GEM elettronica

TECHNICAL SPECIFICATION

SCANNER UNIT 10KW

SU 70-10NR

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GEM elettronica

REVISIONS INDEX

REV.	DESCRIPTION	APPROVATION	DATE
0	ORIGINAL		24/01/2002
1			11/07/2002

GENERAL INDEX

FIGURES INDEX

TABLES INDEX

1. GENERAL

The scanner unit SU70-10NRR has been designed for surface search systems.
This unit can be connected to systems of radar presentation and management.
The scanner unit SU70-10NR also features an extreme reliability and duration of operation under adverse climatic conditions.
The whole electronics and the motor group are contained in a waterproof pedestal in aluminum alloy, easily accessible for possible maintenance activities.

2. TECHNICAL SPECIFICATION

The technical features of the scanner unit are:

Peak power (nominal):	10 kW (typical)
Radiation frequency:	9410 ± 30 MHz.
Pulse Width:	80 ns – 300 ns – 600 ns – 1.2 µs
	(with ± 10% tolerance)
Pulse Repetition Frequency:	3200 Hz – 1600 Hz – 800 Hz – 500 Hz
	(with ± 10% tolerance)
Modulator:	fully solid state
Receiver type:	logarithmic, fully solid state
Dynamic range:	= 100 dB
Intermediate Frequency (I.F.):	60 MHz ± 2 MHz
I.F. bandwidth:	20 MHz with short and medium pulses;
	4 MHz with long and extralong pulses
	(with ± 10% tolerance)
Front End:	microwave integrated circuit
Noise figure:	= 4 dB
Duplexer:	ferrite circulator with solid state limiter diode
Antenna rotation speed:	22 ± 2 r.p.m.
Tolerable relative wind speed:	100 Kts

3. ARRAY UNITS

In Table 1 are given the technical specifications of the antenna arrays available with the Scanner Unit SU70-10NR; dimensions and weights are shown in Fig. 2.

ARRAY MODEL	AU11-04NR	AU11-06NR	AU11-07NR	AU11-09NR
Length	4 feet	6 feet	7.5 feet	9 feet
Type	Slotted waveguide			
Frequency band	X band, λ = 3.2 cm, frequency range 9410 ± 60 MHz			
Polarization	H	H	H	H/C
Horizontal beamwidth to –3dB	≤ 1.9°	≤ 1.2°	≤ 1.1°	≤ 0.85°
Vertical beamwidth to –3dB	~ 25°	~ 25°	~ 25°	~ 25°
Sidelobes within 10°	-26dB	-26dB	-26dB	-26dB
Sidelobes outside 10°	-30dB	-30dB	-30dB	-30dB
Gain	≥ 27dBi	≥ 29dBi	≥ 30dBi	≥ 31dBi
Rotation speed	22 rpm (selectable speed available as an option)			
Tolerable relative wind speed	100 knots			

Table 1 – Technical features of the available antenna arrays

4. OTHER FEATURES

4.1 Environmental features

Operative temperature: from -25°C to +55°C

Storage temperature: from -40°C to +70°C

Relative humidity: up to 90% at +40°C

4.2 Reliability

The MTBF value for the scanner unit SU70-10NR has been estimated to be about 30000 hours.

4.3 Dimensions and weights

The dimensions and the weight of the scanner unit SU70-10NR are shown in Fig. 1.

The dimensions and weights of the antenna arrays suitable for mounting on the SU70-10NR scanner unit are shown in Fig. 2.

5. SIGNALS DESCRIPTION

A list of all the scanner unit interface signals follows in Table 1.

The operation of the control signals SB_OP, RAD0 and RAD1 is shown in Table 2.

In Table 3 are given the suitable frequencies of the TRG signal for a proper operation of the Scanner Unit SU 70-10N.

Name	Description	Value/features
P_MOT	Positive motor power supply	+24 Vdc ± 20% I = 0.3 A (typical), 10 A (peak)
N_MOT	Negative motor power supply	-24 Vdc ± 20% I = 0.3 A (typical), 10 A (peak)
GND	Ground	
GND	Ground	
+24V	+24 Vdc voltage	24 Vdc ± 10% I = 1 A (typical), 1.5 A (peak)
+12V	+12 Vdc voltage	12 Vdc ± 10% I = 0.5 A (typical), 0.7 A (peak)
-12V	-12 Vdc voltage	-12 Vdc ± 10% I = 0.7 A (typical), 1 A (peak)
TRG	Transmission trigger	positive logic width = 10 Vdc; duration 1µs impedance 50Ω
TRG-S	Trigger ground	
TRG-RTN	Trigger return	positive logic width between 5 and 10 Vdc duration = 1 µs; impedance = 50 Ω *(always to be loaded, also when not used)*
TRG-RTN-S	Trigger return ground	
ACP	Azimuth Clock Pulse	open collector V_{MAX} = 15 Vdc; I_{MAX} = 10 mA; 2048 pulses/revolution
HL	Head Line (North)	positive logic open collector V_{MAX} = 15 Vdc; I_{MAX} = 10 mA duration = 50 ms at 22 r.p.m.
SB_OP	Standby / Operation selector (see Table 3)	open collector V_{MAX} = 5 Vdc; I_{MAX} = 10 mA
RAD0	Pulse Width selector (LSB) (see Table 3)	open collector V_{MAX} = 5 Vdc; I_{MAX} = 10 mA

