

# Embedded Communication DC Power Supply System

**model: TY-DU68-B301V-5.0**

## overview

TY-DU68-B301V-5.0 is an embedded shared DC power supply system with AC input and output of 48VDC. The power system consists of a complete set of components (rack, cabinet with control unit, molding module, distribution connector panel, and cable system), forming a complete DC power supply equipment.

## Product Highlights

- ★ It can realize the scenario of tenants sharing stations;

- ★ Measurable tenants' DC electricity consumption and electricity ratio;

The peak efficiency of the rectifier is as high as 96.3%;

Efficiency under rated load conditions  $\geq 95\%$ ;

- ★ Suitable for a wide single-phase voltage range of 85VAC to 295VAC, with strong adaptability to the power grid;

In energy-saving mode, the monitoring unit automatically sleeps redundant rectifiers or wakes up dormant rectifiers based on changes in load power.

The power consumption of the rectifier during sleep is not greater than 4W, saving energy consumption;

- ★ Standard USB port, supports batch parameter setting, copying history records, and upgrading programs on USB flash drive;

- ★ Flexible monitoring network: Provides input/output dry contacts, RJ45 Ethernet interface, RS232 communication interface, RS485 communication interface.

Meet the networking requirements of Telnet, HTTP, FTP, and SNMP.

## Product structure diagram



## Specification parameters

general requirements	describe
1.1.1	300A power cabinet (indoor power cabinet with 3 storage blocks (Rect) and 5 rectifier units (Rect) in compliance with international standards)
1.1.2	Anti interference: Complies with FCC, ClassB or equivalent standards
1.1.3	Fire safety standards: comply with the UL1950 standard, CSA60950 safety standard or equivalent standards in the United States, and the QCVN9:2016/BTTTT telecommunications engineering grounding standard of the Ministry of Information and Communications. Complies with the standards and technical regulations for telecommunications station infrastructure alarm, monitoring, and control systems as stated in Letter No. 5515/VNPT-CNM
1.1.4	The lightning protection standards QCVN32-2020-BTTTT and TCVN8687:2011 provide a -48VDC power supply for telecommunications systems. Certification in compliance with ROHS hazardous substance restriction standards
1.1.5	Electromagnetic/EMC compatibility: certified in accordance with EN55022B or equivalent standards, applicable safety standards: certified in accordance with IEC60950-1, EN60950, UL60950 or equivalent standards
parameter	describe
Product version number	TY-DU68-B301V-5.0
1.1.6	System capacity: The rectifier block should have at least 5 slots and be able to expand a total power of at least 300A (maximum output current).

1.1.7	System efficiency, system efficiency $\geq$ 93.5% @ 30% rated power; System efficiency $\geq$ 95.5% @ 50% rated power; System efficiency $\geq$ 95.5% @ 100% rated power
1.1.8	MTBF $\geq 3.2 \times 10^5$ h
1.1.9	The system is installed on a 19 inch standard rack and integrated into one cabinet, which seamlessly fits into one rack and consists of a complete set of components (rack, cabinet with control unit, molding module, distribution connector panel, and cable system) to form a complete DC power supply equipment.
<b>1. Forming Cabinet</b>	
1.1 System Requirements	The power system consists of a complete set of components (rack, cabinet with control unit, molding module, distribution connector panel, and cable system), forming a complete DC power supply equipment.
1.2 Requirements for rectifier	The rectifier block should have at least 5 slots and be able to expand a total power of at least 300A (maximum output current).
1.3 Function Description of Cabinet	Equipped with appropriate capacity for installation at BTS/NodeB stations, high performance $\geq 95\%$ , controlled and programmed by microprocessors (soft switching technology), with state-of-the-art power management and external device control connection functions.
1.4 Cabinet Control	The rolling forming machine cabinet is controlled locally through screens/buttons, and the software is connected to a computer (PC) and remote, centralized (remote) through an IP network.
1.5 Working mode	The rectifier block operates in N+1 redundancy mode, with automatic load sharing, rotation interruption, and adjustment when the load increases
1.6 Fan cooling block	Automatically adjustable according to temperature, capable of replacing and replenishing heat (hot swappable) without affecting the operation and power function of the entire system
1.7 Voltage Adjustment Method	The molded cabinet is equipped with a low-voltage circuit breaker (LVD), and the thermal compensation block can automatically adjust the output voltage according to changes in ambient temperature
1.8 Abnormal Errors and Warning Requirements	The alarm states sent by the monitoring module to the upper computer include: AC overvoltage, AC undervoltage, AC phase loss, AC air switch, module fault, fan fault, module current limit, DC undervoltage, DC overvoltage, battery power down, load fuse, battery fuse status, low voltage warning (LVD), high voltage warning
1.9 Input (nominal)	Single phase voltage 220VAC and three-phase 380VAC, frequency 50-60Hz.
1.10 Output voltage:	-48VDC nominal, grounded anode.

