



# **Agilent 54/45 Room Temperature Shims**

## **User Guide**



**Agilent Technologies**

# Notices

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# Agilent 54/45 Room Temperature Shims

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## Introduction

This guide contains installation instructions and specifications for the Agilent 54/45 RT (room temperature) shims. These RT shims have the following model numbers and characteristics:

Model	Bore diameter [mm]	Center field [MHz]	RT Shim ID/OD [mm]	Number of channels	Magnet base plate to center field [mm]	Top of RT Shim base plate to field center [mm]
GR1539CV01	54	400	54/45	27	350 ±5	330
GR1538EV01	54	500	54/45	28	391 ±5	401
GR1481DV01	54	600, 700	54/45	28	439 ±5	449
GR1608CV01	54	800	54/45	28	520 ±5	530
GR1664AV01	89	400	54/45	28	366 ±3	379
GR1729AV01	89	400	54/45	28	395 ±3	408
GR1665CV01	89	500	54/45	28	463 ±3	466
GR1666AV01	89	600	54/45	28	439 ±3	452

## Contact Information

### Europe

**Address:**

Agilent Technologies UK Ltd.  
6 Mead Road  
Oxford Industrial Estate  
Yarnton, Oxfordshire OX5 1QU

**Telephone Numbers:**

To find contact information for your country, click the following link, select your country, and then click **Go**.

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Santa Clara, CA 95051

**Telephone Numbers:**

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### Agilent website (all countries)

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<http://www.chem.agilent.com/en-us/ContactUS/Pages/ContactUs.aspx>

## Installing 54/45 RT Shims in a 54 mm Bore Magnet

To avoid damage to the internal structure of the shims during installation, do not hold the region marked “Do Not Handle Here” or press it hard against a surface.

A set of nylon disks is supplied to use as spacers. These nylon disks allow you to adjust the RT shim to the same centerline position as the magnet. Select the appropriate thicknesses, and fit them over the shim tube.

The system is supplied with a cable to connect to the thermocouple on the RT shim. This cable and connector are temperature compensated. If this cable is not used, a temperature offset is given on the temperature readings.

For instructions on how to connect the shim cable earth lead, see [“Connecting the Shim Cable Earth Lead”](#) on page 8. For instructions on how to connect the shim cable earth lead for 800 MHz magnets, see [“Connecting the Shim Cable Earth Lead for 800 MHz Magnets”](#) on page 10.

## Installing 54/45 RT Shims in an 89 mm Bore Magnet

To avoid damage to the internal structure of the shims during installation, do not hold the region marked “Do Not Handle Here” or press it hard against a surface.

To mount the RT shim coil set, first mount the 89 Bore adaptor plate to the bottom flange of the magnet. Use the provided M5 countersunk stainless steel screws. Use the shorter (12 mm long) screws if there is not enough depth for the longer ones (16 mm long). Do not over tighten.

Before mounting the RT shim coil assembly in the magnet, make sure that the adaptor ring is mounted on the RT shim coil assembly. (See [“Customer Interface Drawings”](#) on page 18.) Its purpose is to center the 54 mm OD RT shim coil inside the 89 mm magnet bore.

A set of nylon disks is supplied to use as spacers. These nylon disks allow you to adjust the RT shim to the same centerline position as the magnet. Select the appropriate thicknesses, and fit them over the shim tube.

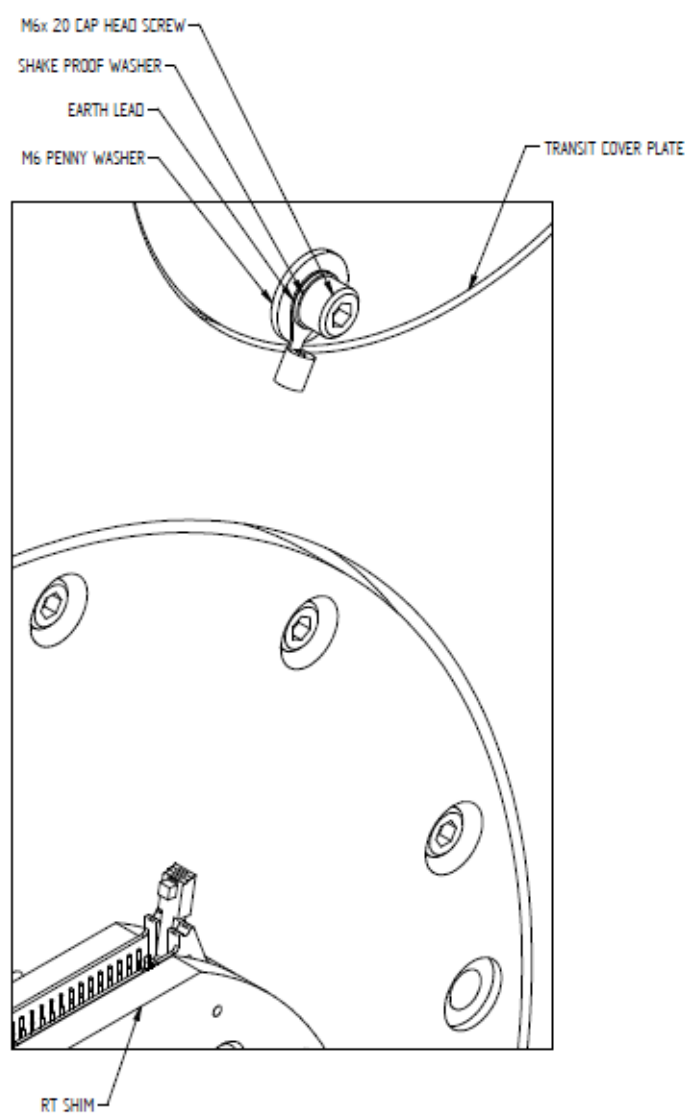
For instructions on how to connect the shim cable earth lead, see [“Connecting the Shim Cable Earth Lead”](#) on page 8.

## Connecting the Shim Cable Earth Lead

See [Figure 1](#). The purpose of this lead is to make a single reliable connection between the magnet and the spectrometer earths.

- 1** Unscrew a suitably located M6 screw from a transit cover plate.
- 2** Connect the shim cable to the shim coil assembly.
- 3** Connect the shim cable earth lead to the free M6 hole using the M6×20 screw, M6 shake proof washer and M6 flat washer. Observe the order shown in [Figure 1](#).



