

INSTRUCTION MANUAL DAAB INTERFACE CARD DB409 FOR FREQUENCY CONVERTER VFD-EL

*For DAAB Automatic control unit
EP104 version 4.08
EP105*



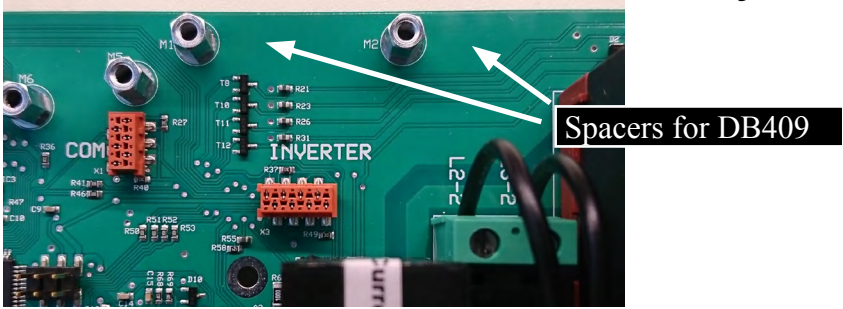
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Installation EP104

1. Disconnect the power to the EP104
2. Screw the DB409 card into place on the spacers on the EP104 using two M3x5 screws.



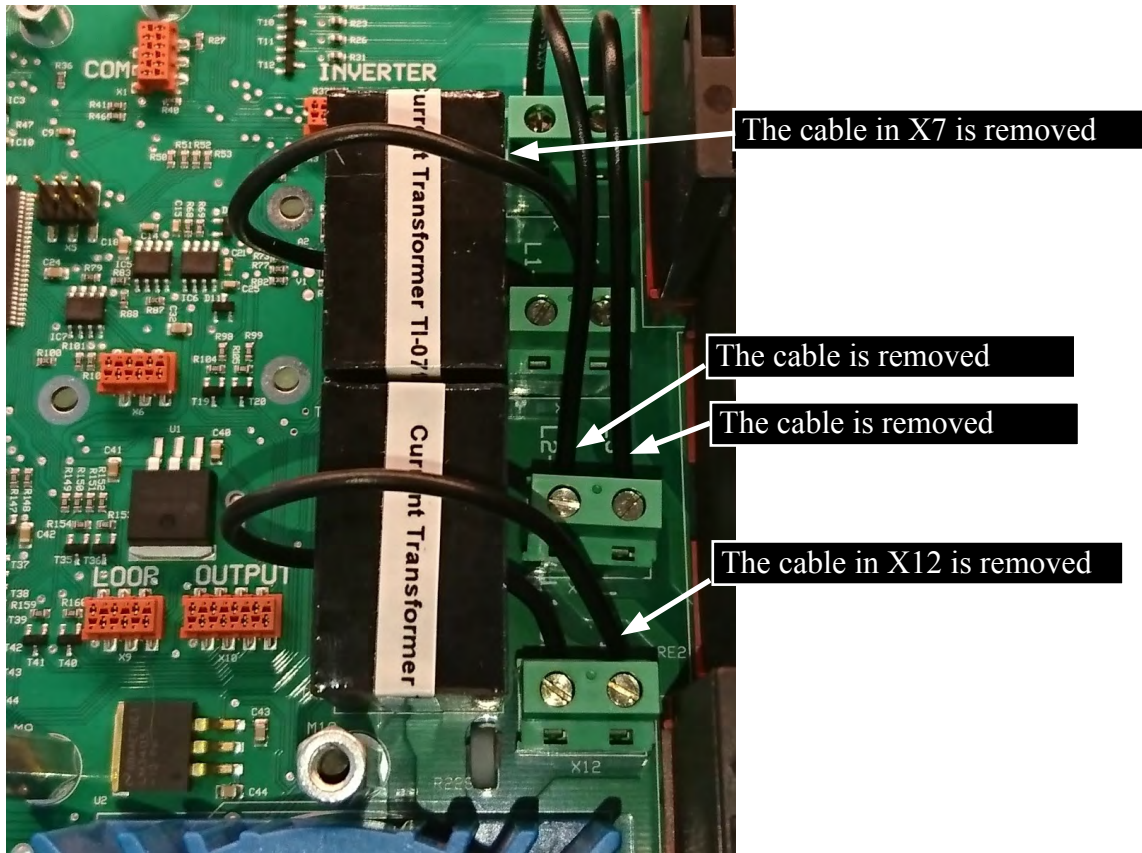
Preparations before connection

NOTE! Take care to ensure that all cables marked as illustrated below are removed. If this is not done correctly, the frequency converter and the automatic control unit may be permanently damaged.

