

A : Survey, Drawing and Office Equipment

AI SURVEY EQUIPMENT

AI (1) Theodolites

Transit Vernier Theodolites

1. Manufacturer/Supplier : M/s East End Engineers,
52, Bhupendra Bose Avenue,
Calcutta-700 004.

		(i)	(ii)	(iii)	(iv)	(v)
Type	:	TH2	TH2OP	RTH2OP	MD5	THEOP3
Telescope	mm	178	178	178	127	178
Aperture	mm	40	40	40	35	40
Magnification	x	28	28	28	15	28
Shortest Focus	m	2.5	2.5	2.5	2.5	2.5
Resolution	m	300	300	300	150	300
Stadia Ratio	:	1:100	1:100	1:100	1:100	1:100
Dia horizontal circle	mm	125	125	125	125	125
Dia verticle circle	mm	114	114	114	80	114
Vernier reading	sec	20	20	20	-	20
Horizontal	min	-	-	-	1	-
Vertical	min	-	-	-	3	-
Plate bubble	:	30 sec	30 sec	30 sec	1 min	30 sec
Altitude bubble	:	20 sec	20 sec	20 sec	1 min	20 sec

		(vi)	(vii)
Type	:	Hanging Theodolite	Rand Type Theodolite
Vernier reading	:	1 min	20 sec

20 sec vernier theodolite with full mining outfit, auxiliary telescope, diagonal eyepiece, zenith prism, prism eyecap and tubular compass.

2. Manufacturer/Supplier : M/s Kaybee & Company
60/1, Chowringhee Road,
Calcutta -700 020.

		(i)	(ii)	(iii)
Type	:	kb 30	kb 20 A	kb 20 B
Length	mm	125	175	175
Magnification	x	30	28	28
Objective aperture	mm	43.75	31.25	31.25
Focusing	:	Internal	Internal	Internal
Minimum Focus	m	2.44 to 3.05	2.44	2.44
Maximum Focus	m	213.35 to 243.83	Staff reading 213.35 m	Staff reading 213.35 mm
		focusing distance : 914.35 m	focusing distance : 914.35 m	
Stadia Constant	:	1:100	1:100	1:100
Spirit level plate/altitude	:	20 sec/2 mm	20 sec/2 mm	20 sec/2 mm
Horizontal				
circular dia	mm	100	125	125

A : Survey, Drawing and Office Equipments

Main Graduation	min	:	20	20	10
Reading by Vernier	sec	:	20	20	10
Vertical Circle dia	mm	:	75	100	100
Main Graduation	min	:	20	20	10
Reading by Vernier	sec	:	20	20	10
3. Manufacturer/Supplier : M/s National Instruments Limited, 1/1 Raja S.C. Mullick Road, Calcutta -700 032.					
Type	:	Transit Theodolite 127mm ISD pattern in box with stand			
Least Count	:	20 seconds with vernier scale.			
4. Manufacturer/Supplier : M/s Sunrays Optical and instruments Corporn. 94, Qanungoyan street, Roorkee - 247 667 U.P.					
Type	:	"Sunrays" Vernier Transit Theodolites - 20 - sec			
Brand	:	Johnson's			
Telescope focal length	mm	:	178		
Magnification	x	:	20 - 30		
Shortest focus	m	:	1 - 2		
Resolution	m	:	200		
Dia of object glass	mm	:	40		
Aperture of object glass	mm	:	30 - 45		
Buble vertical plate	:	25 sec			
Bubble horizontal plate	:	30 sec			

Optic Theodolites

1. Manufacturer/Supplier : M/s East end Engineers 52, Bhupendra Bose Avenue Calcutta-700 004.					
Type	:	Microscopic Theodolite			
Estimation	:	± 6 sec, with full mining outfit auxiliary telescope Diagonal eyepiece, zenith prism, prizm eyecap and tubular compass			
2. Manufacturer/Supplier : M/s National Instruments Limited, 1/1 Raja S.C. Mullick Road, Calcutta -700 032.					
Type	:	(i)	(ii)	(iii)	
Magnification	:	NITD-50	NITC-20 (MICRO)	NITC - 20E	
Image	:	25 X	25 X	25 X	
Field view	:	inverted	inverted/erect erect		
Shortest focusing	:	1.5°	1.5°	1.5°	
Distance	m	:	2.5	2.5	2.5
Multiplication constant	:	100	100	100	
Sensitivity of level	:	plate - 30 sec	plate - 30 sec	plate- 30 sec	
(per 2mm run)	:	index - 3 sec	index - 3 sec	index - 3 sec	
Direct reading	:	1 min	20 sec	20 sec	
(horizontal and vertical)	:				
Reading by estimation	:	6 sec	6 sec	2 sec	

