INTRA Sun Monitor

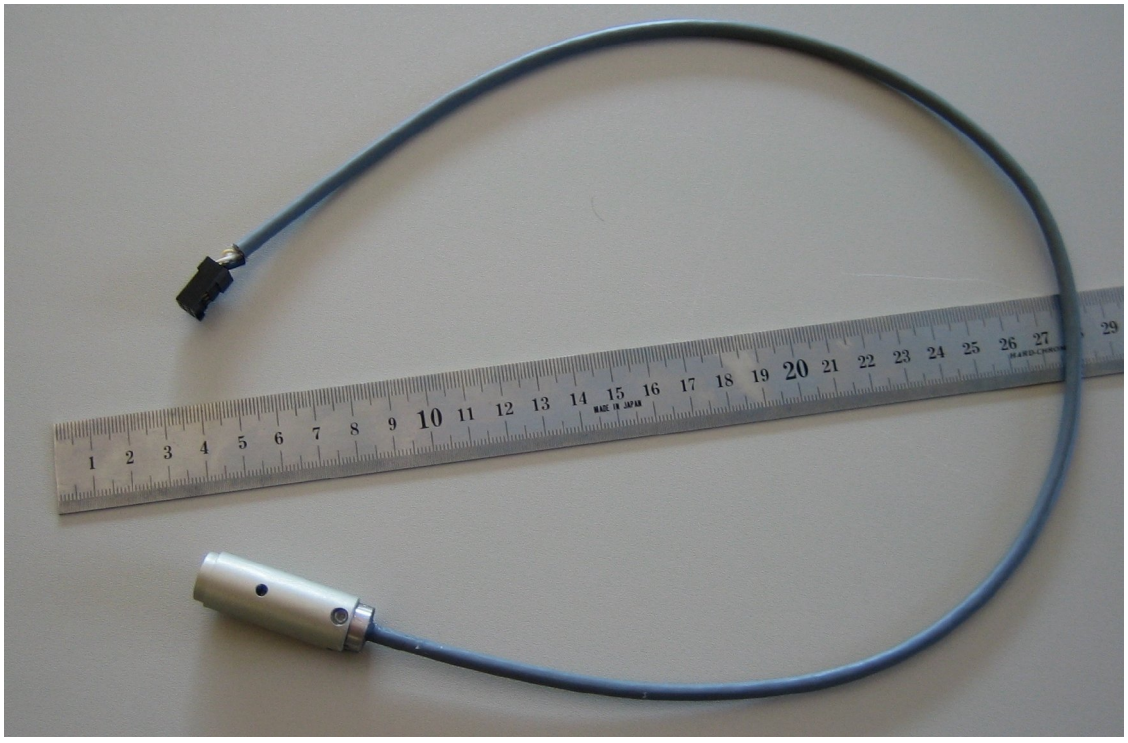
The Sun Monitor is a Quadrant Silicon Detector equipped with a simple aperture optics (no lenses). The detector is sealed in a all weather resistant case. Radiation enters this case through a window made of acrylic glass[1].

Table 1 Parameters of the Aperture Geometry of the Sun Monitor. Additional apertures – not mentioned in this table – are introduced between view limiting and entrance aperture to reduce the amount of scattered light during periods with non-normal incidence.

Diameter of view limiting aperture:	3.0	mm
Diameter of entrance aperture:	1.0	mm
Dimensions of Si-detector:	4 x (1.5 x 1.5)	mm
Distance between entrance aperture and detector:	9.5	mm
Resulting field of view (with full signal):	app ±6	°
Signal (sum of 4 quadrants) - typical	40	µA

The quadrant-detector is a SD 085-23-21-21. . No electronics is included in the package. The cable caries the signals of the diode pins.

Figure 1 The Sun Monitor, complete with cable and connector.



[1] This window should periodically be polished using a special polish for acrylic windows. The rate depends on environmental conditions – typically once every 3 years.

Table 2 Cable and Connector

Cable:	5 x 0.14 mm^2 with shield
Length of cable:	app. 0.6 m
Diameter of cable:	5.25 mm
Connector:	Comatel H13/HE15

Table 3 Pin Assignments of the Comatel H13/HE15 connector and quadrants/pins of detector SD 085-23-21-021

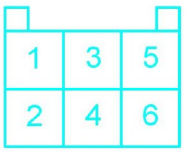
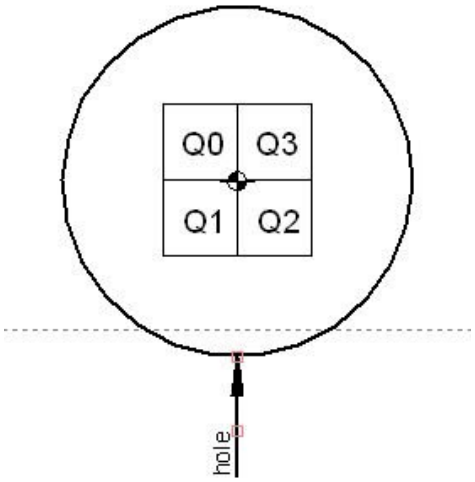
Signal	**color**	**connector pin**	**detector**	**front view of connector**
shield	-	01		
Ref (case)	white	02	5	
Q0	green	03	D-2	
Q1	yellow	04	A-3	
Q2	grey	05	B-4	
Q3	brown	06	C-1	

Figure 2 Detector: Front View – as seen from the sun. The arrow at the bottom indicates the position of the (identification) hole in the case of the sun sensor.



sum = Q0+Q1+Q2+Q3

daz = ss ((Q0+Q1) - (Q2+Q3)) / sum
del = ss ((Q0+Q3) – (Q1+Q2)) / sum

where
ss = 0.0434
is the (sensor-specific) factor to (approximately) express daz and del in radians.

hints: at northern latitudes.
daz > 0 → tracker ahead of sun
del > 0 → tracker points above sun

Figure 3 Dimensional Outline of Sun Monitor.
During assembly, the strip of the detectors case is aligned to point to the 1xØ3-hole near the middle bottom of the case. The hole is sealed with silicon following assembly. The 2.5 mm slit at the rear end of the case is to accept a 2.5 mm bolt that slightly protrudes into the Ø15mm hole into which the case is installed.