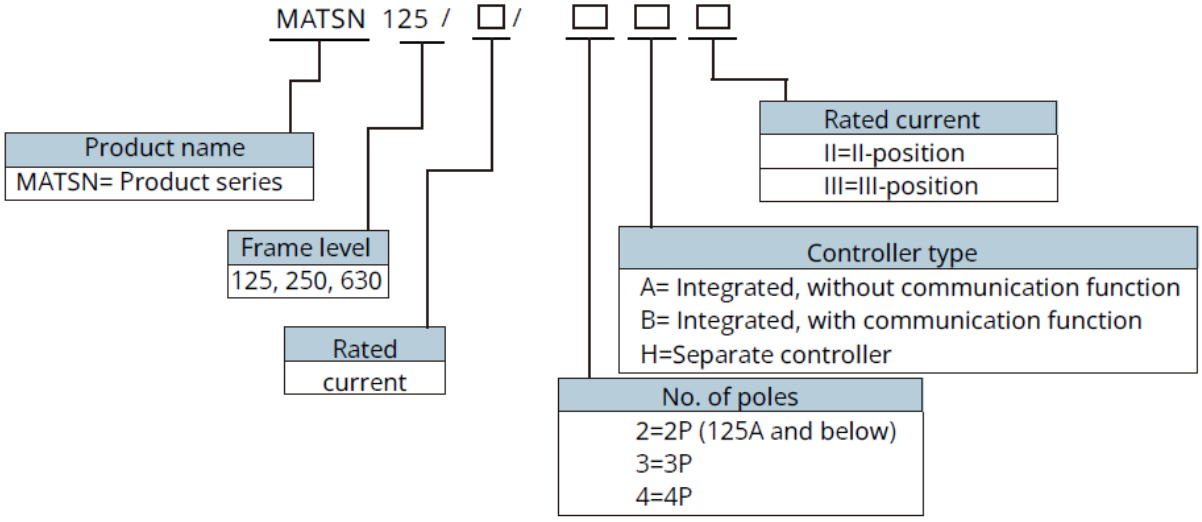
MATSN Series Dual Source Automatic Transfer Switch Application Instructions

Powering Business Worldwide

1. Product overview

The MATSN series products are electromagnetic dual-source automatic transfer switches, characterized by fast switching speed and short power outage time during transfers. The MATSN series offers two categories: II-position and III-position, and features four operating modes, including automatically transfer and restore operation, automatically transfer and nonautomatically restore operation, mutual-backup operation, and utility-generator modes. Additionally, the devices come with functions such as transfer delay settings, operation status indication, manual/automatic mode transfer, and RS485 data communication. They are widely used in data centers, transportation infrastructure, laboratories, medical centers, and various types of buildings. Three controller types are available in the MATSN series, including Type A, Type B, and Type H. Among them, Type A is the basic functional type.

Catalogue numbering description:



• Type A controllers

Fire work interlocking function:

- In the event that the fire work interlocking signal contact is closed, both power sources will enter into the Open states, and the dual-source Open state output contacts will be closed. After the fire work interlocking signal contact is opened, both sources can be switched back from the Open state by re-powering on, or performing an Automatic-Manual-Automatic transfer operation.
- The fire work interlocking signal is a passive NO contact signal.

Note: The fire work interlocking function is not available for II-position products.

Generator start/stop function:

- Utility power is connected to Source 1 (S1), which is identified as normal source by default; the self-generated power is connected to Source II (SII). Connect the generator starting power (DC24V) to the corresponding terminal of the terminal block on the side, and connect the generator starting terminal on the dual source device to the generator starting device. In case of SI source faults, the dual source device sends a signal to start the generator, and automatically transfer back to the self-generated power when it's normal. The device will automatically transfer back to the S1 source when it recovers.
- Generator start signal is a passive NO contact outputs, with the terminal capacity of AC 220V and 1A.

Position feedback:

- Three contact positions are available, including SI Source Closed, SII Source Closed and dual-source Open position, to provide passive NO contact outputs.
- Note: Dual-source Open position feedback function is not available for II-position products.