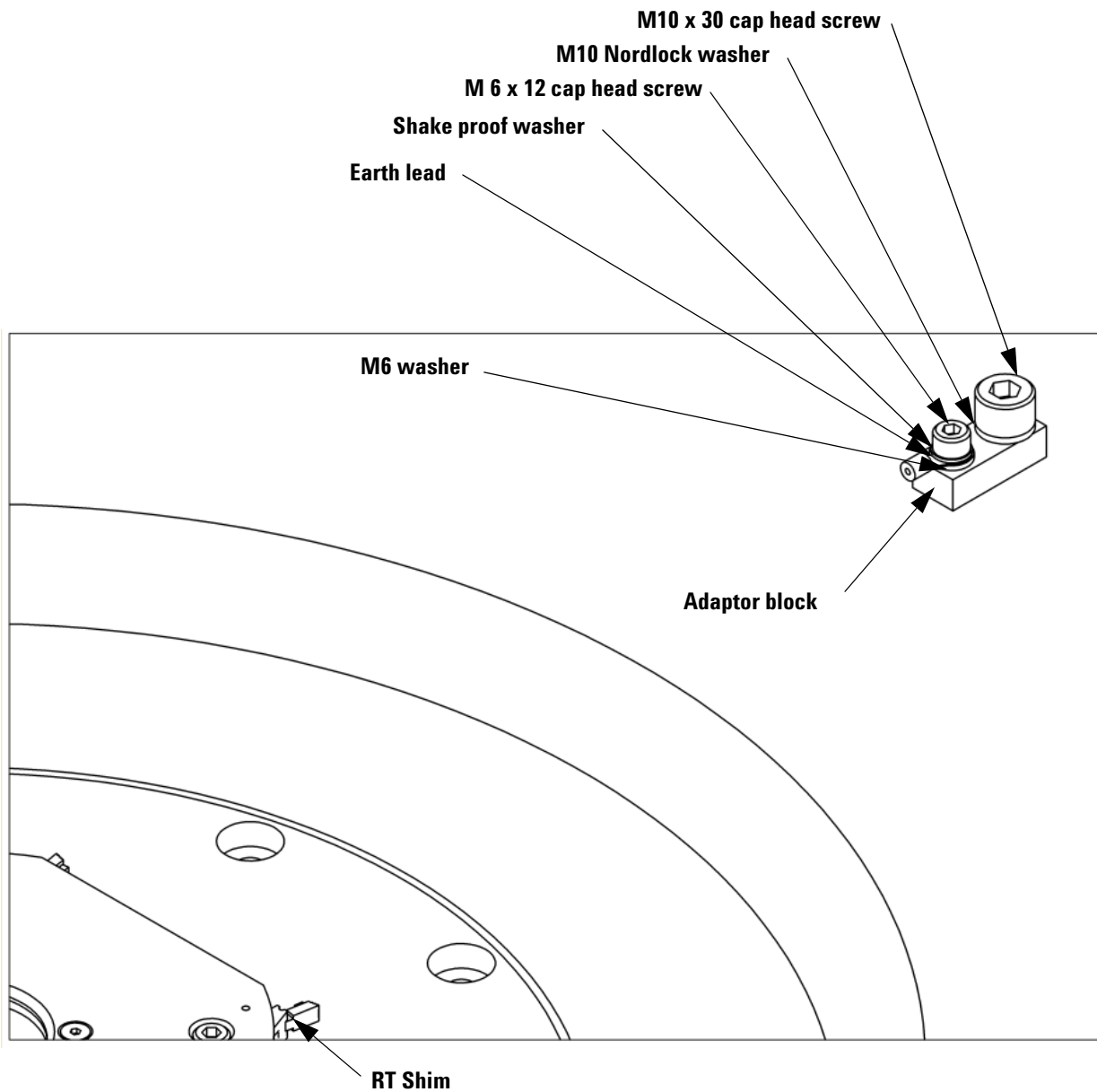


**Figure 1** Installing shim cable earth lead

## Connecting the Shim Cable Earth Lead for 800 MHz Magnets

See [Figure 2](#). The purpose of this lead is to make a single reliable connection between the magnet and the spectrometer earths.

- 1** Locate a suitable M10 hole on the bottom flange of the magnet. Using an M10 cap head screw, mount the adaptor block. See [Figure 2](#).
- 2** Connect the shim cable to the shim coil assembly.
- 3** Connect the shim cable earth lead to the free M6 hole using the M6 screw, M6 shake proof washer and M6 flat washer. Observe the order shown in [Figure 2](#).



**Figure 2** Installing shim cable earth lead for 800 MHz 54/45 magnets

## Parts Supplied

### Parts supplied with 54/45 RT shims for 54 mm bore magnets

**Table 1** Parts supplied with 54/45 RT shims for 54 mm bore magnets

Part	400 MHz 54/45, 27-channel	500 MHz 54/45, 28-channel 600 MHz 54/45, 28-channel 700 MHz 54/45, 28-channel 800 MHz 54/45, 28-channel
RT shim, 54 mm OD, 45 mm ID	X	X
Nylon tube, 5 m OD	X	X
Nylon spacers (10 mm, 5 mm, 3 mm, 2 mm, and 1 mm)	X	X
Stainless steel fixing screws (M6x25, M6x30, M6x35, M6x 40 and M6x45 mm, 3 each)	X	X
Air tube adaptors	X	X
RT shim manual	X	X
Thermocouple cable with Fischer connector (S102A016) and flying leads (5.8 meters)		X
Stainless steel screw M6x20, M6x18 flat stainless steel washer and M6 shake proof washer for earth lead connection	X	X
54/45 RT Shim Adjustment kit, ARZ546767	X	X
Nonmagnetic Allen key, 5 mm	X	X

## Parts supplied with 54/45 RT shims for 89 mm bore magnets

**Table 2** Parts supplied with MHz 54/45 28-channel RT shims for 89 mm bore magnets

Part	GR1664AV01, GR1729AV01	GR1665AV01	GR1666AV01
RT shim, 54 mm OD, 45 mm ID mounted with adaptor ring	X	X	X
Nylon tube, 5 m OD	X	X	X
Nylon spacers (10 mm, 5 mm, 3 mm, 2 mm, and 1 mm)	X	X	X
Stainless steel screw M6×20, M6×18 flat stainless steel washer and M6 shake proof washer for earth lead connection	X	X	X
M5 countersunk Stainless steel fixing screws (12 mm and 16 mm long, 4 each)	X		
Allen keys, nonmagnetic	3 mm and 5 mm	5 mm	5 mm
89 Bore adaptor plate	DRZ344306		5022-8769
Air tube adaptors	X	X	X
Stainless Steel fixing screws (M6 x 25, 30, 35, 40, and 45 mm long, 3 off)	X	X	X
Thermocouple cable with Fischer connector (S102A016) and flying leads (5.8 meters)		X	X
RT shim manual	X	X	X
54/45 RT Shim Adjustment kit, ARZ546767	X	X	X

## Mechanical Specifications

See [“Customer Interface Drawings”](#) on page 18 for detailed dimensions.