Pick out the following:

EP104-1	EP104-2
The cable in X12	The cable in X12
	The cable in X7
	The cables between X4 and X11

The illustration shows EP104-2

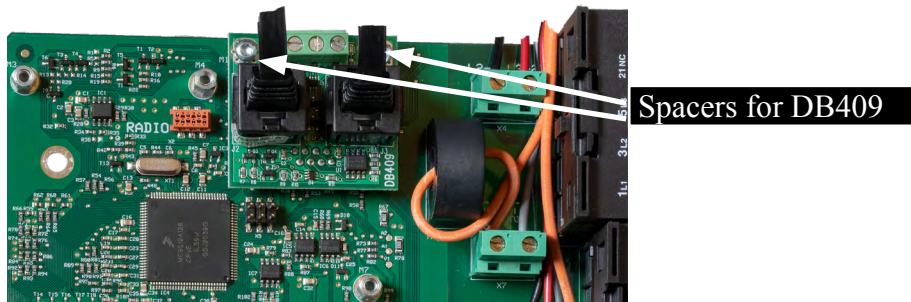


Connection

The frequency converter being connected to the DB409 must be a DELTA VFD-EL. This frequency converter is based on negative logic. Refer to the following pages for full details regarding signals and connecting electric motors.

Installation EP105

1. Disconnect power to EP105
2. Screw the DB409 card into place on the spacers on the EP105 using two M3x5 screws..



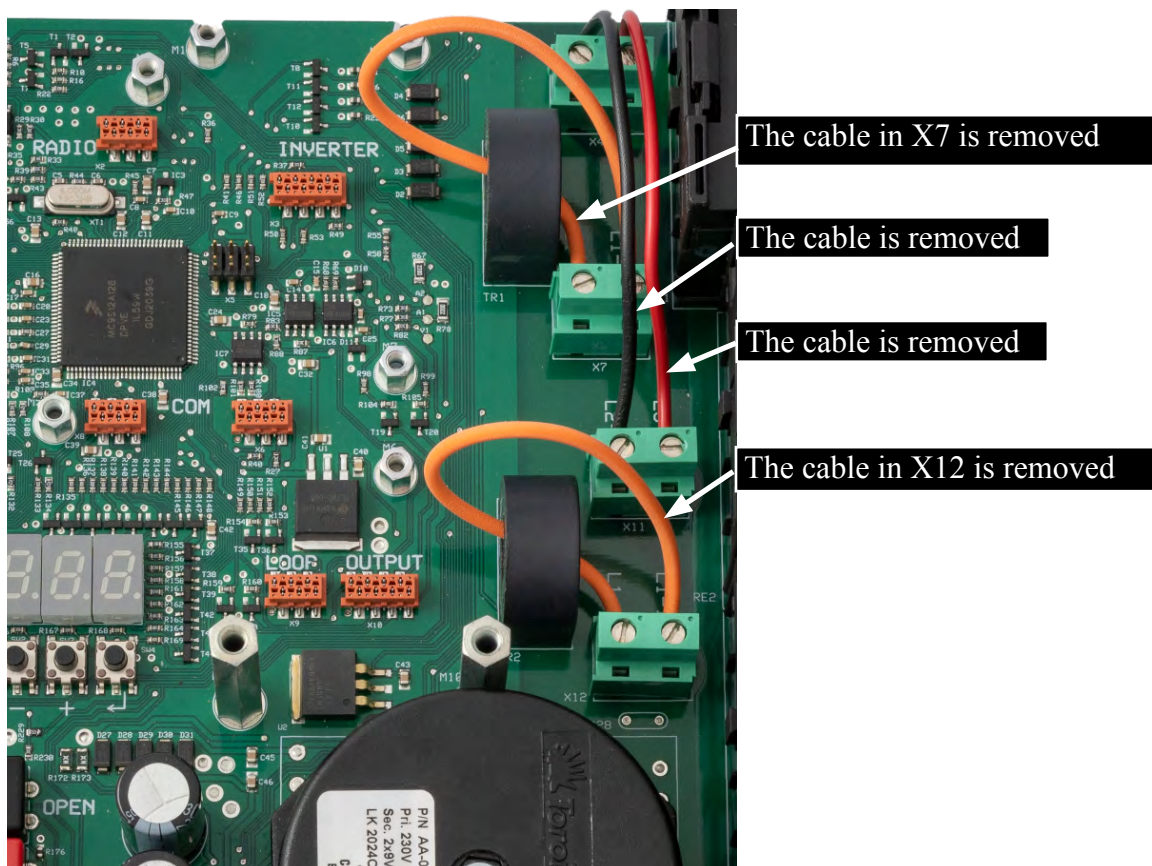
Preparations before connection

NOTE! Take care to ensure that all cables marked as illustrated below are removed. If this is not done correctly, the frequency converter and the automatic control unit may be permanently damaged.

Pick out the following:

EP105-1	EP105-2
The cable in X12	The cable in X12
	The cable in X7
	The cables between X4 and X11