Name	Description	Value/features
RAD1	Pulse Width selector (MSB) (see Table 3)	open collector V_{MAX} = 5 Vdc; I_{MAX} = 10 mA
MAG I	Magnetron power indicator	voltage between 8 and 12 Vdc high impedance
TN_IND	Tune indicator	voltage between 0 and 4 Vdc high impedance
TN_REG	Tune regulator	adjustable voltage between 0 and 5 Vdc high impedance
TUNE	Tune voltage	between 0 and 30 Vdc (12 Vdc typical) high impedance
PM	Performance Monitor *(not used)*	open collector V_{MAX} = 12 Vdc; I_{MAX} = 10 mA
VD	Video output *(negative)*	-4 Vdc peak; impedance = 50 Ω
VD-S	Video ground	

Table 2 – Interface signals

SB_OP	RAD0	RAD1	TRG	Mode
X	X	X	absent	stand-by
1	X	X	X	stand-by
0	0	0	present	radiate, short pulse
0	1	0	present	radiate, medium pulse
0	0	1	present	radiate, long pulse
0	1	1	present	radiate, extra long pulse

Table 3 – Operation mode and Pulse Width

Pulse Width	SHORT (80 ns)	MEDIUM (300 ns)	LONG (600 ns)	EXTRALONG (1.2 µs)
PRF	FAST (3200 Hz)	MEDIUM (1600 Hz)	SLOW (800 Hz)	VERY SLOW (500 Hz)

Table 4 – Suitable frequencies for the TRG trigger signal

6. CONNECTORS

– Connector HRS 24 p.f.m. (see Fig. 3).

SU 70-10N J8 Terminal board	Function	Wire – Wire section (mm^2)
1	P.MOT	BLACK/BROWN 0.5
2	P.MOT	BLACK/RED 0.5
3	N.MOT	BLACK/ORANGE 0.5
4	N.MOT	BLACK/YELLOW 0.5
5	GND	BLACK/GREEN 0.5
6	GND	BLACK/BLUE 0.5
7	+24V	BLACK/VIOLET 0.5
8	+12V	BLACK/GRAY 0.5
9	-12V	BLACK/WHITE 0.5
10	TRG-S	GND COAX1
11	TRG	COAX1
12	TRG-R-S	GND COAX2
13	TRG-RTN	COAX2

Table 5 – Interconnection between the terminal board J8 of the scanner unit and display unit

SU 70-10N J9 Terminal board	Function	Wire – Wire section (mm^2)
1	ACP	BROWN 0.08
2	HL	RED 0.08
3	SB-OP	ORANGE 0.08
4	RAD 0	YELLOW 0.08
5	RAD 1	GREEN 0.08
6	MAG I	BLUE 0.08
7	TN-IND	VIOLET 0.08
8	TN-REG	GRAY 0.08
9	TUNE	WHITE0.08
10	PM	BLACK 0.08
12	VD-S	GND COAX3
13	VD	COAX3

Table 6 – Interconnection between the terminal board J9 of the scanner unit and display unit