For all 54/45 RT shims:

- Forced air cooling, inlet provided
- 0 to 60 degrees centigrade
- Anodized aluminum

**Table 3**     Weight

RT shim	Weight (approx.)
<b>400 MHz 54/45, 27-channel</b>	1.6 kg
<b>500 MHz 54/45, 28-channel</b>	1.8 kg
<b>600 MHz 54/45, 28-channel</b> <b>700 MHz 54/45, 28-channel</b>	1.9 kg
<b>800 MHz 54/45, 28-channel</b>	2.3 kg
<b>400 MHz 54/45, 28-channel</b> <b>for 89 mm bore magnets</b>	2.0 kg
<b>500 MHz 54/45, 28-channel</b> <b>for 89 mm bore magnets</b>	2.0 kg

## Strength and Resistance for 54/45 RT Shims

Orthogonality – All shims are designed to be fully orthogonal

'X' axis alignment – Parallel with the baseplate connector

The following table gives specifications for RT shim strength and resistance for 54/45 RT shims, including shims for wide bore magnets.

**Table 4** Strength and resistance for 54/45 RT shims

Shim	Strength at maximum current (Proton Hz/cm <sup>n</sup> ) <sup>*</sup>	Main impurity maximum level (Order/%)	Resistance (excl cable) less than /Ω	Maximum shim current /A
Z0	9800	Z2 (0.2)	185	0.02
Z1	1200	Z3 (1.0)	6	0.10
Z2	1280	Z4 (0.5)	10	0.20
Z3	720	Z (7.0)	14	0.20
Z4	350	Z2 (50)	32	0.20
Z5	110	Z (150)	18	0.30
Z6	120	Z2 (300)	22	0.30
Z7 <sup>†</sup>	80		35	0.30
X, Y	1800	ZX (1.0)	5.6	1.0
ZX, ZY	850	X (3.0)	3.2	1.0
C2, S2	950	X (5.0)	1.8	1.0
Z2X, Z2Y	950	ZX (10.0)	3.2	1.0
ZC2, ZS2	1280	X (5.0)	3.3	1.0
C3, S3	720	C2 (10)	3.0	1.0
Z3X, Z3Y	480	Z2X (12)	3.2	1.0
Z2C2, Z2S2	350	Z2X (10)	2.3	1.0
ZC3, ZS3	360	Z (15)	3.4	1.0
Z4X, Z4Y	80	C2 (15)	1.1	1.0

\* Second and higher order transverse shims are normalized in the following way: 1.0 Hz/cm<sup>2</sup> of ZX shim generates at point having Cartesian coordinates (0, 1 cm, 1 cm) a Z component of magnetic flux density of 1.0 Hz.

† This shim coil is not present in the 400 MHz shim coil assembly.

# Electrical Specifications

## Connectors

Table 5

Connector	400 MHz 54/45, 27-channel	500, 600, 700, 800 MHz 54/45, 28-channel 400, 500 MHz 54/45 28-channel for 89 mm bore magnets
3764-6602 (3M) on shim baseplate	X	X
D102A106 (Fischer) T type thermocouple connector		X



## Pinouts on 64-Way connector for 54/45 RT Shims

**Table 6** Pinouts for 54/45 RT shims

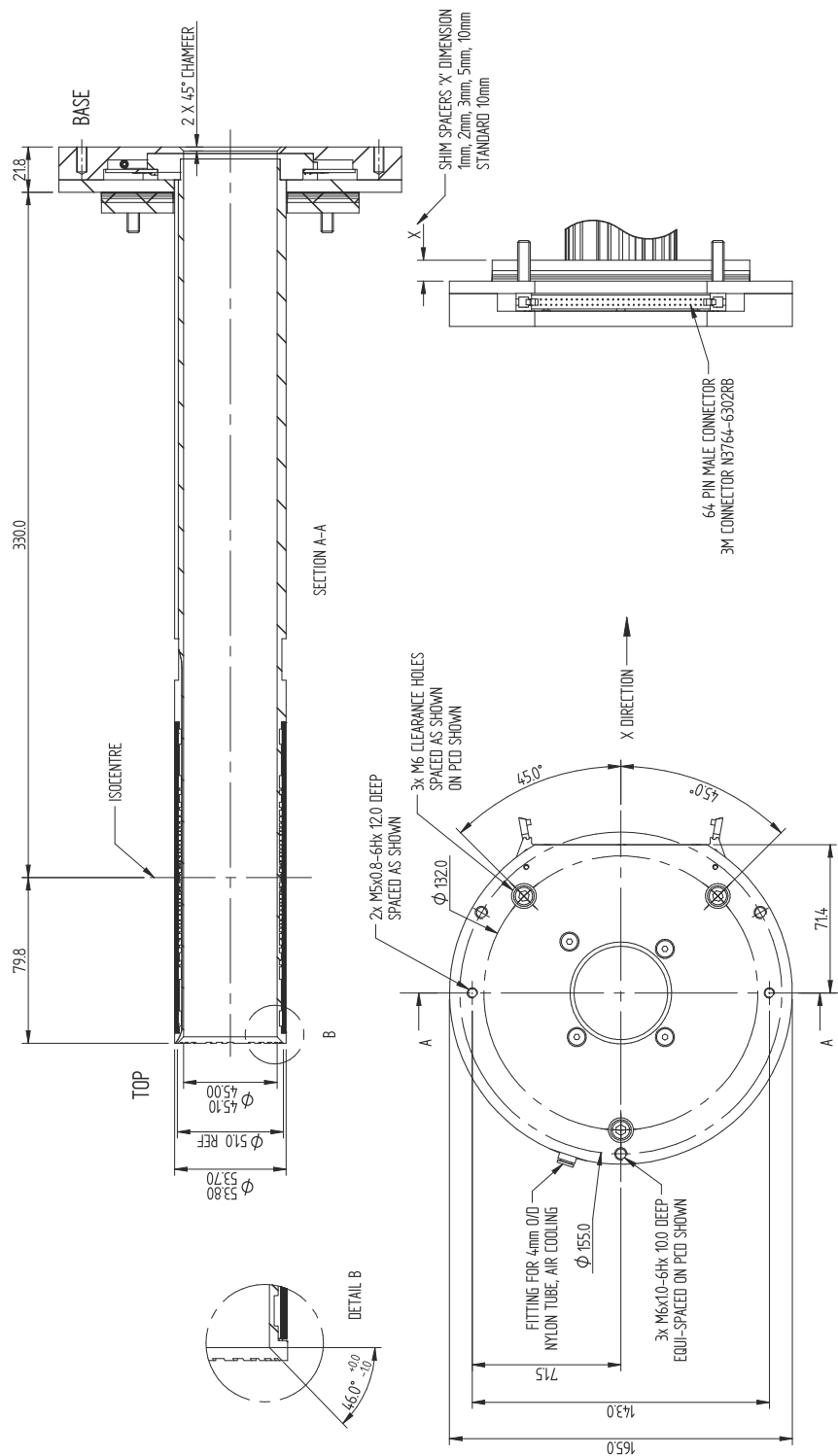
Pinouts	Shim
1a – 1b	Z0
2a – 2b	Z1
3a – 3b	Z2
4a – 4b	Z3
5a -5b	Z4
6a -6b	Z5
7a – 7b	Z6
8a -8b	Z7 *
9a – 9b	X
10a – 10b	Y
11a -11b	ZX
12a – 12b	ZY
13a -13b	C2
14a -14b	S2
15a – 15b	Z2X
16a -16b	Z2Y
17a -17b	ZC2
18a – 18b	ZS2
19a – 19b	C3
20a -20b	S3
21a -21b	Z3X
22a – 22b	Z3Y
23a -23b	Z2C2
24a – 24b	Z2S2
25a -25b	ZC3
26a -26b	ZS3
27a – 27b	Z4X
28a – 28b	Z4Y
29a – 29b	Open Circuit
30a -30b	Open Circuit
31a -31b	Open Circuit
32a – 32b	Open Circuit