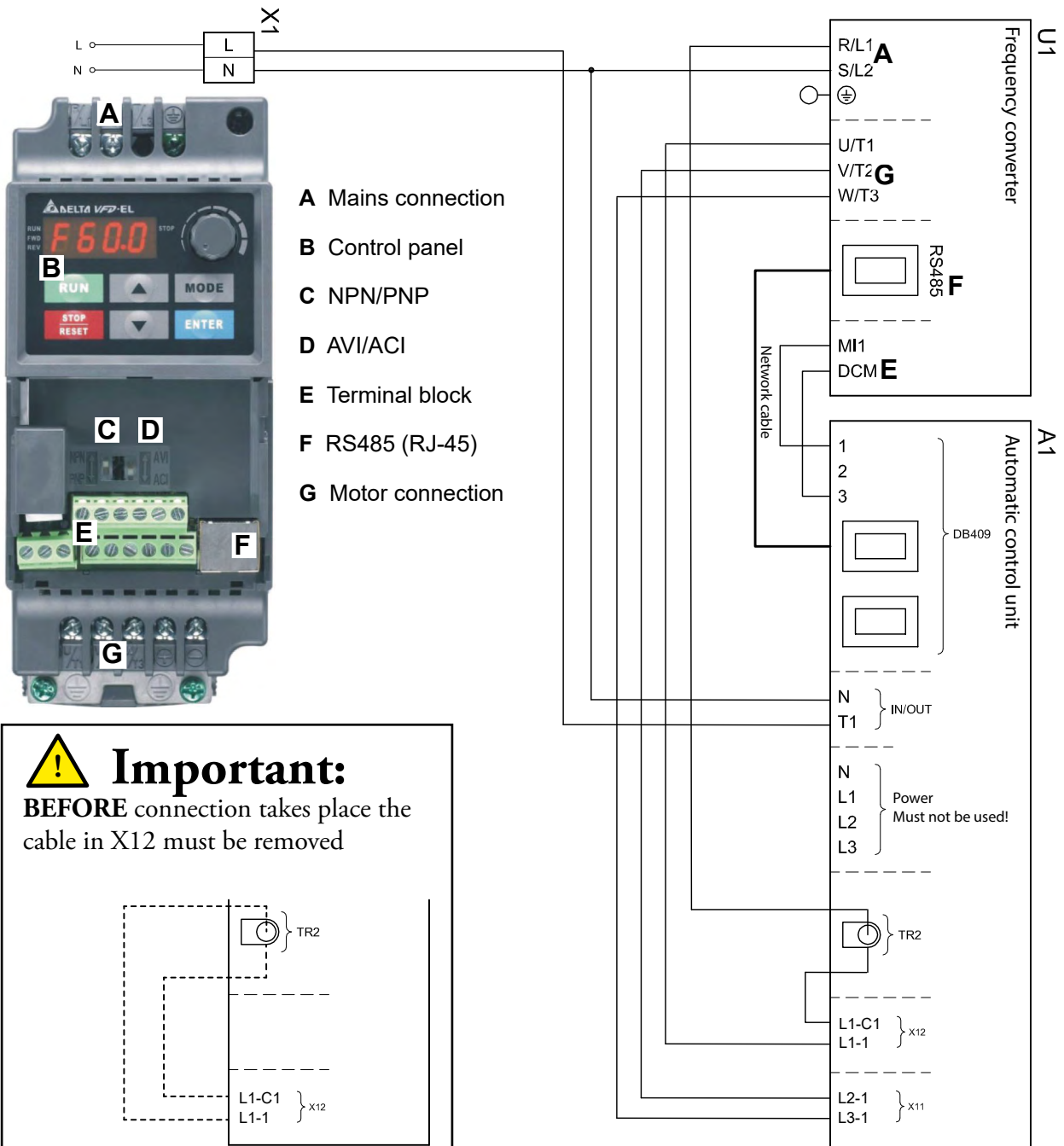
The illustration shows EP105 -2



Connection

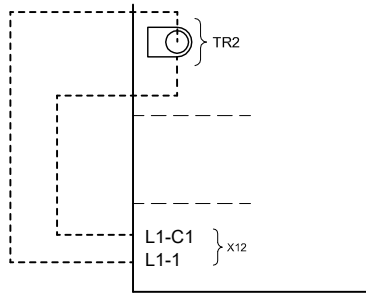
The frequency converter being connected to the DB409 must be a DELTA VFD-EL. This frequency converter is based on negative logic. Refer to the following pages for full details regarding signals and connecting electric motors.

• Wiring diagram for one motor

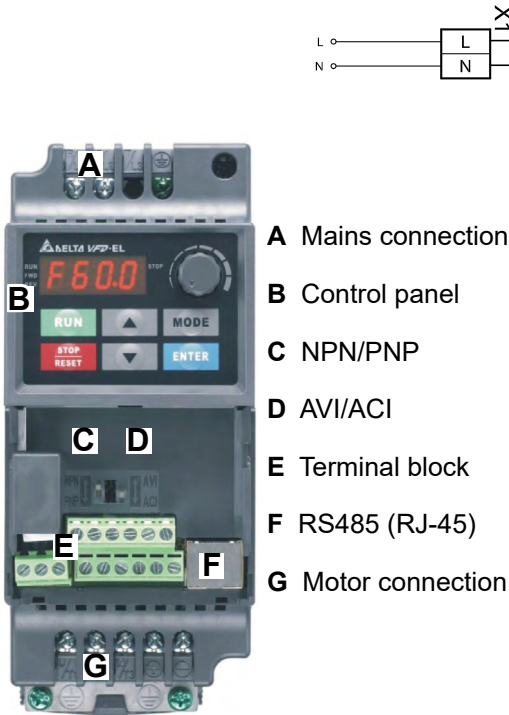


Important:

