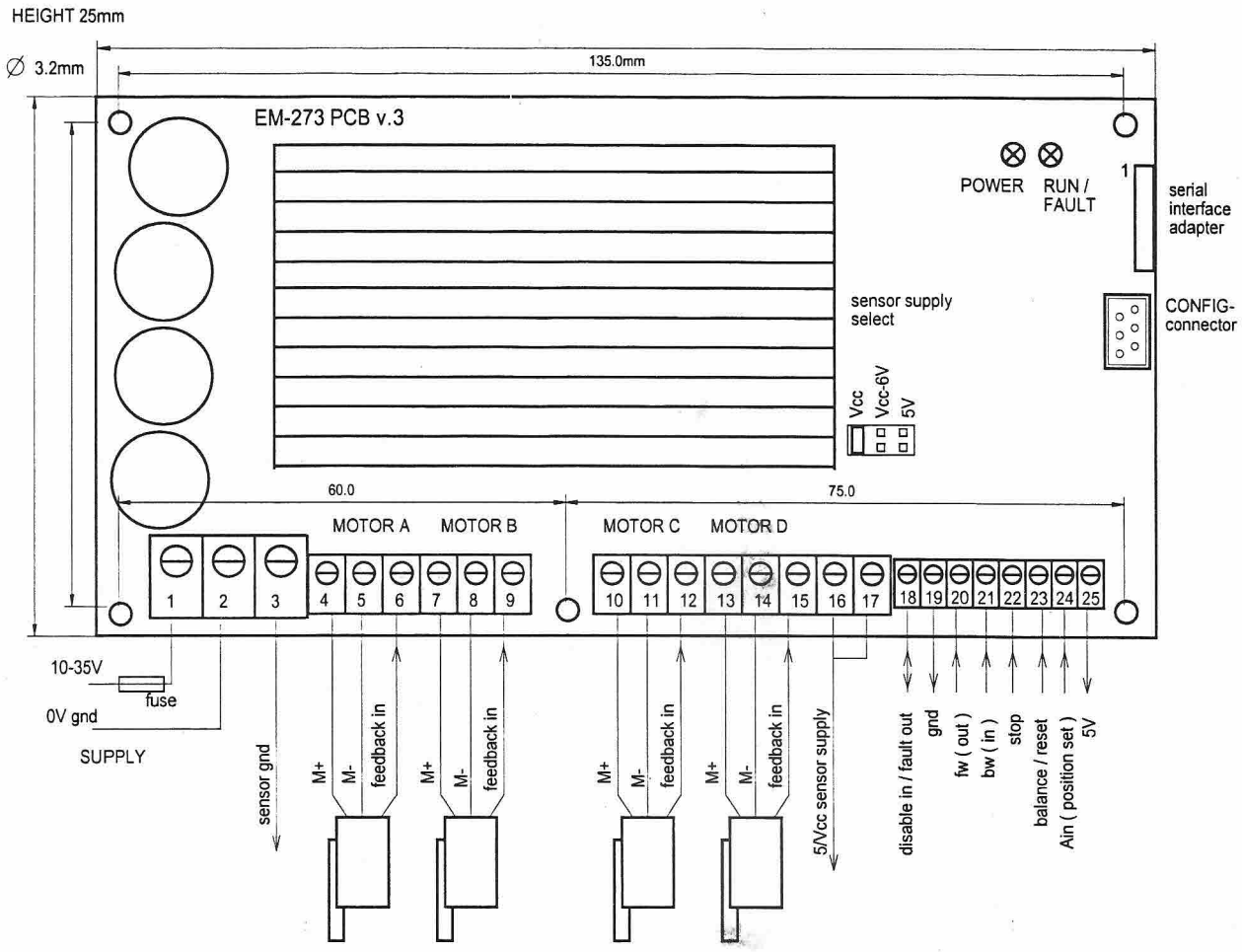


EM-273

EM-273 is a parallel synchro controller up to 4 DC- motors. Controller has four H-bridge power stages. The feedback from motor can be pulses or analog signal. The control is done with fw / bw commands or with analog position signal.
The synchronization control will keep all motors in same speed and position. If synchronous error exceeds the set difference limit, all motors will be stopped. Device includes adjustable acceleration and deceleration ramps which enable the smooth starts and stops. Separate start levels for both directions offer good operation also with asymmetric loads. Adjustable current limits can be set to protect motor and mechanics against over current (over sized forces).

TECHNICAL DATA

Supply voltage 10-35V
Undervoltge shutdown 8V
Overvoltage limit 38V
idle current < 20mA
Motor current:
4x15A duty cycle 50%
4x20A duty cycle 25%
4x30A max. in start
Current limit, setting 1-20A
Overtemp limit 90°C
PWM frequency 2kHz
Input control logic levels:
"NPN" ON= 0-1V, OFF=4-30V or open
"PNP" ON=4-30V, OFF=0-1V or open
Control input impedances typ. 10kohm
Fault out. NPN open coll. max 30V/50mA
Disable in NPN-logic: 0-1V=fault
5V aux. output max 20mA
Supply connectors 4mm2
Motor/control connectors 2.5/1,5mm2
Weight 200g
Operating temp (Ta) 0-60°C
Housing options:
- Rail base
- Fibox PC150/60, (180x130x60)
- Fibox PC200/125 (255x180x125) include 700VA supply

INPUTS / OUTPUTS

FEEDBACK input can be set to work NPN or PNP logic in pulse mode. Pulse rate can be max. 800Hz.
FB-inputs can also be set to work with analog feedback signal (par.3) for example with potentiometer.

SENSOR SUPPLY output terminal (16 and 17) can be set to give 5V or Vcc with jumper setting.

DISABLE IN and FAULT OUT are in the same terminal. DISABLE input works with NPN logic. So if this terminal is externally pulled down the system stops and is disabled as long as the line is pulled down.
FAULT output is activated in all FAULT situations. FAULT output is open collector NPN.
So it will pull down when active.

FW & BW are control command inputs. Forward (out) and backward (in). The long (5s.) simultaneous command will start home run or learning routine according to setting of "Double push" parameter .