\* This shim coil is not present in the 400 MHz shim coil assembly

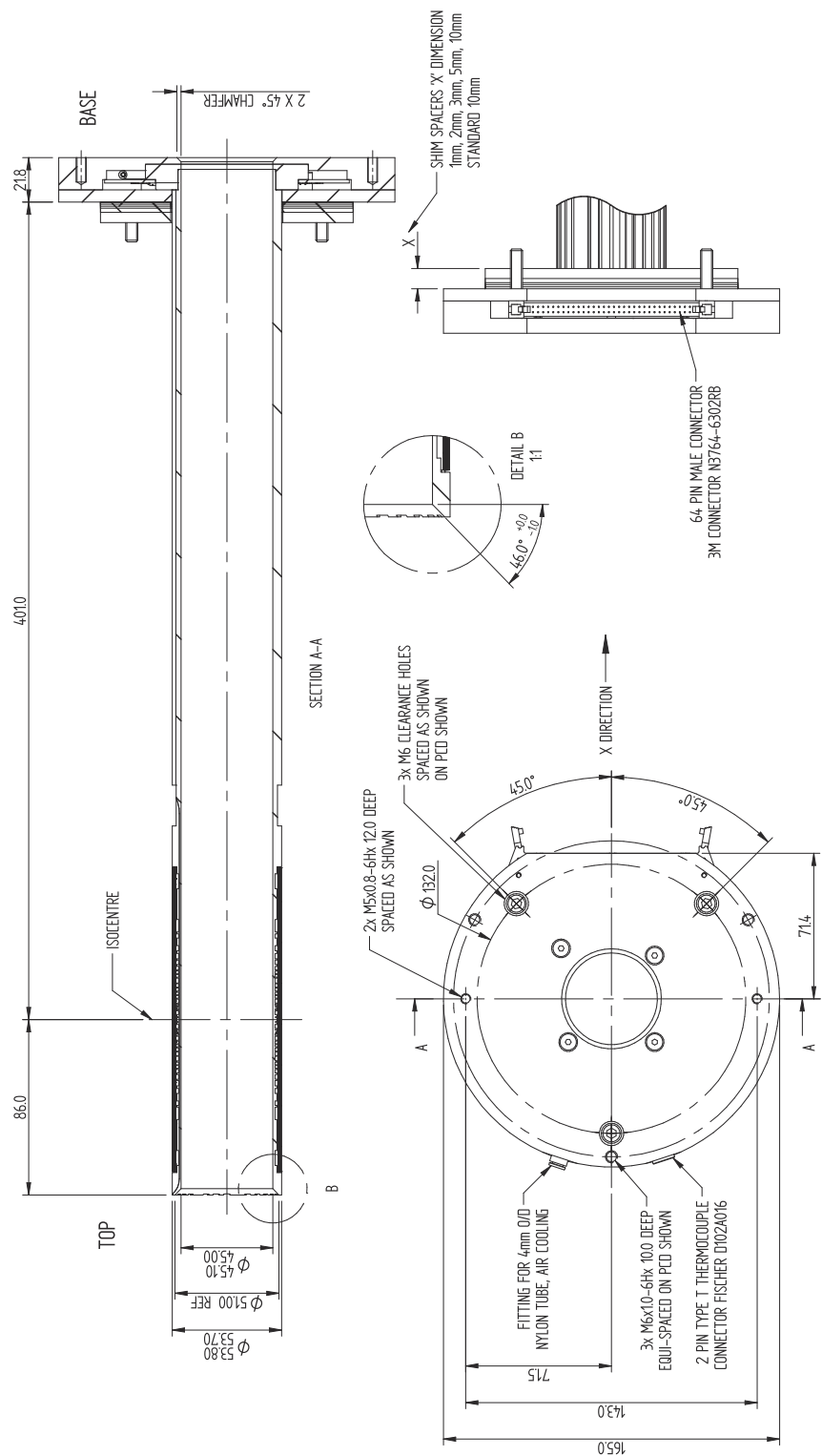
## **Customer Interface Drawings**

The drawings in this section provide additional details about the RT shims.

