mW)	η	0.08	0.14	0.3 mW/mA
Monitor current at $V_{RM} = 15\text{ V}$	I_M	200	500	1000 μA
Monitor dark current at $V_{RM} = 15\text{ V}$	I_D			20 nA
Monitor capacitance at $V_{RM} = 15\text{ V}$	C		5	10 pF

Optical

Wavelength at peak emission	CQF25A/D	λ_p	805	820	835 nm
	CQF25B/D	λ_p	836	850	865 nm
	CQF25C/D	λ_p	866	875	885 nm
Spectral width (FWHM)		$\Delta\lambda$		6	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 ($T_{case} = 0\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$) (with respect to output power at $T_{case} = 25\text{ }^{\circ}\text{C}$)		T.E	-10		10 %

Laser diode family

CQF25A/D SERIES
CQF25B/D SERIES
CQF25C/D SERIES

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SAFETY PRECAUTIONS

Aluminium 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.

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**PHILIPS**

April 1989

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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/cm²), 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.

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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.

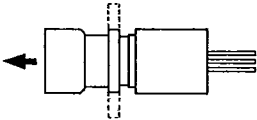

DEVELOPMENT DATA



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CONNECTORIZED LASER DIODE


AVOID EXPOSURE
INVISIBLE LASER
RADIATION IS EMITTED
FROM APERTURE


PHILIPS COMPONENTS
Gerstweg 2
6534 AE Nijmegen
The Netherlands

Manufactured in The Netherlands
THIS PRODUCT COMPLIES WITH 21 CFR 1040.10 AND 1040.11
MONTH _____ YEAR _____ *

Fig.1.

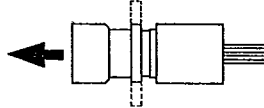


PHILIPS




CONNECTORIZED LASER DIODE

AVOID EXPOSURE
INVISIBLE LASER
RADIATION IS EMITTED
FROM APERTURE



PHILIPS COMPONENTS, Gerstweg 2, 6534 AE Nijmegen, The Netherlands
Manufactured in The Netherlands
MONTH _____ YEAR _____
THIS PRODUCT COMPLIES WITH 21 CFR 1040.10 AND 1040.11



CAUTION
Aluminum gallium arsenide lasers emit radiation which is invisible to the human eye. When in use, do not look directly into the device. Direct viewing of laser light at close ranges, especially in conjunction with collimating lenses, may cause eye damage.

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Fig.2.

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

MECHANICAL DATA

Dimensions in mm

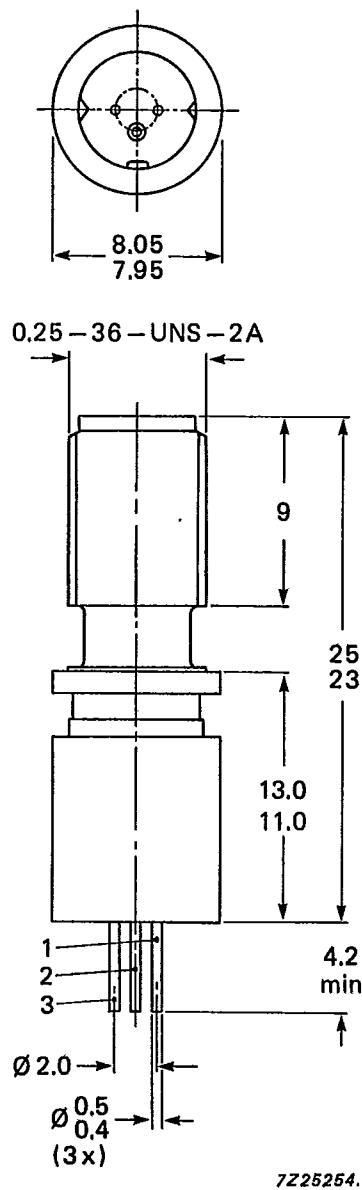
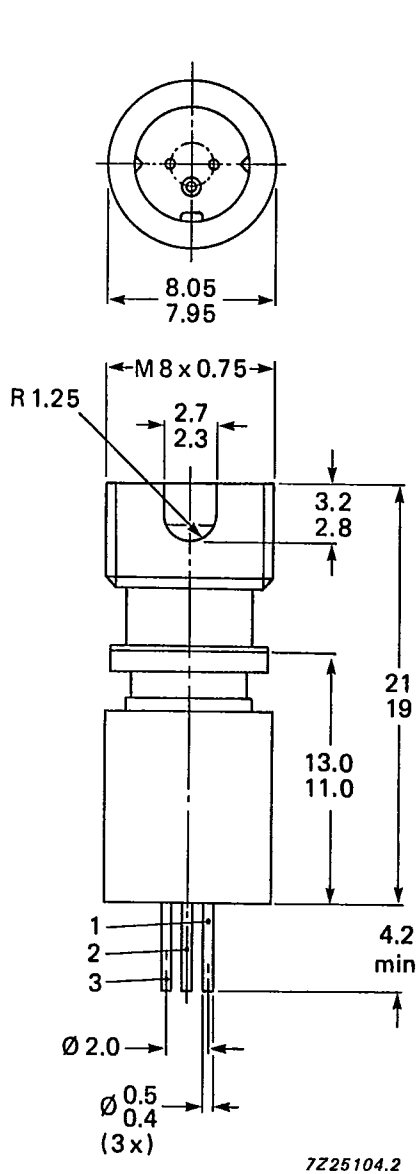