STOP input is for optional incoming stop command (eg. end switches). STOP input works only if a digital command mode is selected (parameter 2).

BALANCE / RESET input starts a home run or learn routine with long command (>5s). Short command only resets the faults. As a special solution this input can be set to be an auto balance trig input. Function is selected with parameter 22.

FW, BW, STOP and LEARN inputs can be set as a group to work with PNP or NPN logic.

Ain input is analog input for positioning voltage signal (positioning/servo use). Range can be selected to 0-5V or 0-10V with paramater 2.

POWER led should normally be lit continuously when device is ready to run.

RUN / FAULT led is lit when motors are running. In fault situation it gives info as pulse coded blinks.

PARAMETER SETTING and VALUE MONITORING

Connect serial interface unit EM-236 or-PC to the CONFIG-connector. You can do it while the power supply is ON. EM-236 displays the device type. Select LOAD & EDIT and you will enter to parameter setting mode. Now you can view the parameters with arrow buttons. Parameters can be changed with + and - buttons. If you want to save parameters do it with a long push of SAVE button (pls. see the EM-236 manual). If you select the MONITOR option from main menu you can scan the monitorable values.

PARAMETER LIST : quality (set range) -default
prog ver. 2.1

1. Input logic 0-3 - 0
   0= control inputs PNP and pulse input PNP
   1= control inputs NPN and pulse inputs PNP
   2= control inputs PNP and pulse inputs NPN
   3= control inputs NPN and pulse inputs NPN
2. Control mode 1-6 - 1
   1 = digital control continuous
   2 = digital control impulse
   3 = Analog position control (servo) 0-5V
   4 = Analog position control (servo) 0-10V
   5 = Analog position control inverted 5-0V
   6 = Analog position control nverted 10-0V
3. Feedback mode 0-2 -0
   0= pulses
   1= analog 0-5V
   2= analog 0-10V
4. Speed fw 40-100% (40-100) -100
5. Speed bw 40-100% (40-100) -100
6. Learning speed 40-100% (40-100) -50
7. Start level fw 10-60% (10-60) -30
8. Start level bw 10-60% (10-60) -30
9. start ramp 0.1-2.5s (1-25) -10
10. stop ramp 0.1-2.5s (1-25) -2
11. Current limit fw (out) 1-20A (1-20) -7
12. Current limit bw (in) 1-20A (1-20) -7
13. Current limit trip delay 5-20ms (5-20) -10
14. Synchronization strength 1-30 (1-30) -10
15. Break zone 1-8% (1-8) -2
16. Dead zone 0.2-5% (2-50) -20
17. difference. limits 0-10% (0-10) -5
    0= syncronization not in use !
18. motor A 0= disable/1=enable -1
19. motor B 0= disable/1=enable -1
20. motor C 0= disable/1=enable -1
21. motor D 0= disable/1=enable -1
22. Balance/Reset input (pin 23) 0-4 (0-4) -0
    0= 5s. command starts home run to bw dir. (forced run bw) [1]
    1= 5s. command starts home run to fw dir. (forced run fw) [1]
    2= trigs auto-balance run to bw dir.
    3= trigs auto-balance run to fw dir.
    4= 5s. push starts learning routine
23. Double push on pins 20 & 21 0-3 (0-3) -1
    0= not in use
    1= 5s. command starts home run to bw dir. (forced run bw) [1]
    2= 5s. command starts home run to fw dir. (forced run fw) [1]
    3= 5s. command starts learning routine
24. Auto-balance 0-2 (0-2) -0
    0= not in use
    1= outer limit trigs auto-balance run fw
    2= inner limit trigs auto-balance run bw
25. Time out 1-255s (1-255) -255
26. Outer limit (fw) 0-50.0% (0-500) -10
27. Inner limit (bw) - 0-50.0% (0-500) -10
28. Full range 30-32767 (30-32767) -1000

NOTES
[1] Forced run bw/fw works only when analog FB is selected

PARAMETER DESCRIPTION

"Input logic " sets the control and feedback input logic.
"Control mode" select the desired control mode
"Feedback mode" select pulse or analog feedback mode.
"Speed fw & bw " is the speed which is used in normal run.
"Learning speed" the speed used during learning cycle
"Start level" is the start voltage level of the motor control
"Start and stop ramps" defines the acceleration and deceleration time 0-100% or 100-0% speed.
"Current limit" is limit value for current trip. If current limit value is exceeded the motors will be stopped. During the period of start ramp + 1s the current limit is 1.5 times the set current limit value.
"Current limit trip delay" will make a delay for current trip.
"Syncronization strenght" defines how fast and intensively the driver will adjust the synchronization between motors. Smooth 1 --> Aggressive 30
"Brake zone" is a proportional speed area in servo use larger area starts the braking earlier when approaching the right position, see picture on next page.
"Dead zone" is the positioning window in servo use
"Difference limit" is the maximun acceptable difference value between actuators. The value is percentage from full range. Value 0 is special case, this setting disables synchronization, Use only in service situation !
"Motor selections" with these four parameters user can individually disable / enable motors. Disabled motors will not run.
"Input pin 23 function" sets the function mode for pin 23
"Double push pins 20&21" sets the special function if these pins are pushed simultaneously for 5s.
"Auto-balance" can be set toactivate auto-balance run. If this option is used the trig point followes the settings of parameters 26 or 27
"Time out" shuts down motors after the set run time is exceeded.
"Outer & Inner limit" are settable end limits. With these limits the stroke can be limited from both ends.
"Full range" is total pulse count of full stroke of actuator. This value should be counted forehand as close as possible. But it is not serious if the value is not exactly right, value can be adjust also afterwards. If analog feedback mode is selected this value represents the ratio of feedback and set value. 1000 equals to ratio 1:1 which is a good start value.

MONITOR VALUES (12pcs)

1. Fault codes
   1=current limit, 2=pulse lost, 3=difference limit
   4=timeout, 5=overvoltage, 6=overtemp, and
   7=position data corrupted, 8=learn fault
   9=ext disabled, 10=FB-fault
2. current of motor A 1=1A
3. current of motor B 1=1A
4. current of motor C 1=1A
5. current of motor D 1=1A
6. Position value motor A 0-1023
7. position value motor B 0-1023
8. position value motor C 0-1023
9. position value motor D 0-1023
10. position set value 0-1023
11. feedback pulse count 0-32767
12. start counter up to 65535 (reset if power off)

FAULTS.