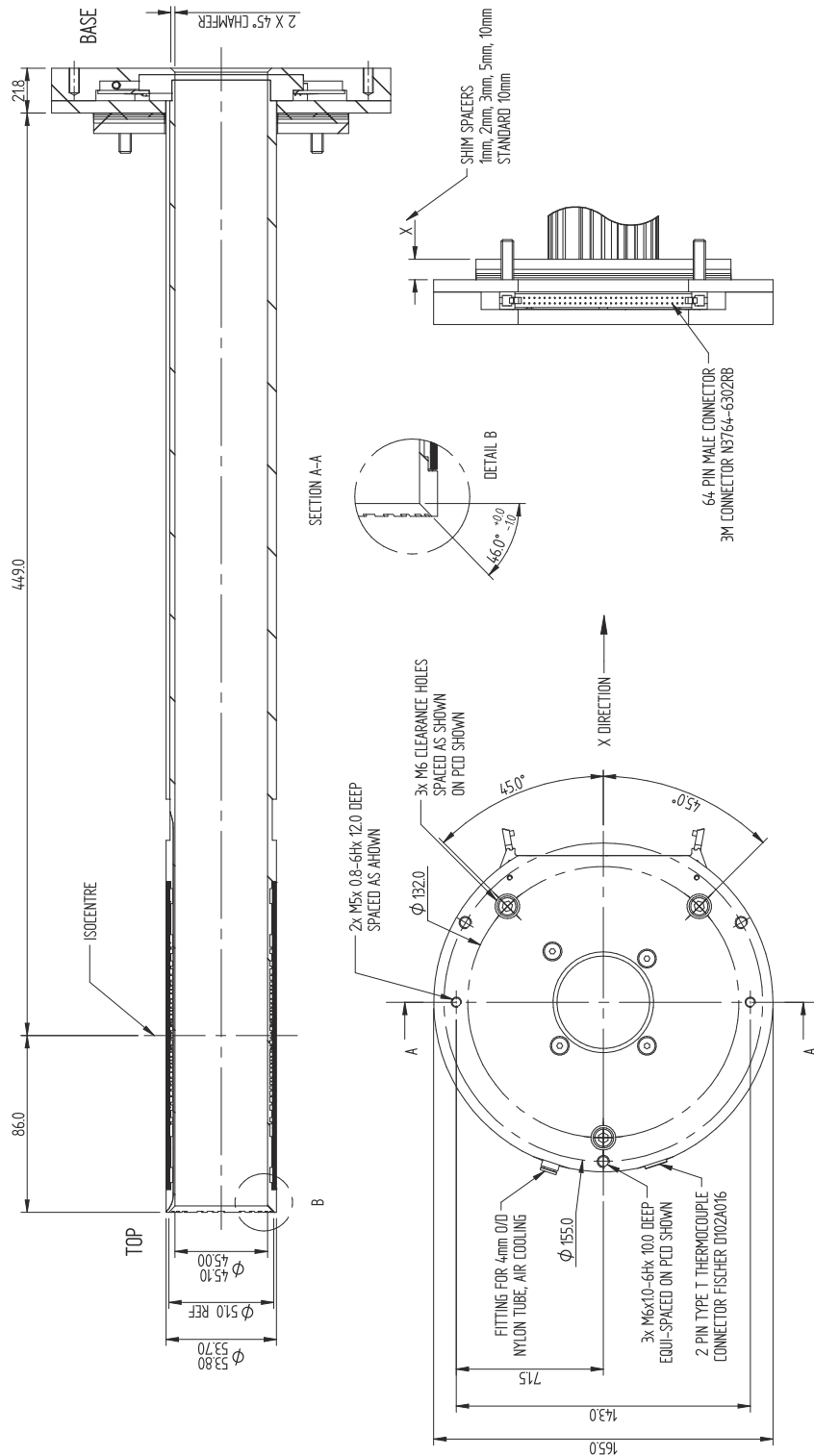
GR1539CV01, 400 MHz 54/45 27-channel customer interface drawing



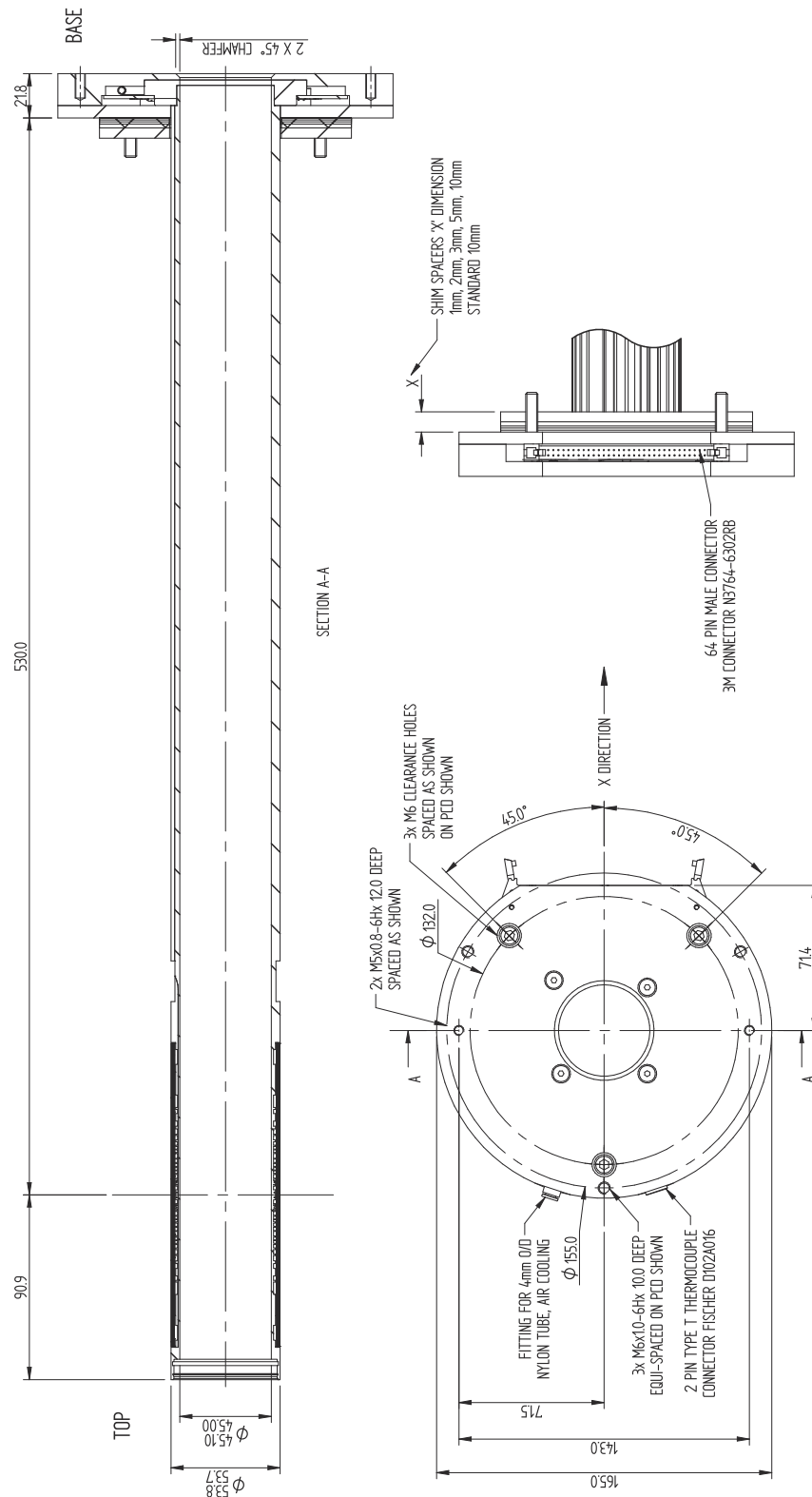
GR1538EV01, 500 MHz 54/45 28-channel customer interface drawing



