

GRI	LOW NOISE CABLES	GRI NO.: GRI/27/10/08-09 DATE : 09.03.2009 PAGE : 1 of 1
-----	-------------------------	--

INDENT NO . : C/T/4100/20089405

DATED : 09.03.2009

LOW NOISE CABLES :

Reinforced, Double Screened, internal graphite coated, low noise co-axial cable, single core, single strand(Dia of central silver coated single conductor should be 0.275 +/- 0.005 mm), teflon (PTFE) insulated, with overall dia of 3.2 mm, in reels of 100 meter running length. These cable are routed out from generator casing through conventional gland sealing system. Hence the cable should be compact along all its layer and throughout its length. The outer insulation of the cable should be of high-density material, should have mechanical strength against abrasion. Should be able to withstand max. ambient temperature of 150°C & humidity of 70 % .

The cable should be compatible with 10-32 UNF microdot connector as specified in Spec.no.GRI/27/06/08-09.

General requirements :

1. Test certificate along with test data of low noise cable should be provided.
- 2 Required quantity of cable is indicated in Annex.-1 at III
4. These low noise cable be guaranteed for the satisfactory performance for at least 24 months period from the date of commissioning.
3. Pre-Qualifying Requirement : The low noise cable offered shall be of proven design. Party should send reference list of customers (last 5 years) to whom they have supplied this item.

Prepared by	D. S. More Mgr. (GRI)	
Checked & Approved by	P. J. BAGAWADE SDGM(GRI	

GRI	CHARGE AMPLIFIER AND ACCESSORIES	GRI NO.: GRI/27/09/08-09 DATE : 09.03.2009 PAGE : 1 of 3
-----	---	--

INDENT NO . : C/T/4100/20089405

DATED : 09.03.2009

CHARGE AMPLIFIER AND ACCESSORIES :

Conditioning multi -channel Amplifier is required for measurement of acceleration using non ICP type piezo-electric charge accelerometers. The amplifiers be 1-Channel, 3-channel or 4-channel units configurable into 32-channel system. Conditioning multi-channel amplifier with facility to take input from both FOA sensors as well as charge type signal from non-ICP type piezo-electric charge accelerometers shall be considered and preferred

Amplifier should have provision of integrator for providing analog output per unit acceleration , velocity and displacement selectable.

TECHNICAL SPECIFICATION: -

Input : Suitable for charge signal input through 10–32 UNF/ BNC Connector. In case any other type connector is provided a suitable adapter for connecting input through 10 –32 UNF connector may be supplied.

Grounding: There should be arrangement for Single-ended or floating type of input.

MAX. INPUT: a) Differential Charge: At least 80 nC (peak)
b) Common Mode Voltage: 4.0V (peak)

INPUT PROTECTION: a) Differential Charge: $\leq 200\text{nC}$ (peak)
b) Common Mode Voltage: $\leq 15\text{ V}$ (peak)
c) Common Mode Rejection: $>40\text{ dB}$

AMPLIFIER GAIN: Should be from 1.0 mV / pC to 10V/pC selectable in 10 dB steps.

TRANSDUCER SENSITIVITY RANGE: Should be at least from 10^{-12} to 10^{-9} C / m/s^2

CALIBRATED OUTPUT: a) Accuracy of the calibrated output signal should be better than or equal to $\pm 5.0\%$.

FREQUENCY RANGE: 1 Hz to 10 kHz

LOW-PASS FILTER: 0.3, 1, 3, 10 kHz (Switch or Jumper selectable)

HIGH-PASS FILTER: 0.1, 1.0 , 10 , 60 Hz (Switch or Jumper selectable)

HARMONIC DISTORTION & NOISE: In BW of 10 Hz to 10 kHz & $V_{\text{out}} < 3.16 V_{\text{peak}}$ less than 0.1%

Prepared by	D. S. More Mgr. (GRI)	
Checked & Approved by	P. J. BAGAWADE SDGM(GRI	

GRI	CHARGE AMPLIFIER AND ACCESSORIES	GRI NO.: GRI/27/09/08-09 DATE : 09.03.2009 PAGE : 2 of 3
-----	---	--

TEST SIGNAL : There should be provision of sinusoidal test signal of a frequency between 80 to 160 Hz. With

- a) Variable magnitude controllable from 10mV to 10 V from front panel.
- b) Reference : 1 V (RMS), ($\pm 1\%$)

CHANNEL TO CHANNEL PHASE-MATCH: $< 3^\circ$

GENERAL SPECIFICATIONS :

PARAMETER SETTINGS: Front panel switches for setting parameters like amplifier gains and sensitivity.

DISPLAY: - There should be a provision of digital display or bar graph display for indication of signal magnitude.

POWER SUPPLY: It should be operable from Mains of $220\text{ V} \pm 20\%$ at $50 \pm 10\%$ Hz

OVERLOAD DETECTION: - LED overload indication at the front panel.