BEFORE connection takes place the cable in X12 must be removed

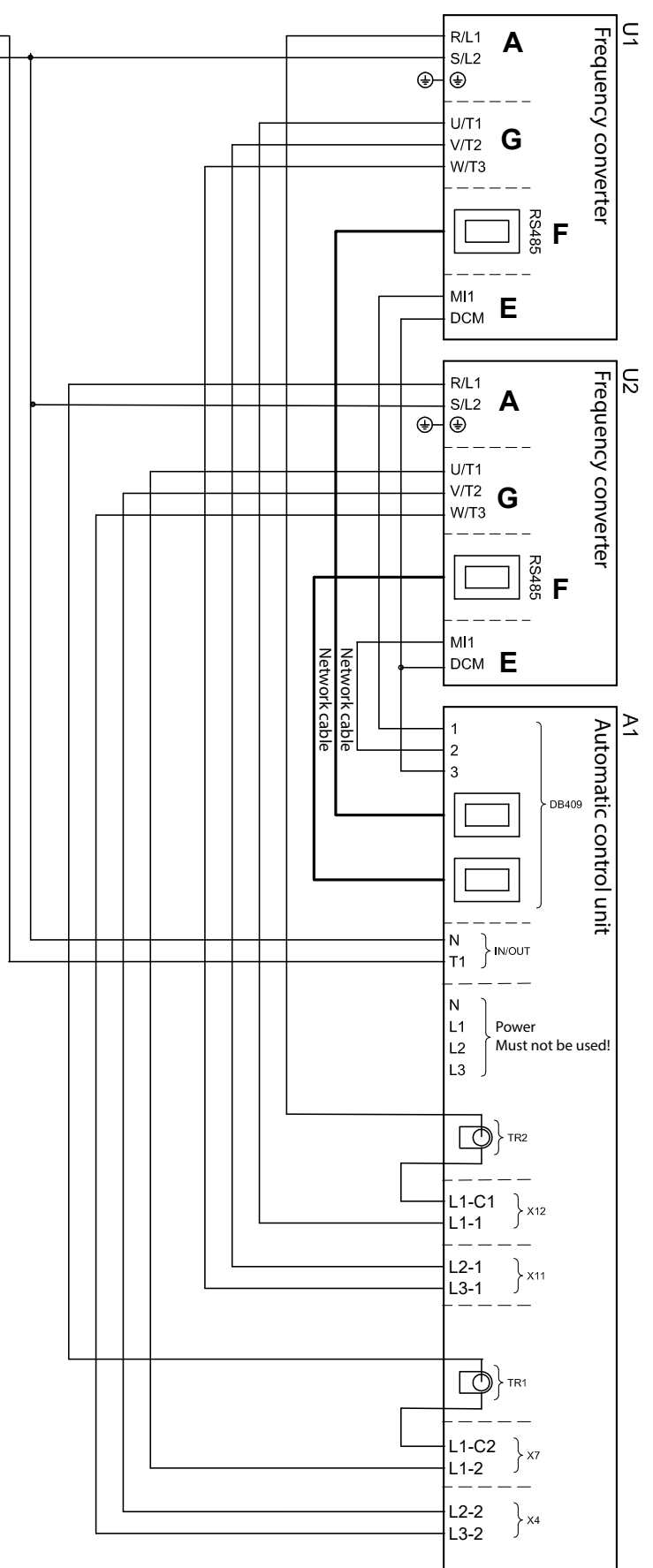


• Circuit diagram for two motors



- A Mains connection
- B Control panel
- C NPN/PNP
- D AVI/ACI
- E Terminal block
- F RS485 (RJ-45)
- G Motor connection

⚠ Important:
BEFORE connection takes place,
 the following cables must be
 removed:
 The cables between X4 and X11
 The cable in X7
 The cable in X12



Installing the Delta VFD-EL frequency converter

- Modification of the motor winder

The following criteria must be met in order to use the DAAB motor winder with the frequency converter:

- If mechanical limit switches are used, the limit switch cams must be wider than normal.
- FAAC Nordic AB recommends using encoder-type limit switches, DB405, together with the frequency converter.
- FAAC Nordic AB recommends using a motor with a speed of 2,800 rpm.

- Programming the frequency converter

To program the frequency converter, press ENTER once to select programming mode. Select program group 00.xx to 11.xx using the arrow keys. Press ENTER to select program group. The program arrows now switch between the different program channels in the selected program group. Press ENTER once more at the selected program channel and select value using the arrow keys. When you have set the desired value, press ENTER again to save the new value. When all the programming has been done, you return to normal operation by pressing MODE until the display shows H for the output frequency concerned. Tip: By pressing MODE once more when stepping between the program channels, you change to stepping between the program groups instead.

- Channel settings in the frequency converter

Channel no.	Description	Factory setting	Modified value
