

PROGRAMMABLE BLOCK FOR COMBINE AND CONVEYOR COMMAND IN EXPLOSIVE MINES

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ABSTRACT

NOVELTY - The invention relates to an electronic block for mining control in the exploitation of useful substances from a deposit, with a shearer, using mining methods, in explosion-prone mines. According to the invention, the block comprises a remote control block, an electronic programmable block and a block of interface and supply circuits.

INTRODUCTION

The invention relates to an electronic equipment with programmable automatic, intended to control the exploitation and transport processes from underground mining operations with danger of explosion. The control of these processes involves the control of the combine and the conveyor with scrapers operated by two motors. The device according to the invention consists of a programmable controller with Schneider-Telemecanique microcontroller type Twido TWDLCAE40DRF (1), a block of interface and supply circuits (2), an intrinsic safety barrier (3) through which orders are sent and confirmations are received from the combine enclosure (4) and the abutment conveyor enclosures (5), (6). The starter controls of the combine and the conveyor are given from the ferroresonant remote control blocks (7) and (8). The start-up of a machine is preceded by the emission of a 5-second preventive acoustic signal by an acoustic prevention prevention installation (9), which emits to the block an electrical signal confirming the integrity of the signal line and validates the start-up.

RESULTS

Functions performed:

- the control of the abattoir combination and the scraper transporter in mine abattoirs with danger of explosion;
- has intrinsic security property and safety property against any defect in the control circuits combines or transporters or programmable automatic;
- cancel the start-up command of the machines if the confirmation signal of the preventive signal confirming the integrity of the signal line is not received;
- command the release of the preventive signal for 5 seconds if a confirmation from one of the ordered covers disappears during operation. In this case 8 seconds after its disappearance, the starting commands for all machines are cancelled, the system is blocked in this state, making it impossible to issue any start command;
- in the case of shunting of the confirmation circuits of the ordered enclosures (accident-generating situation used often by underground miners), after 8 seconds after the connection is switched on, it crashes, making it impossible to issue any start-up order;
- optically signals through a display digit the operating regime of the block, damage (disappearance of confirmations) and makes it impossible to start it in this case. The display digit is located next to a viewfinder located on the case of dimensions regulated by anti-gristin standards;
- provides protection against accidental starts caused by defects or anomalies in the driving programme.

KEYWORDS

Refuse collection,
Conveyors,
Process and machine control,
Electronic mining control,
Electronic programmable block

