

## BOQ

## Sub:-LOWSIDE WORKS FOR HVAC SYSTEM AT BLOCK AB-2 AT IISER MOHALI

Item		Description	Unit	Qty	Rate	Amount
<b>A</b>		<b>EQUIPMENT</b>				
1		Supply installation testing and commissioing of Inline fans complete with insulation and 3 speed regulator and wiring with DP switch of following capacity				
1.1	NDSR	250 CMH/ 6 mm static	Sets	3		
1.2	NDSR	350 CMH/ 6 mm static	Sets	2		
1.3	NDSR	500 CMH/ 6 mm static	Sets	10		
1.4	NDSR	650 CMH/ 6 mm static	Sets	6		
1.5	NDSR	800 CMH/ 6 mm static	Sets	1		
1.6	NDSR	1000 CMH/ 6 mm static	Sets	5		
2	NDSR	Supply installation testing and commissioning of HEPA Filters of size 610 x 610 x 305 mm (min 99.97 % efficiency upto 0.3 micron) with HEPA filer box (bottom loading) , SS 304 perforated diffuser plate of minimum 2 mm thick. (with minimum 60% perforations)	Nos	10		
3	NDSR	Winter Heating / Reheat package comprising of strip heater, MS frame duly painted, Humidistat, Thermostat, Internal wiring within the bank and complete as per instructions of engineer in charge of following capacity. 6 KW each.	Nos	7		
4	NDSR	Winter Heating / Reheat package comprising of strip heater, MS frame duly painted, Humidistat, Thermostat, Internal wiring within the bank and complete as per instructions of engineer in charge of following capacity. 3 KW each.	Nos	10		
<b>B</b>		<b>LOW SIDE</b>				
1	DSR	Supply, installation, balancing and commissioning of factory fabricated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required as per specifications.				
1.1	Ref no 16.12.1.1	Thickness 0.63 mm sheet	Sqm.	700		
1.2	Ref no 16.12.1.2	Thickness 0.80 mm sheet	Sqm.	400		
2	DSR	Supply, installation, balancing and commissioning of fabricated at site GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required as per specifications.				
2.1	Ref no 16.12.2.1	Thickness 0.63 mm sheet	Sqm.	250		
2.2	Ref no 16.12.2.2	Thickness 0.80 mm sheet	Sqm.	175		

3	NDSR	Supply, fabrication, installation and testing the <b>flexible connections</b> constructed of fire resistance flexible double canvas sleeve as per the approved shop drawings.	Sqm.	16		
4	Ref no 16.13	Supply, installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc, as per specifications.	Sqm.	5		
5		Fire Damper with Control Mechanism				
5.1	Ref no 16.20.1	Supplying, Fixing,testing and commissioning of fire dampers in supply air duct/main branch and return air path as and where required of required sizes i/c control wiring,the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal complete as required andas per specifications.	Sqm	4		
		Electric Actuator				
5.2	Ref no 16.20.2	Electric actuator with necessary linkage to actuate fire dampers complete with required wiring and associated accessories.	Nos.	10		
		Note: Fire dampers shall be supplied with sensors/actuators/control etc duly factory fitted and tested at manufacturers works and certificate to this effect produced along with delivery of fire damper.				
6	Ref 16.17	Supplying, fixing testing commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core as per specification.	Sqm.	16		
7	Ref 16.16	Supplying & fixing of powder coated aluminium Return Air Grills with louvers but without volume control damper complete as required.	Sqm.	16		
8	NDSR	Supplying & fixing of opposed blade aluminium construction volume control dampers in supply air duct collars as per approved drawings and specifications.	Sqm.	7		
9	NDSR	Supply, installation, testing and balancing of inlet air louvers with bird screen and volume damper for fresh air in powder coated extruded aluminium construction as per specifications and approved shop drawings.	Sqm.	5		
10	NDSR	Supply, installation, testing and balancing of powder coated extruded aluminum construction Transfer grills without volume control dampers.	Sqm.	3		
11	NDSR	Supply and installation of <b>External Thermal</b> insulation on ducts with <b>cross linked nitrile rubber class O</b> as per the approved specifications. Quoted price shall be inclusive of adhesive, tapes as per specification.				
		Inside the building				
		13 mm thick insulation for air ducts.	Sqm	900		