1.11Efficiency:	$\geq 95\%$
1.12Power Distribution Table:	Communication input connection (using 3-phase 4-pole MCB). 03CB/fuse $\geq 125A$ is used for battery connection, 10 CBs are used for load (3 CBs $\geq 50A$ , 2 CBs $\geq 32A$ , 2CB $\geq 16A$ ), and CB expansion can be installed as needed.
1.13 Input Standards	Input voltage range: It can operate within the range of 85AVC to 300AVC, automatically disconnect the input when the voltage exceeds the allowable voltage range, and automatically restore within the voltage range (90VCA-290VCA). When the input voltage exceeds the range, it can work for a short period of time. Power factor $\geq 0.98$ , load range 50% -100%, 220VCA input, AC Surge Protection: The input has lightning protection circuits and voltage transients. The lightning protection circuits are installed in all branches of the AC input and comply with Class C standards (identifier 20kA, 8/20 $\mu s$ ; maximum 40kA, 8/20 $\mu s$ ).
1.14 Output Standards	1. Output voltage range (adjustable within the range): 43VDC to $58 \pm 0.5\%$ VDC. 2. Output power distribution table (available): Battery: 03CB $\geq 125A$ Load: Minimum 10CB ( 3CB $\geq 63A$ , 3CB $\geq 50A$ , 2CB $\geq 32A$ , 2CB $\geq 16A$ )
1.15 Output Protection	1. Circuit breaker when the voltage is below the threshold (LVD) 2. The disconnection voltage can be adjusted within the range of 42 to 50VDC. 3. Adjustable hotspot from 47VDC to 57VDC 4. Minimum identifier: 200A 5. Short circuit protection, anti polarity reversal (open circuit delay $<3ms$ ). 6. Overload protection. 7. High temperature overheating protection: automatic power reduction or system shutdown 8. Overvoltage protection: DC high-voltage circuit breaker ( $U_{out}>58VDC$ )
1.16 Lightning Protection System	1. Secondary lightning protection system for each block. 2. The output DC lightning arrester adopts MOV technology (allowing users to replace it when damaged by lightning). 3. Protective structures (L-N, N-E); Working temperature range: $-40^{\circ}C$ to $55^{\circ}C$ ; Response time: $< 25ns$ ; Nominal voltage: 48VDC; Maximum operating voltage: 75VDC. 4. Pulse normal discharge current (8/20 $\mu s$ ): 15kA; Pulse protection level (20kA, 8/20 $\mu s$ ): 150V.
<b>2. Remote monitoring</b>	
2.1 Documents	Provide MIB files
2.2 Monitoring Parameters	1.Basic information (power cabinet name, working mode, number and version of controllers, number and version of rectifiers) 2.AC voltage phase 3.DC rectifier 4.DC load current

	5. Load DC voltage level meter 6. Collect the setting parameters of the power cabinet (DCLow, BLVD, LLVD, ACLow...) 7. Battery temperature 8. Environmental temperature
2.3 Warning	Power grid outage, high battery temperature, high ambient temperature, rectifier error, battery jumping with CB, CB jumping load, LLVD, BLVD, DC low alarm information
2.4 Remote Installation	Low AC voltage threshold, LLVD, BLVD, DC low voltage butterfly valve values Waiting for parameter settings
<b>3. Control block</b>	
3.1 Function	1. The control block can be connected to the rectifier block through digital signals using software, allowing for real-time monitoring and control of the entire source system. 2. LCD screen, to LED, displaying and warning system status; The button allows the device to set system parameters and control the molding machine cabinet. 3. On site control software or remote control through interface ports can store/restore the configuration of the entire molding cabinet through files, support software update capabilities, and will not interrupt power supply or have any impact on system operation. 4. The software must be compatible with the Windows operating system, support management using a web browser, have built-in SNMP, and be in English or Vietnamese language.
3.2 Display Image and Sound Indication	1. Display screen: The display screen displays the operating status of the power cabinet, allowing clear and distinct character display. Can display symbols and icons/graphics 2. Indicator lights: LED light (color change of indicator light): green light for normal operation, yellow warning light, red light for fault/power failure) 3. Sound alarm: Play the alarm sound when there is an alarm, self recover when the alarm ends (sound off), and when the alarm is >60dB, the sound level is at a distance of 1m.
3.3 Having physical interfaces (connections) for monitoring and control	At least 08 programmable dry contacts are used for monitoring or controlling peripheral devices. 2. Supports interfaces: RS232, RS485, USB RJ45. 3. Expanded I/O card slots that can be connected to external centralized monitoring systems for control and monitoring
3.4 Memory	Support storage of local data on memory cards/hard drives
3.5 Management Software	1. Security mode can be set to enable multi-level/multi-user decentralized control blocks. 2. It has self checking function (system, LVD, alarm relay). 3. The entire system configuration can be installed, stored, and restored through files. It can store at least 10000 event alerts and 10000 data alerts, automatically inserting new data when storage capacity expires. 4. Support the operation and management of external system devices through physical interface ports, including solar cell systems, wind power generation systems, and air conditioning systems 5. Support the operation and management of external system devices through physical interface ports, including solar cell systems, wind power generation systems, and air

