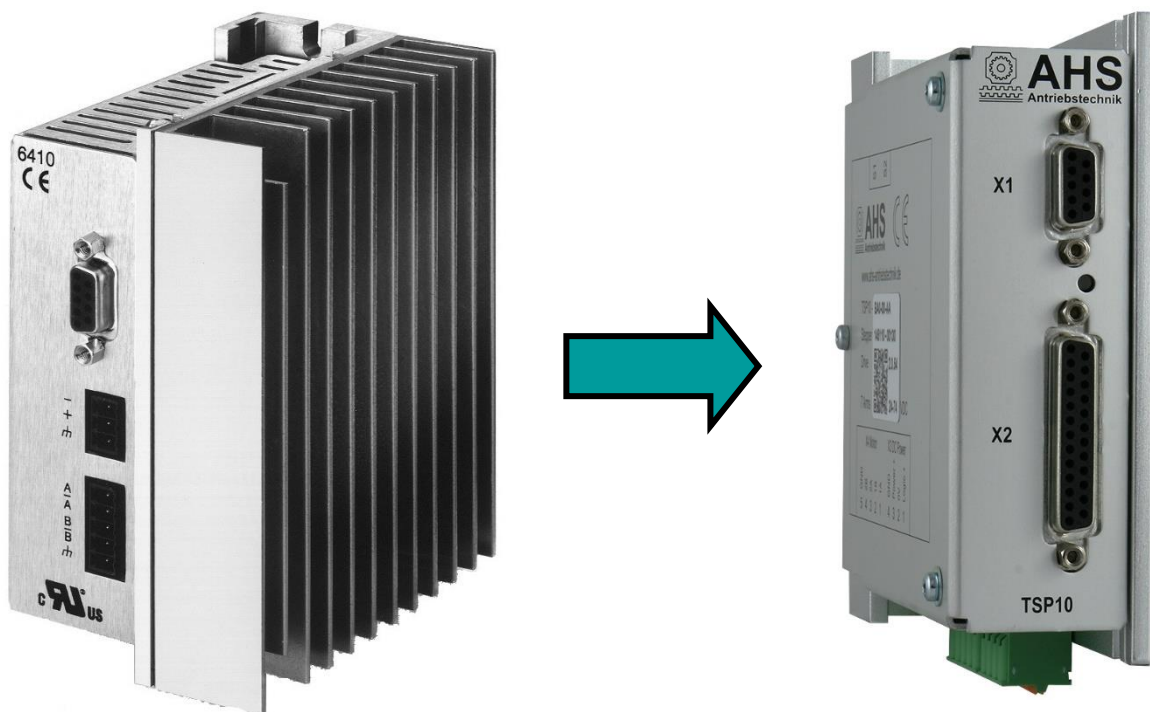


Application Note

Change from Step Motor Driver 6410 to TSP10-BA



- Technical Data
- Connection/ Configuration
- Adjustment values for motor current and step resolution
- Additional adjustment possibilities

AHS Antriebstechnik GmbH
Fichtenweg 17
64319 Pfungstadt
Phone: +49 6157 9866110

Types of device

Step motor driver 6410-001-x-x-x is replaced by the TSP10-BA0-00-09.

Technical Data

| | 6410 | TSP10-BA |
|---|--|--|
| Supply voltage range | 24 to 75 V DC | 24 to 74 V DC |
| Motor current Number of selectable values | 0,625 to 5,0 A _{rms} 8 | 0,2 to 7,0 A _{rms} 16 |
| Permissible ambient temperature • Operation • Storage | 0 °C to +50 °C -55 °C to +70 °C | 0 °C to +50 °C -55 °C to +70 °C |
| Motor current @ ambient temperature • without heat sink • with heat sink | 2,50 A @ 25 °C 1,25 A @ 45 °C 5,0 A @ 25 °C 2,5 A @ 45 °C | 3,2 A @ 25 °C 1,6 A @ 45 °C 7,0 A @ 25 °C 3,5 A @ 45 °C |
| Permissible heat sink temperature (forced cooling may be necessary) | Max. 60 °C | Max. 60 °C |
| Humidity | 10-90 %, non-condensing | 10-90 %, non-condensing |
| Fault protection | Short circuit (phase to phase, phase to zero conductor) and over temperature | Short circuit (phase to phase, phase to zero conductor) and over temperature |
| Idle current reduction | off after 0.05 s after 0.1 s after 1.0 s | off - * after 0.1 s - * |
| Input interface | Step and direction | Step and direction RS232 |
| Max. input frequency | 500 kHz | 500 kHz |
| Chopper frequency of power stage | 20 kHz | 20 kHz |
| Adjustable step resolution | 200 to 51200 | 200 to 10000 * |
| Adjustable step resolution | Not available | Two-Colour-LED |

* set additional values via the RS232 interface

Connection and adjustment

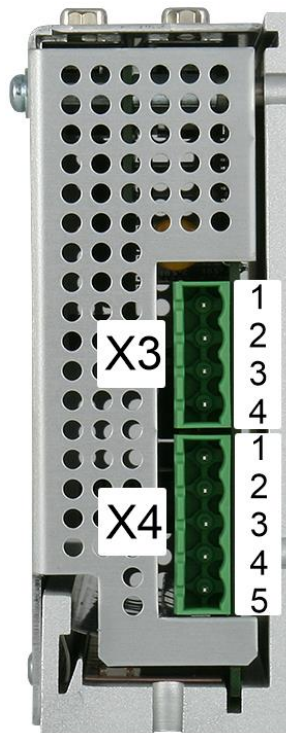
The design and signal assignment of the connectors for power supply and motor current are different to 6410, but the connectors will be delivered together with our drive. The signal assignment is identical, except for the additional logic supply. The logic supply can be connected to the motor connection.