A : Survey, Drawing and Office Equipments

Type	: (iv) Transit theodolite 127mm ISD pattern in box with stand	(v) Transit theodolite 127 mm ISD pattern in box with telescopic stand
Least Count	: 20 seconds with vernier scale	20 seconds with vernier scale

Universal Theodolite

Manufacturer/Supplier	: M/s National Instruments Ltd., 1/1 Raja S. C. Mullick Road, Calcutta - 700 032.
Type	: NT-T2 (Wild Model)
Magnification	: 30 x
Image	: Erect
Filed view	: 1.7°
Shortest focusing distance	m : 2.2
Multiplication constant	: 100
Sensitivity of level (Per 2 mm run)	: Plate : 20 Sec Index : Automatic
Direct reading (Horizontal & Vertical)	: 1 Sec
Reading by Estimation	: 2 Sec

Geodetic Distance Measuring Instruments

Manufacturer/Supplier	: M/s National Instruments Ltd., 1/1 Raja S. C. Mullick Road, Calcutta - 700 032.	
Type	(i) Citation Ni-450	(ii) DI-100
Range 1 Prism	m : 1200	700
3 Prisms	km : 2.3	
Accuracy	: 5 mm ± 5ppm	5 mm ± 5 ppm
Temperature range	: (-) 20° C to +50° C	(-) 20° C to +50° C
Battery Rechargeable	: 12 V NICD	0.5 AH, 2AH & 7 AH
No. of Measurement with fully charge battery	: 500	500, 2000 & 7000
Dimension	mm : 200 x 150 x 120	-
Wt	kg : 2.8	1.1
4. Manufacturer/Supplier	: M/s Sunrays Optical and Instruments Corporation., 94, Qanungoyan street, Roorkee -247 667.	

Type	: (i) Johnson's level	(ii) Johnson's auto level	(iii) Dumpy level	(iv) Tilting Level
Magnification	x : 24 - 30	28 - 32	-	-
Stadia ratio	: 1 : 100	1 : 100	-	-
Shortest Focussing distance	m : 2.2 - 1	1.2	-	-
Image	: erect	erect	-	-

AI(2) Levels

1. Manufacturer/Supplier		M/s East End Engineers, 52, Bhupendra Bose Avenue, Calcutta-700 004.										
Type		(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)			
Telescope L	mm	WOEL-78	QEL-7A	DL 12	DL 12C	COEL 7C	WOEL 7A	MRL 9C	DL-7 RIGID			
Aperture	mm	Simple	Setting			Quick	Compact		Dumpy			
Magnification	X	tilting	precision			setting	tilting		level			
Nearrest Focus	m	level	engineers			Engineers	level		level			
Resolution	m	level	level			level	level		level			
Stadia Ratio	m	178	305	305	305	178	178	178	178			
Horizontal Circle		40	37	37	37	40	40	40	40			
Minimum angle		28	20	20	20	28	28	28	28			
Spirit Level		2.5	3	3	3	2.5	2.5	2.5	2.5			
Compass dia		200	200	200	200	200	200	300	200			
Division	mm	1:100	1:100	1:100	1:100	1:100	1:100	1:100	1:100			
		360°	360°	-	-	360°	360°	-	360°			
		6 min	6 min	20 sec	20 sec	6 min	6 min	20 sec	6 min			
		25 sec	25 sec	-	72	25 sec	25 sec	-	25 sec			
		-	-	-	30 min	-	-	-	-			
		-	-	-	-	-	-	-	-			
Type		(ix)	(x)	(xi)								
		Dumpy level	Engineers level	Vernier type								
		Microptic Precision level	Vernier type	Precision level								
		Direct reading - 5 min	Precision level									
2. Manufacturer/Supplier		M/s Kaybee & Company 60/1, Chowringhee Road, Calcutta-700 020										
Type		(i)	(ii)	(iii)	(iv)	(v)	(vi)					
		Kaybee Brand	Kaybee Brand	Kaybee Brand	Kaybee Brand	Kaybee Brand	Kaybee Brand					
		300 mm Dumpy	300 mm	Precision	Precision	Tilting	Reversible					
		Level with	standard	Engineers level	Engineers level	level	level					
		Compass	Dumpy level	(Quick Setting)								