Operating mode selection function:

- Supports on-site selection of the operating modes including automatically transfer and restore operation, automatically transfer and nonautomatically restore operation, mutual-backup operation, and utility-generator modes.

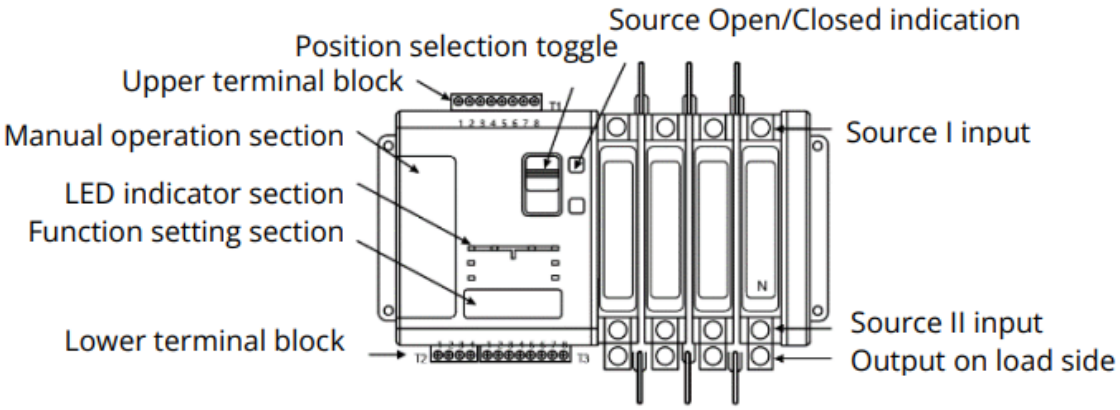
Type B controllers

- Equipped with all the functions offered by Type A controllers, and additional communication function:
- RS485 interface, with Modbus communication protocol.
- Enables remote communication, remote measurement, remote adjustment, and remote control.

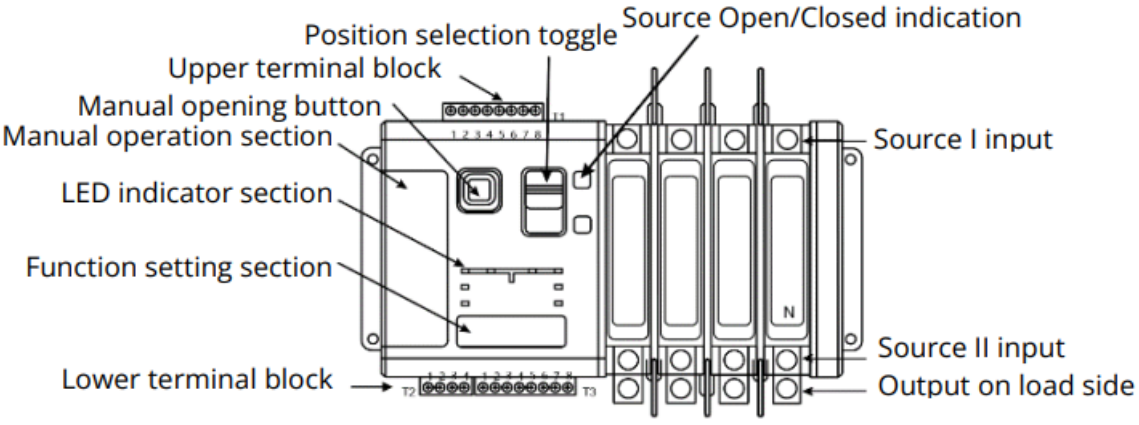
Type H controllers

- Equipped with all the functions offered by Type B controllers, and added functions, including:
- Separate mounting, with LCD display.
- In the event of dual-source faults, the system outputs a set of alarm signals (passive NO contact outputs, with the contact capacity of AC220V and 1A).
- Load shredding.
- Support non-standard customization per user request.