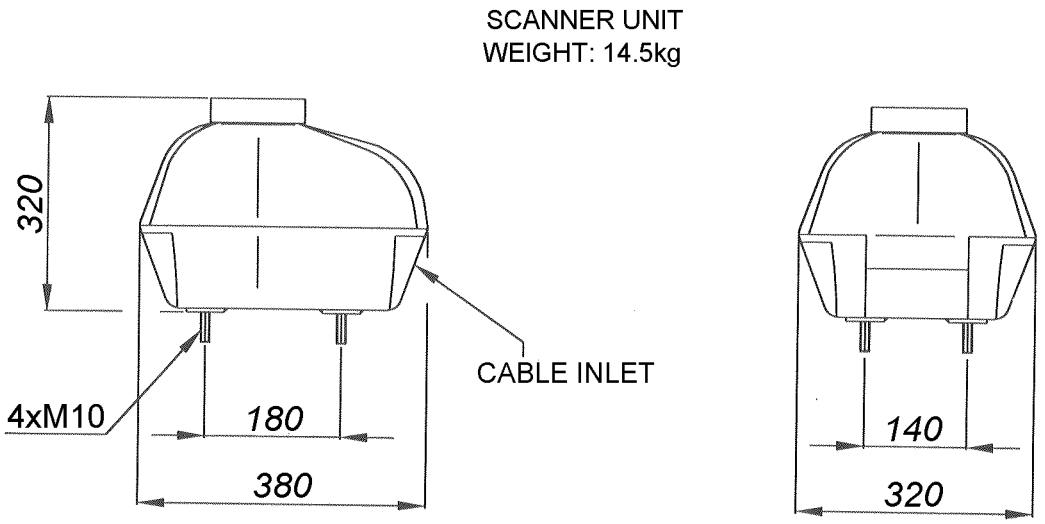


Fig. 1 – Dimensions and weight of the scanner unit SU70-10NR

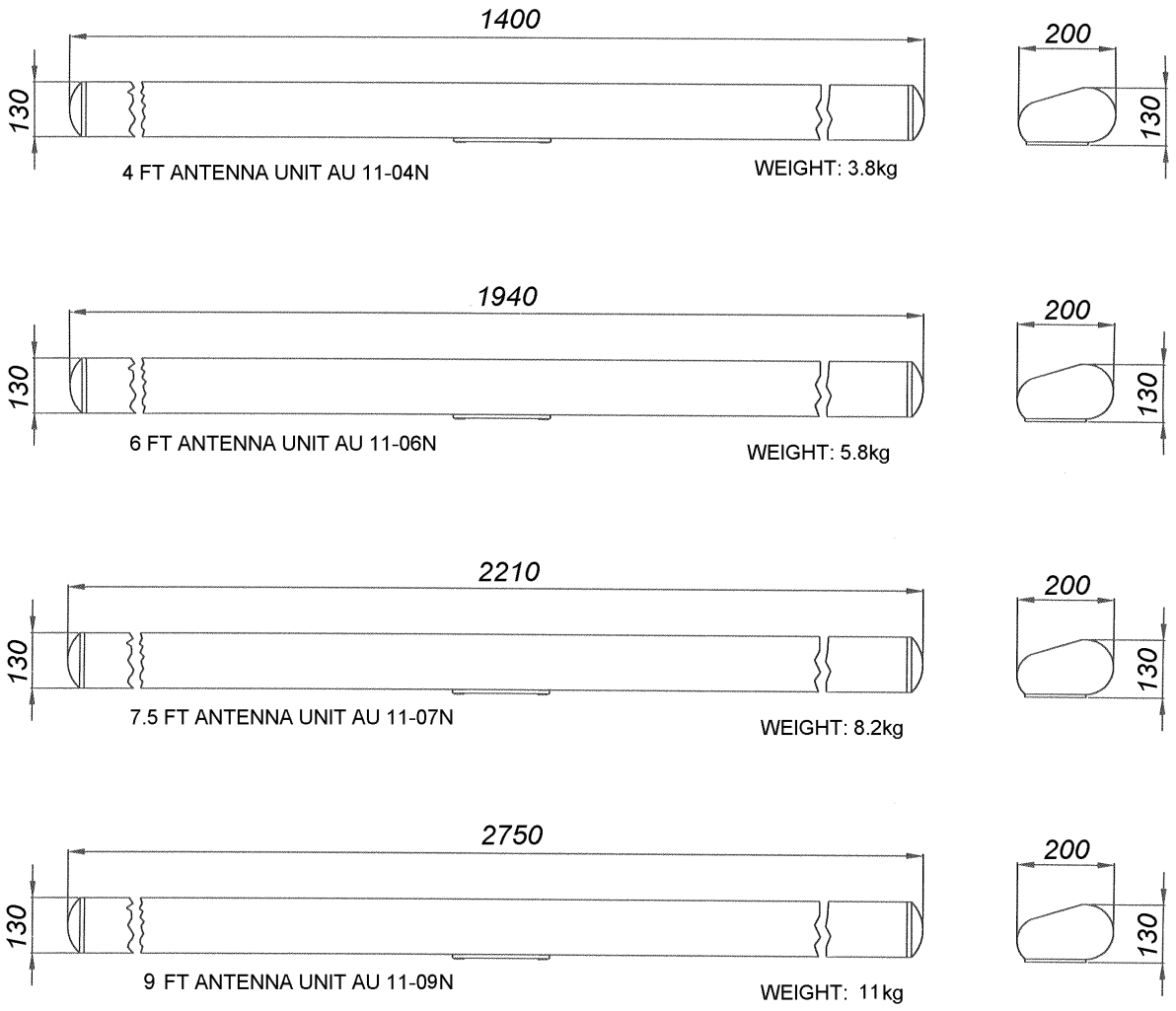
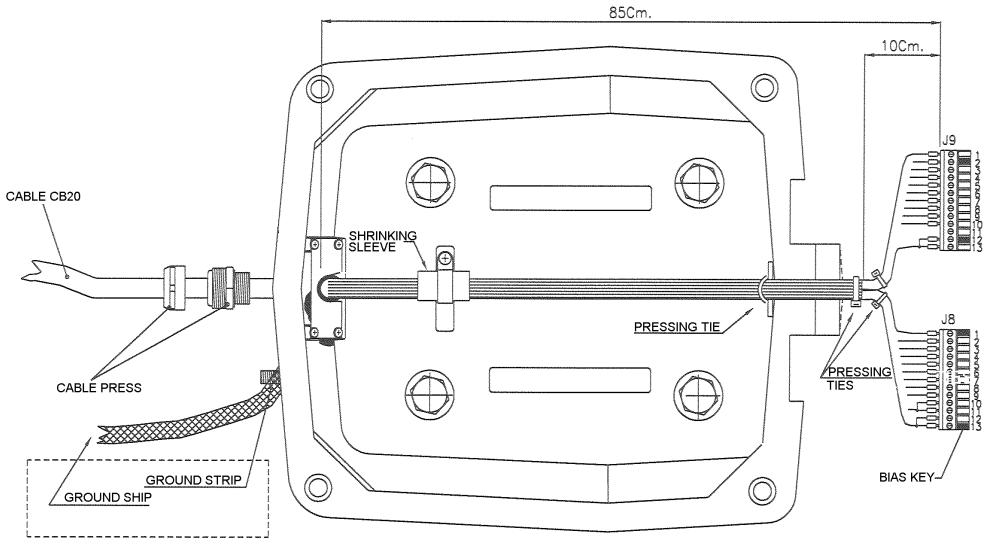
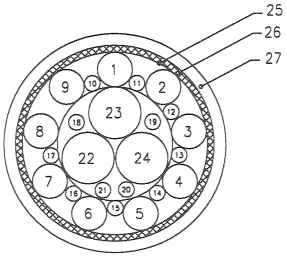