If some malfunction occurs the driver stops the motors and gives a fault indication with red led. The blinking is coded as below:
1 blink - current limit
2 blinks - pulse lost (FB no change)
3 blinks - difference limit
4 blinks - timeout
5 blinks - overvoltage
6 blinks - overtemp
7 blinks - position data corrupted
8 blinks - home run/learn fault
9 blinks - externally disabled with pin 18
10 blinks - FB-false

With these faults, the fault output (pin 18) will also be pulled down.
About fault resetting, see page 3.

CONNECTION

Connect motors and supply as in picture (page1). Supply voltage 12-35Vdc must be filtered. Ripple less than 20% . Device has no inbuilt fuse, so use external fuse, recomended value range 10-60A.

START-UP

First when the device is turned on a parameter check should be made. Connect interface unit in to device and change parameters to suit the application, Most important is to check: Input locig, Control mode, FB-mode, current limit and Full range. If number of actuator is less than four, the open motor lines should be disabled.

BALANCING

In analog feedback mode the system does not need any balancing, only the the full range parameter has to be set right. The value 1000 means that feedback /set values ratio is about 1:1.
If the FB-potentimeter gives less than the full range, the value should be set smaller with the same ratio. For example 0-3V FB-signal will need full range value about 600 (when the FB range is chosen to 5V).

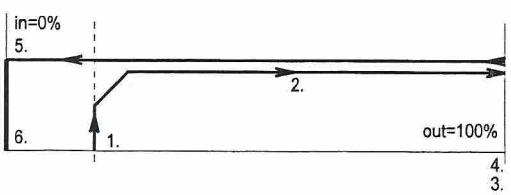
In pulse feedback mode the system should be balanced. This means that all actuators should be driven to end point (home) where the pulse counters are reset. The expression "home" means the mechanical end of actuator or the position of an mechanical end switch. The home run can be started in two ways: with long 5s. command to pin 23 or simultanenous long command to pins 20 and 21. This command must stay on during the whole home run. The home point can be set to bw-end or to fw-end with parameter 22 and 23

Before starting the home procedure the full range of the actuator stroke in pulses should be set (param. 28). This value should be checked from actuator datasheet or estimated as close as possible but not over the true value. Never estimate it higher than the real count. It can be increase later if needed.

When home run is started, the actuators are driven synchronously until one of those stops. After that the synchronization is disabled and actuators are able to run 1s. to same direction. During this time all actuators should reach the "home" positon and stop individually. In the end of this cycle the pulse counters will be reset. If some of the actuators did not reach the "home" position in this 1s time, the "home" run should be started again.

LEARN

Learn is a special balancing routine. Normally this in not neccessary! But can be useful if the actuators have some mutual differences.
Notice! that synchronization is not in use during learn rountine. The learn can be started the same way as "home" run. Setting is done with parameters 22 & 23.



1. Start learning by giving a >5s command to learn input or give a long >5s simultaneous command with FW and BW. Keep command on until learning cycle is complete.
2. Motors start to run out dir. (fw) with learning speed.
3. Current limit or Pulse lost will stop the motor when mechanical end is reached.
4. Motor starts to in direction (bw) and makes a full stroke. During stroke the pulse counter measures the range.
5. When motor reaches the mechanical in-end the current limit stops the motor. Now the command can be released.
6. The learned full stroke is scaled and saved as a value range 0-1023. Device is now ready for use.

AUTO BALANCE

Auto-balance is a special solution for applications where is a possibility for pulses to be lost.
System can be balanced automatically when limit value is reached. Auto balance eliminates possible cumulative pulse corruption. Auto-balance can be triggered with external end switch on pin 23 or it can be set to trigg from outer (fw) or inner (bw) limit. Trigger source can be selected with parameters 22 and 24. Notice. Auto-balance routine disables synchronization in the end of stroke (for 1s) and lets every actuator run to "home" position, and then resets the pulse counters.

SERVICE RUN

In some situation there can occur a need to run motors individually. Individual motors can be disabled with parameters 18-21. Only the enabled motors will start.
If there is a need to run more than one motor unsynchronously, set the parameter 17 to 0.

FAULT RESETTING

Current limit and difference limit will be reset with reverse control command (BW/FW) or with reset command to pin 23 or with a short simultaneous command with BW and FW.

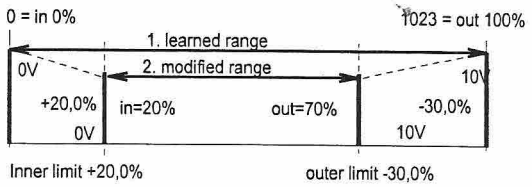
Pulse lost fault can be reset with short command to reset input (pin 23) or short simultaneous command to BW and FW inputs.

FB-false error can be reset only with new home command. It is started with long 5s. command to reset input (pin 23) or a long 5s, simultaneous command with BW and FW.

Fault in learn can be reset only with new learn (5s to input 23 or simultaneous FW/BW)

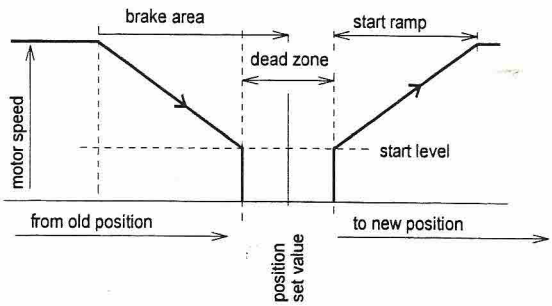
All errors are reset when power is turned off.