A : Survey, Drawing and Office Equipments

Telescope	mm	300	300	175	125	350	175
Aperture	mm	31.25	31.25	37.5	31.25	43.75	37.5
Magnification	X	20	20	28	26	28	28
Focusing		Internal	Internal	Internal	Internal	External	Internal
Stadia constant	m	1:100	1:100	1:100	1:100	-	1:100
Minimum Focus	m	2.44	3.05	3.05	2.44	-	2.44
Maximum Focus	m	182.87	182.87	213.35	182.87	-	213.35
Shortest distance reading	m	-	-	-	-	3.05	-
Longest staff reading	m	-	-	-	-	213.35	-

(vii)

Type : Kaybee Brand Abney Level
 Tube : 100 mm with improved reflector
 Reading : By vernier to 10 minutes

3 Manufacturer/Supplier : M/S National Instruments Ltd.,
 1/1 Raja S. C. Mullick Road,
 Calcutta-700 032.

5

Type		(i)	(ii)	(iii)	(iv)	(v)
Magnification		NI NA 20	Level Engineers	Level Dumpty 279 mm	Quick set level	Hand level
Image	X	Automatic level	24	internal focusing	ML - 10	Ambeys
Stadia Ratio		Erect	inverted	inverted	16	-
Shortest Focusing distance	m	1:100	1:100	1:100	inverted	-
Horizontal Circle		0.5	3	3	1:100	-
Least Count of Circle		Metal	-	-	3	-
Working range of Compensator		1°	-	-	Metal	-
Setting accuracy of Compensator		30 Minutes	-	-	1°	-
		±0.8 sec.	-	-	-	-

AI(3) Mining Dials

1. Manufacturer/Supplier : M/s East End Engineers
52, Bhupendra Bose Avenue
Calcutta -700 004.

Type	:	(i) SROBONA-MMT 87 (Microptic)	(ii) Microptic mining Dial (1 minute estimation)	(iii) Improved type mining dial (1 minute vernier)	(iv) Van dial (1 minute vernier)
Telescope Aperture of objective	mm	:	24		
Field of view		:	3°		
Magnification	x	:	10		
Shortest reading	m	:	2.1		
Stadia ratio		:	1:100		
Elevation or Depression		:	50°		
Total length	mm	:	115		
Circle dia	mm	:	72.4		
Graduation Level		:	5 minutes		
Smallest reading		:	1 min by estimation		
Bubble sensitivity		:	2 min		
Tripod		:	Sliding leg wooden		

2. Manufacturer/Supplier : M/s Kaybee & Company,
60/1, Chowringhee Road,
Calcutta -700 020

Type	:	KB 10 (TRANSIT)
Length of telescope	mm	: 87.5
Aperture of object glass	mm	: 25
Focusing		: external
Minimum focus	m	: 1.52
Maximum focus	m	: 304.79
		staff reading : 91.44 m
Magnification	x	: 28
Spirit levels		
Plate/Altitude		: 30 sec/2 mm
Horizontal circle	mm	: dia : 125
		graduation : 20 minutes
		Reading by vernier : 20 seconds
Vertical circle	mm	: dia : 75
		graduation : 20 minutes
		Reading by vernier : 20 seconds

AI(4) Compasses

Brunton Compass for pocket transit

1. Manufacturer/Supplier : M/s East End Engineers,
52, Bhupendra Bose Avenue,
Calcutta -700 004.

A : Survey, Drawing and Office Equipments

- Type : (i) Brunton Compass (ii) Esray Clind Compass
2. Manufacturer/Supplier : M/s Kaybee Company,
60/1, Chowringhee Road,
Calcutta -700 020
- Type : Kaybee brand Brunton Compass
or Pocket transit
- Measuring the dip : Up to 60°
- Size mm : 68.75 X 68.75 X 25
3. Manufacturer/Supplier : M/s National Instruments Ltd.,
1/1, Raja S.C. Mullick Road,
Calcutta -700 032.
- Type : Brunton compass with bracket
(without stand)
4. Manufacturer/Supplier : M/s Sunrays Optical and Instruments Corporation,
94, Qanungoyan Street,
Roorkee 247 667, (U.P.)
- Type : Brunton Compass