Fig.3 CQF25A/D11; FC type connector (no flange).

Fig.4 CQF25A/D12; SMA type connector (no flange).

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Dimensions in mm

DEVELOPMENT DATA

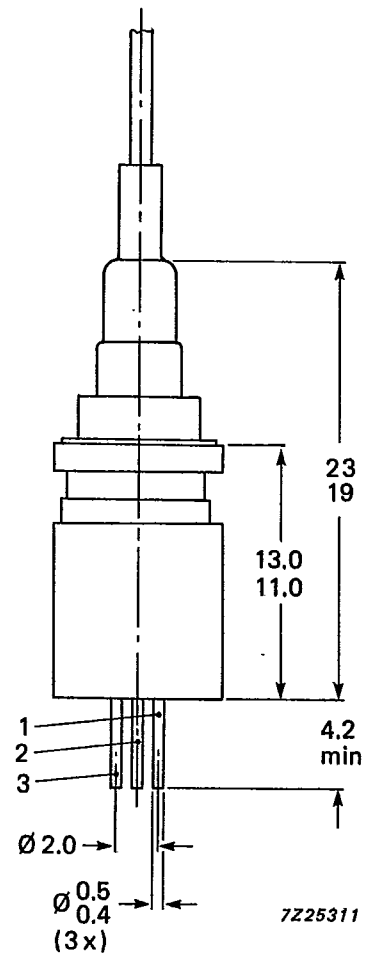
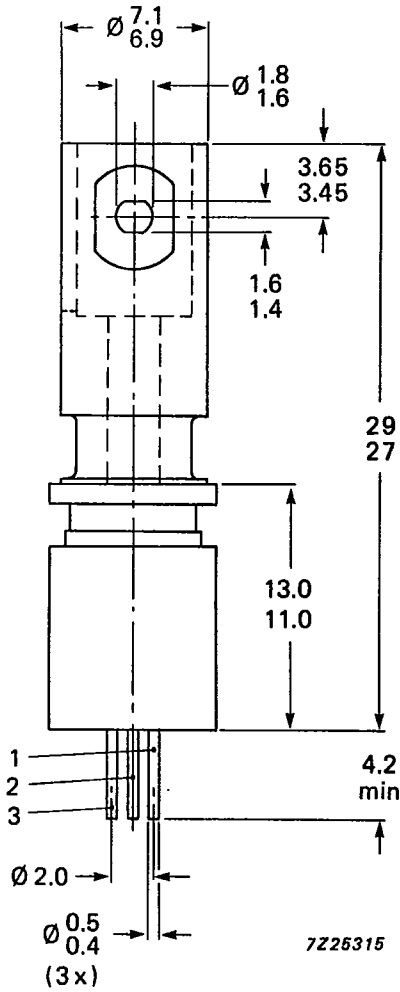