RANGE SCALING



1. original learned range = mechanical full range = position counter scaled to 0 - 1023 in learning
2. modified range example:
   Inner limit = 20,0% and Outer limit = 30,0%.
   Now the stroke of actuator is compressed to 0-10V --> 20% to 70%

POSITIONING WINDOW IN SERVO USE



TR-EM-273 Application note 1

Application

Four actuators adjusting working height of a working platform
The load is 100-1000kg. The actuators run synchronously
and the platform will be kept in balance. If some actuator
overloads or fails the others will be shut down.

Calculated full stroke is 185 pulses for these actuators,
so the range parameter value is set to 185
Full stroke is 200mm and the desired working stroke in
application is 160mm. Working stroke is limited with
TR-EM-273 software limits.
Because the auto-balance is in use the inner limit is not
limiting the range, but it starts the auto-balance routine.

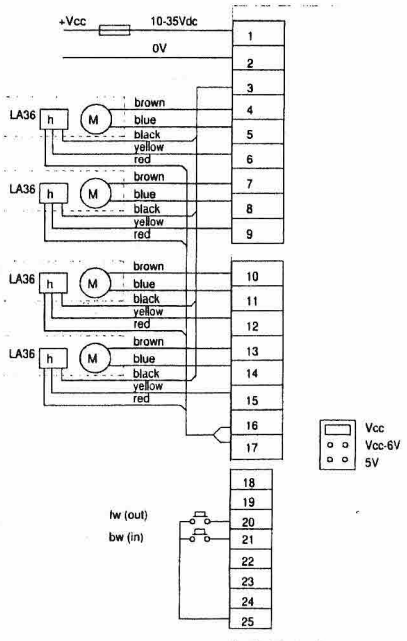
The current limit and start level are higher for fw direction
(out), because the load is higher to this direction
The speed is full for both directions. The start ramp is 1s.

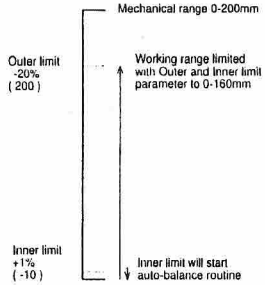
In the inner end the driver starts autobalance routine.
It balances automatically the possible differences between the
actuator positions. This routine is triggered when some of the
actuators comes to the bw-limit.

The system can be balanced with pushing of fw and bw control
buttons simultaneously over 5s. This starts the "home run"
and actuators are drived to bw direction. Go on pushing until all
actuators have reached the end. If it looks that some
actuator did not reach the end position, push again.

4 x LA36 with pulse feedback, stroke 200mm
item no: 363B32+2H200B20

Driver TR-EM-273 prog. version v1.5



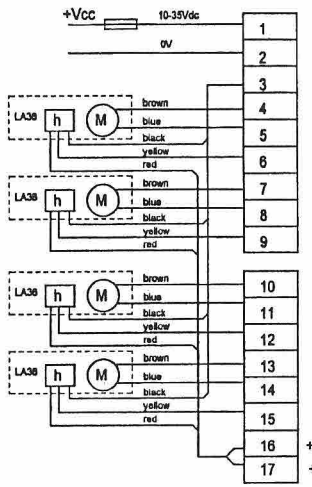


PARAMETER SETTING (v1.5)

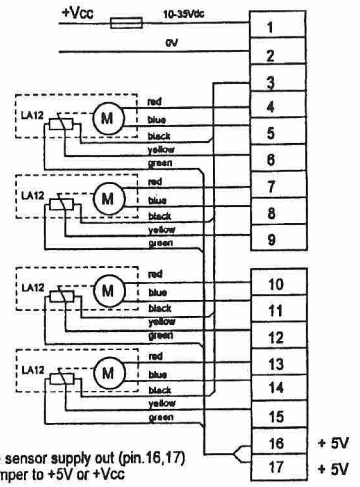
1. Input logic - 0
2. Control mode - 1
3. Feedback mode - 0
4. Speed fw - 100
5. Speed bw - 100
6. Learning speed - 50
7. Start level fw - 30
8. Start level bw - 30
9. start ramp - 10
10. stop ramp - 2
11. Current limit fw (out) - 10
12. Current limit bw (in) - 7
13. Current limit trip delay - 10
14. Syncronization strength - 20
15. Break zone - 2
16. Dead zone - 10
17. difference. limits - 5
18. motor A - 1
19. motor B - 1
20. motor C - 1
21. motor D - 1
22 Input pin 23 function - 0
23 Double push pin 20 & 21 -1
24. Auto-balance -2
25. Time out - 255
26. Outer limit (fw) - 200
27. Inner limit (bw) - 10
28. Full range - 185

EM-273 INSTRUCTION GUIDE page 3
wiring examples

4 x LA36 with pulse feedback

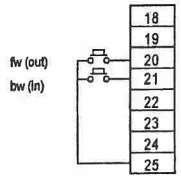


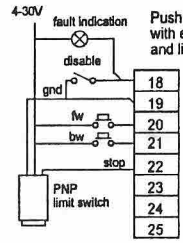
4 x LA12 with potentiometer feedback



Set the sensor supply out (pin.16,17)
with jumper to +5V or +Vcc

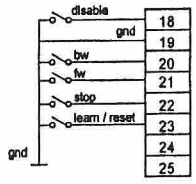
Basic use with
command switch



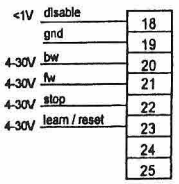


Push button use
with external voltage
and limit switch

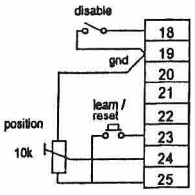
NPN command use
(NPN input mode selected)



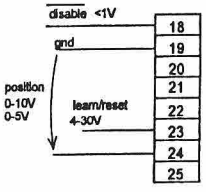
External voltage use
(PNP input logic selected)



Positioning use with
potentiometer (servo)



Positioning use with
voltage signal (servo)

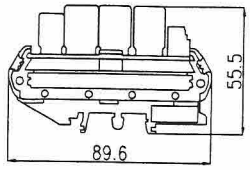


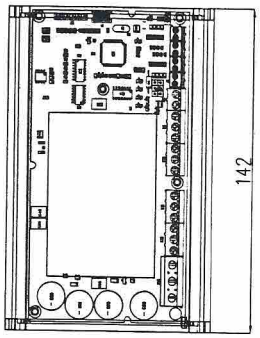
NOTICE !