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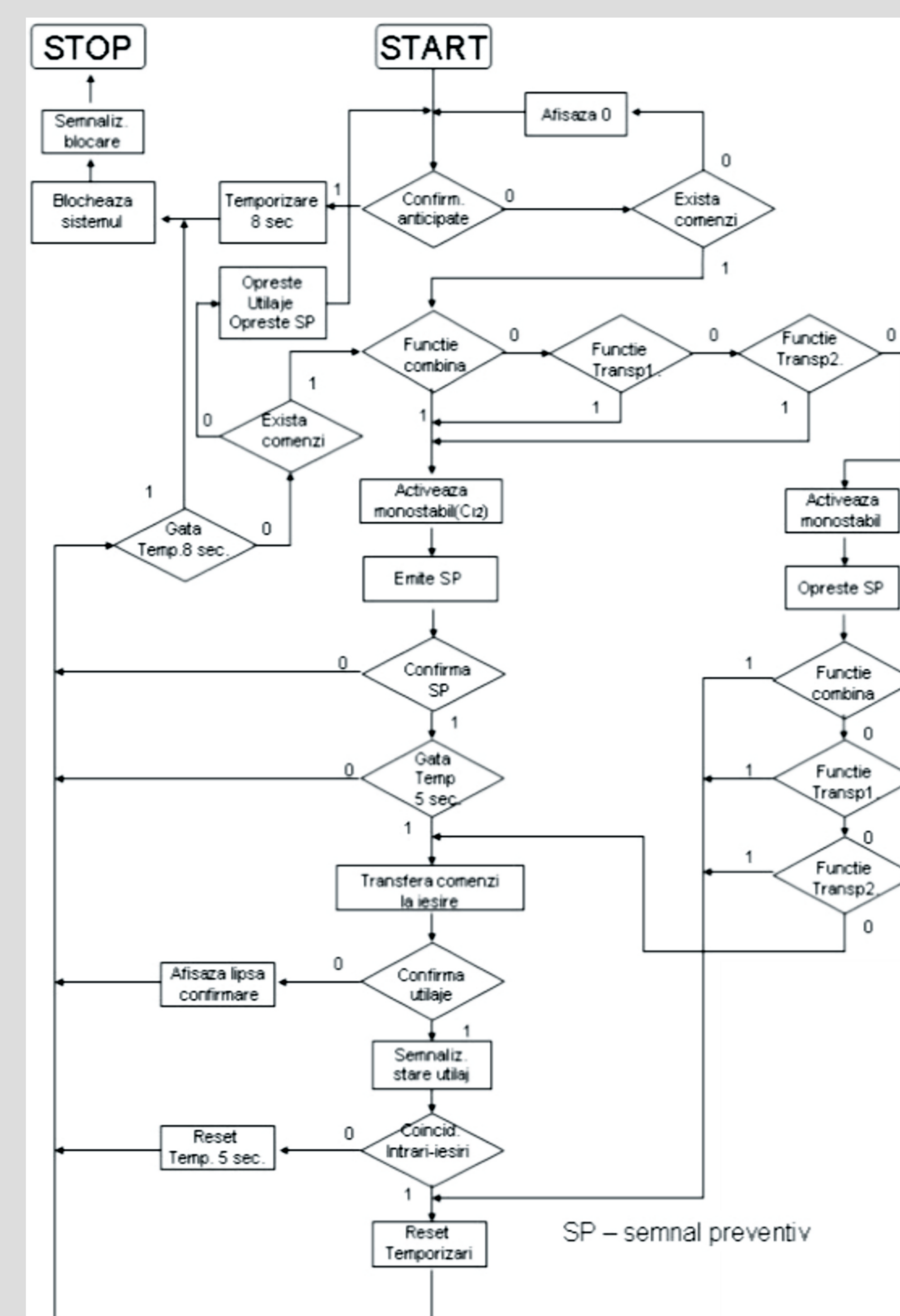