	conditioning systems
3.6Control function, setting the molding machine cabinet mode:	1.Alarm off 2.Set the output voltage of the straightening machine within the range of 43V to 58V $\pm 0.5\%$ , with a resolution of $\pm 0.1V$ 3.Set high voltage alarm and power-off threshold within the range of 45 to 59.5VDC, supporting level 2 4.Set low voltage alarm and power-off threshold within the range of 42 to 58VDC, supporting level 2  5.Set and adjust the blower speed: automatic, manual, full speed operation. 6.Setting mode of low voltage circuit breaker (LVD) 7. Allow flexible parameter settings for main/branch LVD: LLVD、BLVD。 8. Allow setting of open circuit voltage, circuit connection voltage, and response time.
3.7Display and Alarm Setting Function	You can set alert levels: set alert generation and check alerts. Can customize/define the name of extended alerts AC power outage alarm (three-phase separate power outage alarm) Power outage/battery/LVD warning Voltage Warning: High DC Voltage (Level 2); Low DC voltage warning (level 2). Battery temperature warning (level 2): Battery capacity warning. Disconnecting warning Launch current alarm. Warning for faulty cabinet; Block fault warning; Warning for multiple error blocks. Rectifier volume alarm (programmable alarm volume level); Warning: Uneven load distribution between rectifier modules. Limit warning, operating mode; Low/high buffering load; Low/high load warning; The system is running; Fast loading, buffer loading, and compensation loading; Test voltage, current, buffer current, and charging compensation. Display battery temperature. Currently updating detailed information for each rectifier module, including current, input/output voltage, inventory/sequence, operating status, storage and export file data.
3.8Setting battery charging mode:	1.Set current limiter and battery coupling voltage 2.BoostCharging/QuickCharge: Charging voltage and current. 3.Balance mode: current, voltage (adjusted from 48V to 58V $\pm 0.5\%$ ) 4.Floating mode: current, voltage (adjustable from 46V to 58V $\pm 0.5\%$ )
3.9Charging Modes with Different Capacity Settings	The minimum capacity is 50Ah, 100Ah, 150Ah, 200Ah, 300Ah
<b>4. Rectifier block</b>	
4.1 Operation	The rectifier block is connected to the control monitoring block through digital signals to monitor and control all block operations.
4.2 Input voltage range	85VAC to 300VAC single-phase
4.3 Short term operation	When the voltage exceeds the range of 300V to 350V, it is allowed to maintain operation for a short period of time



4.4 Power	$\geq 2900W$
4.5 Power factor	Power factor $\geq 0.99$ , load range 50% -100%, input voltage 220VAC
4.6 Efficiency	$\geq 95\%$ (load of 40% -100%)
4.7 Load efficiency	Load efficiency 40% -100%, voltage 220V AC input ( Certification of laboratory measurement results according to ISO17025 or equivalent standards
4.8 Rated power conditions	Allow 100% power to be provided at internal voltages ranging from 180VAC to 300VAC.
4.9 Under 85VAC voltage	The minimum rated power is 40%.
4.10 Holding time	$\geq 20$ milliseconds.
4.11 Maximum input current	$\leq 19A$ ms.
4.12 Operating frequency range	From 45Hz to 65Hz.
4.13 Transition Time	The transition time from supplying power to the molding machine cabinet to the nominal DC output voltage of 5 seconds.
4.14 Static voltage variation	When the load is adjusted from 10% to 100%, the voltage change is less than or equal to 1%.
4.15 Dynamic Voltage Changes	$\leq \pm 5\%$ load variation of 10-90% or 90-100%, response time $< 50ms$
4.16 Minimum range of adjustable output DC voltage	43VDC-58VDC.
<b>Wire current Aptomat</b>	
5.1 Specification requirements	All conductive interfaces of wires and busbars must meet the requirement of passing current density not exceeding $3A/mm^2$ ( $\leq 3A/mm^2$ ). The thickness and cross-section of the lead system, CB installation busbar, and fuse should match the maximum capacity of the straightening machine system. Pure red bronze busbar, coated with anti-oxidation material (tin/nickel)
5.2 Interface Requirements	All cable endpoints must have a wrapped end, welded end, or clamped end so that the connection site does not generate temperatures higher than the wire temperature.

5.3	CB type Aptomat: manufactured according to IEC60898/IEC60947-2.
<b>product traceability</b>	
6.1	The product comes with a QR code stamp, and the encoded information includes: number, contract date; Warranty period: Seller's name; Phone number (warranty information QR CODE form to be agreed upon by both parties in advance).
6.2	Material: High strength, waterproof, and non fading material over time.
6.3	Location: Pasting in areas with less contact will damage the stamp, which can be seen and scanned.