Fig. 2 – Dimensions and weights of the available array units



J9			
N°	FUNCT.	CONDUCTOR COLOUR / REF	SEZ. mmq.
1	ACP	BROWN	0,082
2	HL	RED	0,082
3	SB_OP	ORANGE	0,082
4	RADO	YELLOW	0,082
5	RAD1	GREEN	0,082
6	MAGI	BLUE	0,082
7	TN_IND	VIOLET	0,082
8	TN_REG	GRAY	0,082
9	TUNE	WHITE	0,082
10	PM	BLACK	0,082
11	NC		
12	GND_VD	BRAID CABLE	
13	VD	COAX 3	

J8			
N°	FUNCT.	CONDUCTOR COLOUR / REF	SEZ. mmq.
1	P_MOT	BROWN - BLACK	0.5
2	P_MOT	RED - BLACK	0.5
3	N_MOT	ORANGE - BLACK	0.5
4	N_MOT	YELLOW - BLACK	0.5
5	GND	GREEN - BLACK	0.5
6	GND	BLUE - BLACK	0.5
7	V24P	VIOLET - BLACK	0.5
8	V12P	GRAY - BLACK	0.5
9	V12N	BIANCO - NERO WHITE - BLACK	0.5
10	GND_TRG	BRAID CABLE	
11	TRG	COAX 1	
12	GND_TRGR	BRAID CABLE	
13	TRGR	COAX 2	



CB20 CABLE Ø 14mm			
NUM. RIFERIM.	CARATTERISTICHE TECNICHE	SEZIONE mmq	COLORE/RIFERIMENTO
1-9	AWG20 conductor, soldered copper, format 19x0.20, isolated PVC 1.55 mm max	0,5	Brown-black, red black Orange-black, Yellow-black; Green-black, blue-black Violet-black, gray-black White-black
10-21	AWG20 conductor soldered copper, format 7x0.127, isolated PVC 0.94mm max.	0.082	Numbered from 1 to 3
22-24	RG174 coaxial		NUMERATO DA 1 A 3
25	Poly strip		
26	Full shield Soldered copper >85%		
27	PVC grey strip, GEM CB label, step 50 cm, ext.diam max 15mm		

Fig. 3 – CB20 cable heading scanner unit