Figure 1. Algorithm

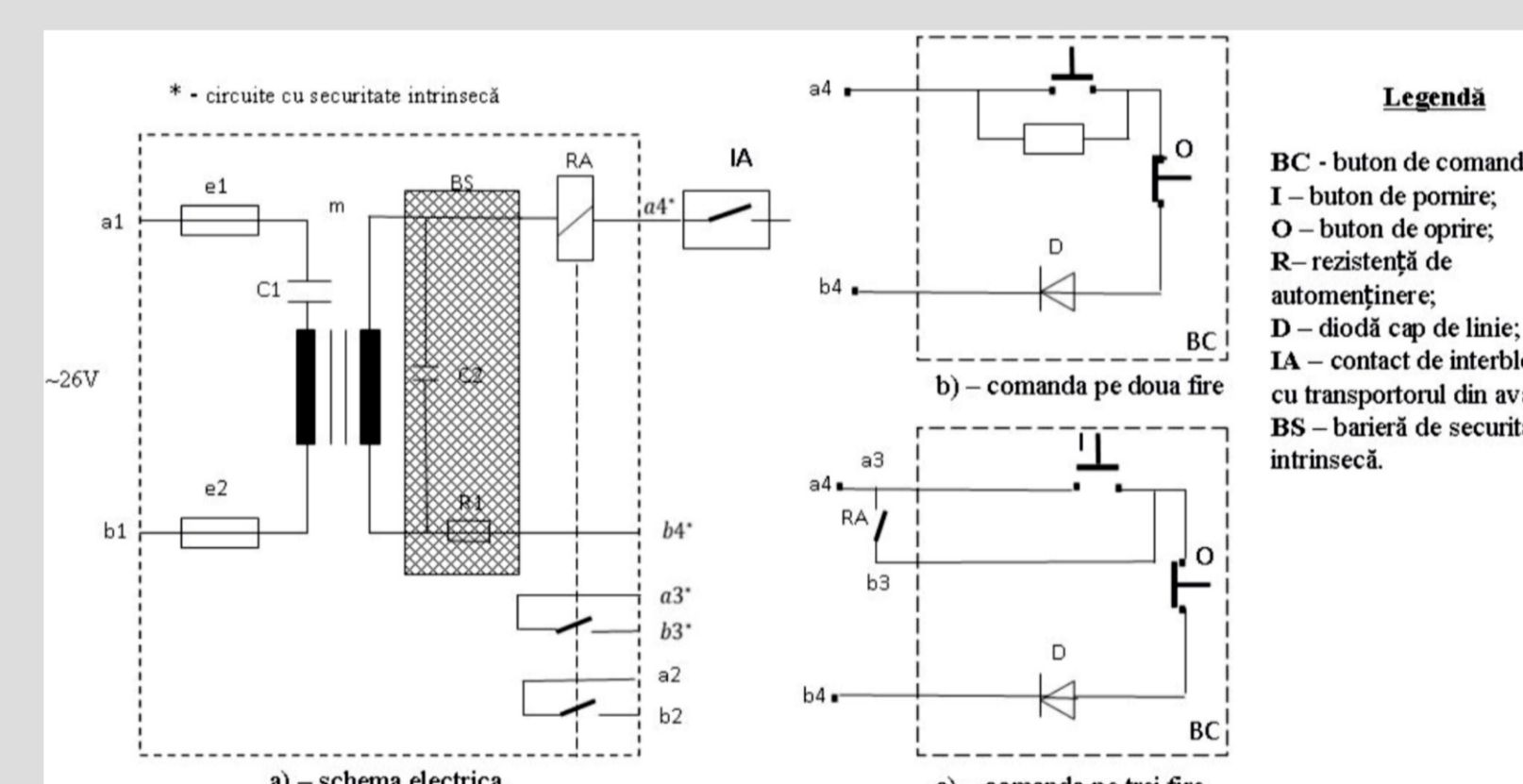


Figure 4. BCD Command Block