II-position outline drawing:



III-position outline drawing:



2.Operating instructions

• Position selection toggle

Three levels are available for selection, corresponding to Automatic operation, Manual SI, and Manual SII. After the manual position is selected, the manual closing operations can be performed through subsequent operations in the Manual Operation Section.

• Manual operation section

III-Position: First, make sure the position selection toggle is set to the desired power source for closing and is in the dual source Open position. Then, open the protective door of the manual operation section, remove the handle, and insert it into the shaft hole. Rotate the handle **downward** to the lowest point, lock the shaft in place to complete the closing operation.

II-Position: First, make sure that the position selection toggle is set to the desired power source for closing. Then, open the protective door, remove the handle, and insert it into the shaft hole. Rotate the handle **upward** to the highest point and then return it to the original low point to complete the power transfer.

Put the operating handle back to its original place after completing the manual closing operation.

The manual operation protective door is locked when in the automatic position. Please do not force it open.

• Manual opening button

In the manual mode, press the button to switch the contact to the dual source Open position. In the automatic mode, the button is locked. Please do not press it with force.
Note: The Manual opening button is not available for II-position products.

• Function setting section

Includes test function, reset function, operating mode setting, delay time setting, and communication setting (from left to right).

Test function (T)

The Test function can be used to check whether the dual-source transfer operation can be performed properly after the product is powered up. Make sure to put the device in the automatic operating status and Source I normal and in closed position. Press and hold the Test button for 2 seconds, and the device will complete a transfer cycle, that is Ion-O-IIon-O-Ion operation for III-position, and Ion-IIon-Ion operation for II-position.

Reset function (R)

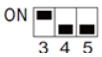
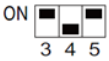
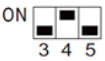
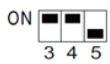
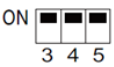
In the event of product fault alarms or dual-source Open operation due to fire work interlocking, the dual-source device will enter a nonautomatic transfer state. Press and hold the Reset (R) button for 2 seconds, to exit this state and restart the controller. After the restart, the controller will re-enter this state if the fault alarm or fire work interlocking signal still exists.

Parameter setting

Operating mode setting table (S1-1.2)

Operating mode	Switch setting
Automatically transfer and restore operation	
Automatically transfer and nonautomatically restore operation	
Utility-generator mode	

Delay time setting table (S1-3,4,5)

Delay time setting	Switch setting	Delay time setting	Switch setting
0s		10s	
2s		15s	
4s		20s	
6s		30s	

Communication address setting table (S2)

Address	Dial switch setting	Address	Dial switch setting
001		004	
002		⋮	
003		247	

3.Operating mode description

Four operating modes are available for dual-source ATS, including:

- **Automatically transfer and restore operation**

This is the most commonly used operating mode for dual-source device. In this mode, by default, SI is identified as normal source and SII as backup source. In the event of normal source faults, it will automatically transfer to the backup source under the condition that it's normal. The device will transfer back to the S1 source once it recovers.

- **Automatically transfer and nonautomatically restore operation**

The difference between this mode and the automatically transfer and restore operation mode is that in this mode, the dual-source device will not automatically transfer back to the SI source when it recovers (can be transferred back via manual operation).

- **Mutual backup operation**

The difference between this mode and the automatically transfer and restore operation mode lies in the criteria used to identify the normal source while everything else remains the same. When the dual source device is powered up in this mode, the SI source is identified as normal source and SII as backup source when SI is normal; the SII source is identified as normal source and SI as backup source when SI is faulty and SII is normal; the line that becomes normal first is identified as normal source and the other as backup If both SI and SII fail.

- **Utility-generator mode**

This mode is used to automatically start and stop the self-supplied generator, and enable automatically transfer between utility and generator. Utility power is connected to Source 1 (S1), which is identified as normal source by

default; the self-generated power is connected to Source II (SII), which is identified as backup source by default. Connect the generator starting power (DC24V) to the corresponding terminal of the secondary terminal block, and connect the generator starting terminal on the dual source device to the generator starting device. In the event of normal source faults, the dual source device sends a signal to start the generator, and automatically transfer back to the self-generated power when it's normal. The device will automatically transfer back to the normal source when it recovers.