00.03	used to display the output frequency during operation after power is switched on	01	
01.00	used to set the maximum output frequency	100.0	
01.03	used to set the low frequency	5.00	
01.04	used to set the low frequency voltage	40.0	
01.05	used to set the start frequency	1.50	
01.06	used to set the start frequency voltage	30.0	
02.00	used to set where the setpoint value for speed is to be taken from	03	
02.01	used to set the start method	01	
02.02	used to set the type of stop	01	
02.04	used to block reversing	01	
03.00	used to set the multifunction output	01	
03.08	used to set the internal cooling fan	01	
04.04	used to set the function of input MI1	00	
06.01	used to set the current limit for a speed increase	200	
06.02	used to set the current limit at constant speed	200	
06.06	used to set the electronic overload relay	02	
09.00	selects communication address: 1 for motor 1, 2 for motor 2	1	
09.01	used to set transfer speed	03	
09.02	used to set error handling	0	
09.07	used to set time delay between messages	0	

- Setting of frequency converter

Note that the switches above the terminal block must be in the upward position! (NPN/AVI)



Channel setting with encoder, DB405

For the automatic control unit to measure current and output correctly, C202 must be set to 4, frequency converter. When a frequency converter is used with the automatic control unit, EP104 or E105, a load guard with personal protection cannot be used. When C202 is set to 4, the personal protection is automatically disabled and channels C230 and C240 are hidden. Depending on the selected setting in C200, the values in C211, C212, C232, C233, C242 and C243 should be adjusted so that satisfactory function and reliable mechanical protection is obtained for the gate or door.