12	ref 16.25	Supply and fixing of 50 mm thick resin bonded fiber glass insulation of 24 kg/cum density, after applying 2 coats of CPRX compound sealing all joints with aluminium tape, covering with 0.63 mm x 19 mm GI wire mesh, netting, butting all joints and laced with GI wire complete and fully covered with 1 layer of tarfelt stuck with hot bitumin to give a smooth finish as per specifications and as required complete in all respect.	Sqm	450		
		Exposed to atmosphere				
13		Providing and fixing of Return Riser				
13.1	NDSR	Factory fabricated Return air riser with internal coving and properly formed of size upto 1000 mm wide x upto 150 mm and 2600 mm high. The riser shall be insulated from outside with 6 mm nitrile rubber on embedded sides before installation at site.	Nos	7		
13.2	NDSR	Factory fabricated Return air riser with internal coving and properly formed of size upto 700 mm wide x upto 80 mm and 2600 mm high. The riser shall be insulated from outside with 6 mm nitrile rubber on embedded sides before installation at site.	Nos	3		
13.3	NDSR	Return riser cover plate mounted Grill Filter assembly with Aluminum Powder Coated Perforated Grill and 20 micron filter	Sqm	3		
14		Supply and Installation of semi rigid aluminium Flexible duct				
14.1	NDSR	150 mm dia	Rmt	80		
14.2	NDSR	100 mm dia	Rmt	60		
<b>C</b>		<b>ELECTRICAL</b>				
1	NSR	Designing, fabricating, transporting to site, installing, testing and commissioning of wall mounted, compartmentalized LT cubical pattern (Extendable Type) metal clad switch board, fabricated from 2mm (14 G) thick CRCA sheet steel suitable for 31 MVA rupturing capacity at 415 V, 3 phase, 4 wire, 50 HZ AC supply and equipped with PVC sleeved aluminum bus bars of specified rating and following switch gears inter connected by PVC sleeved solid conductors, including 7-tank cleaning, degreasing, phosphating process and treatment of panel with anti-corrosive zinc based primer paint and finally powder coating the panel, complete with earthing terminals, cable and bus bar alleys and hoisting hooks as required. The LT panel will comprise of MCCBs/ MPCBs / MCbs as described below for incoming and outgoing power supplies.				
		Necessary cable alley, spare switches, internal wiring, control wiring / cabling and earthing of all equipment shall also be included.				
		<b>INCOMER FEATURES</b>				
		All the incoming circuit breakers of panels shall consist of following accessories:				
		0-500 V range voltmeter 144 x 144 mm size with selector switch and back up fuses. : 1 Set.				
		Suitable range of ammeter 144 x 144 mm size with selector switch and CTs as mentioned in schedule. : 1 Set.				

		Phase indicating neon lamps with MCB protection. : 3 Sets.				
		Breaker 'ON'/'OFF' indication lamp with MCB protection. : 2 sets.				
		Standard trip and over load relays.				
		ON/OFF push buttons with motorized spring charged mechanism 230 V AC. : 1 No.				
		<b>OUTGOING MCCB/MPCB FEATURES :</b>				
		Each outgoing MCCB ICS=ICU KA capacity 35 KA of panel shall consist of following accessories :				
		Suitable range of ammeter 144 x144 mm size with selector switch and CT as mentioned in schedule. 1 Set				
		Suitable range of voltmeter 144 x 144 mm size with fuse as mentioned in schedule. 1 Set				
		Breaker 'ON'/OFF indication lamp with back-up fuse protection. 2 Sets				
		Standard over load and short circuit release.				
		<b>OUTGOING STARTER FEATURES</b>				
		All starters shall have the following accessories:				
		TPN MPCB as per the suitable rating, terminal block for power distribution, contactor, overload relay with built in single phasing protection, phase indication lights and indicating light for ON/OFF status, ammeter with CTs & selector switches, relay, auto manual selection & push buttons with SP MCB.				
		All internal wiring and GI earthing of air handling unit motors from the panel shall be included. The panel shall include the following accessories.				
		220/24 volts transformer. (For AHUs provided with fire damper)				
		Wiring for micro-switch smoke sensor and electric actuator for stopping the fan when smoke/fire damper closes (For AHUs provided with fire damper).				
		Control wiring for thermostat.				
		Bimetallic lugs shall be used at copper to aluminium joints.				
		Auto / Manual start / stop selector switch shall be provided for each equipment in the panel to facilitate remote operation from Central Indication Light Panel. Panels shall have adequate space for mounting transformers and other accessories related to control system.				
		<b>NOTE: IISER shall free issue 5 nos 200 A MCCB and 15 nos 63 A MCCB ( All L&amp;T ) make. The vendor has to consider usage of the MCCBs issued in the panels being supplied and accordingly the switchgear shall be adjusted. The quantity given in the BOQ is the total required.</b>				
1.1		<b>PANEL NO 1 ( for Lab 1 Prof Anand)</b>	Nos	1		
		<b>INCOMERS</b>				