1. Disable input works always in NPN logic. Pull down stops and disables the system
2. Stop input has not function in servo use
3. "learning cycle" is started also with long (>5s) simultaneus command to fw and bw (pins. 21,22)

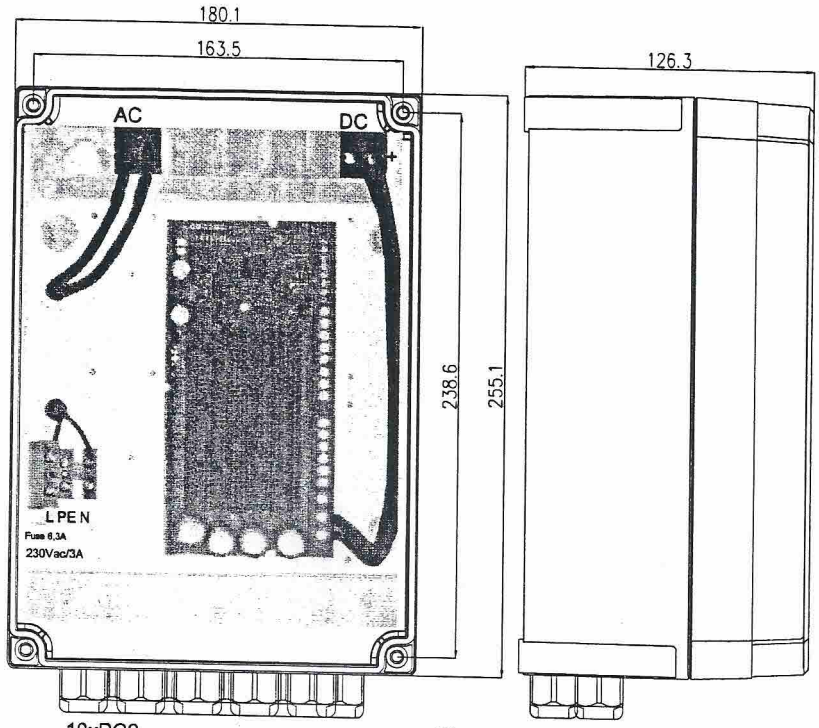
TR-EM-273 Housing options

TR-EM-273-R





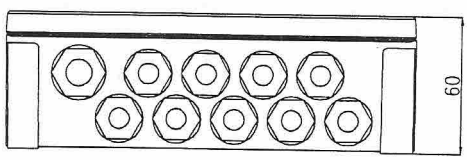
TR-EM-273-T-230
(TR-EM-000-T-230-700)

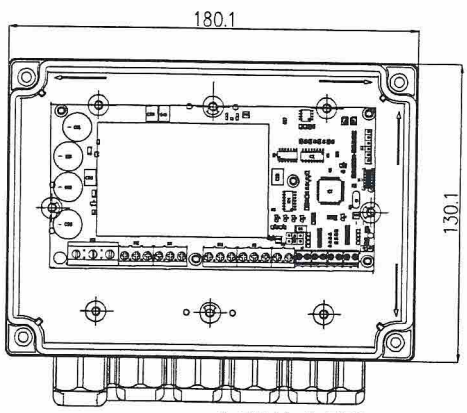


10xPG9

Fibox PC200/125XHG IP66 housing

TR-EM-273-H

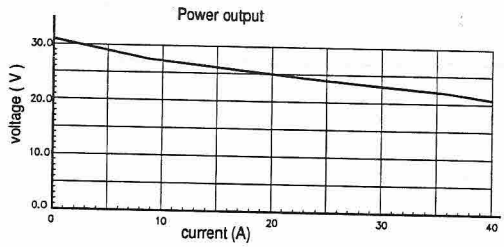




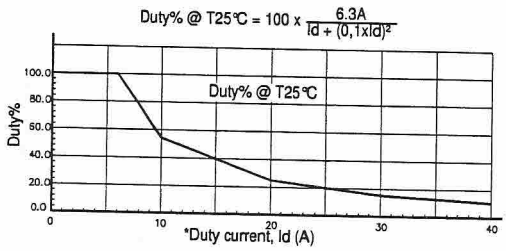
1xPG11, 9xPG9

Fibox PC150/60HG IP66 housing

Power supply TR-EM-000-T-230-700



Duty% @ T25℃ = 100 x $\frac{6.3A}{Id + (0,1xId)^2}$



Max. duty time on 25 ℃ ambient

td25 @20A = 15min
td25 @30A = 5min
td25 @40A = 2min*

Derating vs. temperature Tamb

*Max. duty time td vs. Tamb (℃)

tdmax = td25(@Id) x $\frac{60\text{-Tamb}}{35}$

Duty% vs. Tamb (℃)

Duty% = Duty% @ T25 x $\frac{60\text{-Tamb}}{35}$

Technical data:

Supply voltage:	230Vac / 3A
Fuse:	T6A3 20x5 tube
Max current:	*40A see tdmax
Cont. current:	6A @ 25℃
Transformer:	230/22V 700VA toroid
Filtering:	33mF (15pcs 2200uF)
Housing:	PC200/125 XHG
Cabel inlets:	10 x Pg9
Amb. temp:	-20 to + 40 °C
Weight:	7,5kg

Product is EMC tested and CE marked

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TR-EM-273 Application note 3

Application

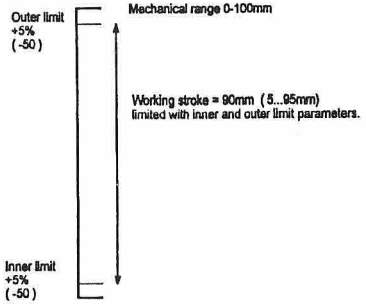
Four actuators are moving symmetric load. The actuators run synchronously. The desired position is given with control potentiometer, so system works like positioning servo.
If some actuator overloads or fails the others will be shut down.

