आज़ादी का अमृत महोत्सव

भारत 2023 INDIA

GOVERNMENT OF INDIA
(Ministry of Home Affairs)
COMMUNICATION & IT DIRECTORATE
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066

(Email:- comncell@crpf.gov.in Tele/Fax:011-26109038)

No. B.V-7/2023-24-C (QRs) Dated, the December'2023

To

The DG NSG
Meharam Nagar,Palam,
New Delhi-37

Subject: Regarding of QRs/TDs of "Fuel cell above 50AHC".

I am directed to refer on the subject mentioned above and to say that the QRs/TDs of **"Fuel cell above 50AHC"** which has been approved by the DG CRPF.

Encl:-As above

26/12/23

{Amit Taneja}
DIG (Equipment)
Communication & IT Branch
Directorate General C R P F

No. B.V-7/2023-24-C (QRs) Dated, the 26 December'2023

Copy to:-

1. Mrs. Sugandhi, Technical Director, and North block, MHA with request to upload the approved QRs/TDs of **"Fuel cell above 50AHC"** on MHA website (e-mail ID: mpsugandhi@nic.in).

Encl:-As above

26/12/23

{Amit Taneja}
DIG (Equipment)
Communication & IT Branch
Directorate General C R P F

QRs FOR FUEL CELL ABOVE 50AHC

S/No (a)	Description/ Specification (b)	Parameters (c)
A.	**FUEL CELL SYSTEM.**	
1.	**Electrical Parameters.**	
(a)	Fuel Cell capacity	350W
(b)	Operating Principle	Natural Gas (LPG/ CNG)
(c)	Control unit	Control button to control the charger
(d)	Max Charging Current	28/ 14/ 7A ± 10 % continuous
(e)	Nominal Output Voltage	12/24/48V DC (Working)
2.	**Physical Parameters.**	
(a)	Weight	≤10 Kg (fuel cell)
(b)	Dimensions	≤ 470 x 210 x 340 mm (L x W x H) (18"L x 8" W x 14"H)
(c)	Ports	(i) Connection for Battery charging cable (ii) Battery Temperature sensor (iii) Communication port/ remote-control connection (RS232/ USB or better) (iv) Fuel cartridge connection
(d)	Protection against	(i) Over current (ii) Over voltage (iii) Short circuit (iii) Reverse polarity (iv) Over temp (v) Fluctuation/ In-surges
(e)	Reliability	Design must have built-in redundancy to increase the reliability of system.
3.	**Special Requirement.**	
(a)	Button	Enable button/ LED Ring, Status button
(b)	Status	Charge status display and Power status display is available
(c)	Display: The LED display should show following information	
	(i) The system status	
	(ii) The state of operating mode	
	(iii) The warning for errors	
4.	**Charging Mode.**	
(a)	Manual / Auto	The unit should switch On manually or automatically and have the capability to only charge the battery if it needs charging (Need/ Demand Based Charging)
(b)	Running time	Min 40 hrs at peak load with one fuel container
(c)	Hot SWAP facility	The Product should allow changing the fuel cartridge without shutting down the fuel cell system
(d)	Intelligent Antifreeze mode	Must not contain water inside the sys to freeze.

