LEDs INTF, 5 VDC, 24 VDC

Table 3-2 LEDs INTF, 5 VDC, 24 VDC

LED	Color	Meaning
INTF	Red	Lights up in the event of an internal fault
5 VDC	green	Lights up as long as the 5 V voltage is within the tolerance limits
24 VDC	green	Lights up as long as the 24 V voltage is within the tolerance limits

LEDs BAF, BATTF

Power supply modules with a backup battery have the following indicators:

Table 3-3 LEDs BAF, BATTF

LED	Color	Meaning
BAF	Red	Lights up if the battery voltage on the backplane bus is too low and the BATT.INDIC switch is at the BATT position
BATTF	Yellow	Lights up if the battery is empty, if the polarity is reversed, or if the battery is missing, and the BATT.INDIC switch is at the BATT position

LEDs BAF, BATT1F, BATT2F

Power supply modules with two backup batteries have the following indicators:

Table 3-4 LEDs BAF, BATT1F, BATT2F

LED	Color	Meaning
BAF	Red	Lights up if the battery voltage on the backplane bus is too low and the BATT.INDIC switch is at the 1 BATT or 2 BATT position
BATT1F	Yellow	Lights up if battery 1 is empty or if the polarity is reversed or if the battery is missing, and the BATT.INDIC switch is at the 1 BATT or 2 BATT position
BATT2F	Yellow	Lights up if the battery 2 is empty, if the polarity is reversed, or if the battery is missing, and the BATT.INDIC switch is at the 2 BATT position

Backup voltage to the backplane bus

The backup voltage is either supplied by the backup battery or fed externally into the CPU or receiver IM. In its normal state, the level of the backup voltage is between 2.7 V and 3.6 V.

The backup voltage is monitored at the lower limit. Violation of the lower limit is indicated by the BAF LED and reported to the CPU.

BAF lights up if the backup voltage on the backplane bus is too low. Possible causes of this include:

- Battery (batteries) empty or battery polarity has been reversed.
- External supply via CPU or receive IM is defective or supply from secondary power supply module is defective or missing.
- Short-circuit or overload on the battery voltage.

Note

Due to internal capacities, if you remove the battery or switch off the external supply, some time may elapse before BAF, BATT1F, or BATT2F lights up.

Function of the operator controls of the power supply modules

Table 3-5 Function of the operator controls of the power supply modules

Control	Function	
FMR button	For acknowledging and resetting a fault indicator after correcting the fault	
Standby switch	Switches the output voltages (5 V VDC24 VDC) to 0 V by intervening in the control loop (no mains disconnection).	
	• |	Output voltages at nominal value
	• ⏻	Output voltage 0 V
Switches BATT.INDIC	Used for setting LEDs and battery monitoring Where one battery can be used (PS 407 4A, PS 405 4A): • OFF: LEDs and monitor signals inactive • BATT: BAF/BATTF LEDs and monitor signals active Where two batteries can be used (PS 407 10A, PS 407 20A, PS 405 10A, PS 405 20A): • OFF: LEDs and monitor signals inactive • 1 BATT: Only BAF/BATT1F LEDs (for battery 1) active. • 2 BATT: BAF/BATT1F/BATT2F LEDs (for batteries 1 and 2) active.	
Battery compartment	For backup battery (batteries)	
Power connection	3-pin connector for the power main (do not pull and plug under power)	

Cover

The battery compartment, battery selector switch, voltage selector switch and power connection are housed under one cover. The cover must remain closed during operation in order to protect these operator controls and to prevent static electricity from affecting the battery connections.

Discharge your body before you start taking any measurements on a module. Do so by touching grounded metallic parts. Always use grounded measuring instruments.

3.5 Fault/Error messages via LEDs

Introduction

The power supply modules of the S7-400 indicate module faults and backup battery faults via LEDs on the front plate.

Overview of the error messages of the power supply modules

Table 3-6 Error messages of the power supply modules

Type of fault/error	LED
Module error	INTF 5 VDC 24 VDC
Backup battery fault	Power supplies with 1 backup battery: BAF BATTF
	Power supplies with 2 backup battery: BAF BATT1F BATT2F

INTF, 5 VDC, 24 VDC LEDs

The following table shows the faults indicated by the INTF, 5 VDC, and 24 VDC LEDs and lists how to remedy the faults. The status of the BAF, BATTF, BATT1F, and BATT2F LEDs is not relevant here.