Prismatic compass

1. Manufacturer/Supplier : M/s Kaybee & Company,
60/1, Chowringhee Road,
Calcutta -700 020
- Type : Kaybee brand Prismatic Compass
- Body : Gunmetal and fitted with alloy aluminium
Graduated ring with machine divided in
scale to read 30 minutes
2. Manufacturer/Supplier : M/s National Instruments Ltd.,
1/1 Raja S.C. Mullick Road,
Calcutta -700 032.
- Type : Compass prismatic in sling leather with stand.
- Dia mm : 114

AI(5) Ranging Rods

- Manufacturer/Supplier : M/s National Instruments Limited,
1/1 Raj S.C. Mullick Road,
Calcutta-700 032.

A : Survey, Drawing and Office Equipments

Type : Ranging Rod (Wooden)
 Lengths m : 2 & 3

Al(6) Levelling Staves

1. Manufacturer/Supplier : M/s Kaybee and Company,
 60/1, Chowringhe Road,
 Calcutta -700 020.
- Type i) : Kaybee's levelling staff telescopic and one piece
 staves of 4.27, 4.87, 5.48, 3.05 & 1.83 m.
 ii) : Kaybee's levelling staff telescopic and one piece
 staves of 5, 4, 3, 2 & 1 m
 iii) : Levelling staff folding type of 4m I.S.I. type.
 modified folder 2 m.
 iv) : Sop with pattern levelling staves.
2. Manufacturer/Supplier : M/s National Instruments Ltd.,
 1/1 Raja S.C. Mullick Road,
 Calcutta-700 032.
- Type i) : Staff levelling of 4m telescopic in 3 lengths
 ii) : Staff levelling of 5m telescopic in 3 lengths
3. Manufacturer/Supplier : M/S Sunrays opticals and Instruments Corporation,
 94, Qarungoyan Street,
 Roorkee-247 667.

Type	:	(i)	(ii)	(iii)
	:	Alumnium levelling	Alumnium levelling	Alumnium levelling
	:	Staff of 4m under 1 m	Staff of 4m under 2 m	Staff of 4m under 3 m
Closing L	m	1	2	1.5
Full L				
Type L	m	4	4	3
Nos. of L		4	2	2
wt	kg	2.8	2.8	2.45
Type	:	(iv)	(v)	(vi)
	:	Alumnium levelling	Alumnium levelling	Alumnium levelling
	:	Staff of 3m under 1 m	Staff of 3m under 0.75m	Staff of 2m under 1m
Closing L	m	1	0.75	1
Full L	m	3	3	2
Nos. of L		3	4	2
wt	kg	2.6	2.75	1.75
Type	:	(vii)	(viii)	(ix)
	:	Alumnium levelling	Alumnium levelling	Alumnium levelling
	:	staff (telescopic)	staff of 5m under 1.25m	staff of 5m under 1 m
Size	m	5, 4 & 3		
closing L	mm	1885, 1535 & 1120		
wt	kg	2		

A : Survey, Drawing and Office Equipments

AI(7) Other Surveying Instruments and Accessories

1. Manufacturer/Supplier : M/s East and Engineers,
52, Bhupendra Bose Avenue,
Calcutta-700 004.
 - i) Brand tape
Length : 30 or 50 m
 - ii) Interchangable Targe
 - iii) Various mining survey fittings.
 - iv) Steel Bandtape
 - v) Telescopic Alidade
 - vi) Illuminating target and substance bar
 - vii) Microptic precision level direct reading 5 min.
 - viii) Tripods

2. Manufacturer/Supplier : M/s Kaybee & Company,
60/1, Chowringhee Road,
Calcutta -700 020.

Telescopic tripod stand

Detachable circular Comapss

Dust brush

Screw Driver

Tommy pins

Plumb bob

3. Manufacturer/Supplier : M/s National Instruments Limited,
1/1 Raja S.C. Mullick Road,
Calcutta-700 032.

Binocular prismatic 6 X 30 in sling leather case

Mirror stereoscope with 3 x binocular

Parallax bar for mirror stereoscope

Pocket stereoscope

Plane table with stand : size : 762 mm x 610 mm

Carrying case

Tool kit,

12V NICD battery

Battery Charger

PPM chart

Yoke fitted with telescope

Cable for battery

Cable for vehicle battery

Triple prism assembly

Prism adopter

Tribrach

Tripod.