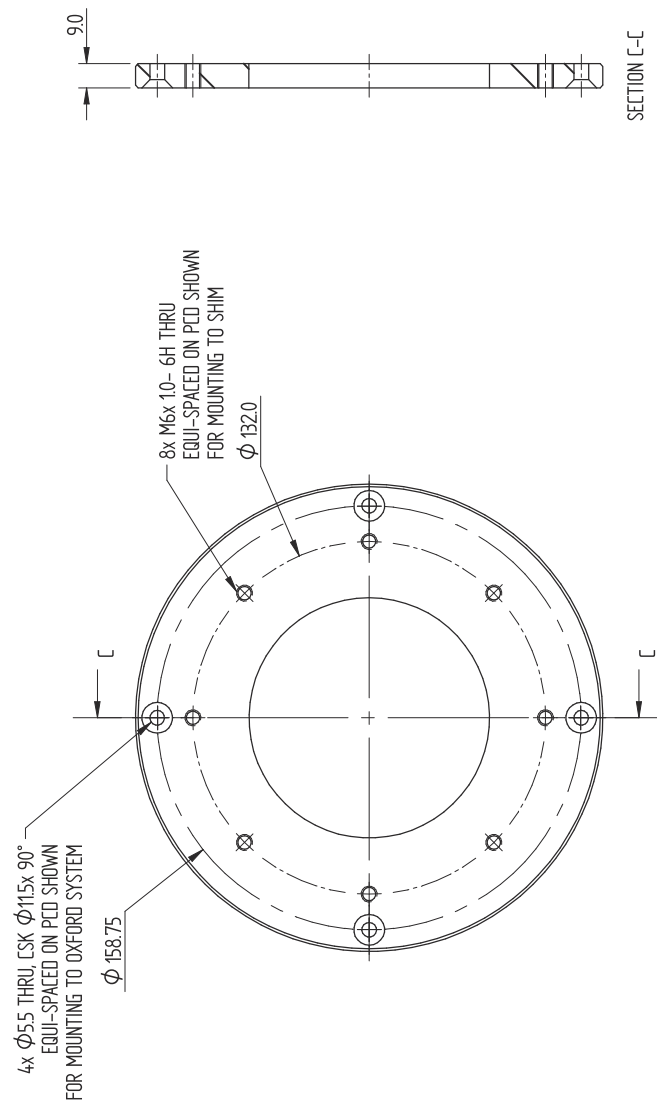
## GR1481DV01, 600 MHz and 700 MHz, 54/45, 28-channel customer interface drawing



