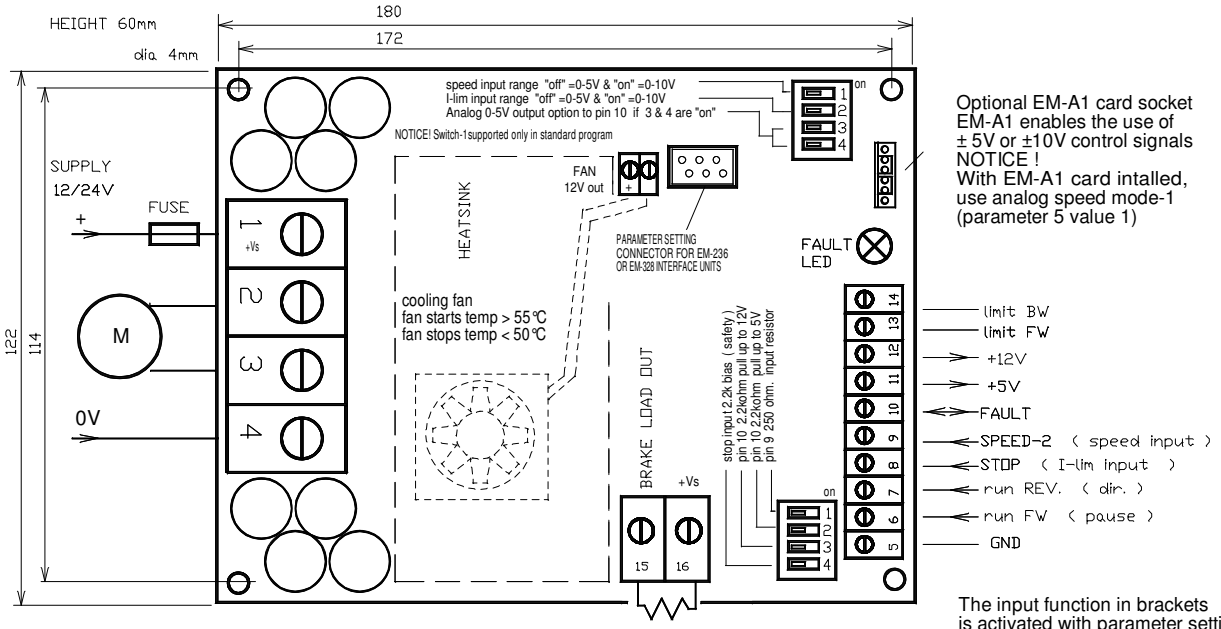
EM-362 basic applications (pcb v2)



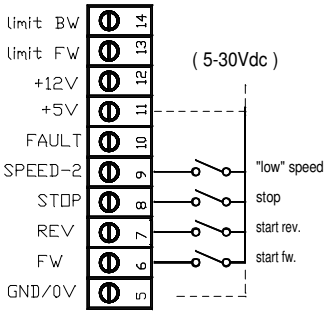
Optional EM-A1 card socket
EM-A1 enables the use of
± 5V or ±10V control signals
NOTICE !
With EM-A1 card intalled,
use analog speed mode-1
(parameter 5 value 1)

The input function in brackets
is activated with parameter setting.
- speed input (param 5=0)
- speed input +dir. (param 5= 1)
- I -lim input (param 6&7= 0)

Optional braking resistor.
Braking resistor needed in application where motor
can supply energy back to supply
Recom. values 0.5R @ 12V, 1R @ 24V
Resistor power rating 50-200W, depends on solution

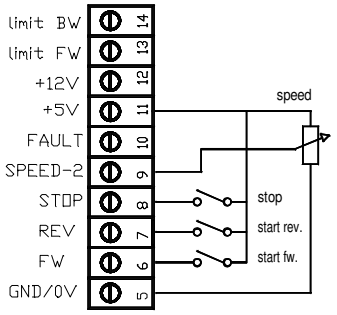
2-speed mode

Start commands with digital fw/bw switch.
Stop impulse from switch will stop the motor.
Active stop command will not prevent the
new start with fw or bw command.
"speed-2" activates slow speed, value
set with parameter 5. Notice! When speed-2 is activated
the stop impulse will stop motor immediately (no ramp).
Command mode to continuous or impulse is set with
parameter 1. Input logic default is PNP but can
be changed to NPN with parameter 3.
In PNP mode the control command can be 5-30Vdc
In NPN mode switches can connect to gnd (0V)