Notes:
a) The operating mode transfer must be selected manually or in a power-off state.
b) When the current actual operating state does not match the set operating mode, all indicators will flash for indication.

4.Communication and address settings

An RS485 communication interface is available, with Modbus-RTU communication protocol and baud rate of 9600 bps. The device can upload dual-source operating status, set up parameters, and enable remote communication, remote measurement, remote adjustment, and remote control.
The communication address code ranges from 1 to 247. Please refer to the communication address setting table for the specific addresses.

5.Operating status indication

Indicator	Status	Message
SI source status	Remain lit on Flashing Not lit on	SI normal SI over-voltage SI phase loss or voltage loss
SII source status	Remain lit on Flashing Not lit on	SII normal SII over-voltage SII phase loss or voltage loss
SI closing status	Remain lit on Not lit on	SI closed SI open
SII closing status	Remain lit on Not lit on	SII closed SII open
Communication	Remain lit on Not lit on	Communication normal No communication

6.Parameters

Type and specifications	MATSN-125	MATSN-250	MATSN-630
No. of poles	2,3,4	3,4	3,4
No. of positions	II, III		
Controller type	Type A, Type B, Type H		
Rated current (A)	6/20/32/40/50/63/80/100/125	100/125/160/200/250	200/250/320/400/500/630
Rated insulation voltage (V)	800	800	1000
Rated impulse withstand voltage (kV)	8	8	12
Rated operating volage (V)	220 (2P), 400 (3P,4P)	400	400
Rated short-time withstand current (kA)	5kA/60ms	10kA/60ms	12.6kA/60ms
Rated short-time making capacity (kA)	7.65	17.24	25.55
Utilization category	AC-33iB (16-125A) AC-33B (16-80A) AC-33iA (16-63A)	AC-33iB (100-250A) AC-33B (100-160A) AC-33iA (100-160A)	AC-33iB (200-630A) AC-33B (200-500A) AC-33iA (200-400A)
Mechanical life	10000		
Electrical life	6000		
Pollution degree	III		
Contact transfer time (ms)	< 100		
Fixed/front panel wiring	●		

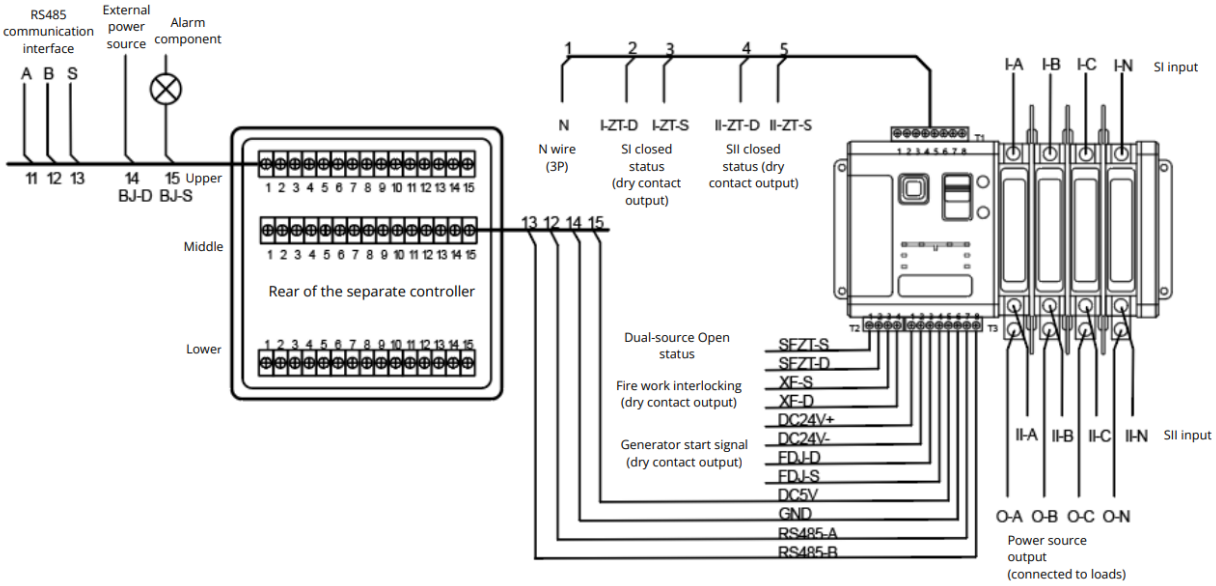
Parameters (continued)

