

# INSTALLATION

All the BPAC units including the modules, connectors and other accessories are factory-checked. However, after unpacking, following **pre-installation test schedule** is being recommended to examine if any kind of damage has occurred during transportation.

Physical Examination:

Required for:

- a) Connectors
- b) Relays and Relay-bases
- c) All the PCB modules / cards
- d) UFSBI Alarm Panel
- e) Block Panel
- f) Block Telephone
- g) Rack and the sub-rack
- h) Card Guides
- i) Motherboard (Backplane)
- j) Interconnecting cables and wires

If any major damages is found it should be brought to the notice of site supervisor for subsequent necessary action.

**Battery:** Good quality 24V 80AH battery with low internal resistance should be used for BPAC. BPAC battery should not be shared with any other gear or any other adjacent BPAC.

**Battery Charger:**

- i) Good quality low ripple battery charger (Axle counter type) 24V/10A as per IRS: S-86/2000 or IPS module (24V/5A) as per RDSO/SPN/165/2004 for each BPAC. Float mode terminal voltage should nominally set at 26V. Terminal voltage should never be outside 21.6V to 28.8V.
- ii) Power supply for BPAC should be separate from Axle Counter and Block telephone power supply.

**Earthing:** Good earthing should be provided for BPAC termination. BPAC should be grounded through proper earth only. Arbitrary earthing must be avoided. It is preferable to provide separate earth pit for BPAC. Value of Earth resistance:  $< 2 \Omega$ .

**Lightning arrestor:** Good lightning protection system with proper connection with earth.

**Communication Channel:** One 4-wire voice channel from the OFC mux / quad cable should be provided for BPAC communication. Block telephone should be connected with a separate 2-wire channel. The BPAC channel should be having S/N ratio of better than 20db. Attenuation 0-3dB (at 1 KHz ).

**Cable:** For connecting UFSBI of BPAC to the optical mux, 0.9mm / 600 ohms telephone cable should be used. A single segment of cable without in between joints should be used for this connection. 56/0.3mm copper wire for power input (Length is as per distance between battery charger or IPS room to BPAC cubicle.)

**Environment:** Adequately spacious, clean, dry and well ventilated location should be used for BPAC. Enough room around the BPAC should be provided for easy access for maintenance.

### Power Supply

- a) Battery Voltage should not exceed the range: 21.6 to 28.8V DC.
- b) Ensure that the above supply is not arbitrarily grounded.
- c) Before insertion of other modules, Power Supply units (PSU) are to be inserted and power connection to the Battery Supply is to be provided. The 'Start' switch on the front panel of the PSU should be lifted once to bring them into operation. The correct output levels should be read from the front panel monitoring points as:

+ 5V	Int	=	5.6V – 6V
	BP	=	4.9V – 5.3V

+12V	Int	=	12.5V – 13.1V
	BP	=	11.8V – 12.4V

The 'OK' LED for +5V & +12V should glow, indicating proper health of PSU.

Installation of BPAC is kept very simple as and such no elaborate procedure will be required except those given as under:

### **Inter Connections :**

a) Plug in all the relays to the respective relay bases :

WD (QN1) : TGTXR (QN1) : SHKR (QN1) : ASGNCR (QNA1) : TCFR (QL1) : HSGNCR (QNA1) :  
BPNR (QN1) : FR1 (QN1) : SD1 (QN1) : TCFXR (QN1) : TCFCR (QN1) : TGTYR (QN1) : ASGNCR  
(QN1) : TGTZR (QN1) : BLR (QN1) : FR2 (QN1) : SD2 (QN1) : BTSR (QN1) : TAR2 (QN1) : TAR1  
(QNA1) : HSBTPR (QNA1) : HSATPR (QNA1) : TGTPR (QN1) : AZTR (QNA1) : 120EJ (Electronic  
Time Delay Unit) : 120JPR (QN1) : CAR (QN1) : CNR (QN1) : TGTNR (QN1) : ASCR (QN1) :  
TGTR (QL1) : TCFZR (QN1)

Note: Relay types are mentioned within parenthesis.

b) Insert all the modules / cards in the UFSBI 6U Rack **in power off condition**.

c) Plug in all the connectors to their matched counterpart. As the length or wire groups corresponding to each connector are optimally fixed, probability of wrong connection is ruled out.

d) Put on the UFSBI PSUs.

## **Start-up & Operation :**

### Start-up

When initially power is applied to the system, 1). The count no. of veeder counter will increase by one as soon as the system passes through Power on Reset, 2). The system goes through some initial self checking showing 'SYSTEM CHECK'. If any of the checks fails system goes to shutdown. Now the system comes to a point where it looks for control voltage of the output card showing 'CNTL. VOLT ABSENT'. When 'CNTL. VOLT' switch is pressed momentarily, desired voltage gets available, and otherwise system goes to shutdown. Now the system will transit to SSB state, assuming failure of inter block communication and will display the message "IB RX FAIL". When the system at the other end is also powered ON, the local end system will transit to the NORMAL state after successful reception of at least three interblock communication packets and will display the message "SYSTEM OK".

### Normal operation

Once the system has successfully completed initialisation, it is now ready for interfacing various signalling information of a BPAC at one end of a block section and exchanging them with the BPAC terminal at the other end

A "Test Signalling Round" involving at least 10 operations needs to be performed before the real operations or the trail run starts. The block operation through BPAC to be kept under observation at least for three up and three down movements of trains.

A close monitoring of the train movements through BPAC to be done at least for 48 Hrs after immediate installation and commissioning of the system.