A basic setting for the motor cutout is 4.0 A in channels C252, C253, C262 and C263 and 5.0 seconds in channel C221. Adjust the settings so that adequate function and safe protection for the motors is obtained.

When a frequency converter is used, only the upper limit is active for the internal motor cutout. This limit is 50% than the set value. If 4.0 A has been indicated, the current limit is 6.0 A. If the current is above this limit during the time in C221, the control unit will stop and show the error code E201 for motor 1 or E202 for motor 2.

In the channel group F, settings are made for how the frequency converter is to work together with EP104 or EP105.

The automatic control unit checks and controls the frequency converters using serial communication. If there are problems with communication or when communication is disabled, via F001, the frequency converters can be operated in hold-to-run at the same speed in both opening and closing, by changing channel 02-00 on the frequency converter to a 4 for the rotatory actuator or 0 to use the arrow keys to adjust the F-value. Note that when the rotatory actuator is turned clockwise the output frequency increases, so start by turning it to the maximum extent anticlockwise and then increase to a suitable output frequency. If communication errors occur or if communication is disabled, the motors can only be operated using hold-to-run. In hold-to-run in this mode, no ramping down takes place before open or closed position is reached. For this reason, adjust the speed and pay attention when the open or closed position is close.

For the speed settings in F012, F013, F022 and F023 to work, the ratio of the motor winder must be specified in the following channels:

F030 = motor winder connected to motor 1.

F040 = motor winder connected to motor 2.

Until ratio has been selected in these channels, maximum speed will be limited to 25Hz. If the ratio is not stated in the documentation belonging to the motor winder, a measurement can be done by displaying channel F031 or F041 and then letting the motor winder open or close until a value appears after approx. 6 seconds in these channels. Compare this value with the values specified in the instruction manual for channel F030 or F040 and specify the corresponding figure in both these channels.

It is specified in channels F002, F003 and F004 how quickly the gate or door is to reach its opening or closing speed.

F002 = Acceleration from fully closed position.

F003 = Acceleration in all other starts. To obtain an even and jerk-free start in the fully open position, the time in F003 must be adjusted for this particular start.

F004 = Acceleration when P500 is programmed to 2, Battery backup, and activated.

It is specified in channels F005 and F006 how quickly the gate or door is to stop.

F005 = Retardation time for limit switches and change of direction.

F006 = Retardation time for photocell and vehicle loops.

The times in these four channels refer to a speed which is 100Hz, i.e. the times apply when the speed is 100Hz. If the speed is lower, for example 50Hz, the time will be halved, but the force in deceleration and speed increase will be the same regardless of speed. If the times increase, the forces on the gate or door decrease in changes of speed.

The factory settings are adapted to a swing gate with a 6 metre opening. Check that the gate accelerates without subsequent swings from both the closed and open positions. Increased times reduce the risk of swings. Check also that the gate slows down gently and without jerking in the open and closed positions. With the photocell or vehicle loop activated, deceleration must take place so that no collision between the gate and the vehicle can occur. Check and adjust the time in F006.

In the case of a sliding gate, the value must be specified in F002 and F003. Adapt the acceleration to the size and weight of the gate. A reasonable starting value is 5.0 seconds. The retardation in F005 and F006 is adjusted in the same way as above.

The readout channels in L114, L115, L124 and L125 cannot be adjusted when the C202 has been chosen for 4 frequency converters. These channels show the calculated angle, before the limit, where the motors will go down to low speed in accordance with F008 and F009. This calculated angle depends on speed, slow speed, retardation and chosen ratio. The angles in these channels are calculated continuously on the basis of these parameters. If stopping at the specified angle for open or closed position takes place too abruptly, there is a possibility of adding a certain angle to the values in these channels. This extra deceleration angle is specified in channels F014, F015, F024 or F025.

Channel settings with mechanical limit switches.

In the case of mechanical limit switches, no ramp-down angles are calculated and suitable run-on times must instead be tested in commissioning.

Channels for setting of run-on time.

Run-on time	EP104	EP105
Opening movement, motor 1	C422	L212
Closing movement, motor 1	C423	L213
Opening movement, motor 2	C432	L222
Closing movement, motor 2	C433	L223

When the limit switch is activated, the automatic control unit will reduce the speed to the value in channel F008 in opening and to the value in F009 in closing. How fast the reduction in speed is to be is selected in channel F005 and how long it is to go on is selected in the channels for run-on. In optimal adjustment, there must be time for the frequency in F008 and F009 to be read on the display on the frequency converter when the door reaches open and closed position.