CISF Assam Rifles BSF CRPF SSB ITBP DCPW

Comn Gp, NSG 2IC ESG, NSG GC Comn Gp, NSG DIG(Comn & IT), NSG

(a)	(b)	(c)
5.	**Environmental parameters.**	
(a)	Operating Temperature	-40 °C to +55 °C
(b)	Storage Temperature	-50 °C to + 70 °C
(c)	Humidity	0 to 99% RH (Relative Humidity)
(d)	Deployment Altitude & power loss	Operate Up to 18000 ft without power loss
(e)	Noise emission	Less than 40 dB (A) at 3 mtr
6.	**Network Support and Firmware Update.**	
(a)	Firmware	System should be capable to update firmware in order to benefit from latest improvements
(b)	Data Interface Port	It should support for standard RS-232/ USB interface or better for hyper terminal support
(c)	Service and fault reports	System should provide the visual and text error messages display
(d)	**Fuel and Fuel Cartridge**	
	(i) General	Max capacity of one fuel cartridge should be 5 kg. Cartridge should be sealed and leak proof. Cartridge should be UN 1075 compliant.
	(ii) Fuel	As per user requirement but should be commercially available.
	(iii) Refillable fuel cartridge	Must be refillable any No of times.
(e)	**Environmental conditions of complete system.**	
	Transportation	System must be provided in pelican suitable carrying case for transportation.
B.	**HYBRID POWER SOURCE(As per user requirement).**	
1.	**Electrical Parameters.**	
(a)	Nominal Power	Min 50AH or more as per user requirement
(b)	Nominal output Voltage	12V DC, ± 5% 24V DC, ± 5% 230V AC, ± 5%
(c)	Input Voltage	220V AC for internal charger 24V DC Solar Energy 24V DC Fuel Cell Energy
(d)	Charging option	Fuel Cell System, Solar energy, DG Sets and grid
(e)	Enable Switch	Must be with enable switch to energise the whole system and ON/Off switch for each port
(f)	Display	Display must be with following facility- (i) Voltage, current & level display of battery. (ii) Level & percentage of battery. (iii) Screen on/ off facility to black out the system. (iv) Overload indicator.

CISF Assam Rifles BSF CRPF SSB ITBP DCPW

Comn Gp, NSG 2IC ESG, NSG GC Comn Gp, NSG DIG(Comp & IT), NSG

(a)	(b)	(c)
2.	**Solar Panel, and MPPT (Max Power Point Tracking).**	(a) 300W, 24V mono crystalline perc technology (b) Max. PV (Photovoltaic) short circuit current of MPPT (Max Power Point Tracking): 15 Amp inbuilt (c) Charge algorithm of MPPT (Max Power Point Tracking): Multi stage charging (d) Protection: Output short circuit, Overload, Over Battery voltage, Low Battery voltage and Over temperature.
3.	**Rectiverter**	800W pure sine wave Rectiverter. Must programmable with software:- (a) Input: 187-265V, 45 - 55Hz single phase power supply and DC Voltage range 21 - 31V DC. (b) Output: Output voltage: 220V AC ± 2% Frequency: 50Hz ± 0.1%. (c) Efficiency: >90% (d) Firmware: firmware upgradation facility available must be online and off line. (e) Virtual Switch facility PLC (Programmable Logic Controller): The VS (Virtual Switch) must be an imaginary on/off switch in the software. The VS (Virtual Switch) is "switched" by the software when certain conditions are met. The conditions which will cause the VS (Virtual Switch) to switch on and off can be configured by the user. Switching the VS (Virtual Switch) ON has priority over switching it off. (f) Load Condition: Must have add or ignore the load conditions in software. (g) Remote Control: Must have Remote on-off facility for charger. (h) Communication port: For parallel, remote monitoring and system integration (RJ45- splitter). (j) Protection:- (i) Output short circuit. (ii) Overload. (iii) Battery voltage too high. (iv) Battery voltage too low. (v) Temperature too high. (vi) Input voltage ripple too high.

CISF Assam Rifles BSF CRPF SSB ITBP DCPW

Comn Gp, NSG 2IC ESG, NSG GC Comn Gp, NSG DIG(Comn & IT), NSG

(a)	(b)	(c)
4.	**Physical Parameters.**	
(a)	Weight	≤25 Kg with battery (weight of Power Source will be decided by user organisation during procurement)
(b)	Dimensions	Dimensions of Hybrid Power Source can be customised as user requirement
5.	**Environmental parameters.**	
(a)	Operating Temperature	-40 to 55° C
(b)	Storage Temperature	-50 to 70° C
(c)	Operating Altitude	Up to 18,000 ft
6.	**Output and Input Ports.**	
	Port Type	**Max Load Capacity**
(a)	Output 12V DC Port (10.0V to 13.0V)	240W (working)
(b)	Output 24V DC Port (21.5V to 29.4V)	350W (working)
(c)	Output 220V AC Port	800W (working)
(d)	Input 24V DC Port (21.5V to 29.4V)	24V DC, up to 700W Fuel Cell 24V DC,300W Solar Energy
(e)	Input 220V AC for charging	220V AC, 800W AC
7.	**Back-up Duration in Different Load Conditions.**	
	Load Conditions	**Backup Durations**
(a)	Only 12V Max Load	05 to 06 Hrs
(b)	Only 24V Max Load	05 to 06 Hrs
(c)	Only Inverter 800 W Max Load	02 to 03 Hrs
(d)	12V & 24V Full load together	03 to 04 Hrs
(e)	12V & Inverter load together	02 to 03 Hrs
(f)	24V & Inverter load together	02 to 03 Hrs
(g)	All three at Full Load together	02 to 03 Hrs