**PRE INSTALLATION CHECK-LIST FOR BPAC (SINGLE LINE)**  
**(AS PER RDSO/SPN/188/2004)**

**Site Requirement details (To be provided by Railways for installation of BPAC)**

Station Name: \_\_\_\_\_

Railway: \_\_\_\_\_ Division: \_\_\_\_\_ Section: \_\_\_\_\_

BPAC working between stations: \_\_\_\_\_ & \_\_\_\_\_

Communication Medium/Type: OFC/Microwave/Quad Cable: \_\_\_\_\_

Sl. No.	Description	Specified Value/ Nos.	Remarks
1.	Site condition	Spacious, clean, dry, well ventilated room preferably with a fan/exhaust fan with adequate space for installation of BPAC.	
2.	Battery	24 V / 120 AH	
3.	Battery charger	i) Good quality low ripple battery charger (Axle counter type) 24V/10A as per IRS: S-86/2000 or IPS module (24V/5A) as per RDSO/SPN/165/2004 for each BPAC. ii) Power supply for BPAC should be separate from Axle Counter and Block telephone power supply.	
4.	Earthing	i) Provision for separate earth pit (preferable) ii) Value of Earth resistance:< 2 $\Omega$	
5.	Lightning arrestor	Good lightning protection system with proper connection with earth.	
6.	Communication channel	4 wire Voice Channel on OFC Jelly Filled Quad Cable (1 Quad) as per IRS TC 30-05 <ul style="list-style-type: none"> <li>• S/N ratio: At least 20dB</li> <li>• Attenuation 0-3dB (at 1 KHz )</li> </ul>	

7.	Cables	<ul style="list-style-type: none"> <li>• Indoor Cable of 0.6 / 0.9 mm diameter will suffice the requirement of picking up I/P or O/P relays.</li> <li>• No. of core requirement will be decided as per no. of I/P and O/P at Station.</li> <li>• 56/0.3mm copper wire for power input (Length is as per distance between battery charger or IPS room to BPAC cubicle.)</li> </ul>	
8.	External terminals (Centre Link Open type)	No. of terminals required at CTR will be as per requirement at station.	
9.	V/F matching transformer (as per communication cable type)	For the system which has to run on Copper cable in RE area V/F tapping transformer is required as per IRS:TC 76-2006. Characteristics impedance for V/F transformer is 600 Ω on primary side(i.e. BPAC side ) and Quad cable impedance on secondary side (normally it is 470 Ω )	

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(WEBFIL Representative)

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(Railway Representative)

**PRE COMMISSIONING CHECK-LIST FOR BPAC (SINGLE LINE)**  
**(AS PER RDSO/SPN/188/2004)**

**PART-A: Site Requirement details (Provided by Railways for installation of BPAC)**

Station Name: \_\_\_\_\_

Railway: \_\_\_\_\_ Division: \_\_\_\_\_ Section: \_\_\_\_\_

BPAC working between stations: \_\_\_\_\_ & \_\_\_\_\_

Communication Medium/Type: OFC/Microwave/Quad Cable: \_\_\_\_\_

Date of installation: \_\_\_\_\_ Date of commissioning: \_\_\_\_\_

Sl. No	Description	Specified Value/ Nos.	Obtained Value / Nos. (if any)	Remarks
1.	Site condition	Spacious, clean, dry, well ventilated room preferably with a fan/exhaust fan.		
2.	Battery	24 V / 120 AH		
3.	Battery charger	Good quality low ripple battery charger (Axle counter type) 24V/10A as per IRS: S-86/2000 or IPS module (24V/5A) as per RDSO/SPN/165/2004 for each BPAC. Power supply for BPAC should be separate from Axle Counter and Block telephone power supply. Normal voltage: 24V/5A (-10% to + 20%) at the output voltage at following 2 condition must be within 21.6V to 28.8V. <ul style="list-style-type: none"> <li>• Charger ON &amp; BPAC ON.</li> <li>• Charger OFF (for 15 min) &amp; BPAC ON.</li> </ul> (Note: The output voltage must be measured at the terminals DC-DC converter input).		
4.	Earthing	i) Provision for separate earth pit (preferable) ii) Value of Earth resistance: < 2 Ω	Ω	
5.	Lightning arrestor	Good lightning protection system with proper connection with earth.		
6.	Communication channel	4 wire Voice Channel <ul style="list-style-type: none"> <li>• S/N ratio: At least 20dB</li> <li>• Attenuation 0-3dB (at 1 KHz )</li> </ul>	dB dB	

7.	Communication Cable	<p>Jelly filled Quad cable as per specn:IRS:TC 30-05</p> <ul style="list-style-type: none"> <li>• Length of Quad cable :</li> <li>• The cable insulation(must be better than 10 M <math>\Omega</math>/Km when tested with 500V Megger):</li> <li>• Loop resistance (should be less than 55 <math>\Omega</math>/Km):</li> <li>• Signal loss (should be less than 30dB at 2.5 KHz):</li> <li>• Near end cross talk (should be better than 55dB/Km at a frequency of 150KHz):</li> <li>• Far end cross talk (should be better than 67.8 dB/Km at a frequency of 150KHz):</li> <li>• The armour of the cable must be properly earthed.</li> </ul>	<p>Km M <math>\Omega</math> <math>\Omega</math> dB dB dB</p>	
8.	External terminals ( <i>Centre Link Open type</i> )	All inputs from the Field, Block Instruments and the Relay room should be terminated with proper identification in a separate location to connect to the BPAC terminals.		
9.	V/F matching transformer (as per communication cable)	To be provided at both ends of Tx and Rx path of the communication cable Characteristics impedance for V/F transformer is 600 $\Omega$ on primary side(i.e. BPAC side ) and Quad cable impedance on secondary side (normally it is 470 $\Omega$ )		

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