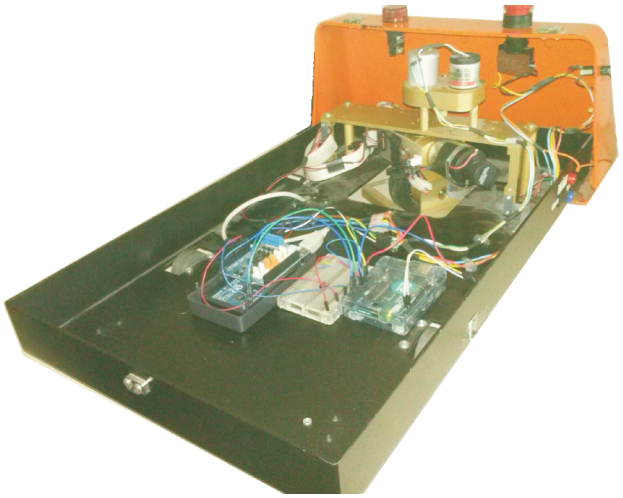
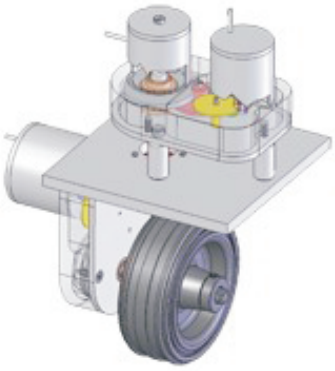
