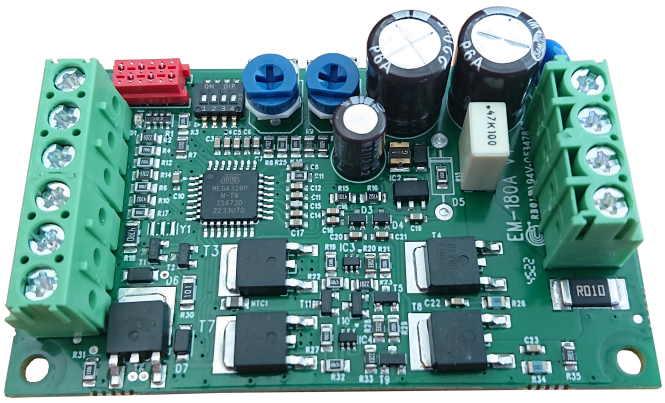
# EM-180A-M1 DC-MOTOR STARTER 12/24V 5A



## FEATURES

- **Fast change of direction**
- **Soft start-up, acceleration ramp**
- **Settable current limit**
- **Trip or continuous current limit**
- **High efficiency**
- **Low RF emissions ( EMC )**
- **Dynamic braking**
- **Low idle current ( sleep mode option )**
- **High momentary load capacity**
- **Continuous or impulse mode control**
- **NPN or PNP control possibility**
- **rail base mountable**
- **EM-180A-M1 replaces EM-180M1**
- **A model has extra features added**
  - **impulse control mode**
  - **extended ramp time up to 3s.**
  - **selectable soft or rattle start**

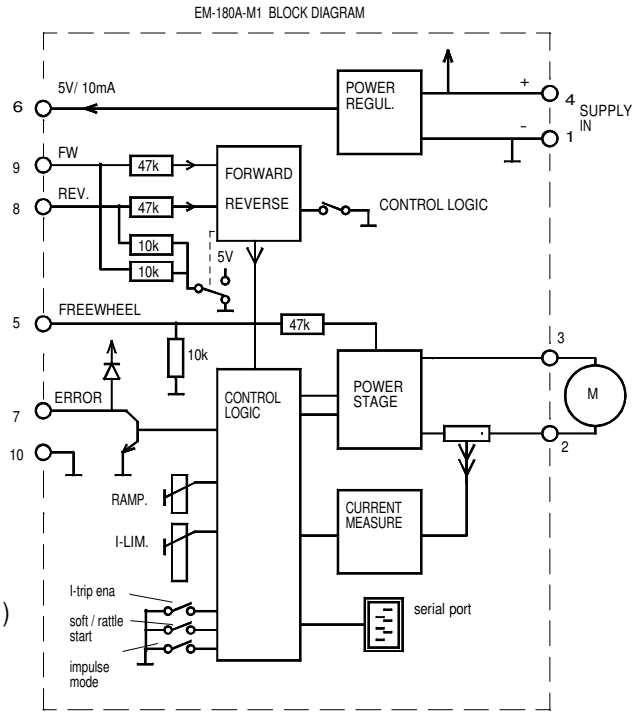
EM-180A-M1 is developed for controlled ON-OFF driving and direction change of a DC-motor with brushes. Driver has advanced current limit features. It limits the motor current in start-up and jam-situations and that way protects the motor and mechanics from over torque. Driver has also an error output to indicate error / over current situations.
EM-180A-M1 is developed from EM-180M1 and it has extra features as impulse control mode and soft or rattle start selection. Rattle mode means that when current limit exceeded in start the driver gives little higher current and rattling, which help releases stuck of actuator of motor. Driver has also serial port which can be used to update a firmware or activates optional features.

The acceleration ramp time for start-up is adjustable to be suited for each application. So the motor voltage is not raised instantaneously but slowly to give a smooth start-up. As the control is set off, the motor is braked with so called dynamic braking, means that the motor poles are connected together. The current protection is double acting. First there is a continuous and adjustable current limit which decreases the motor voltage if the current exceeds the adjusted value. Second there is settable trip feature that cuts the motor voltage if the current limit value is exceeded. After trip the motor starts only to the opposite direction. Additionally the driver doubles the adjusted current value for 0.3 seconds in start-up to ensure sufficient power to overcome the start-up friction.

## TECHNICAL DATA

| | |
|---|---|
| Supply | 10-35Vdc |
| Over voltage protection | 38V |
| Under voltage shutdown | 8V |
| Start up voltage | 9V |
| Idle current | typ 13mA / ( 1.5mA sleep opt. ) |
| Driving current | 5A continuous<br>10A peak 5s |
| Current limit | 0-20A<br>boost 1.5 times in rattle start |
| Current trip delay | n. 200ms |
| Start delay | 5ms |
| Stop delay | 5ms |
| Direction change time | n. 20ms |
| Voltage loss | 0.5V ( Im=10A ) |
| Operating frequency | 2kHz |
| Ramp | 0-2.5s |
| Digital inputs | "high" @ Uin 4 -30V or open<br>"low" @ Uin 0-1V |
| Fault output | max 35V 2A ( PNP open collector ) |
| Measures | 43x73x35mm |
| Weight | app. 35g |

EM-180A-M1 BLOCK DIAGRAM

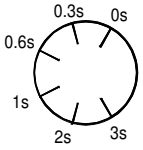


# EM-180A-M1 OPERATING INSTRUCTIONS

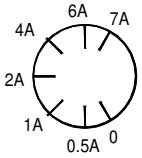
Supply should be filtered 10-35Vdc,
max. ripple <20% on full load.
ATT. Wrong supply polarity can damage the driver.
ATT. Driver has no fuse in it.

Dip switch selections
1. Control logic PNP / NPN
   PNP ( = 5-30V cont. signal ) or NPN ( = gnd control )
2. I-trip enabled ( motor shutdown with overcurrent )
3. Control mode Continuous / Impulse
   Continuous = run as long as control signal occurs
   Impulse = a short control signal starts
4. Start mode Rattle / Soft
   In soft mode current limit is same all time
   In rattle mode start is boosted 1.5 times and
   rattling if the current limit is exceeded.

Acceleration ramp time




Current limit ( I-lim. )




Notice!
The current limit value can be affected by the used motor in rattle start mode