Theoretical full range parameter would be 1000, but because the input impedande of EM-273 is 10k and output impedance of potentiometer of LA12 is 1k, so the signal will be damped.
The tested value for full range parameter is 870. The working stroke is limited for 90mm with inner and outer limit parameters (26 and 27).

The current limit and start level is same for both directions and the speed is full for both directions. The start ramp is 0.5s.

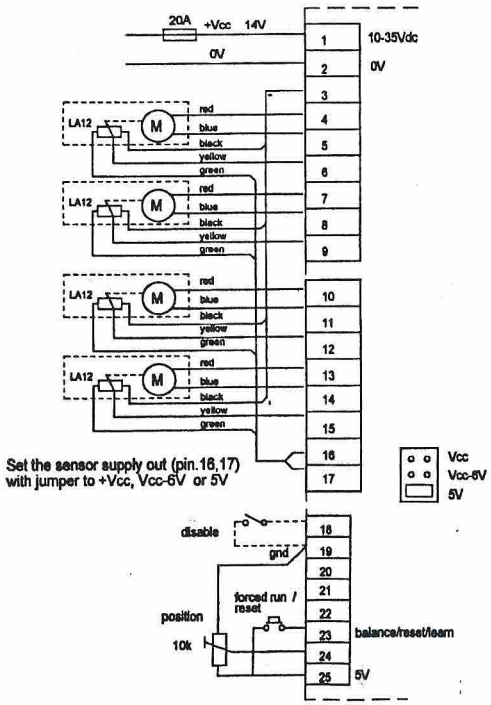
Because there is potentiometer feedback the system should not need any balancing, but if there is remarkable unbalance after installation, the system can be balanced with pushing forced run button over 5s. This starts the "forced run" and actuators are drived in forced mode to the selected direction. Go on pushing until all actuators have reached the end.

With disable switch between pin 18 and 19 the system can be halted as long as the switch is closed.



4 x LA12 with potentiometer feedback, stroke 100mm
item no: 121P00-11001200

Driver TR-EM-273 prog. version v1.8 / v1.9



PARAMETER SETTING (v1.8 / v1.9)

1. Input logic - 0
2. Control mode - 3
3. Feedback mode - 1
4. Speed fw - 100
5. Speed bw - 100
6. Learning speed - 60
7. Start level fw - 30
8. Start level bw - 30
9. Start ramp - 5
10. Stop ramp - 2
11. Current limit fw (out) - 4
12. Current limit bw (in) - 4
13. Current limit trip delay - 10
14. Syncronization strength - 10
15. Break zone - 4
16. Dead zone - 10
17. Difference. limits - 5
18. Motor A - 1
19. Motor B - 1
20. Motor C - 1
21. Motor D - 1
22 Input pin 23 function - 0
23 Double push pin 20 & 21 -0
24. Auto-balance -0
25. Time out - 255
26. Outer limit (fw) - 50
27. Inner limit (bw) - 50
28. Full range - 870

TR-EM-273 Application note 2

Application

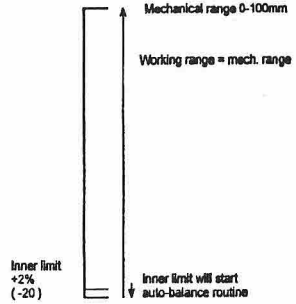
Four actuators moving symmetric load. The actuators run synchronously. If some actuator is overloaded or fails to run the others will be shut down.

Tested full stroke (full range) is 136 pulses for these actuators, so the range parameter value is set to 136.
Full stroke is about 100mm and the desired working stroke is same in this application. Working stroke can be limited with TR-EM-273 software limits.

The current limit and start level is same for both directions and the speed is full to both directions. The start ramp is 1s.

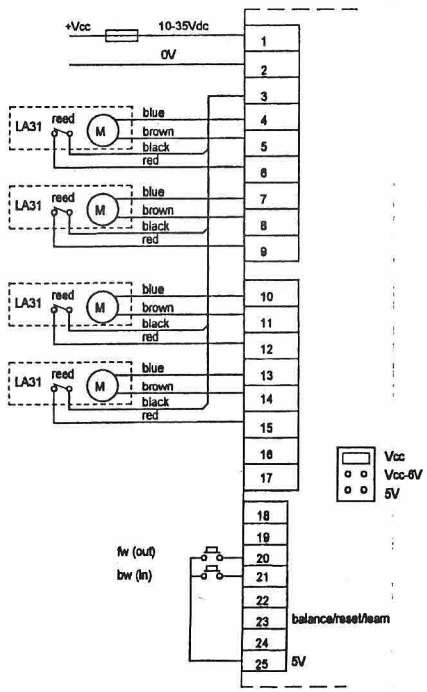
In the inner end the driver starts autobalance routine.
It balances automatically the possible differences between the actuator positions. This routine is triggered when some of the actuators comes to the bw-limit.

The system can be balanced with pushing the fw and bw control buttons simultaneously over 5s. This starts the "home run" and actuators are driven to bw direction. Go on pushing until all actuators have reached the end. If it looks that some actuator did not reach the end position, push again.



4 x LA31 with reed relay pulse feedback, stroke 100mm
item no: 31710R+1110004W

Driver TR-EM-273 prog. version v1.8 / v1.9



PARAMETER SETTING (v1.8 / v1.9)

1. Input logic - 2
2. Control mode - 1
3. Feedback mode - 0
4. Speed fw - 100
5. Speed bw - 100
6. Learning speed - 60
7. Start level fw - 30
8. Start level bw - 30
9. Start ramp - 10
10. Stop ramp - 2
11. Current limit fw (out) - 3
12. Current limit bw (in) - 3
13. Current limit trip delay - 10
14. Syncronization strength - 10
15. Break zone - 2
16. Dead zone - 10
17. Difference. limits - 5
18. Motor A - 1
19. Motor B - 1
20. Motor C - 1
21. Motor D - 1
22. Input pin 23 function - 4
23. Double push pin 20 & 21 -1
24. Auto-balance -2
25. Time out - 255
26. Outer limit (fw) - 0
27. Inner limit (bw) - 20
28. Full range - 137