The output frequency on the frequency converter is shown by pressing the MODE button, on the frequency converter, until display begins with H.

When L001 and/or L002 have been selected as 2, Limit switch, some of the F-channels will be hidden, as they are not to be set.

A basic setting for the motor overcurrent protection cutout is 4.0 A in channels C252, C253, C262 and C263 and 5.0 seconds in channel C221. If a frequency converter with power output 1.5 kW is used, channels C252, C253, C262 and C263 are set to 6.0 A. Adjust the settings so that adequate function and safe protection for the motors are obtained.

Channel list, Frequency converter, F-channels

No.	Name	Range	Factory	Setting
F001	Communication with frequency converter	0 - 1	1	
	0	Communication disabled		
	1	Communication activated		
F002	Acceleration time from closed position motor 1 and 2 (from 0-100Hz)	0.5-9.9 seconds	2.0	
F003	Acceleration time in all movements except at closed position motor 1 and 2 (from 0-100Hz)	0.5-9.9 seconds	4.0	
F004	Acceleration time when P500 is set to 2 and the input is activated, battery backup	5.0-12.0 seconds	7.0	
F005	Retardation time with limit switch and change of direction for motor 1 and 2 (from 100-0Hz)	0.5-9.9 seconds	4.0	
F006	Retardation time with photocell and vehicle loops for motor 1 and 2 (from 100-0Hz)	0.5-9.9 seconds	2.0	
F008	Low-speed frequency for opening movement, motor 1 and 2	5-20 Hz	5	
F009	Low-speed frequency for closing movement, motor 1 and 2	5-20 Hz	10	
F012	Opening frequency / Opening speed for motor 1	21-99 Hz	50	
F013	Closing frequency / Closing speed for motor 1	21-99 Hz	30	
F014*	Number of degrees with low-speed frequency before open position for motor 1	0-60 degrees	0	
F015*	Number of degrees with low-speed frequency before closed position for motor 1	0-60 degrees	0	
F022	Opening frequency / Opening speed for motor 2	21-99 Hz	50	
F023	Closing frequency / Closing speed for motor 2	21-99 Hz	30	
F024*	Number of degrees with low-speed frequency before open position for motor 2	0-60 degrees	0	
F025*	Number of degrees with low-speed frequency before closed position for motor 2	0-60 degrees	0	

* = Shown only when L001 and/or L002 are set to 1 encoder or 4, hold-to-run without limit switch.
F-channels are shown only when C2020=4, frequency converter.

No.	Name	Range	Factory	Setting
F030*	Choice of ratio for motor 1	0 - 9	0	
	0	Not selected, in this position the motor only rotates at 25Hz		
	1	MK with pulleys 40/71 (ratio 1318:1)		
	2	MK with pulleys 50/71 (ratio 1098:1)		
	3	MK with pulleys 71/71 (ratio 791:1)		
	4	MK with pulleys 100/71 (ratio 565:1)		
	5	MK with pulleys 125/71 (ratio 456:1)		
	6	MK with pulleys 140/71 (ratio 409:1)		
	7	MT (ratio 791:1)		
	8	M10 with pulleys 71/71, motor 1400 rev/min (ratio 2970:1)		
	9	M10 with pulleys 71/71, motor 2800 rev/min (ratio 1485:1)		
F031*	Measured ratio motor 1. Only when F030=0.	0 - 9999		
F040*	Choice of ratio for motor 2	0 - 9	0	
	0	Not selected, in this position the motor only rotates at 25Hz		
	1	MK with pulleys 40/71 (ratio 1318:1)		
	2	MK with pulleys 50/71 (ratio 1098:1)		
	3	MK with pulleys 71/71 (ratio 791:1)		
	4	MK with pulleys 100/71 (ratio 565:1)		
	5	MK with pulleys 125/71 (ratio 456:1)		
	6	MK with pulleys 140/71 (ratio 409:1)		
	7	MT (ratio 791:1)		
	8	M10 with pulleys 71/71, motor 1400 rev/min (ratio 2970:1)		
	9	M10 with pulleys 71/71, motor 2800 rev/min (ratio 1485:1)		
F041*	Measured ratio motor 2. Only when F040=0	0-9999		

* = Shown only when L001 and/or L002 are set to 1 encoder or 4, hold-to-run without limit switch.
F-channels are shown only when C2020=4, frequency converter.



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