4. Manufacturer/Supplier : M/s Sunrays Opticals & Instruments Corporation,
94, Qanungoyan Street,
Roorkee - 247 667.

Forestry Compass
Blume-Leiss-Altimeter
Box Sextant
Bar Substance
Planimeter
Water Current Meter
Binocular
Padometer
Rotameter
Altimeter
Barometer

AI(8) Laser Alignment System

1. Manufacturer/Supplier : M/s Jyoti Limited,
P. O. Chemical Industries,
Industrial Area,
Baroda-390 003.
- Type : (i) JAL-HS-2041 F
- Wave Length : 632.8 Manometer (Red, Visible)
Beam Dia (At exit) : 10 mm (AT 1/E²) Approx.
Output Power Density : 2.5 Milli watt s/sq.cm
Freedom Movement : Horizontal : ± 4 degrees (Total 8°)
Vertical : ± 3 degrees (Total 6°)
Input Voltage : 220^{±30} V AC; 50-60 HZ; 1 Ø
- 20
Or
110^{±15} V AC; 50-60 HZ; 1 Ø Or 12^{±1} V DC
- Range : Diameter of the laser spot is about 20mm at 250m & about 50 mm at about 500 m
Operating temp : Upto 45°C
Operating Humidity : Upto 90%
Approved by : DGMS
- Type : (ii) JAS-A-022 (iii) JAL-CS-2041 (iv) JAL-HS-2041W
Standard Model Water proof Model
- (v) JAL-S-2041 (vi) JUS-C-101

AI(9) Accessories of Laser Alignment System

1. Manufacturer/Supplier : M/s Jyoti Limited,
P. O. Chemical Industries,
Industrial Area,
Baroda-390 003.
- Item : (i) Bracket (ii) Bracket (iii) Visual Target Plate
Model : Jyoti U Jyoti 'L' JAD-V-000 'Jyoti'
with wall mount
- Coarse Adjustments**
- Horizontal : ± 20 mm ± 20 mm
Vertical : ± 150 mm 3° ANGULAR
(Approx.)
- Pattern : Concentric Circles
Freedom of Movement : - 200 mm and 40 mm
along orthogonal axes

AII. DRAWING AND OFFICE EQUIPMENT

All(1) Drawing Instruments

1. Manufacturer/Supplier : M/S National Instruments Ltd.,
1/1 Raja S. C. Mullick Road,
Calcutta-700 032.

	(i)	(ii)
Item	: Drawing Board with Rose wood edge	T. Square
Sizes	mm : 610 x 813	813
	762 x 1067	1067
	838 x 1372	1372

All(2) Ammonia Printing Machine

1. Manufacturer/Supplier : M/s. Sunrays Optical & Instruments Corporn.
94-Qanungoyan Street,
Roorkee-247 667.

	(i)	(ii)
Type	: EXPO-Master II "Johnson Brand"	EXPO-Master III "Johnson Brand"
Light Source	Watts : 120	3 x 120
Blue Flourocet Tube	: 1	3
Speed	mm/min : 0-1500	0-3000
Paper width	mm : 1150	1200
Paper	L : Infinite	Infinite
Operating volts	: 200/240 AC	200/240 AC
Cycles	: 50	50
AMPS	: 5	5
Phase	: Single	Single

All (3) Computers

Manufacturer/Supplier : M/s Uptron India Ltd.,
Control System Division,
10, Ashok Marg, Lucknow -226 001.

i) Dynalink Micro-Minos System

Micro Computer : SN-23 with intelligent console terminal
Memory : 256 kb parity memory
Display (VDU) : 20" colour monitors RGB type and TDS 4000 character generators
(14" option available)

A : Survey, Drawing and Office Equipments

Control (keyboards) : Functional to Sepec. PSL045
 Printer : Centronics or equivalent
 System size : Standard 2 rings (16 outstations/ring) expandable to 4 & 7 ring versions
 Outstation Compatibility : Upton DL 300 series - primarily used for conveyor, pump, fan, control and monitoring

Upton DL 400 series - primarily used for general purpose monitoring and control including face operations - fully expandable.

Upton DL 500 series - primarily used for environmental monitoring and dedicated monitoring tasks.