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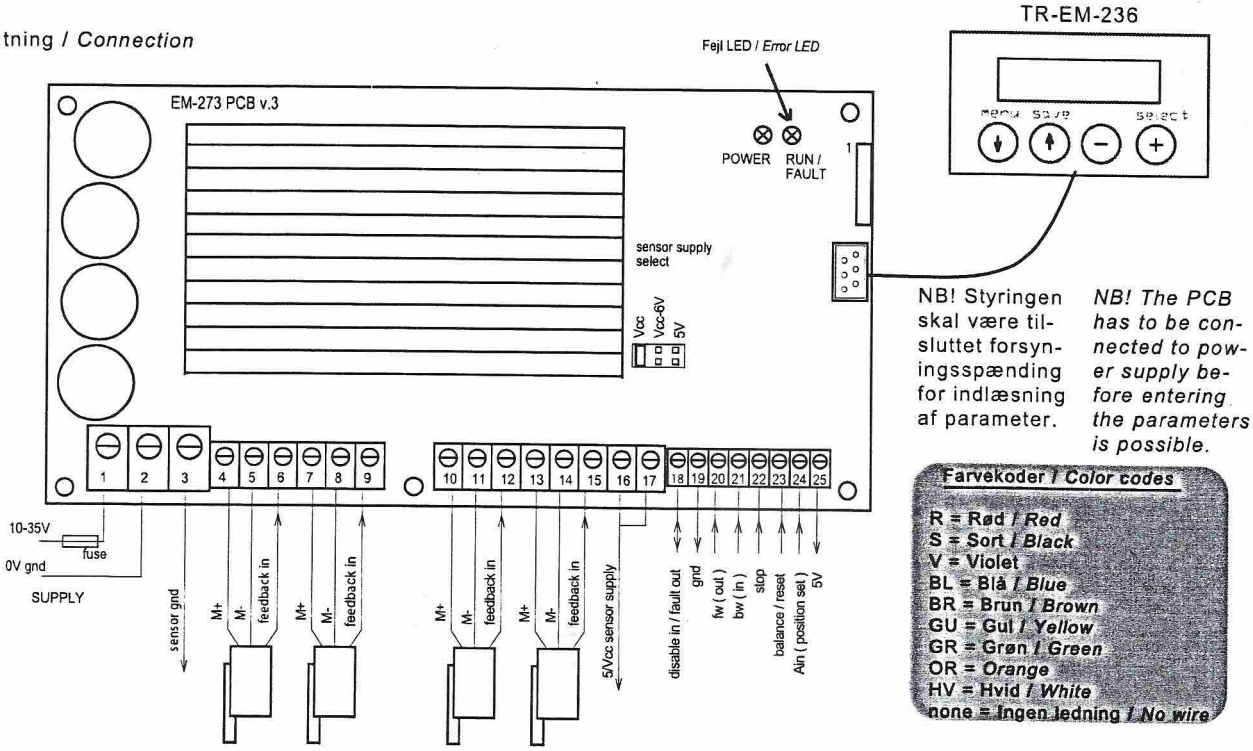
Motorstyring / *Motor Controller*
Type TR-EM-273

Tilslutning / *Connection*



NB! Styringen skal være tilsluttet forsyningsspænding for indlæsning af parameter.

NB! The PCB has to be connected to power supply before entering the parameters is possible.

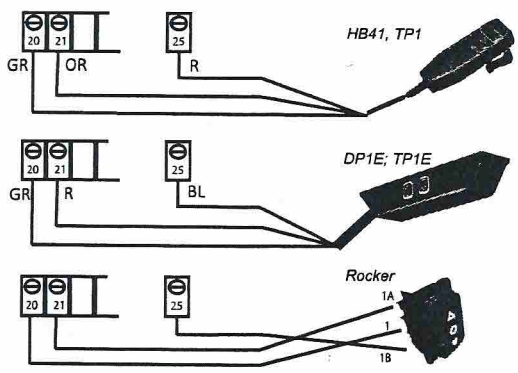
Farvekoder / *Color codes*

R = Rød / *Red*
S = Sort / *Black*
V = Violet
BL = Blå / *Blue*
BR = Brun / *Brown*
GU = Gul / *Yellow*
GR = Grøn / *Green*
OR = *Orange*
HV = Hvid / *White*
none = Ingen ledning / *No wire*

Tilslutning af aktuatorer ved hjælp af ledningsfarver / *Connection of Actuators by the help of wire colors*

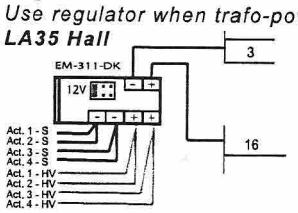
	Number	LA12-Reed	LA12-Pot.	LA23-Hall	LA28-Reed	LP2-Reed	LA30-Reed	LA31-Reed	LA32-Reed	LA35-Hall	LA36-Hall	LA36-P/Hall_pot	BL1-Hall
		12xRxx-xxxx24xx	12xPxx-xxxx24xx	23xxxxx02xxxBx	28xxRx-xxxxx0xx	Tungløft/Heavy lif	30xxRx-xxxxx0xx	31xxxR-xxxxx0xx	32xxRx-xxxxx0xx	35xxxx+xHxxxBxx	36xxxx+xHxxxBxx	36xxxx+xP/Bxxx8xx	BL1x1Hxxxxx
24V +	1	R	R	R	R	R	R	R	R	R	R	R	R
0V -	2	S	S	S	S	S	S	S	S	S	S	S	S
GND	3	S	S	S	none	none	none	S	none	S	S	S	S
Actuator 1	4	R	R	BR	S	S	S	BL	S	BR	BR	BR	PIN 3
	5	BL	BL	BL	BR	BR	BR	R	BR	BL	BL	BL	PIN 6
	6	HV	GU	GU	BL	BL	BL	HV	BL	V	GU	V	PIN 4
Actuator 2	7	R	R	BR	S	S	S	BL	S	BR	BR	BR	PIN 3
	8	BL	BL	BL	BR	BR	BR	R	BR	BL	BL	BL	PIN 6
	9	HV	GU	GU	BL	BL	BL	HV	BL	V	GU	V	PIN 4
Actuator 3	10	R	R	BR	S	S	S	BL	S	BR	BR	BR	PIN 3
	11	BL	BL	BL	BR	BR	BR	R	BR	BL	BL	BL	PIN 6
	12	HV	GU	GU	BL	BL	BL	HV	BL	V	GU	V	PIN 4
Actuator 4	13	R	R	BR	S	S	S	BL	S	BR	BR	BR	PIN 3
	14	BL	BL	BL	BR	BR	BR	R	BR	BL	BL	BL	PIN 6
	15	HV	GU	GU	BL	BL	BL	HV	BL	V	GU	V	PIN 4
Act. 1+2	16	none	GR	R	none	none	none	none	none	HV (note 1)	R	R (note 2)	PIN 2 (note 1)
Act. 3+4	17	none	GR	R	none	none	none	none	none	HV (note 1)	R	R (note 2)	PIN 2