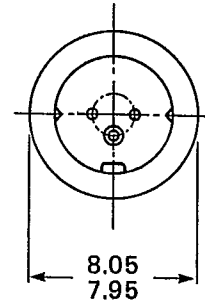
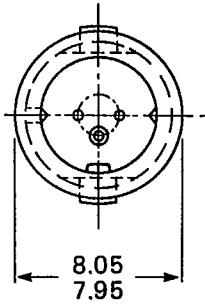
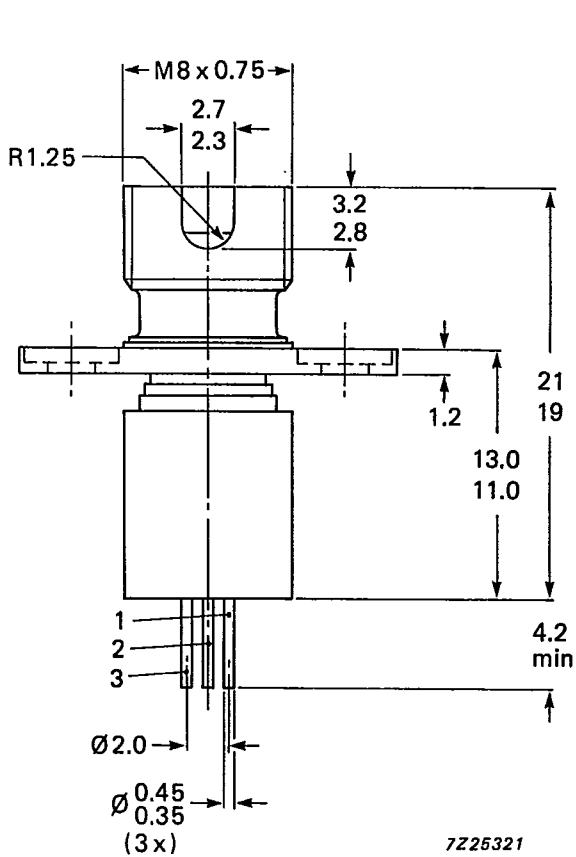
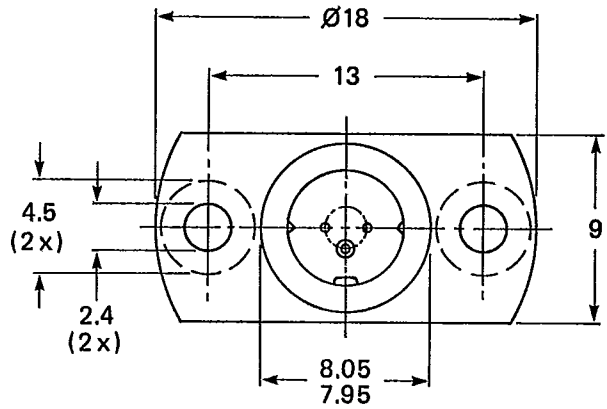
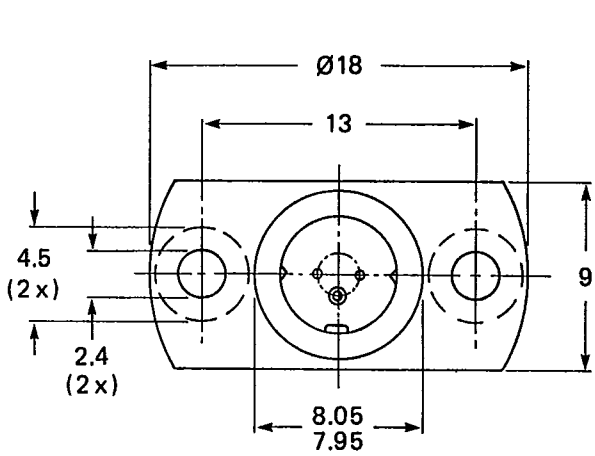


Fig.5 CQF25A/D13; ST type connector (no flange).