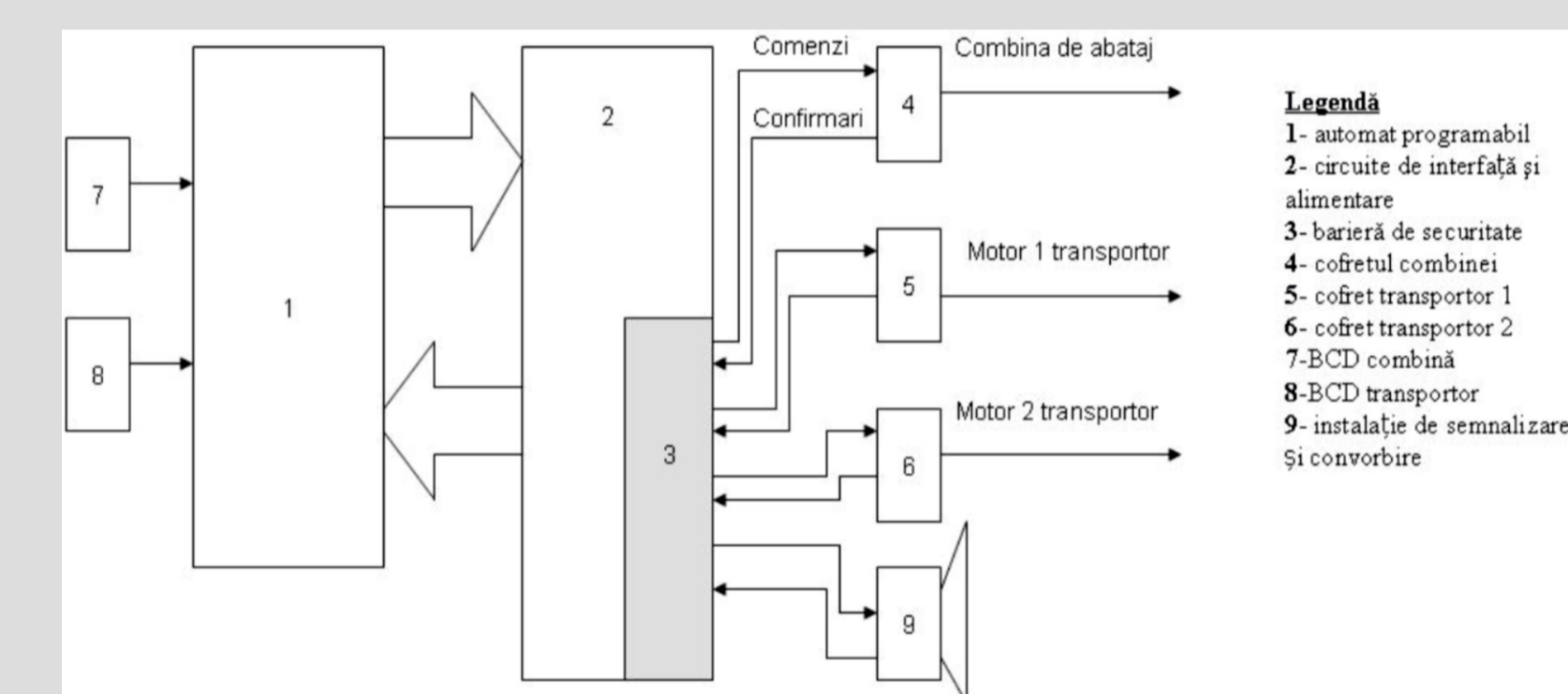


Figure 2. Block diagram

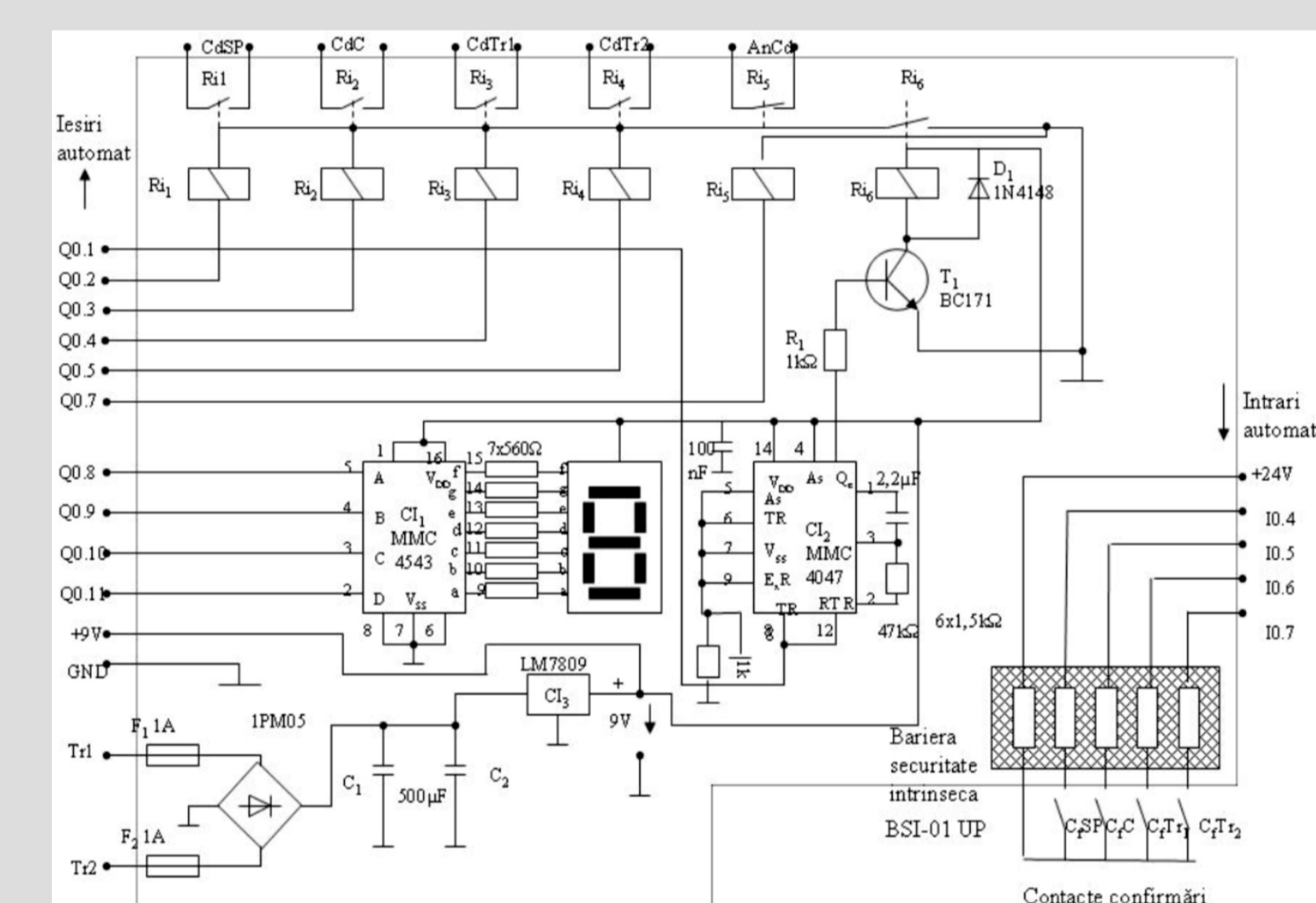