Sub Inspector S D Arya, CISF

WO/RM J D Verma, Assam Rifles

Inspector (RM) Manish Raj, BSF

Rajesh Kumar Barnela, Asst Comdt, CRPF

Arjun singh, Asst Comdt (Comn), SSB

Nemi Chand, Dy Comdt, ITBP

Hemant Kumar, Deputy Director, DCPW

Maj Siddharth Ghosh, Comn Gp, NSG

Lt Col Kanwar Gaurav Singh, 2IC ESG, NSG

Col GP Singh, Gp Cdr Comn Gp, NSG

Brig Suyash Sharma, DIG (Comn & IT), NSG

Shalin, IPS, IG (prov), HQ NSG

Approved / Not Approved

DG CRPF

TDs FOR FUEL CELL ABOVE 50AHC

S/No (a)	Specification (b)	Parameters (c)	Trial Procedure (d)
A.	**FUEL CELL SYSTEM.**		
1.	**Electrical Parameters.**		
(a)	Fuel Cell capacity	350W	The BOO will check practically.
(b)	Operating Principle	Natural Gas (LPG/ CNG)	
(c)	Control unit	Control button to control the charger	
(d)	Max Charging Current	28/ 14/ 7A ± 10 % continuous	
(e)	Nominal Output Voltage	12/24/48V DC (Working)	
2.	**Physical Parameters.**		
(a)	Weight	≤10 Kg (fuel cell)	The BOO will check practically.
(b)	Dimensions	≤ 470 x 210 x 340 mm (L x W x H) (18"L x 8" W x 14"H)	
(c)	Ports	(i) Connection for Battery charging cable (ii) Battery Temperature sensor (iii) Communication port/ remote-control connection (RS232/ USB or better) (iv) Fuel cartridge connection	
(d)	Protection against	(i) Over current (ii) Over voltage (iii) Short circuit (iii) Reverse polarity (iv) Over temp (v) Fluctuation/ In-surges	
(e)	Reliability	Design offers must have built-in redundancy to increase the reliability of system.	Firm will submit certificate of any Govt. Lab or NABL or (ILAC) accredited laboratory.

CISF Assam Rifles BSF CRPF SSB ITBP DCPW CG, NSG 2IC ESG, NSG GC CG, NSG DIG(Comn & IT), NSG

(a)	(b)	(c)	(d)
3.	**Special Requirement.**		
(a)	Button	Enable button/ LED Ring, Status button	The BOO will check practically.
(b)	Status	Charge status display and Power status display is available	
(c)	**Display.** The LED display should show following information:-		The BOO will check practically.
	(i) The system status		
	(ii) The state of operating mode		
	(iii) The warning for errors		
4.	**Charging Mode.**		
(a)	Manual / Auto	The unit should switch On manually or automatically and have the capability to only charge the battery if it needs charging (Need/ Demand Based Charging)	The BOO will check practically/ physically.
(b)	Running time	Min 40 hrs at peak load with one fuel container	
(c)	Hot SWAP facility	The Product should allow changing the fuel cartridge without shutting down the fuel cell system	
(d)	Intelligent Antifreeze mode	Must not contain water inside the sys to freeze.	
5.	**Environmental parameters.**		
(a)	Operating Temperature	-40 °C to +55 °C	Firm will submit certificate of any Govt. Lab or NABL or (ILAC) accredited laboratory.
(b)	Storage Temperature	-50 °C to + 70 °C	
(c)	Humidity	0 to 99% RH (Relative Humidity)	
(d)	Deployment Altitude & power loss	Operate Up to 18000 ft without power loss	
(e)	Noise emission	Less than 40 dB (A) at 3 mtr	
6.	**Network Support and Firmware Update.**		
(a)	Firmware	System should be capable to update firmware in order to benefit from latest improvements	Firm will submit OEM certificate.
(b)	Data Interface Port	It should support for standard RS-232/ USB interface or better for hyper terminal support	The BOO will check practically.
(c)	Service and fault reports	System should provide the visual and text error messages display	