Tilslutning af håndbetjening ved hjælp af ledningsfarver / *Connection of a handset by the help of wire colors*

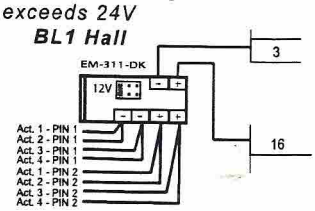


Note 1)
Regulator anvendes hvis trafo-spænding overstiger 24V
Use regulator when trafo-power exceeds 24V

LA35 Hall



BL1 Hall



Note 2)
Til aktuatorer produceret ***før d.15-10-2014*** anvend ***Hvid*** leder
*Use the **White** wire for Actuators produced before **15-10-2014***

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QUICK GUIDE **30 -01- 2017**

Motorstyring / *Motor Controller*
Type TR-EM-273

Parameterindstillinger / *Parameter settings*

36xxxx+xP/BxxxBxx

Tilslut programmeringsenheden TR-EM-236 og indlæs nedenstående værdierne for det pågældende aktuatorsæt

Connect the programming unit TR-EM-236 to the PCB and enter the values from the list below for the resp. Actuators

Parameter	LA12-Reed	LA12-Pot.	LA28-Reed	LP2-Reed	LA30-Reed	LA31-Reed	LA32-Reed	LA35-Hall	LA36-Hall	LA36-Pot.	LA36-Hall_pot	BL1-Hall
	12xRxx-xxxxxxxx	12xPxx-xxxxxxxx	28xxRx-xxxxxxxx	Tungløft	30xxRx-xxxxxxxx	31xxxR-xxxxxxxx	32xxRx-xxxxxxxx	35xxxx+xHxxxxxx	36xxxx+xHxxxxxx	36xxxx+xPxxxxxx	36xxxx+xBxxxxxx	BL1x1Hxxxxx
1	2	0	0	0	0	2	0	0	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	1
3	0	1	0	0	0	0	0	0	0	1	2	0
4	100	100	100	100	100	100	100	100	100	100	100	100
5	100	100	100	100	100	100	100	100	100	100	100	100
6	75	75	75	75	75	75	75	75	100	100	100	75
7	30	30	60	10	60	60	60	60	60	60	60	60
8	30	30	60	60	60	60	60	60	60	60	60	60
9	5	5	5	5	5	5	5	1	5	5	5	1
10	1	1	1	1	1	1	1	1	2	2	2	1
11	1	1	3	3	3	3	3	5	10	10	10	5
12	2	1	2	2	2	3	2	5	10	10	10	5
13	10	10	10	10	10	10	10	10	10	10	10	10
14	20	20	30	30	30	20	30	30	30	30	30	30
15	2	2	2	2	2	2	2	2	2	2	2	2
16	10	20	20	20	20	10	20	10	10	20	20	10
17	10	10	10	10	10	10	10	10	5-10	10	10	10
18	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	1	1	1	1	1	1	1	1	1
22	0	0	0	1	0	0	0	0	0	0	0	0
23	3	3	3	3	3	3	3	3	3	3	3	3
24	0	0	0	0	0	0	0	0	0	0	0	0
25	255	255	255	255	255	255	255	255	255	255	255	255
26	10	10	10	10	10	10	10	10	10	10	10	10
27	10	10	5	10	5	10	5	10	10	10	10	10
28	Learn	Learn	Learn	Learn	Learn	Learn	Learn	Learn	Learn	Learn	Learn	Learn
DIP	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V	Vcc Vcc-6V 5V

Opstart i læringstilstand

1. Start læring ved at trykke på PIL-OP og PIL-NED på samme tid i >5 sekunder.
2. Vigtigt! Oprethold kommandoen, indtil læringscyklussen er helt gennemført. Dvs. indtil aktuatorerne har nået endepositionen ude og er returneret til udgangsposition.
3. Aktuatorerne starter med at køre udad (FREM) med reduceret hastighed. Strømgrænse eller pulstab stopper motoren, når det mekaniske endestop er nået.
4. Aktuatorerne kører nu indad (TILBAGE) i hele slaglængden.
5. Når aktuatorerne når til det mekaniske endestop, holdes knapperne nede i yderligere 10 sek.
6. Den lærte fulde slaglængde måles og gemmes som et værdi område på 0-1023 (Parameter 28). systemet er nu klar til brug..

For yderligere vejledning, henvises til brugsanvisningen på www.linakthirdparty.com

Starting up in Learning mode

1. *To initiate Learning mode, press ARROW UP and ARROW DOWN simultaneously for >5 seconds.*
2. *Important! Maintain the command until the entire learning cycle has been completed – i.e. until the actuators have reached their end position (out) and returned to their starting position (in).*
3. *The actuators start by moving out (FORWARD) at reduced speed. The power limit or pulse loss will stop the motor once the mechanical end stop has been reached.*
4. *The actuators will then move in (BACK) along the full stroke length. The pulse counter will measure the area long the full stroke length.*
5. *When the actuators reach the mechanical end stop, keep the buttons pushed for at least 10 sec. more.*
6. *The full stroke length learned is then measured and saved with a value range of 0–1023 (Parameter 28). The system is now ready for use.*

For detailed instructions please refer to the Instruction manual at www.linakthirdparty.com

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