		160 Amps TPN MCCB with 160/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		160 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	2 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 2 nos for ODUs				
		1 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for 5 HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				
	HEATERS	2 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 6 KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	inline	1 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.2		<b>PANEL NO 2 ( for Lab 2, 3 Prof samrat, Prof Shavan)</b>	Nos	2		
		<b>INCOMERS</b>				
		160 Amps TPN MCCB with 160/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		160 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				

		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	2 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 2 nos for ODUs				
		1 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for 5 HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				
	HEATERS	1 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 6 KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	inline fans	2 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.3		<b>PANEL NO 3 ( for Lab 4, Prof Kavita)</b>	Nos	1		
		<b>INCOMERS</b>				
		160 Amps TPN MCCB with 160/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		160 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				

	VRV ODU	2 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 2 nos for ODUs				
		1 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for 5 HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				
	HEATERS	1 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 6 KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	inline fans	1 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	HUMIDIFIER	1 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 3 KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.4		<b>PANEL NO 4 ( for Lab 5,6, Prof Ram, Prof Mehak, Prof Rachna)</b>	Nos	1		
		<b>INCOMERS</b>				
		315 Amps TPN MCCB with 350/5A ratio Current Transformer, 0- 400 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		400 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	DU	4 Nos MPCB's as per following details/ specifications:				

	VRV OI	63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 4 nos for ODU				
		7 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for upto HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				
	HEATERS	7 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 6 KW/ 3KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	inline fans	2 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	HUMIDIFIER	6 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 3 KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.5		<b>PANEL NO 5 ( for Lab 7 Prof Kuljeet)</b>	Nos	1		
		<b>INCOMERS</b>				
		63 Amps TPN MCCB with 63/5A ratio Current Transformer, 0- 60 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		100 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	1 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 1 nos for ODU				
		4 nos 16 A MCB for IDU				
	inline fans	1 Nos. MCB as per following details/ specification:				



		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.6		<b>PANEL NO 6 ( for Lab 8 Prof Shashi)</b>	Nos	1		
		<b>INCOMERS</b>				
		160 Amps TPN MCCB with 160/5A ratio Current Transformer, 0- 160 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		160 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	3 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 3 nos for ODUs				
		6 nos 16 A MCB for IDU				
	inline fans	1 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.7		<b>PANEL NO 7 ( for Lab 9 Prof Rhitobhan)</b>	Nos	1		
		<b>INCOMERS</b>				
		160 Amps TPN MCCB with 160/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		160 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	DU	2 Nos MPCB's as per following details/ specifications:				

	VRV OI	63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 2 nos for ODU's				
		3 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for upto 5 HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				
	HEATERS	2 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 6 KW/ 3KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	inline fans	1 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.8		<b>PANEL NO 8 ( for Lab 10 Plant Growth facility)</b>	Nos	1		
		<b>INCOMERS</b>				
		200 Amps TPN MCCB with 200/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		200 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	4 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 4 nos for ODU's				
		4 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for upto 5 HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				

	Inline fan	2 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.9		<b>PANEL NO 9 ( for Lab 11 Common equipment room)</b>	Nos	1		
		<b>INCOMERS</b>				
		160 Amps TPN MCCB with 160/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		160 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	2 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 2 nos for ODUs				
		4 Nos MPCB's as per following details/ specifications:				
	AHU MOTOR	11-16 amps TPN MPCBs, 25 KA, with extended handle with power contactor for upto 5 HP DOL starters for outgoing feeders to AHU motors. Each of these compartments shall contain CT operated ammeter of 0-20 Amps range with selector switch, auto manual switch along with an ON / OFF indicating lamps and push buttons for status of the pump motors with SP MCB,.				
	HEATERS	4 Nos. MCB as per following details/ specification:				
		25 Amps, MCB,D curve with power contactor for 3KW Heaters.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
	Inline fan	2 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for inline fans.				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.10		<b>PANEL NO 10 ( for Chemistry lab 4TL 1, 4 TL 2, discussion)</b>	Nos	1		
		<b>INCOMERS</b>				
		200 Amps TPN MCCB with 200/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				