Because of the B9/S25-serial adapter this applies also to the signal inputs / outputs.

| | 6410 | TSP10-BA |
|---------------------------------------|--------------------------------------|---|
| Supply voltage | Front side, 3-pole Series terminals | Bottom side, FKCT 2.5/4-ST |
| Motor connection | Front side, 5- pole Series terminals | Bottom side, FKCT 2.5/5-ST |
| Signal inputs/ outputs | Front side, Sub-D-socket 9p | Front side, Sub-D-Socket 9p (B9/S25-Seriell-Adapter), 57259 |
| Step resolution/ motor current | Upper side, DIP-switch 8p | Upper side, 2x Hex-rotary switch |
| Jumper | Inside the device | - |
| RS-232 Interface | - | Front side, Sub-D-Socket 9p |
| When using heat sink | Mounting with 4 screws | Mounting with 3 screws |



Front side



Bottom side



Top side

| Power supply X3 | | |
|------------------------|-------------|---------------------------------------|
| Terminal No. | Line | Description/ Notes |
| 1 | Logic + | +24 ... +74 Volt |
| 2 | 0 Volt | Ground this connection externally |
| 3 | Power + | +24 ... +74 Volt, max. 7 A |
| 4 | Grounding | Connected with the case in the device |

| Motor connection X4 | | |
|----------------------------|-------------|-----------------------------|
| Terminal No. | Line | Description/ Notes |
| 1 | 1-A | motor phase 1-A |
| 2 | 1-/A | motor phase 1-/A |
| 3 | 2-B | motor phase 2-B |
| 4 | 2-/B | motor phase 2-/B |
| 5 | Grounding | Connect with the motor case |

| Signal input/ output X2 (with B9/S25-Serial-Adapter) | | | |
|---|-----------------------|--|----------------|
| B9 Pin | Signal | Description/ Notes | S25 Pin |
| 1 | Clock + | Clock pulse input, 1 clock puls = 1 step | 8 |
| 2 | Direction + | Input to control the direction of motor rotation | 3 |
| 3 | Enable + | TSP10 factory set-up: Signal without function | 2 |
| 4 | Activated (Collector) | Transistor turned on at activated motor current | 20 |
| 5 | Not connected | | 7 |
| 6 | Clock - | Clock pulse input, 1 clock puls = 1 step | 6 |
| 7 | Direction - | Input to control the direction of motor rotation | 4 |
| 8 | Enable - | TSP10 factory set-up: Signal without function | 5 |
| 9 | Activated (Emitter) | Transistor turned on at activated motor current | 22 |
| Housing | Shield | Use shielded cable | Housing |

Note:

The serial adapter is only used to adapt the signal assignment to the pin assignment of the stepper motor driver 6410. Do not mix it with the serial interface X1 for the set-up program "TopSuite"

Adjustment

The setting of motor current, the step resolution and the current reduction is done at TSP10-BA with two rotary switches (S1 = motor current, S2 = step resolution and current reduction). This type of parameter setting is less complex and easier to handle than the setting with dip switches and jumpers.

Description of the jumpers and DIP switch positions on the step motor drive 6410:



Motor current

Overview of the settings for the motor current for the two step motor drives

| | 6410 | | | TSP10-BA |
|---|-------------|-------------|-------------|---------------------------|
| Motor current [A_{rms}] | DIP6 | DIP7 | DIP8 | Switch S1 Position |
| 0,2 | --- | --- | --- | 0* |
| 0,4 | --- | --- | --- | 1 |
| 0,625 | open | open | open | --- |
| 0,7 | --- | --- | --- | 2 |
| 1,0 | --- | --- | --- | 3 |
| 1,25 | open | open | close | -- |
| 1,5 | --- | --- | --- | 4 |
| 1,875 | open | close | open | --- |
| 2,0 | --- | --- | --- | 5 |
| 2,5 | open | close | close | 6 |
| 3,0 | --- | --- | --- | 7 |
| 3,125 | close | open | open | --- |
| 3,5 | --- | --- | --- | 8 |
| 3,75 | close | open | close | --- |
| 4,0 | --- | --- | --- | 9 |
| 4,375 | close | close | open | --- |
| 4,5 | --- | --- | --- | A |
| 5,0 | close | close | close | B |
| 5,5 | --- | --- | --- | C |
| 6,0 | --- | --- | --- | D |
| 6,5 | --- | --- | --- | E |
| 7,0 | --- | --- | --- | F |

* Switch S1 to position 0 = factory set-up

For the switch position S1 = 0, the motor current is a preset value. This value can be modified and saved in the TSP10-BA with the set-up program "TopSuite".