Type and specifications	Type A	Type B	Type C
Mounting method	Integrated	Integrated	Separatee
Frequency	50/60Hz	50/60Hz	50/60Hz
II service position			
Source I (SI) closed	●	●	●
Source II (SII) closed	●	●	●
III service position			
Source I (SI) closed	●	●	●
Source II (SII) closed	●	●	●
Dual-source Open	●	●	●
Operating method			
Automatic operation	●	●	●
Manual operation	●	●	●
Communication remote control	-	●	●
Automatic operation			
Monitoring SI under/over-voltage	●	●	●
Monitoring SI voltage loss, phase loss	●	●	●
Monitoring SII under/over-voltage	●	●	●
Monitoring SII voltage loss, phase loss	●	●	●
Generator control	●	●	●
Fire signal to cut off non-fire source (III)	●	●	●
Operating mode selection	●	●	●
Display			
SI source operating indication	●	●	●
SII source operating indication	●	●	●
SI source fault indication	●	●	●
SII source fault indication	●	●	●
Fire work interlocking indication	●	●	●
Power source indication	●	●	●
Operating mode	●	●	●
Delay time selection	●	●	●
Display method	LED	LED	LED
Parameter setting			

Parameters (continued)

Delay time setting	0,2,4,6,10,15,20,30s	0,2,4,6,10,15,20,30s	0-255s
Operating mode setting	●	●	●
Under-voltage action range (V)	160-175 (not adjustable)	Adjustable via communication	Adjustable
Under-voltage recovery range (V)	185-195 (not adjustable)	Adjustable via communication	Adjustable
Over-voltage action range (V)	265-275 (not adjustable)	Adjustable via communication	Adjustable
Over-voltage recovery range (V)	240-260 (not adjustable)	Adjustable via communication	Adjustable
Other functions			
Fire work interlocking input	●	●	●
Position feedback output	●	●	●
Communication function	-	●	●
Automatic/manual transfer	●	●	●
Test function	●	●	●
Load shredding	-	-	●
Support non-standard customization	-	-	●

7.Electrical wiring descriptions



- **Type H**

Communication interface and fault alarm output (top terminal block)

1) Communication interface (11-13)

Connect to the upper computer system; 11 is RS485 (A+), 12 is RS485 (B-), 13 is the shield layer (S); Communication cable uses ZR-RVSP 2x1.5mm, two-core shielded twisted pair.

2) Fault alarm output (14-15)

When a fault occurs in the dual-source basic device, the system outputs a set of alarm signals (passive normally open contact output with the contact capacity of AC220V 1A).

Communication interface and power source input (middle terminal block)

1) Communication interface (12-13)

Connect to the dual-source basic device; 12 is RS485 (A+), 13 is RS485 (B-);

Communication cable uses ZR-RVSP 2x1.5mm, two-core shielded twisted pair.

2) DC 5V power input (14-15)

The working source for the separate controller;

14 is the negative terminal, 15 is the positive terminal, sourced from the dual-source basic device.

- **Type A/B**

Feedback wiring terminal (T1 terminal block)

(1): 3P dedicated neutral wire terminal; 4P does not require neutral wire connection.

(2-3): SI source closing status output, passive NO contact output, with the contact capacity of AC220V 1A.

(4-5): SII source closing status output, passive NO contact output, with the contact capacity of AC220V 1A.