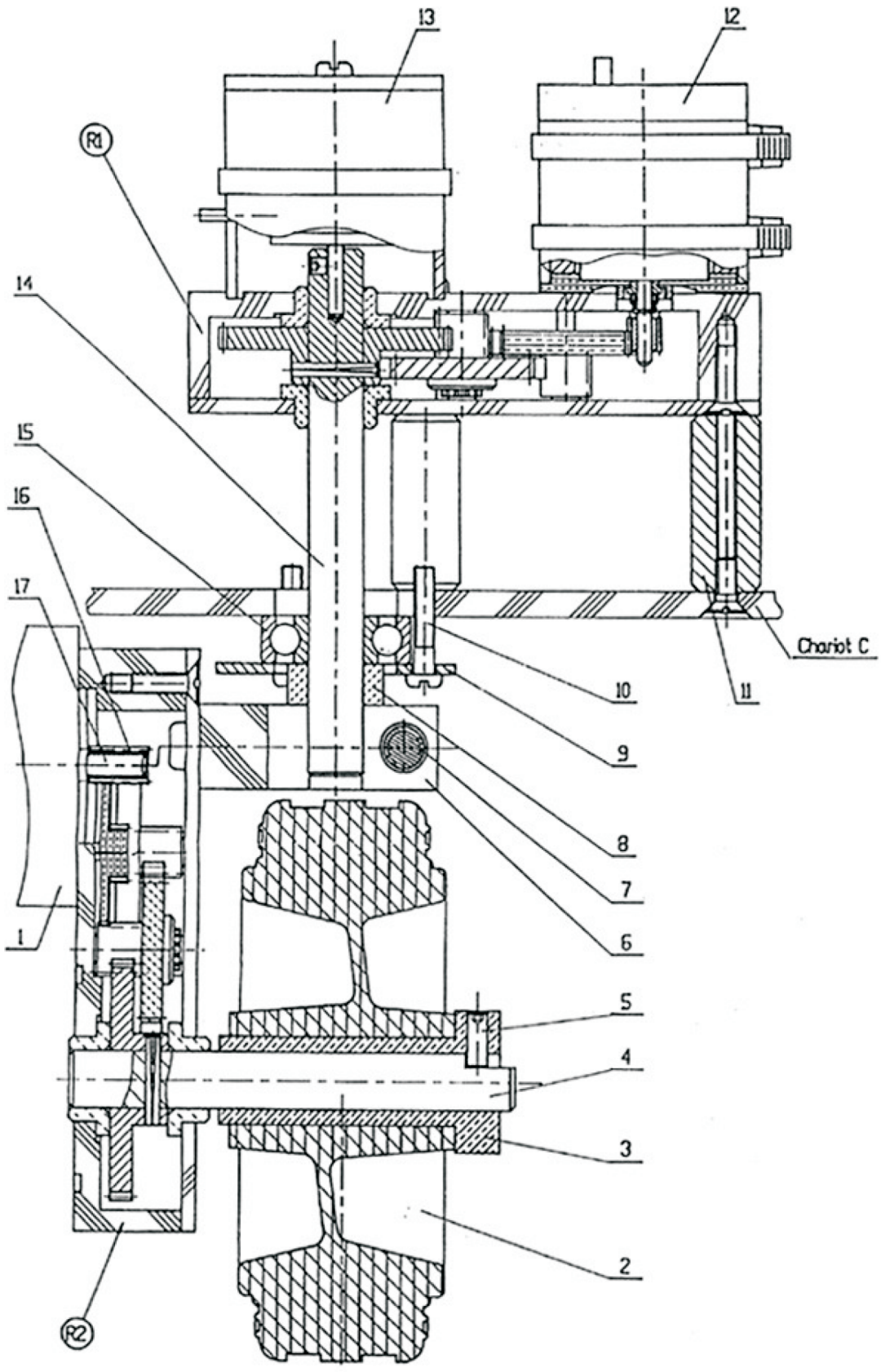
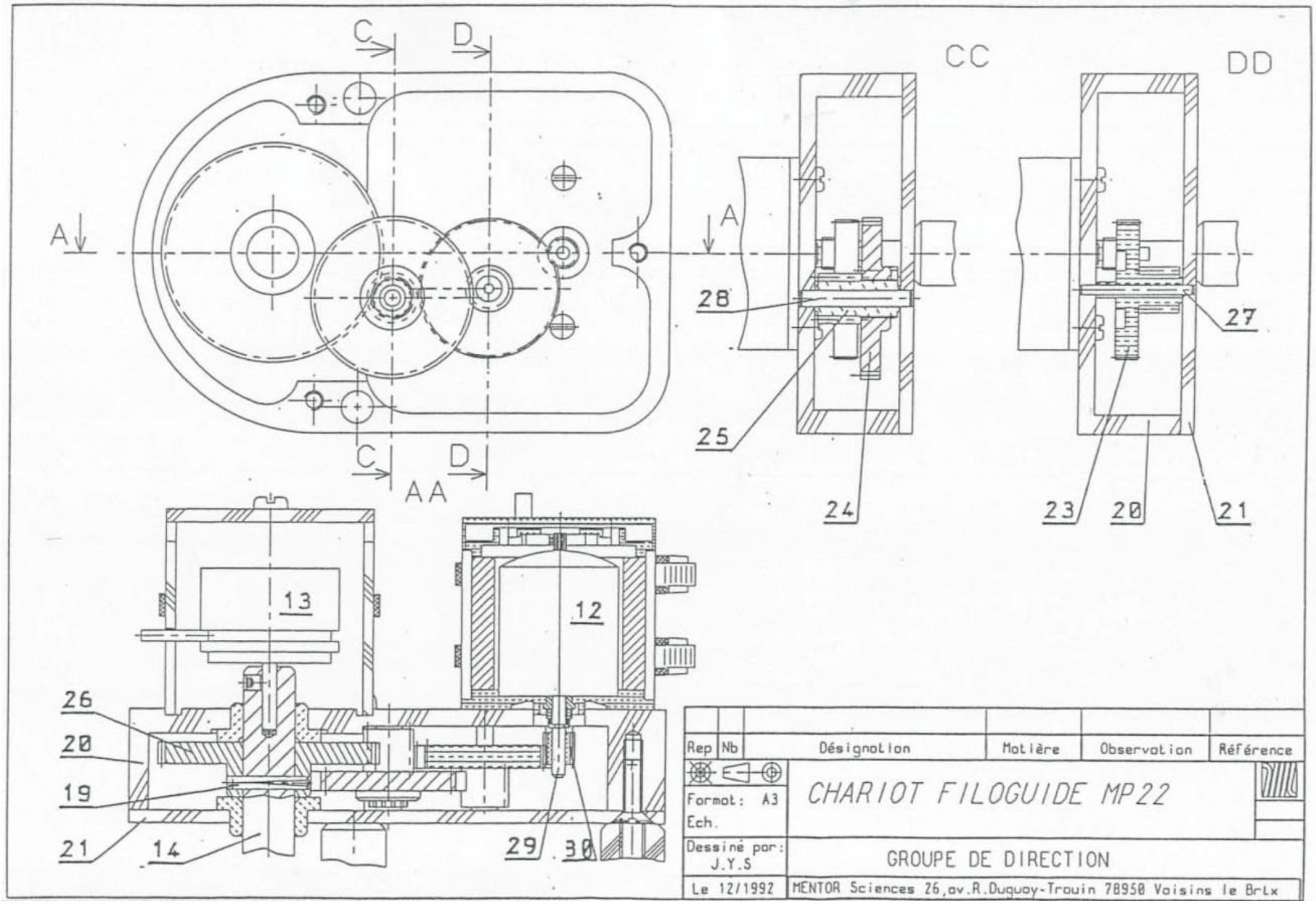
Chariot filoguidé