ANALOGUE OUTPUT: -

1. Connector : BNC
2. Calibrated output selectable in 10 dB steps or fixed for 100mV/m/Sec^2 & 100mV/mm/Sec and $10\text{mV}/\mu\text{m}$.
3. Grounding : Single-ended or floating
4. Output Impedance : $\leq 1\Omega$
5. Max. Output (differential voltage) : $\leq 10\text{V}$ peak (20 V peak to peak)

OUTPUT PROTECTION: -

1. Differential Voltage : $\leq 50\text{ V}$ (peak)
2. Common Mode Voltage : ≤ 15 (peak)
3. Common Mode Rejection : $>40\text{ dB}$ (50 Hz) for common Mode Voltage $\leq 2\text{ V}$ peak
4. Output be protected against short circuiting/ voltage overload even when instrument is switched off.

OUTPUT DRIVE CAPACITY: - 1000m of cable length upto 1 kHz

ANALOG OUTPUT CONNECTION ACCESSORIES:

1. Co-axial cable 3 meters long with BNC Connector at each end

ANALOG OUTPUT CONNECTION ACCESSORIES:

OPERATING CONDITIONS: The system should be able to perform satisfactorily under following operating environmental conditions.

- a) Ambient Temp. 0 to 50°C
- b) Humidity 0 to 90 %

Prepared by	D. S. More Mgr. (GRI)	
Checked & Approved by	P. J. BAGAWADE SDGM(GRI	

GRI	CHARGE AMPLIFIER AND ACCESSORIES	GRI NO.: GRI/27/09/08-09 DATE : 09.03.2009 PAGE : 3 of 3
-----	---	--

General requirements :

- 1. TEST/CALIBRATION CERTIFICATES:** The party will give test certificate/ detail calibration certificate traceable to national / International standards.
- 2. SPECIAL TESTS:** You may please indicate various tests carried to ensure its reliability like Burn in test at max. ambient temperatures and humidity conditions indicated in operating conditions above. Tests certificates in support of these tests will also be required.
- 3. PREDISPATCH INSPECTION :** Party shall offer the system for pre-dispatch inspection and performance testing (including burn-in test).
- 4. COMMISSIONING:** Party will carry out commissioning of the system at BHEL Haridwar
- 5. GUARANTEE/WARRANTEE:** These Conditioning Amplifiers be guaranteed/warranted for the onsite performance of at least 24 months period from the date of commissioning.
- 6. ANNUAL MAINTENANCE CONTRACT:** Party should quote for Annual Maintenance Contract charges for period beyond expiry of the guarantee period.
7. Prices should be quoted for individual items separately.
8. Different types of connector along with cables and adapters combinations may be quoted which are useful for increasing versatility of equipments and also field-testing as and when required.
9. Party should mention make, model no. and send technical details of the parts etc. which have been quoted for conditioning amplifiers.
10. Party should quote for set of spares (including spare mains adapters where applicable) for trouble-free operation of the system for a minimum period of five years.
11. Five sets of detailed operation and maintenance manual including circuit diagrams be supplied.
12. Required quantity of Conditioning amplifier and accessories is indicated in Annex.-1 at II.
13. Pre-Qualifying Requirement : The equipment offered (mainly Charge amplifier)shall be of proven design. Party should send reference list of customers (last 5 years) to whom they have supplied such items.

Prepared by	D. S. More Mgr. (GRI)	
Checked & Approved by	P. J. BAGAWADE SDGM(GRI)	

<i>GRI</i>	INDUSTRIAL HOUSING CABINET AND ACCESSORIES	GRI NO.: GRI/27/11/08-09 DATE : 09.03.2009 PAGE : 1 of 3
------------	---	--

INDENT NO . : C/T/4100/20089405

DATED : 09.03.2009

INDUSTRIAL HOUSING CABINET & ACCESSORIES :