Figure 3. Interface and power circuits

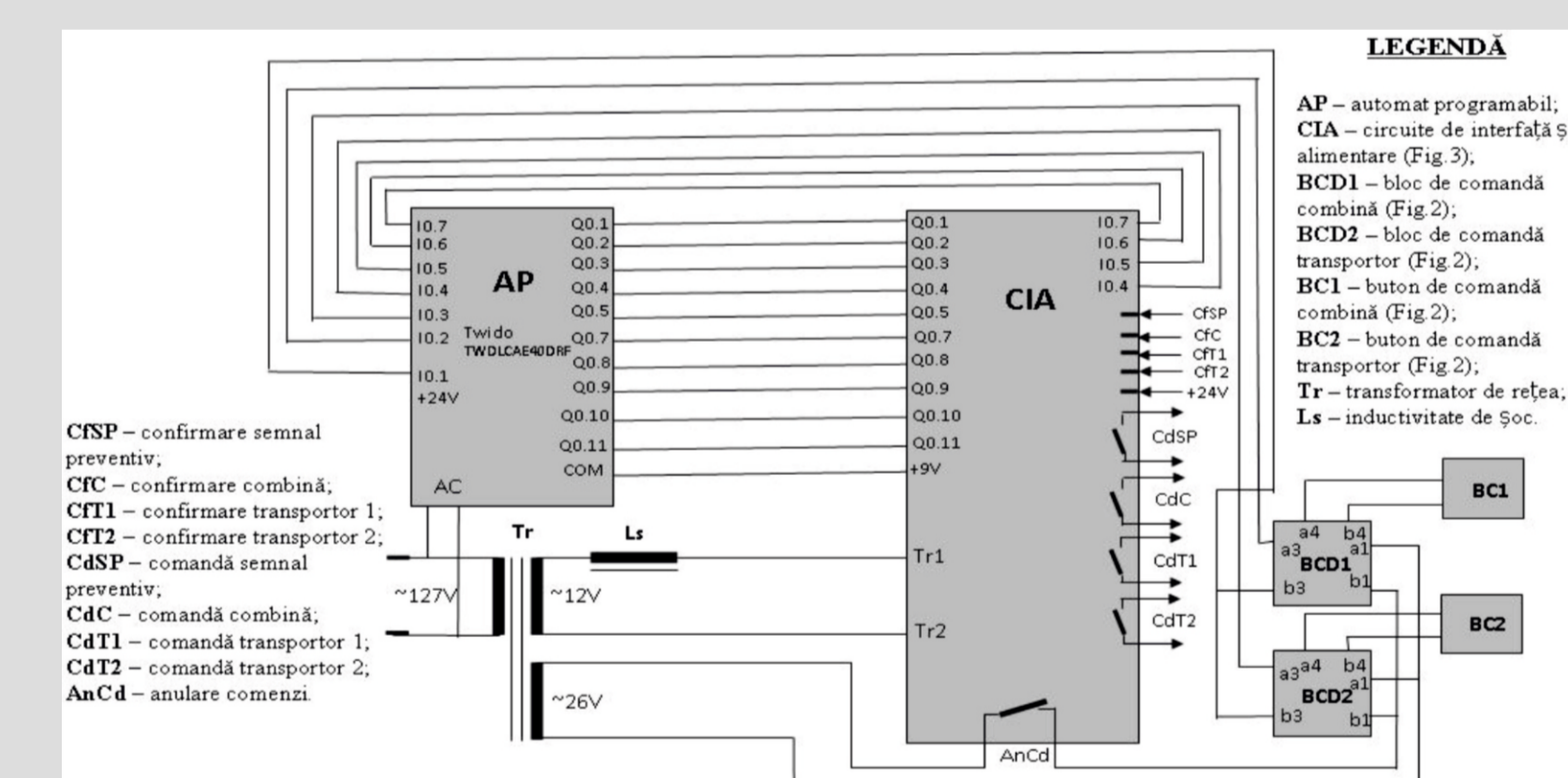


Figure 5. Wiring diagram