		200 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	4 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 4 nos for ODUs				
		24 Nos DP MCBs as per following details/ specifications:				
	IDU S	10 amps DP MCBs, with ON / OFF indicating lamps and push buttons for status.				
	Inline fan	5 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for Inline fan				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.11		<b>PANEL NO 10 ( for Chemistry lab 5TL 1, 5 TL 2)</b>	Nos	1		
		<b>INCOMERS</b>				
		200 Amps TPN MCCB with 200/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		200 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	4 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 4 nos for ODUs				
		21 Nos DP MCBs as per following details/ specifications:				
	IDU S	10 amps DP MCBs, with ON / OFF indicating lamps and push buttons for status.				
	Inline fan	5 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for Inline fan				

		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
1.12		<b>PANEL NO 12 ( for Chemistry Research lab)</b>	Nos	1		
		<b>INCOMERS</b>				
		100 Amps TPN MCCB with 100/5A ratio Current Transformer, 0- 200 A ammeters & selector switch Voltmeter with selector switch, along-with other accessories as specified. : 1 Set				
		<b>Bus Bars (35 KA)</b>				
		125 Amps TPN electrolytic aluminum E 91 grade bus bars with heat shrinkable insulation cover sleeves.				
		Maximum density of aluminimun bus bars for current carrying capacity shall be one amp per square mm.				
		<b>OUTGOINGS :</b>				
	VRV ODU	2 Nos MPCB's as per following details/ specifications:				
		63A, TPN MPCB with 0-60 A ammeter 100 / 5A Current Transformer & selector switch, indication lamp with MCB for 'ON' status of equipment. Overload and under voltage protection device, ELCB of minimum 300 mA current sensitivity, Time delay relay, Single phase preventer, phase reversal protection : 4 nos for ODUs				
		12 Nos DP MCBs as per following details/ specifications:				
	IDU S	10 amps DP MCBs, with ON / OFF indicating lamps and push buttons for status.				
	Inline fan	4 Nos. MCB as per following details/ specification:				
		6 Amps, MCB,D curve with power contactor for Inline fan				
		"ON/OFF" LED indicating lamp with 6A control SP MCB				
		Interlocking with singal /communication wire as per recommendation of VRF OEM .				
2		Supplying of following 1100 volt grade insulated sheathed Aluminium conductor armoured cables / copper cables				
		<b>Important Note: IISER shall free issue Al cable of size 70 sqmm and 25 sqmm. Which has to be consumed/ laid by the bidder. Only balance quantity shall be supplied by the vendor.</b>				
2.1		<b>Armoured Copper conductor cable.</b>				
2.1.1		4 x 25 sq.mm	Mtr	225		
2.1.2		4 x 16 sq.mm	Mtr	200		
2.1.3		3 x 2.5 sq.mm	Mtr	1450		
2.1.4		3 x 1.5 sq.mm	Mtr	300		
2.1.5		4 x 4 sq.mm	Mtr	500		

2.2		<b>Armoured Aluminium conductor cable.</b>				
		3.5 C 35 sqmm	Mtr	100		
3	DSR	laying of following 1100 volt grade insulated sheathed Aluminium conductor armoured cables / copper cables on cable trays, in trenches, on walls clamped to wall with suitable clamps, saddles, and fixing bolts, or laying in ground including cost of digging brick and sand protection, and including jointing / connecting / terminating, testing and commissioning :				
	refer 7.8.1	upto 35 sq mm	Mtr	2775		
	refer 7.8.2	above 35 sqmm upto 95 sqmm	Mtr	500		
4		Isolator				
		Providing & fixing weather proof isolator near each outdoor unit. Capacity 63Amp/40 Amps 3 Phase.	Nos.	35		
		<b>Total</b>				

Contractor