Power Supply : 240 V or 120 V 50 to 60 hz AC

		(i)	(ii)	(iii)
Equipment Details	:	Console	Rack Assembly	Printer
W	cm :	161.5	53.5	57.1
H	cm :	112	122.5	19
D	cm :	81.5	71.5	46.3
wt Approx.	kg :	80	160	22

ii) Microprocessor - Based Mine Surveillance Systems

Microprocessor : Intel 8088, 16 bits processor
 Memories : Ram, Prom, Floppy disks
 Display : Colour VDU
 Control : Keyboard with self diagnostic facility
 Monitor Channels : 16 Digital, 8 Analogue Monitoring points for each outstations
 Control Channels : 3 in each outstation
 Transducer Types : Up to 5 different types
 System Size : Up to 8 outstations in a ring
 Power : 230 v 50 hz AC
 Ambient : 25°C + 2°C
 Application/Areas : Monitoring of different environmental parameters
 E.G. Methane, Carbo Monoxide, Air velocity, temperature, oxygen deficiency, etc. inside a gassy mine.
 Status Monitoring of different machines working
 Underground production monitoring.

iii) Sequel System

Salient Features : Prom based system software leading to increased system reliability
 Modular in nature and hence expandable
 Power failure detector to ensure systematic shut down
 Colour Mimics showing 'solids' and 'liquids' flow using specially designed character set.

A : Survey, Drawing and Office Equipments

		Data Acquisition, Comparison and output rate control Use of well proven software Full plant control and monitoring providing start/stop, sequencing, interlocking, power check and control loop tasks. Robust mechanical design with adequate internal cooling
Software Control Facilities	:	Sequence start/stop software control Individual start/stop of units Block stop of all dependent units on a fault or unexpected stop Automatic sequence restart of units stopped on sequence Automatic time out of starting and stopping Analogue loop control
Available Moduls	:	Central Processor Module Solid State MOs Memory with battery backed RAM Analogue to digital converter Analogue multiplexer Digital to Analogue converter 16 way AC/DC Isolated digital inputs 16 Way Relay output Power supply unit
Application Areas	:	Coal preparation plant/washeries Coal handling plant Mineral Handling & Processing plants General process monitoring and control

iv) Control & Automation system

Micro Processor based Mine Operating System	:	Remote control and monitoring of coal transportation system Bunker automation and measuring equipment for both Horizontal and vertical strata bunkers/bins utilising radar principle - Face operations monitoring equipment Power distribution monitoring systems Cosmos - 1 Mine Surveillance system Microprocessor based automation system for coal washeries\mineral preparation plants (Sequel) Microprocessor based automation system for coal/mineral handling plants (Sequel) Vertical Bunker Level Indicator
---	---	--

A : Survey, Drawing and Office Equipments

- v) Communication & Signalling system** : IS Auto-cum- Automanual Telephone System
Battery Powered Telephone System (Loud Hailers)
Pre-start Alarm System for Conveyors
Roadway Signalling Systems
Face Signalling & Communication System
Shaft Signalling & Interlock System
Leaky Feeder Based Mine Radio Communication System
Cage Communication System
Vehicle Communication System
- vi) Underground Power Supplies :** Bati I S Rechargeable 7 A hour Battery
DC 2 Power Supply (Output 12 V DC)
DC 3 Power Supply (Output 18 V DC)
DC 4 Power Supply (Output 7.5 V DC)
DC 3/Bati Power Supply
- vii) Fixed Station Monitors System :** Methane Monitor Model BM3
Carbon Monoxide Monitor Model BCO 1/BCO1-2
Oxygen Deficiency Monitor Model B 01/B 01-R
Air Velocity Monitor Model BA-5
Temperature & Humidity Monitor Model TH 1
Ventilation Monitor Model VM1
Spontaneous Combustion
Total Monitoring of the products and /or CO model Fidesco
- viii) Hand Held Detectors :** Portable Methanometer Monitor Model SM 1
Automatic Fire Damp Detector Model AFD 2
Portable Carbon Monoxide Monitor Model SCO-2m
Portable Oxygen Detector Model OXD-2m
- ix) Vertical Bunker Level Indicator System**
- Radar Head Unit : Oscillator Frequency : within 13.414 GHz band
Output Power : 25 milliwatt peak
Aerial Gain : 20 dB
Beam Angle : 20 degree
Pulse Duration : minimum 33 nano sec.
Pule Repetition Rate : 1 mhz - 5 mhz
Measurement Accuracy : 5% of max Bunker depth setting
Output : 0.4 to 2.0 volts to represent 0 to 100% with
a facility of scale to individual bunker depth.