Dessin d'ensemble du groupe d'entrainement et de direction



Rep	Nb	Désignation	Matière	Observation	Référence

Format: A3
Ech.

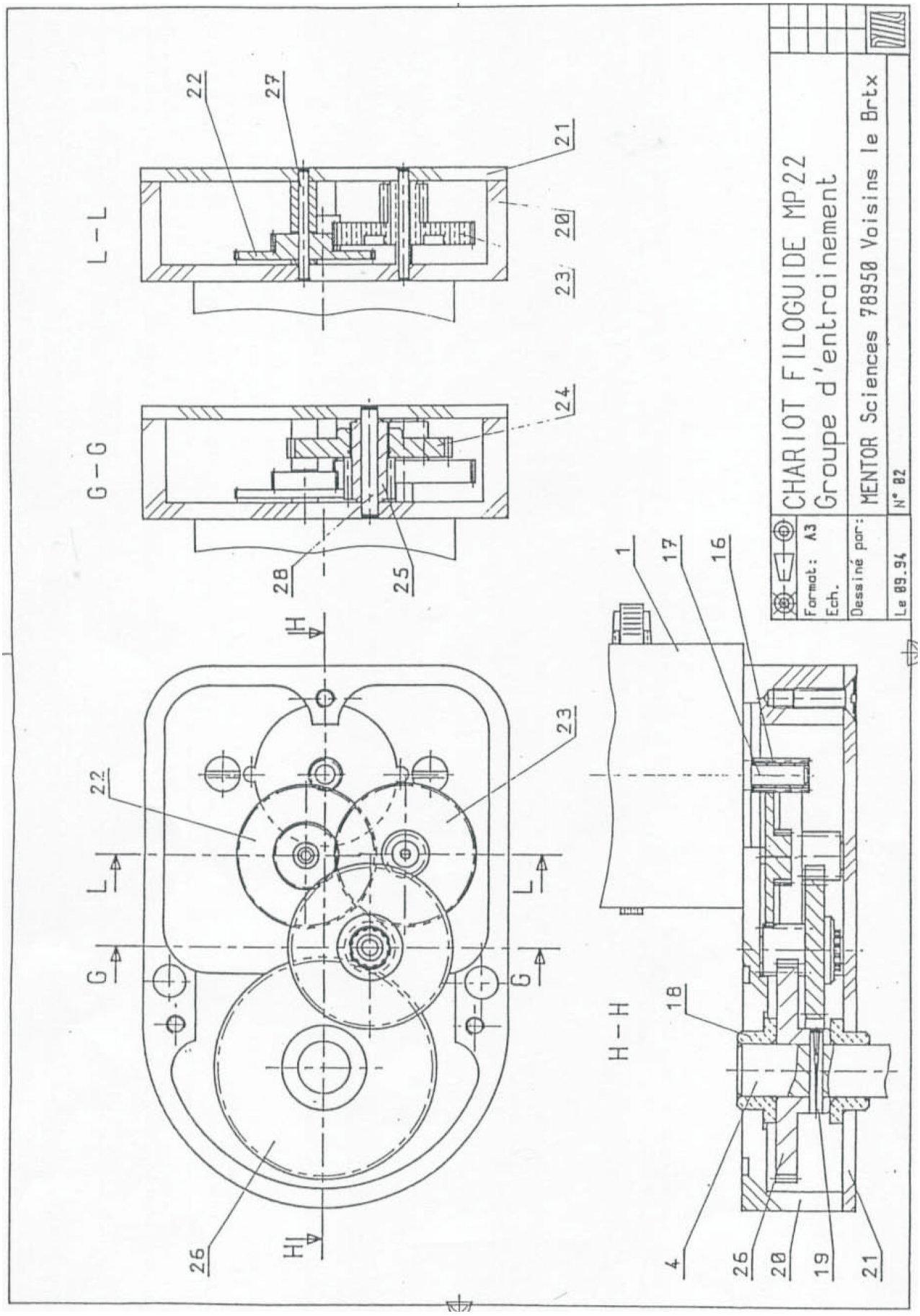
CHARIOT FILOGUIDE MP22

Dessiné par: J.Y.S

GROUPE DE DIRECTION

Le 12/1992

MENTOR Sciences 26,av.R.Duquay-Trouin 78950 Voisins le Brtx


L - L
G - G
H - H
CHARIOT FILOGUIDE MP22
Groupe d'entraînement
Format: A3
Ech.
Dessiné par:
MENTOR Sciences 78950 Voisins le Brtx
Le 09.94
N° 02

Nomenclature

30	1	Pignon moteur Z = 12 m = 0,35	Cu Zn 38 Pb2
29	1	Axe moteur	MAXON DC Motor
28	2	Axe aiguille diamètre 2,5 – 17,8	Nadella
27	2	Axe aiguille diamètre 1,5 -15,8	Nadella
26	2	Roue dentée Z = 55 m = 0,6	XC 38
25	2	Roue dentée Z = 11 m = 0,6	Cu Sn 8
24	2	Roue dentée Z = 40 m = 0,6	Cu Zn 38 Pb 2