## GR1608CV01, 800 MHz 54/45 28-channel customer interface drawing

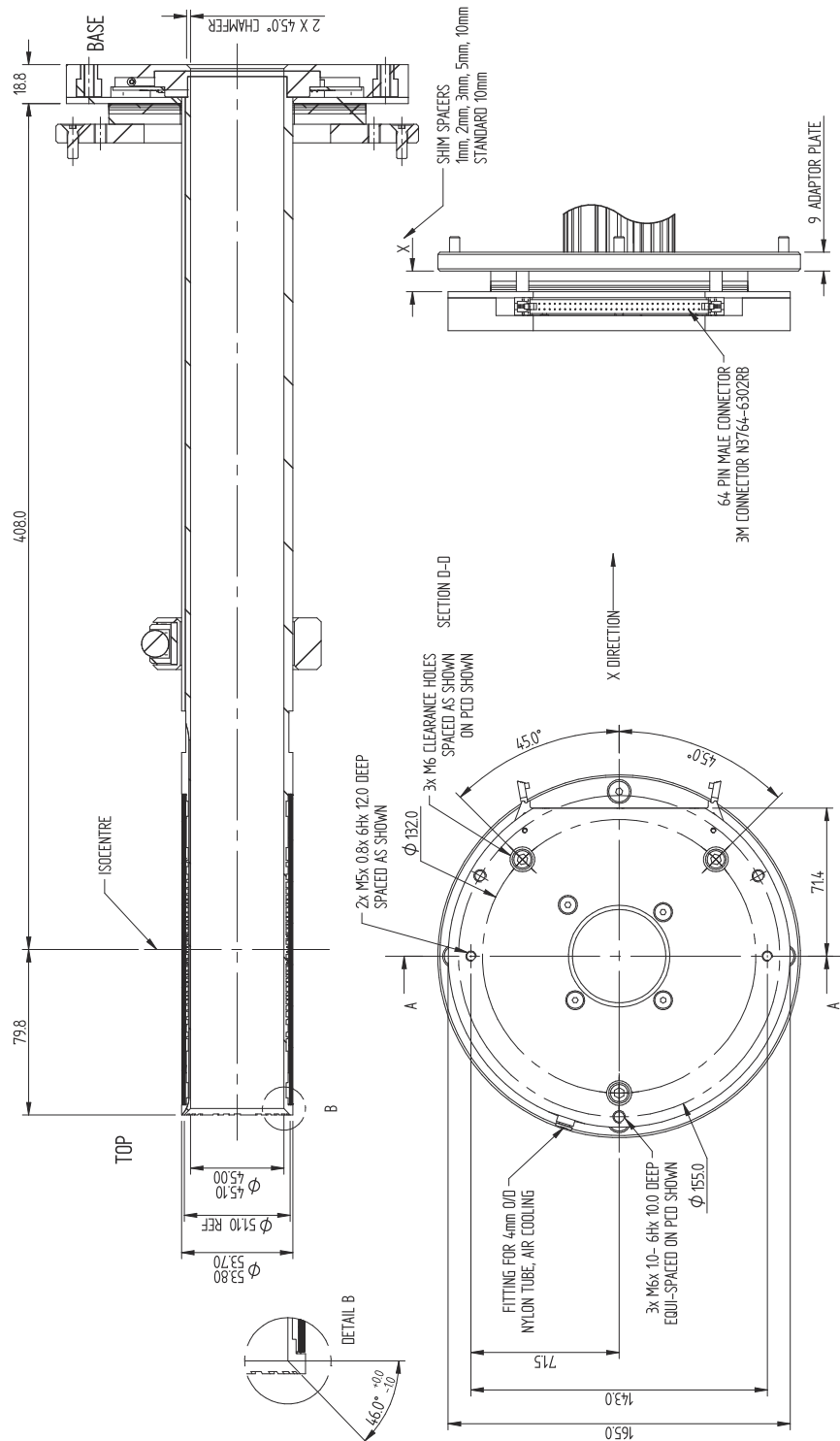


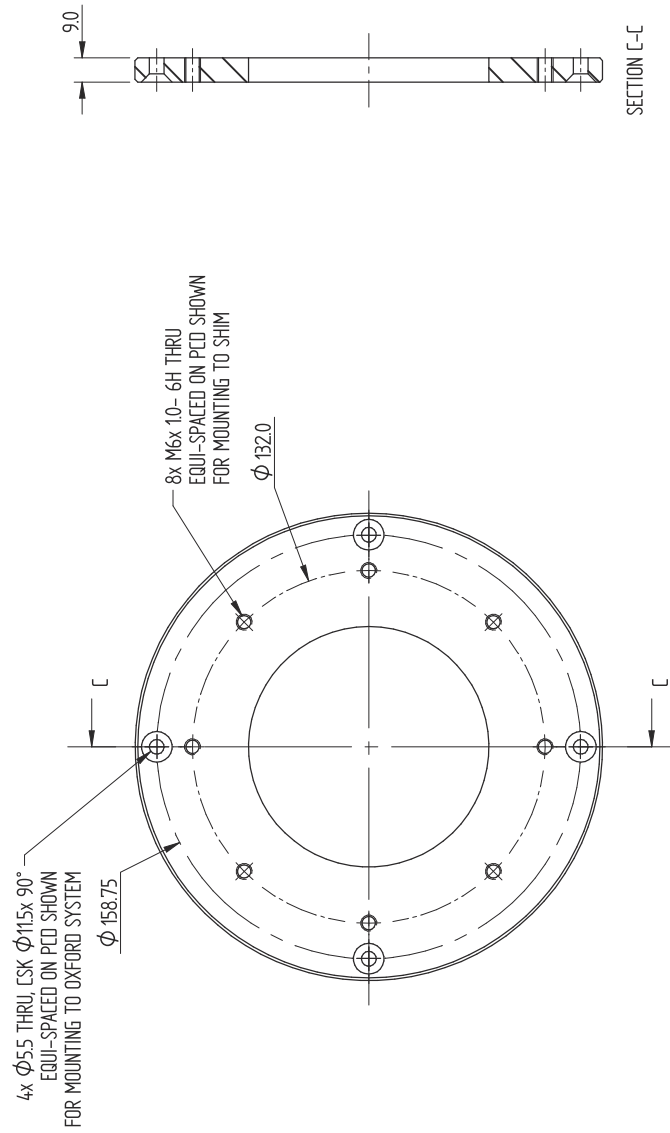
[illegible]





## GR1729AV01, 400 MHz, 54/45, 28-channel, 89 mm bore customer interface drawings





Technical drawing of the 3M connector assembly, showing top, side, and detail views.

**Top View:**

- Overall dimensions: 1650 (width) x 714 (height).
- Inner circular features:
  - Outer circle:  $\phi 132.0$
  - Inner circle:  $\phi 45.10$
  - Reference circle:  $\phi 510$  REF
  - Bottom circle:  $\phi 53.78$
- Features:
  - 2x M5x0.8-6Hx 12 DEEP SPACED AS SHOWN
  - 3x  $\phi 6.5$  THRU HOLES SPACED AS SHOWN
  - FITTING FOR 4mm O/D NYLON TUBE AIR COOLING
  - 3x M6x10-6Hx 10 DEEP EQUI-SPACED ON PCD SHOWN
  - 2 PIN TYPE T THERMOCOUPLE CONNECTOR FISCHER D102A016
- Angles: 45° and 0.5° are indicated.
- Section lines A-A and B-B are shown.