A : Survey, Drawing and Office Equipments

Display Unit	:	Form	:	MIMIC, 0 to 100% in 10% increments
(Both local and remote) Input	:	0.4 to 2.0 volts		
		Relay outputs	:	up to 4 sets of clean contacts available trip at 10% level increments
		Flexibility	:	can be used as general purpose display unit for analogue values
General	:	Range of operation	:	Bunker Depth of up to 100 m
		Remote Display	:	Can be sited up to 1 km from Radar head
		Zero range adjustment	:	0 to 5 m
		Power Supply Requirements	:	7.5 V at 1.4 A DC
		Units Monitoring	:	Supplied mounting bars or directly bolted to structure certified intrinsically safe for underground use.

x) Dynalink Monitoring and Control Systems

(i) DL 400 Series Combined Outstation Unit

Digital Inputs	:	No.	:	Up to 232 off "Clean Contact" states
Protection	:	Protection against short circuit		
Analogue Inputs	:	No.	:	Up to 10 off
		Type	:	0.4 V to 2.0 V or 4 mA to 20 mA (0 volt earth free)
Outputs	:	No.	:	up to 6 off (Pilot 1, Pilot 2, Section switch trips)
		Type	:	FLP Relay contacts
Communications	:	Output	:	2 watts peak power up to 20 remote 8 mA amplifiers may be driven from one system
Signalling	:	Coverage up to 15 km in a single span		
		Numerical Indication up to 150 "Solus" pull keys		
Operating Temp	:	0°C to 45°C (standard)		
Humidity	:	0 to 85% non condensing		
Power Requirements	:	110 V AC or 220 V AC at 50 Hz (standard)		
		The FLP unit provides all IS power supplies for the following		
		Communications and signalling unit : 13 V DC at 500 mA (for BMA Communcation)		
		13 V DC AT 500 mA (For Signalling system)		
		28 V DC (For key identification)		
		DL 400 Control and Monitoring Unit : 12 V DC AT 500 mA		
		Certified Intrinsically safe for underground coal mines use		
		Uses include face, conveyor, pump, fan, compressor, bunker and fixed plant control and monitoring		

A : Survey, Drawing and Office Equipments

Dimensions and Weights	:	Communications and Signalling unit	DL 400 Control and Monitoring unit	FLP unit
W	mm	480	880	530
H	mm	270	450	330
D	mm	300	248	240
wt	kg	26	30	92
Ancillaries	:	BMA Roadway Amplifiers PSA Remote Generator Communication Cable (5 core, 2.5 sq.mm PVC/SWA/PVC) Solus pull keys including wire grips, shackles, eyelets and pigtail Pull Cable (4 core, 0.75 sq mm) Tail End Unit		
Options	:	Surface Exchange Remote stop/start unit with protection Transmission cable to surface (6 core, 1.5 sq mm PVC/SWA/PVC) Mounting plinth BMA portable handset (including jack) Dynalink 600 Transmission conforming to BS 6556 low speed digital standard		

(ii) DL 500 Series Outstation Unit

Digital Inputs	:	No.	:	16 off
Type	:	Square Wave Excitation (Pilot Core Drive)	:	
Analogue Inputs	:	No.	:	Protection Against Short Circuits
Type	:	0.4 to 2.0 V or 4 to 20 mA (0 V earth free)	:	8 off
Outputs (IS)	:	No.	:	3 off
Type	:	Changeover Relay	:	
Operating Temp.	:	Standard Rating	:	12 VDC at 500 mA
	:	Operating	:	0 to 55°C
	:	Storage	:	0 to 75°C
	:	Humidity (standard)	:	0 to 85% Non Condensing operating
Power Requirements	:	12 V DC at 500 mA	:	
Dimensions and weights	:		:	
W mm	:	560	:	
H (over glands) mm	:	560	:	
D mm	:	173	:	
wt kg	:	20	:	
Application Areas	:	Environmental//ventilation monitoring and control Face equipment monitoring Fixed Plant Monitoring including electrical distribution, pumps etc. Haulage Monitoring Conveyor Monitoring General Purpose Surface Activities		
Options	:	A range of options are available including mounting plinth Communication Jack Industrial Power Supply (Non IS version)		