Fire work interlocking input and dual-source Open status feedback (T2 terminal block)

(1-2): Fire work interlocking dual-source Open status output, passive NO contact output, with the contact capacity of AC220V 1A.

(3-4): Fire work interlocking signal input, passive NO contact input.

Note: This terminal is invalid for II position products.

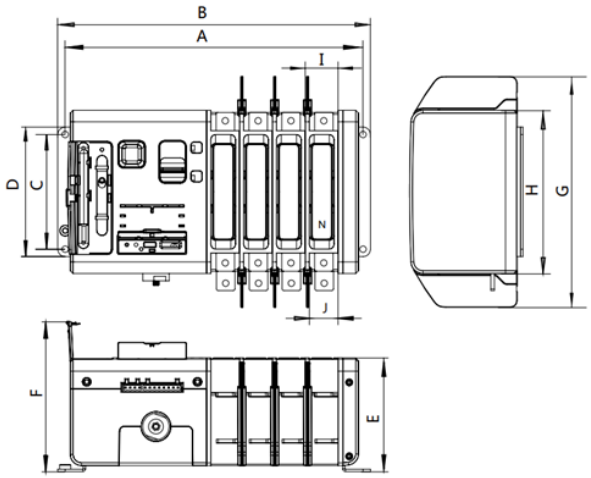
Utility/generator input/output and other signals (T3 terminal block)
(1-2): DC24V+, DC24V-, DC 24V power input, from the generator starting device.
(3-4): FDJ-D, FDJ-S, generator start signal, passive NO contact output, with the contact capacity of AC220V 1A.
(5-6): DC5V+, GND, DC 5V output.
(7-8): RS485 (A+), RS485 (B-), RS485 communication bus; communication cable uses ZR-RVSP 2x1.5mm² shielded twisted pair. For this communication interface, Type B is connected to the upper computer; Type H is connected to the separate controller.

8.Notices

- Neutral wire connection:
  For four-pole transfer switches, the neutral wire is connected to the N pole of the incoming copper bar.
  For three-pole transfer switches, the neutral wire is connected to the N-end of the secondary wiring terminal.
  The neutral wire must be connected as specified; otherwise, it may damage the dual-source device.

- All input and output control signals are passive contacts. Do not connect active signals to the input control terminals. Connecting active signals to the fire work interlocking input terminal will damage both sources.

9.Outline dimensions

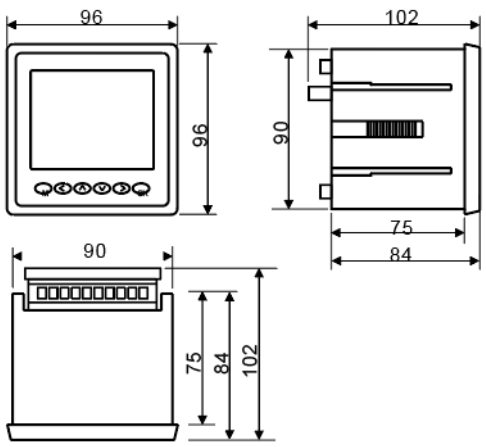


Unit:mm

Type Number	A	B	C	D	E	F	G	H	I	J
MATSN-125/2	241.5	258	124	140	123	163	250	177	30.5	26
MATSN-125/3	272	288	124	140	123	163	250	177	30.5	26
MATSN-125/4	302.5	319	124	140	123	163	250	177	30.5	26
MATSN-250/3	287	303	124	140	123	163	250	177	35.5	31
MATSN-250/4	322.5	339	124	140	123	163	250	177	35.5	31
MATSN-630/3	416	436	159	179	141	180	430	221	62	48
MATSN-630/4	478	498	159	179	141	180	430	221	62	48

Outline and mounting dimensions for Type H controllers

Unit:mm



Cut out a square hole of 92x92mm on the mounting panel, and put the Type H controller in from the front. Then, fasten it from the back of the panel with a locking slider, which requires no additional fixing structures and fasteners.

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