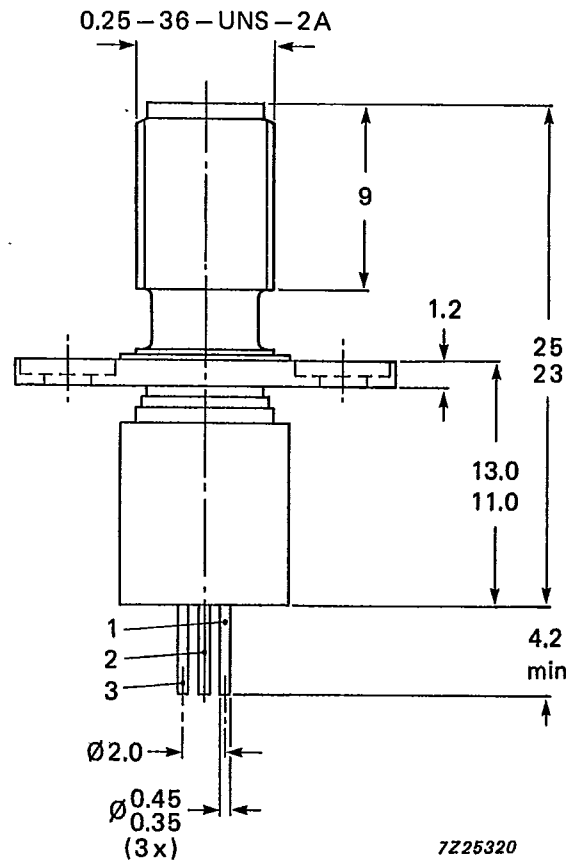
Fig.6 CQF25A/D14; Pigtail (50/125) (no flange).

MECHANICAL DATA (continued)

Dimensions in mm



7225321



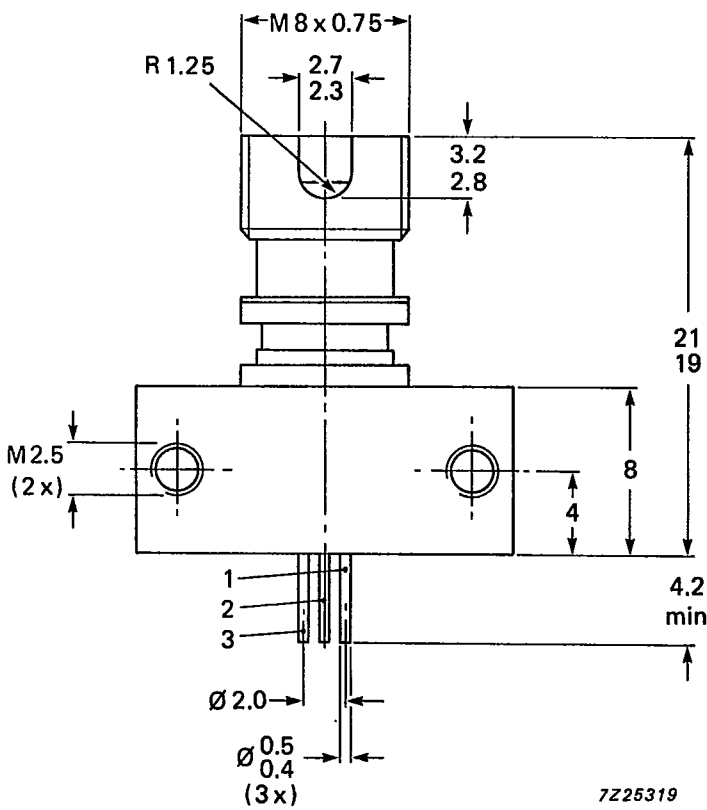
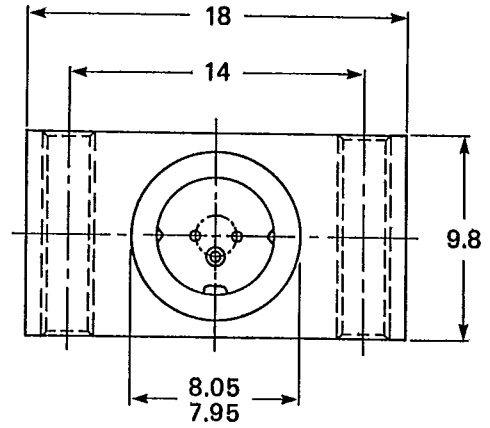
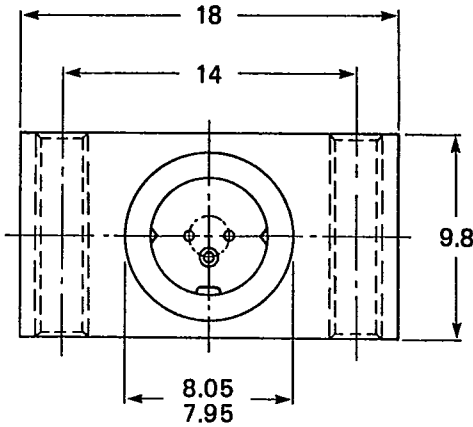
7225320

Fig.7 CQF25A/D21; FC type connector (2-hole flange).