Table 3-7 INTF, 5 VDC, 24 VDC LEDs

INTF LED	LED DC5V	LED DC24V	Cause of fault	Remedy
D	D	D	Standby switch in ⏻ position	Set standby switch to the | position
			Line voltage missing	Check line voltage
			Internal fault, power supply module defective	Replace power supply module
			Cutoff after overvoltage on 5 V or non-permissible external supply	Disconnect from mains and reconnect after approximately 3 minutes; if necessary, remove external supply
			Power supply module operated in wrong slot	Install the power supply module in the correct slot (slot 1)
			Short-circuit or overload on 5 V	Switch off the power supply module, remove the source of the short-circuit; after approximately 3 seconds, the power supply module can be switched on with the standby switch or via the power system.*

INTF LED	LED DC5V	LED DC24V	Cause of fault	Remedy
D	H	D	Overvoltage on 24 V	Check if there is an external supply; if not, replace power supply module.
H	D*	D	Short-circuit or overload on 5 V and 24 V and overheating	Check the load on the power supply module. Remove module if necessary. Wait 5 minutes before switching the power supply module again.
H	H	D	If the standby switch is set to the ⏻ position, illegal external supply on 5 V	Remove all modules; determine which module is faulty.
			If the standby switch is set to the | position, short-circuit or overload on 24 V.	Check the load on the power supply module. Remove module if necessary.
D	B	H	Voltage restored after short-circuit or overload on 5 V if faults occur in operation	Press FMR button: Flashing changes to steady light
			Dynamic overload on 5 V	Check load on the power supply module. Possibly remove modules.
D	B	B	Voltage restored after short-circuit or overload on 5 V and 24 V if faults occur in operation	Press FMR button: Flashing changes to steady light
D	B	B	Dynamic overload on 5 V and 24 V	Check load on the power supply module. Possibly remove modules.
D = LED is dark; H = LED lights up; B = LED flashing;				

* If the power supply module does not start up again after a few seconds once the overload has been removed, remove power to the module for 5 minutes and then switch it on again. If the module stills does not start up, you must replace it. This applies to the following power supply modules:

- 6ES7407-0KA01-0AA0, Release 3
- 6ES7407-0KR00-0AA0, Release ≤ 5
- 6ES7407-0KA01-0AA0, Release ≥ 10
- 6ES7405-0DA02-0AA0, 6ES7407-0DA02-0AA0
- 6ES7405-0KA02-0AA0, 6ES7407-0KA02-0AA0
- 6ES7405-0KR02-0AA0, 6ES7407-0KR02-0AA0
- 6ES7405-0RA02-0AA0, 6ES7407-0RA02-0AA0

The same characteristic is displayed by the built-in overtemperature protection is triggered.

If either the 5 VDC or 24 VDC LEDs remains dark after switching on, the system has not powered up.

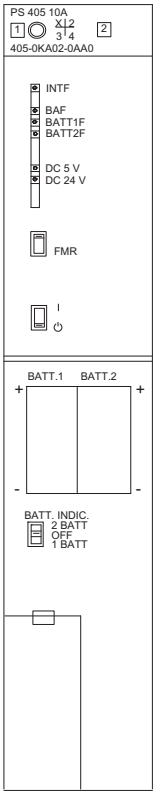
If either of the 5 VDC or 24 VDC LEDs of the PS 407 10AR remains dark for longer than 1 or 2 seconds after it is switched on, the power supply module will not start up.

3.15 Power supply modules PS 405 10A (6ES7405-0KA02-0AA0) and PS 405 10A R (405-0KR02-0AA0)

Function

The power modules PS 405 10A (standard) and PS 405 10A R (for redundant operation) are designed for connection to a 19.2-72 V DC network, and supply 5 V/10 A DC and 24 V/1 A DC at the secondary side.

PS 405 10A and PS 405 10A R operator control and monitoring elements



Mounting screw

LEDs INTF, BAF, BATT1F, BATT2F, 5 V DC, 24 V DC

FMR button (Failure Message Reset)

Standby switch (does not cut off mains)

Under cover

Battery compartment

Switch BATT. INDIC, 2 BATT, OFF, 1 BATT

3-pin power connector

Mounting screw

Figure 3-11 PS 405 10A and PS 405 10A R operator control and monitoring elements

PS 405 10A and PS 405 10A R technical specifications

Dimensions, weight and cable cross-sections	
Dimensions W x H x D (mm)	50x290x217
Weight	1.2 kg
Cable cross-section	3x1.5 mm^2 (stranded wire with wire end ferrule; use single conductor or hose line)
Cable diameter	3 to 9 mm
Input variables	
Input voltage	

• Rated value	24 V/48 V/60 V DC
• Permitted range	Static: 19.2 to 72 V DC Dynamic: 18.5 to 75.5 V DC
Rated input current	4.0 A/2.0 A/1.6 A
Inrush current	Peak value 18 A Full width at half maximum 20 ms
Output variables	
Output voltage • Rated values	 5.1 V DC/24 V DC
Output current • Rated values	 5 V DC: 10 A 24 V DC: 1.0 A
Parameters	
Protection class pursuant to IEC 60536	I, with protective conductor
Overvoltage category	II
Pollution degree	2
Rated voltage U_e $0 < U_e \leq 50$ V $150 < U_e \leq 300$ V	Test voltage 700 V DC (secondary <-> PE) 2200 V DC (primary <-> secondary/PE)
Backup for power failures	> 20 ms at a repeat rate of 1 s, meets NAMUR recommendation NE 21
Power consumption	95 W
Power loss	20 W
Backup current	maximum of 100 µA when power off
Back-up batteries (option)	2 x lithium AA, 3.6 V/2.3 Ah
Protective separation in accordance with IEC 61131-2	Yes