CISF Assam Rifles BSF CRPF SSB ITBP DCPW CG, NSG 2IC-ESG, NSG GC CG, NSG DIG(Comn & IT), NSG

(a)	(b)	(c)	(d)
(d)	**Fuel and Fuel Cartridge**		
	(i) General	Max capacity of one fuel cartridge should be 5 kg. Cartridge should be sealed and leak proof. Cartridge should be UN 1075 compliant.	The BOO will check practically.
	(ii) Fuel	As per user requirement but should be commercially available.	
	(iii) Refillable fuel cartridge	Must be refillable any No of times.	
(e)	**Environmental conditions of complete system.**		
	Transportation	System must be provided in pelican suitable carrying case for transportation.	The BOO will check practically.
B.	**HYBRID POWER SOURCE (As per user requirement).**		
1.	**Electrical Parameters.**		
(a)	Nominal Power	Min 50AH or more as per user requirement	The BOO will check practically.
(b)	Nominal output Voltage	12V DC, ± 5% 24V DC, ± 5% 230V AC, ± 5%	
(c)	Input Voltage	220V AC for internal charger 24V DC Solar Energy 24V DC Fuel Cell Energy	
(d)	Charging option	Fuel Cell System, Solar energy, DG Sets and grid	
(e)	Enable Switch	Must be with enable switch to energise the whole system and ON/Off switch for each port	
(f)	Display	Display must be with following facility:- (i) Voltage, current & level display of battery. (ii) Level & percentage of battery. (iii) Screen on/off facility to black out the system. (iv) Overload indicator.	The BOO will check practically.

CISF Assam Rifles BSF CRPF SSB ITBP DCPW CG, NSG 2IC ESG, NSG GC CG, NSG DIG(Comn & IT), NSG

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2.	**Solar Panel and MPPT (Max Power Point Tracking).**	(a) 300W, 24V mono crystalline perc technology. (b) Max. PV (Photovoltaic) short circuit current of MPPT (Max Power Point Tracking): 15 Amp inbuilt. (c) Charge algorithm of MPPT (Max Power Point Tracking): Multi stage charging. (d) Protection: Output short circuit, Overload, Over Battery voltage, Low Battery voltage and Over temperature.	The BOO will check practically.
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(a)	(b)	(c)	(d)
		(h) Communication port: For parallel, remote monitoring and system integration (RJ45-splitter). (j) Protection:- (i) Output short circuit. (ii) Overload. (iii) Battery voltage too high. (iv) Battery voltage too low. (v) Temperature too high. (vi) Input voltage ripple too high.	
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(a)	Weight	≤25 Kg with battery (weight of Power Source will be decided by user organisation during procurement)	The BOO will check practically.
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5.	**Environmental parameters.**		
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(c)	Operating Altitude	Up to 18,000 ft	
6.	**Output and Input Ports.**		
	Port Type	**Max Load Capacity**	The BOO will check practically.
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(c)	Output 220V AC Port	800W (working)	
(d)	Input 24V DC Port (21.5V to 29.4V)	24V DC, up to 700W Fuel Cell 24V DC,300W Solar Energy	
(e)	Input 220V AC for charging	220V AC, 800W AC	

CISF Assam Rifles BSF CRPF SSB ITBP DCPW CG, NSG 2IC ESG, NSG GC CG, NSG DIG(Comn & IT), NSG

(a)	(b)	(c)	(d)
7.	**Back-up Duration in Different Load Conditions.**		
	Load Conditions	**Backup Durations**	
(a)	Only 12V Max Load	05 to 06 Hrs	The BOO will check practically.
(b)	Only 24V Max Load	05 to 06 Hrs	
(c)	Only Inverter 800 W Max Load	02 to 03 Hrs	
(d)	12V & 24V Full load together	03 to 04 Hrs	
(e)	12V & Inverter load together	02 to 03 Hrs	
(f)	24V & Inverter load together	02 to 03 Hrs	
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Col GP Singh, Gp Cdr, Comn Gp, NSG

Brig Suyash Sharma, DIG (Comn & IT), NSG

Shalin, IPS, IG (Prov), HQ NSG

Approved / Not Approved

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