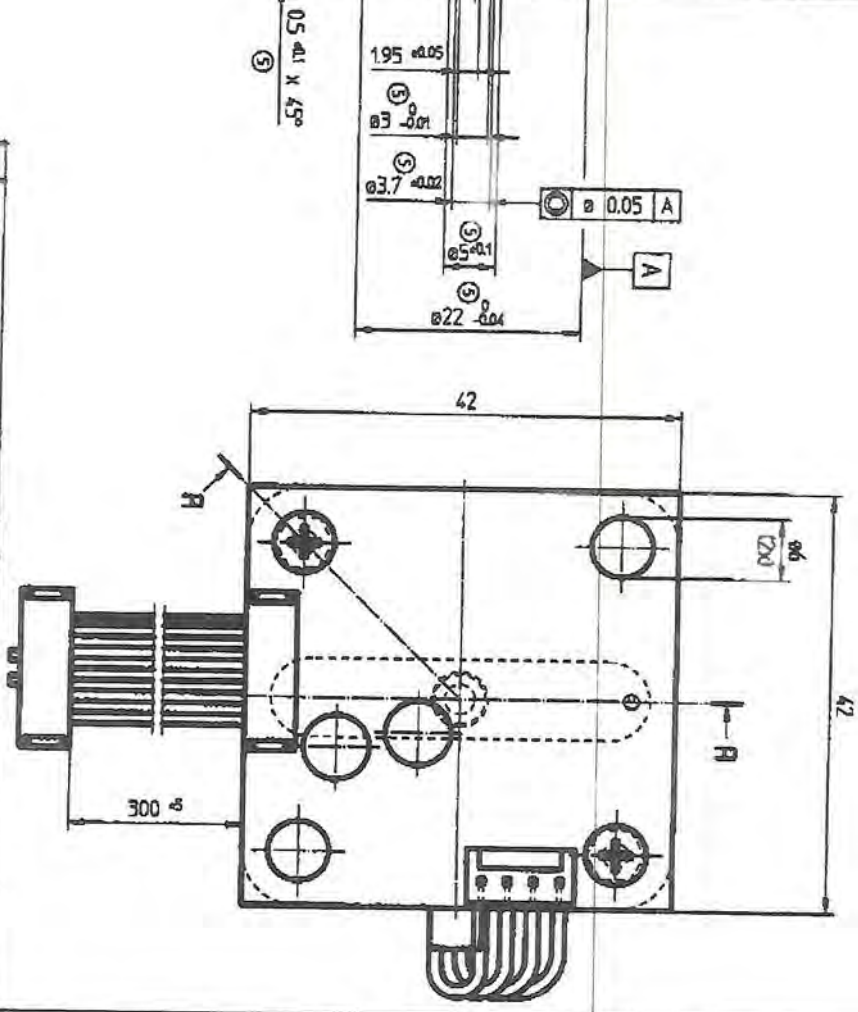


Demi-coupe R-R

Remarque :  
 1) le support doit être chassé, collé avec l'odine 648°



6110-001005

Spécification	Position	Notice	Traitement thermique	FD4
Particularités	Code mat. int.		Tolérances géométriques selon DIN 7560	
			± 0.1	+ 0.03
			± 0.02	+ 0.03
				+ 0.05
Echelle		Remarque par:		
Révisé		04.04.01	FB	
Approuvé				

ENSEMBLE 8110R001



Sonceboz SA  
 CH-2805 Sonceboz

8110-1001005



TC-S

## Stepper Motor System Specification.

Our comments or changes/supplements for your specification from 08.03.96

### ad. 1 Stepper Motor.

#### □ Mechanical dimensions

Motor + controller

See attached our draw. no. 081B9044 (restrictions on pump PCB)

Motor shaft material spec.

AISI 316 ≈ W 1.4401/W1.4404

Motor shaft dimensions

See attached our draw. no. 081B9045 (shaft for micropump)

### ad. 3 Stepper Motor Controller

#### 3.1 Electrical Data

□ Current consumption on 5 VDC

We want 5 VDC generated on the controller board

□ Inputs

Enable

To be changed to - logic "0" means motor current off

#### 3.2 Function description

□ We want the mean torque of the load to be increased to 70 mNm. What effect does it have to the time needed for the motor to do the angle  $4,5^\circ$ .

□ Encoder feedback to be done within the the step ( $4,5^\circ$ ) and be hold active by the microcontroller until the step has been left.

Encoder signal according to shaft shape (D-cut) has to be exact the same from motor to motor.

□ Motor Speed for short time:

- 100 rpm in 2 min. (mean torque)
- 40 rpm in 6 min. (mean torque)
- 100 rpm in 10 sek. (high torque)
- 5 rpm in 2 min. (high torque)

### ad. 4. Enviromental.

□ Operating temperature increased to

0 to  $50^\circ$  C



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P.02



## Project Danfoss

### Stepper Motor System Specifications Version 1.0

#### 1. Stepper Motor

- Type 6540
- Step angle 200
- Phase resistance 9  $\Omega$  to 20  $\Omega$  bipolar (to be optimised)
- Dynamic torque min 130 mNm for step frequency < 750 pps
- Holding torque at rest 50 mNm (with reduced current)
- Mechanical dimensions
  - Motor 42 \* 42 \* 33 mm (l \* w \* h)
  - Motor + controller max. 42 \* 42 \* 60 mm (l \* w \* h)
  - See drawing nbr. 081B9044 rev. B.
  - Motor shaft material spec. 1.4305
  - Motor shaft dimensions See drawing nbr. 081B9045