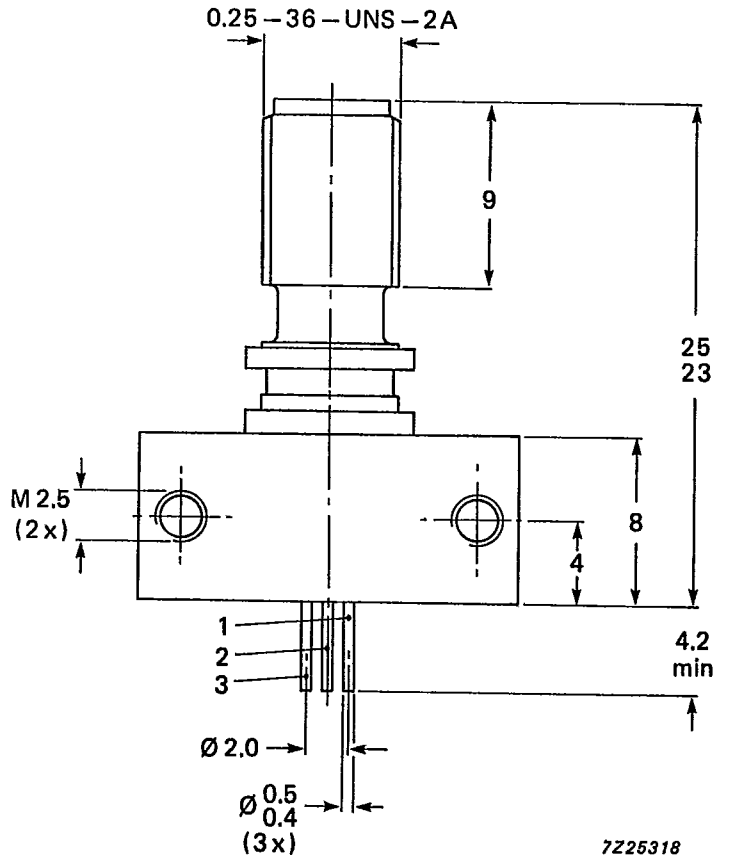
Fig.8 CQF25A/D22; SMA type connector (2-hole flange).

MECHANICAL DATA (continued)

Dimensions in mm



7225319



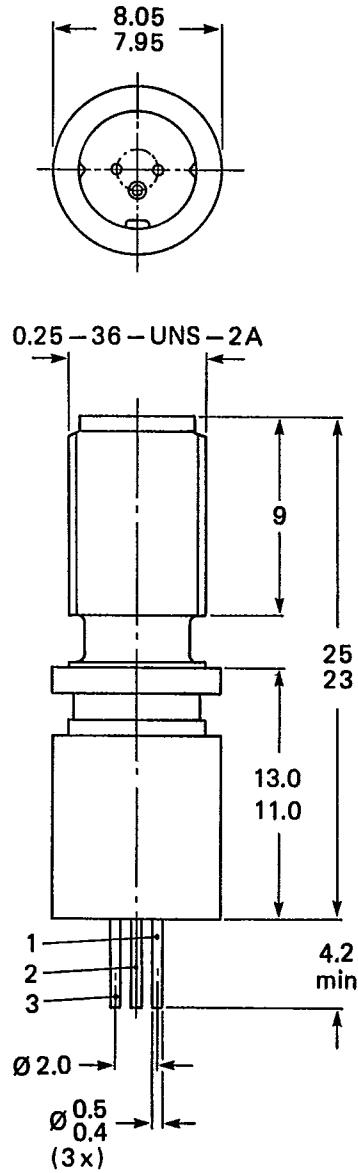
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Fig.11 CQF25A/D41; FC type connector (mounting block).

Fig.12 CQF25A/D42; SMA type connector (mounting block).

MECHANICAL DATA (continued)

Dimensions in mm



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Fig.15 CQF25A/D52; SMA type connector (potentiometer).