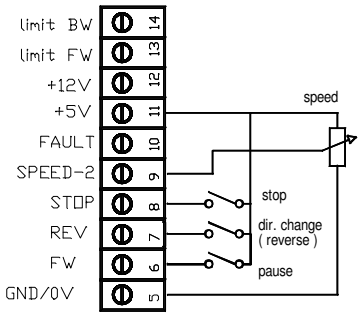
Analog speed control mode-1

This mode is selected by setting param.5 = 0
Speed-2 input is changed in to speed input.
Motor starts with digital command fw or bw.
The speed adjust signal can be 0-5V or 0-10V
voltage signal. The basic range is selected
with dip-switch 1. and the fine tuning of range
can be done with parameter 4
In analog control mode-1 pls. use a PNP logic
for control logic. (see param. 3)
Potentimeter recom. value 1-100kohm



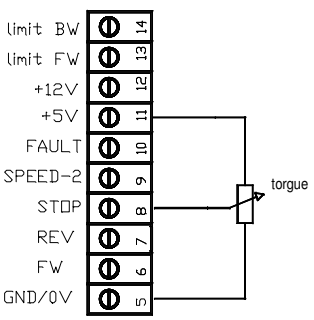
Analog speed control mode-2

This mode is selected by setting par.5 to val.1
Speed-2 input will be changed to speed input
and bw. input will work as direction change
input. (open =fw. / closed =bw.)
Motor starts when speed control signal starts
to increase from 0V. The basic range is
selected with dip-switch 1. and the fine tuning
of range can be done with parameter 4.
Use PNP logic for control logic (see param. 3)
Potentiometer recom. value 1-100k



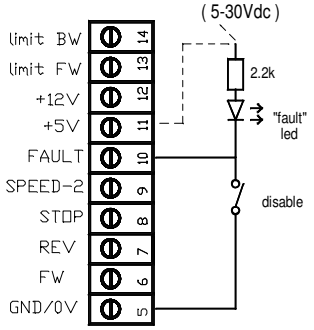
Analog torque (current) adjust

Set parameters 6 & 7 to val. 0, then stop input
is changed to work as torque adjust input.
This option can be used with all above
examples. The adjust signal range is 0-5V.
Recom. potentiometer value 1-100k



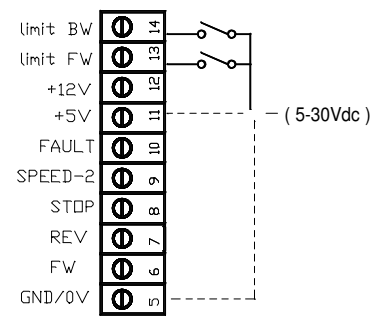
Fault output/input pin.

This pin works as NPN output in case of overheat
and other cases which are defined with parameter 10.
This pin works also as disable input if it is externally
pulled down. When this pin is pulled down the driver
stops immediately and will not start with any command !
This input can be connected as shown below or only
to LED or switch. The led voltage can be internal
5V or 12V or external 5-30V.



Limit inputs

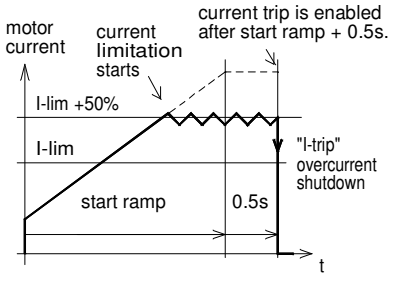
These inputs stop and disable run to
fw. or bw. direction. As long as limit input
is active the drive is disabled to this direction.
Normally the limit inputs stops motor quickly
with dynamic brake but in 2-speed mode dynamic
brake is enabled only when speed-2 is activated
The logic of limit inputs can be set with param. 3
In PNP mode the control voltage can be 5-30Vdc
In NPN mode switch can be connected to gnd (0V)



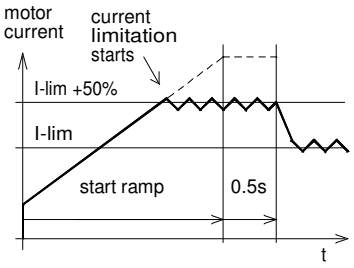
COMMON DYNAMIC FEATURS OF EM-DC-DRIVERS SERIES-3 (firmaware version -C)
Products EM-324C, -241C, -243C, 282C, -341, 348 -362, 368 and hybrids EM-A24C & -A34C

Motor Current limit (torque limit)
Current limit has two basic mode, The limitation is always enabled and it reduces driver output if limit will exceed. The "I-trip" means that driver output shut down in case of over current this function can be delayed and disabled. There is also current limit start boost to ensure start of motor. Start boost is 50% or 25% in bigger driver. Start boost is active in start ramp +0.5s. I-trip is also disabled during current boost.