#### 2. Load

- Nominal friction torque max. 70 mNm
- Fiction torque (after long time stand) max. 100 mNm  
(High torque input must be activated)
- Inertia 5 gcm<sup>2</sup>

#### 3. Stepper Motor Controller

##### 3.1. Electrical Data

- Motor power supply 24 VDC  $\pm$  20 %
- Current consumption on 24 VDC ~ 800 mA (during ~ 15 ms)  
mean value at 5 rpm ~ 200 mA
- Inputs
  - TTL level, max. 0.5 mA logic "0" or "1"
  - Active high pulse
  - Max. frequency 90 Hz (65 rpm)
  - With high torque active 70 Hz (50 rpm)
  - Min duration 40  $\mu$ s
  - 1 pulse produce a rotation of 2.5 steps (4.5°)
  - Logic "1" means CW
  - Enable Logic "1" means motor current on
  - High torque Logic "1" means high torque with reduced velocity
  - Init Logic "1" means initialise the system
- Output
  - TTL level max. 2.5 mA logic "0" or "1"
  - Encoder feedback Logic "0" means gap closed

### 3.2. Function description

The stepper motor controller board comprise a chopper driver circuit and a micro controller.

By power-up of the system the initialisation phase is automatically activated. The motor turn in CW direction until the flag is detected from the optical detector. If the flag were soon on the detector or the number of steps until its detection, the motor is turned 8 steps CCW and then again CW until the flag is detected. If no flag is detected and the motor has turned 204 steps the system go into error mode. CW direction is defined motor seen from D-shaft. The position of the D-cut after initialisation correspond to drawing nbr. 081B9044 with a tolerance of  $\pm 5^\circ$ .

When 1 pulse is received, the step motor rotate 2.5 steps ( $4.5^\circ$ ) in the direction defined by the direction input. The time needed to the motor to do this angle is about 7 ms in normal condition, its mean torque of the load  $< 70$  mNm. This time is due to the inertia of the load and the rotor. In case of a torque of the load between 70 and 100 mNm the time needed for  $4.5^\circ$  become about 12 ms. This is automatically achieved by activating the High torque input. This input is only activated after long time stand or a fault detection from the encoder. During the movement the currents of the phases are increased to permit the motor to give over torque. After the moving the currents are automatically reduced. The nominal motor speed is 5 rpm.

For short time, this speed can be increased to:

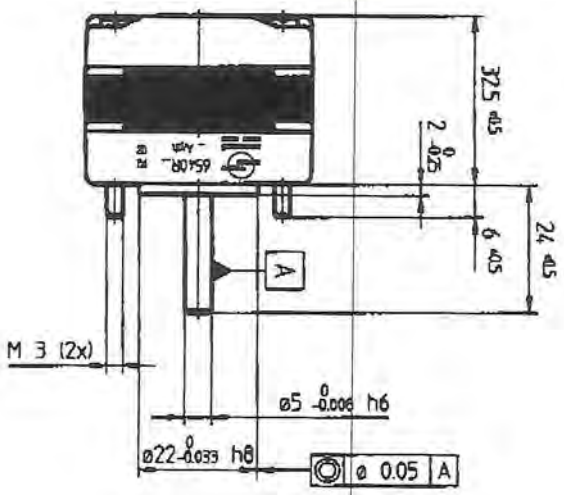
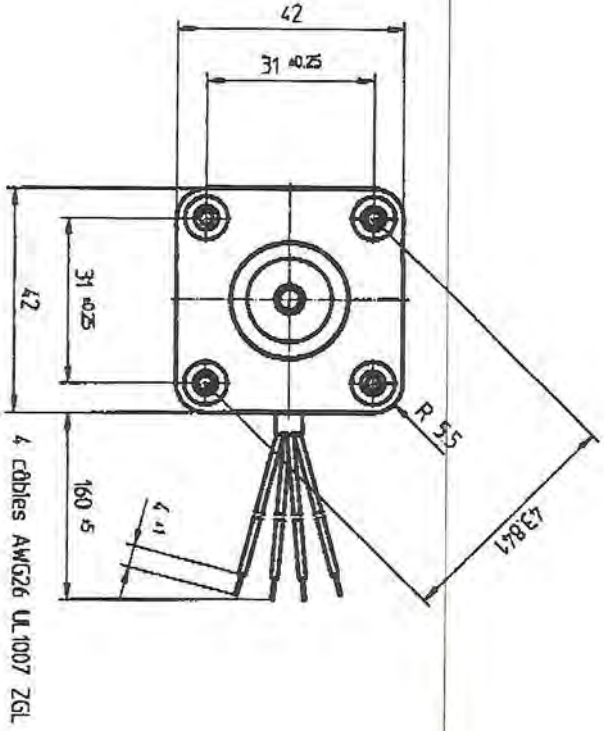
- 65 rpm in 2 min. (nominal torque)
- 40 rpm in 6 min. (nominal torque)
- 50 rpm in 10 sec. (high torque)
- 5 rpm in 2 min. (high torque)

The encoder feedback output is active between two pulses, one time every rotation. This signal is indexed with the shaft of the motor.

The init input is for the re initialisation of the system. It produce the same as by power-up of the system.



6540-1028.000



No de piece	Specification	Position	Matiere	Traitement thermique	Fin
Distributeur centre	Modification	Code mat. int.		Tolerances generalistes norm DIN 71658	
520				± 0 ± 0.30 > 30 à 70 ± 0.1 à 35	
				* 0.1 ± 0.2 ± 0.3 ± 0.5	

ENCOMPREMENT STANDARD



Sonceboz SA  
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Echelle	Remplace par:
1:1	
Quantité	7/02/92
Contrôle	01

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