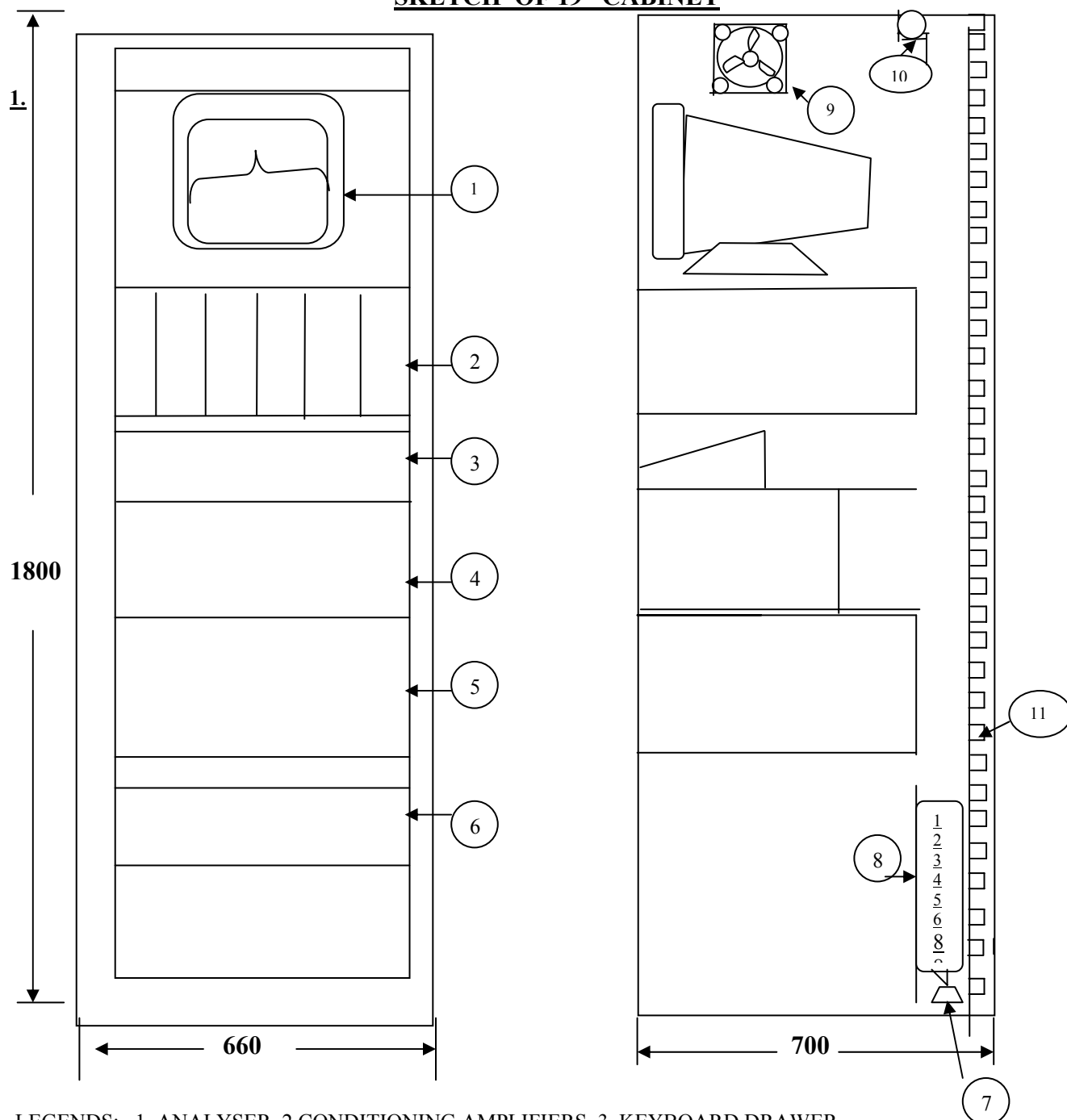
This stand alone cabinet should be suitable for housing of 19" rack mounting Signal conditioner & Data Acquisition Computer along with its peripherals and should have basic provision of internal cabling. A general sketch is attached herewith. Apart from this it should have following provisions

1. Front and back doors. Front door should have top half transparent with good quality anodize /Acrylic sheet or glass. The top compartment of panel should have also a transparent with good quality Perspex/Acrylic sheet
2. Lighting arrangement
3. Exhaust fan fitted at side panels
4. There should be provision of interlocking relay that will be actuated by rear door such that with door open light should be on & fan off and with door closed fan be on & light off.
5. Earthing bolt or suitable provision (at both doors, top & bottom plate of cabinet , two side panels both at top & bottom)
6. Terminal boards -1no.(19" din-rail mountable 200 ways cage clamp type screw less terminal block Suitable for 0.08mm² - 2.5 mm² ,500V/24A, Side Entry,Grey)
7. A provision of keyboard and printer drawer with push-in /push out arrangement
8. Provision of eye bolts at top of the cabinet for lifting cabinet with help of over head cranes.
9. Two Nos. Strip type Five Socket mains power supply board (preferably Anchor make) with in-built filter/spike suppressor
10. Circular Cable inlets/outlets at bottom and at sides of ø 25 mm and with provisions to blank them when not in use. Also there should be provision for grouting the panel with the bolts provided at the floor in control room.
11. Provision of 19" rack mounting panel with cut out for 17" CRT monitor.
12. Ventilating holes/slots at top and bottom of rear door along with mesh & filter
13. Colour Scheme : Standard Siemens Gray powder coated colour scheme for all Front, Rear, side & top panels.
14. For other parts following colour scheme be followed:
 - Aluminium extruded section – White anodized
 - Bottom plate & Base frame - Powder coated Black matt
 - Resting angles & plates for monitor, amplifiers, CPU& printer (4 sets of angles & plates) – Powder coated Black mat
15. A Proper Sealing arrangement in the doors to prevent vibration and ingress of dust when closed.
16. Industrial type finish with corrosion free and anti scratch , thermally cured paint.
17. Anodised label plate to be fixed at top of front door as per details given below. The letter size should be preferably in between 28 to 36 (MS WORD). The letter should be in white colour on the black background. Self illuminated label plates/annotation shall be preferred.