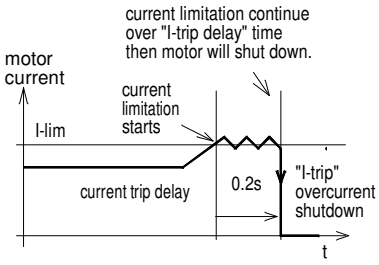
Current limit boost in start



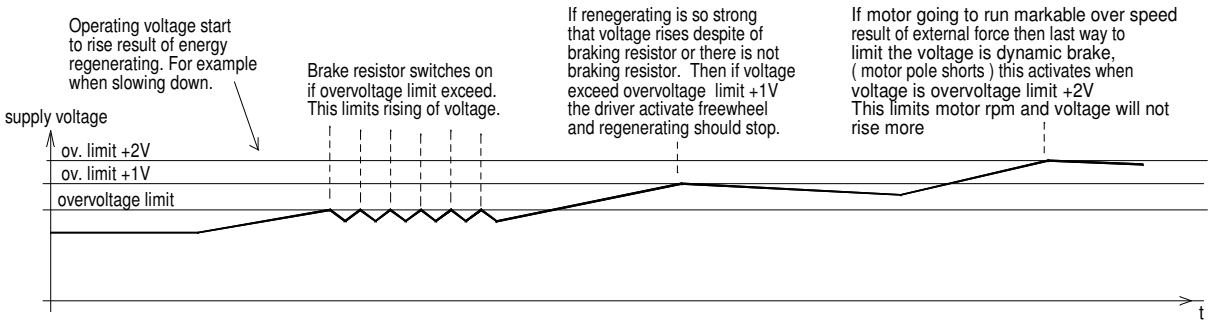
current trip is disabled with parameter



current limit in normal run and "I-trip is enabled"

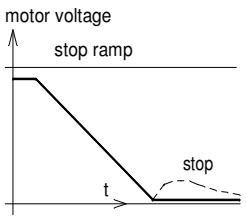


Braking behaviour
(brake output function only in product, which has brake output port)
We recommended to use driver with brake output if there is long and big inertia braking situation. If needed only short slowing down braking then also can be used "dynamic brake" to stop the motor

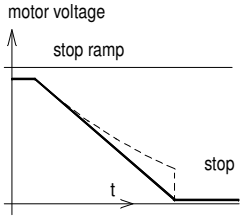


Freewheel options
Normally motor poles is shorted in stop situation. and motor resist rotating. With parameter can be set that driver disable power stage in stop and then the motor rotor run free. Also freewheel can beactivate during stop ramp (slowing down) then motor will not regenerate energy and not rise voltage.

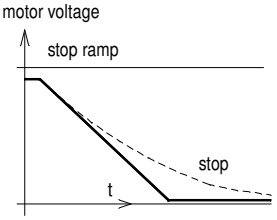
Solid line shown normal function
Dashed line shown voltage when freewheel options is enabled (this also tells motor rpm)



freewheel active in "stop"
If motor still running after stop ramp, then motor emf voltage can be see when freewheel releasing motor.



freewheel active during "stop ramp"
Motor slowing down freely until end of stopramp, then motor poles shorted

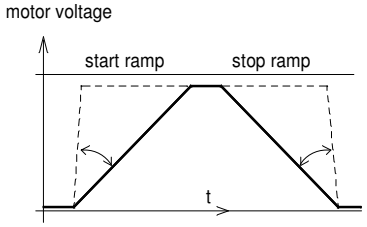


freewheel active in "stop ramp" and "stop"
Motor slowing down freely and stay free.
Motor rotor can rotate without resistence

DISABLE command

DISABLE command always bypass stop ramp and it stops motor immeadiately, but freewheel setting select does it use dynamic brake or freewheel

START and STOP ramp
Start ramp decreases the motor start-up current Stop ramp smooths the stop and also affect the strength of regeneration in stopping.



Load compensation (RxI)

This features improves torque and speed regulation at low speed. Idea is that driver increases the voltage of motor when loading (current) of motor increases.
This compensation factor depends on motor and right value has to find with testing.
Too big value generates oscillation.