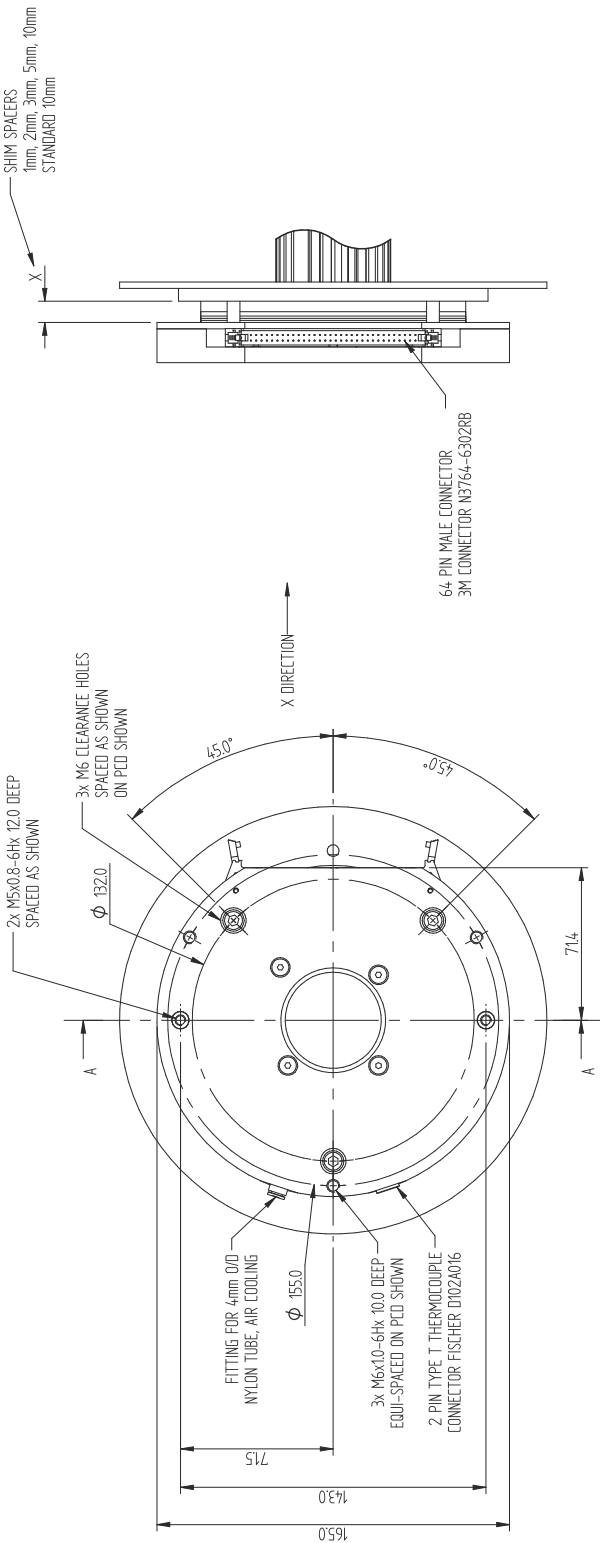
**Side View (SECTION A-A):**

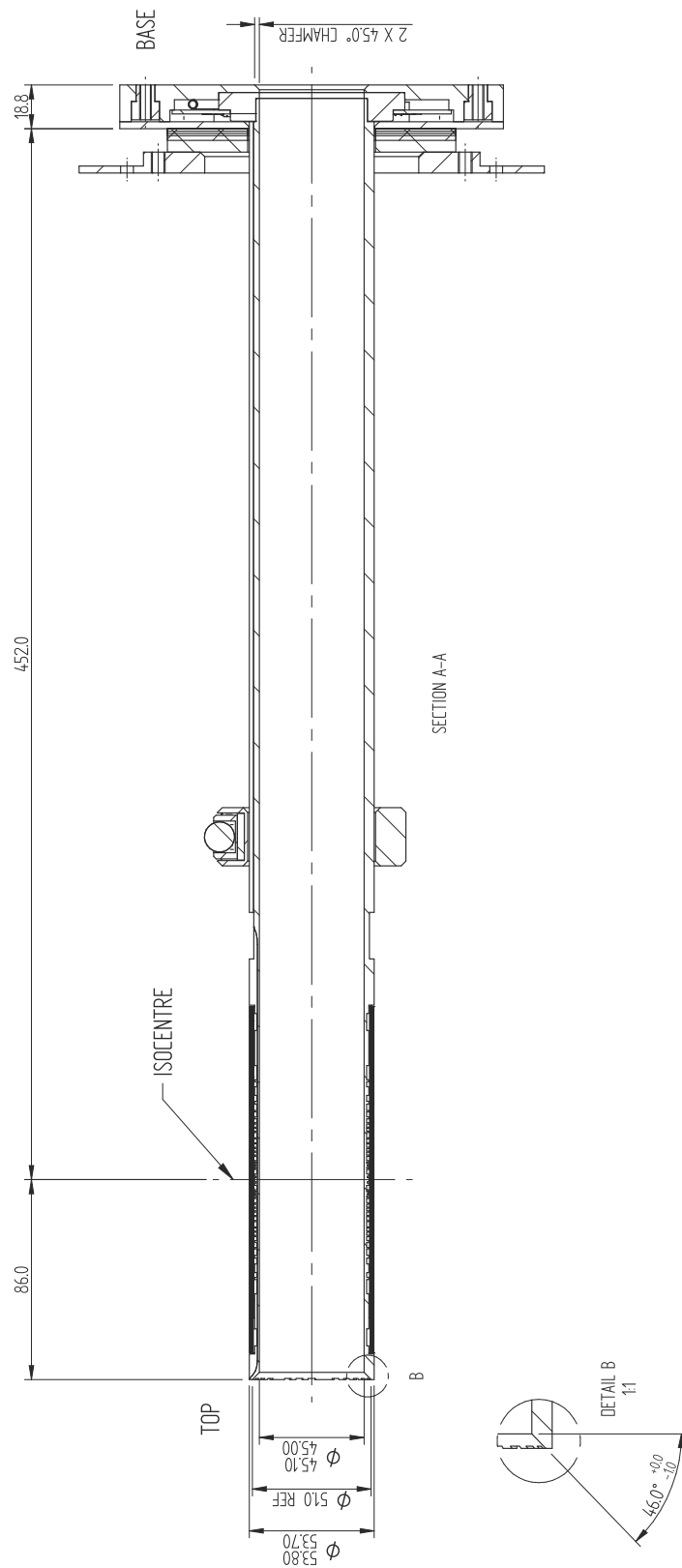
- Overall height: 466.0
- Top flange height: 18.8
- Base height: 86.0
- ISO CENTRE line is indicated.
- 2 X 45° CHAMFER is shown on the top flange.

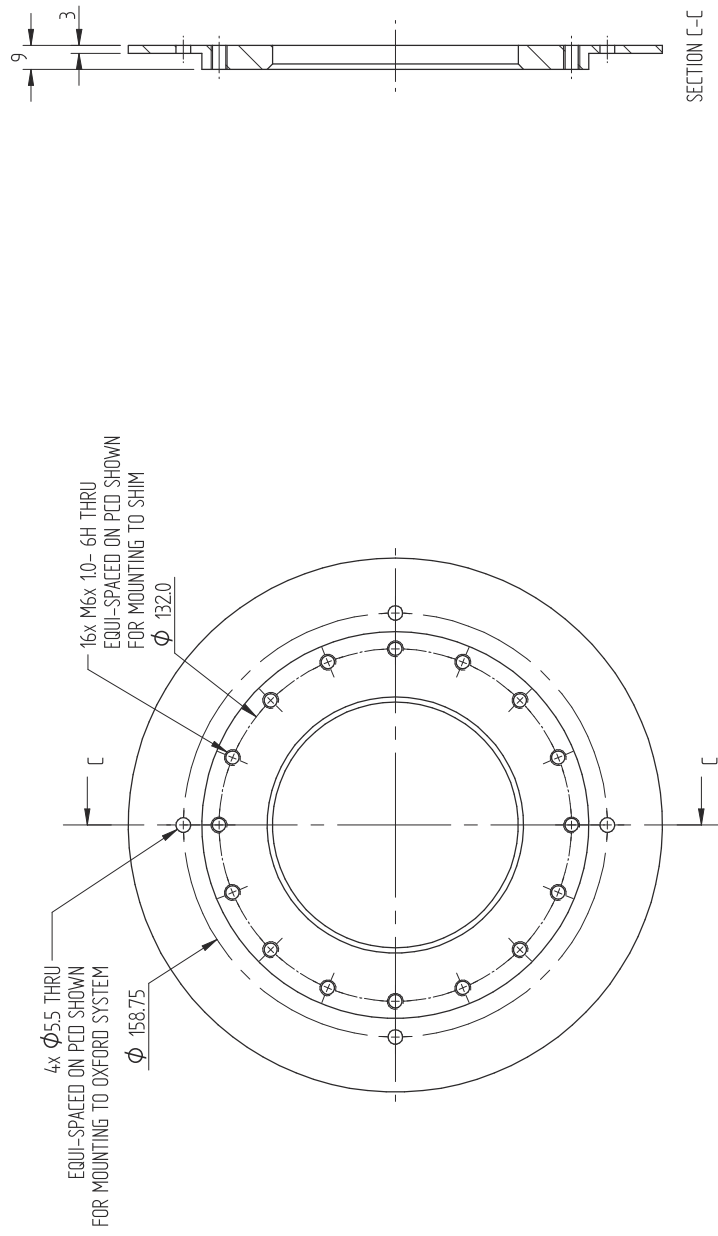
**Detail B:**

- Shows a 64 PIN MALE CONNECTOR (3M CONNECTOR N3764-6302RB) mounted on a PCB.
- SHIM SPACERS 'X' DIMENSION: 1mm, 2mm, 3mm, 5mm, STANDARD 3mm.
- Angle: 46.0° ± 0.7°

**GR1666AV01, 600 MHz, 54/45, 28-channel, 89 mm bore  
customer interface drawings**











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