Values range: 200 ... 7000 mA_{rms}

Step resolution / Idle current reduction

With the rotary switch for the step resolution (S2), also the delay time for the current reduction is set. The motor current is reduced to 50% after the delay time expires (position 0...7).

No current reduction is done for the switch positions 8 to F.

S2 Position 0 ... 7 idle time = 0.1 Second, Idle Current Reduction to 50 %

S2 Position 8 ... F no current reduction

| Revolutions per steps | 6410 | | | | TSP10-BA | |
|-----------------------|-------|-------|-------|-------|--------------------|-------------|
| | DIP1 | DIP2 | DIP3 | J 3-4 | Switch S2 Position | |
| | | | | | with SSR | without SSR |
| 1/1 (200/full step) | close | close | close | set | 1 | 9 |
| 1/2 (400/Half step) | close | close | close | open | 2 | A |
| 1/2 (400/Halfstep) | close | close | open | set | 2 | A |
| 1/2,5 (500) | --- | --- | --- | --- | 3 | B |
| 1/4 (800) | close | close | open | open | 4 | C |
| 1/5 (1000) | close | open | close | set | 5 | D |
| 1/8 (1600) | close | open | close | open | --- | --- |
| 1/10 (2000) | close | open | open | set | 6 | E |
| 1/16 (3200) | close | open | open | open | --- | --- |
| 1/25 (5000) | open | close | close | set | 7 | F |
| 1/32 (6400) | open | close | close | open | --- | --- |
| 1/50 (10000) | open | close | open | set | 0* | 8 |
| 1/64 (12800) | open | close | open | open | --- | --- |
| 1/125 (25000) | open | open | close | set | --- | --- |
| 1/128 (25600) | open | open | close | open | --- | --- |
| 1/250 (50000) | open | open | open | set | --- | --- |
| 1/256 (51200) | open | open | open | open | --- | --- |

* Switch S2 to Position 0 = factory set-up

Jumper 7-8 (J 7-8) and DIP switch 5 (DIP5) indicate whether a standstill current reduction is set on the step motor drive 6410:

| 6410 | | |
|--------------|-------------|-------------------------------|
| J 7-8 | DIP5 | Idle current reduction |
| set | close | off |
| set | open | active, after 0.1 s |
| open | close | active, after 0.05 s |
| open | open | active, after 1.0 s |

For switch position S2 = 0, the values for step resolution, standstill current reduction and waiting time are preset. With the "TopSuite" parameterization program, these values can be changed as required within their value ranges and permanently saved in the step motor drive. The set value for the step resolution is also transferred to switch position 8. The value ranges are as follows:

Step resolution: 200 to 25600 steps per mech. Revolution (n x 50)

Reduced motor current: 0 to 100% of the nominal value

Waiting time: 1 to 3000 ms

Enable signal

At step motor control 6410 the enable signal input can be configured. This can be used, for example, to activate the step motor control after switching-on without establishing an enable input.

J6 bridge 5-6 set: enable = optocoupler on

J6 bridge 5-6 drawn: enable = optocoupler off

At the step motor control TSP10-BA, the sense of enable signal input cannot be configured.

Enable = optocoupler on

The enable input is disabled at factory set-up, means the step motor control TSP10-BA is directly active after turning on power.

Using the set-up program "TopSuite" the enable input can be turned on and this setting can be saved in the TSP10-BA. In this case an enable signal is required (optocoupler on) to activate the stepper motor controller.

Operation Lights

The stepper motor controller 6410 has no status display.

TSP10-BA: a single two-colour-LED.

By the two-colour-LED displays you find the following information:

| LED-Display | Description/ Notes |
|---|---|
| Green, blinking | After turning on the TSP10-BA, the firmware version is indicated as a blinking code. e.g., 1x blinking, stop period, 2x blinking = version 1.2 |
| Orange, briefly on, repeated after 3 s. | TSP10-BA powered on but not enabled |
| Green, permanently on | Motor current on, motor stopped |
| Orange, blinking | Motor current on, motor is running |
| Red, blinking | TSP10-BA turned off because of an error. The blinking codes indicates the type of error. 4 x blinking = over temperature 7 x blinking = over current |

Advanced connectivity

Serial interface

The serial interface (RS-232) is required for the "TopSuite" parameterization program and is not galvanically isolated. Connect the TSP10 and the computer or laptop with a 1:1 cable including plug and jack (item AHS - KAB-TSP-232)

| Serial Interface X1 (RS-232) | | |
|------------------------------|--------|--|
| Terminal No. | Signal | Description/ Notes |
| 1 | DCD | Indicates the connection with the device |
| 2 | TXD | Send Data |
| 3 | RXD | Received Data |
| 4 | DTR | not used |
| 5 | GND | Common for all signals |