Prepared by	D. S. More Mgr. (GRI)	
Checked & Approved by	P. J. BAGAWADE SDGM(GRI)	

GRI	INDUSTRIAL HOUSING CABINET AND ACCESSORIES	GRI NO.: GRI/27/11/08-09 DATE : 09.03.2009 PAGE : 2 of 3
-----	---	--

SKETCH OF 19" CABINET



LEGENDS: 1. ANALYSER 2.CONDITIONING AMPLIFIERS 3. KEYBOARD DRAWER
4. PRINTER DRAWER 5. ANALYSER & DC POWER SUPPLY 6. DRAWER 7. CABLE INLET
8. A STEEL OR EPOXY SHEET FOR INSTALLATION OF TERMINAL BOARDS
9. COOLING FAN 10. LIGHT 11. PVC CABLE ROUTINE CHANNELS & DIN RAIL CHANNEL

Note : 1. Sketch is not to the scale 2. All dimensions are in mm
2. Door enclosure at front & rear with top half front door with Perspex sheet.
4. Enclosure siemens gray colour.

Prepared By / Checked By	D.S. More , Mgr.(GRI)	
Approved By	P.J.Bagawade , SDGM (GRI)	

<i>GRI</i>	INDUSTRIAL HOUSING CABINET AND ACCESSORIES	GRI NO.: GRI/27/11/08-09 DATE : 09.03.2009 PAGE : 3 of 3
------------	---	--

BHARAT HEAVY ELECTRICALS LIMITED, HARDWAR
ON-LINE STRUCTURAL VIBRATION MONITORING SYSTEM

18. Panel should be complete with internal cabling.
19. Party should supply one set of following accessories as spares :-
 - Tube-light
 - Fan
 - Interlock relay
 - 10m length earthing cable with transparent insulation
20. Panel should have PVC channels for running cable at rear (both right & left sides)
21. Party should supply accessories like base frame for fixing & grouting panel, grouting bolts etc. detailed assembly drawing depicting inside general arrangement of cabinet rack and **grouting provision** with detail dimensions.
22. 4No.19” Din-rail channel mounted rear side of panel for terminal blocks and mounting of other accessories.

General requirements :

1. Prices should be quoted for individual items separately.
2. Party should quote for set of spares (including spare mains adapters where applicable) for trouble-free operation of the system for a minimum period of five years.
3. Cabinet should have a very high quality finish.
4. Guarantee/Warranty : The cabinet should be guaranteed / warranted for the quality of material (durability of its finish, paint, weld seams, antirust treatment, moveable parts, interlocks operation etc.) for at least 24 months period from the date of installation.
- 5. PREDISPATCH INSPECTION :** Party shall offer the cabinet for pre-dispatch inspection and at the same time impart training in assembly and disassembly of panel fittings.
5. Required quantity of panel and accessories is indicated in Annex.-1 at IV .
6. Pre-Qualifying Requirement : The equipment offered (mainly Industrial housing cabinet)shall be of proven design. Party should send reference list of customers (last 5 years) to whom they have supplied such items.

Prepared by	D. S. More Mgr. (GRI)	
Checked & Approved by	<i>P. J. BAGAWADE SDGM(GRI)</i>	

INDENT NO . : C/T/4100/20089405

DATED : 09.03.2009

ITEM DESCRIPTION: LOW NOISE CABLES, CHARGE AMPLIFIER , INDUSTRIAL HOUSING
CABINET AND ACCESSORIES

LIST OF ITEMS REQUIRED

I. CHARGE AMPLIFIER AND ACCESSORIES

Sl.No.	Item Description	Qty.
1.	Conditioner (charge) Amplifier (04- channel amplifier configurable to 32 channels)	08 Nos.
2.	Co-axial cable 3 meters long with BNC Connector at each end	32 Nos.

II. LOW NOISE CABLE

Sl.No.	Item Description	Qty.
1.	Low Noise Double Screened Cable	6000 Meters

III. INDUSTRIAL HOUSING CABINET AND ACCESSORIES

Sl.No.	Item Description	Qty.
1.	Industrial housing cabinet	2 .No.
2.	Spares set as per following details	
	- Tube-light	1 No.
	- Fan	1 No.
	- Interlock relay	1 No.
	- Earthing cable with transparent insulation	10 M