23	2	Roue dentée Z = 10 m = 0,8 ; Z = 60 m = 0,35	Derlin
22	1	Roue dentée Z = 27 m = 0,35 ; Z = 60 m = 0,35	Cu Zn 38 Pb 2
21	2	Couvercle de réducteur	Alliage d'aluminium
20	2	Carter de réducteur	Alliage d'aluminium
19	2	Goupille cannelée G1.2-13	
18	4	Bague épaulée	Cu Sn 8 P
17	1	Axe moteur	MAXON DC Motor
16	1	Pignon moteur Z = 13 m = 0,35	Cu Zn 38 Pb 2
15	1	Roulement 8 BC 10 EE	
14	1	Axe Z 10 CNF 18-8	
13	1	Potentiomètre de recopie 09-78CS-B-5KW	Sfernice
12	1	Moteur de direction 2130.906.22.112.050	MAXON DC Motor
11	3	Entretoise	Alliage d'aluminium
10	3	Vis CLS M3- 16	
9	1	Rondelle d'arrêt	XC 10
8	1	Bague	Cu Zn 38 Pb 2
7	1	Vis CHC M 6 – 20	
6	1	Support	Alliage d'aluminium
5	1	Vis sans tête à bout plat HC M 3 – 8	
4	1	Axe Z 10 CNF 18-8	
3	1	Coussinet	Cu Zn 38 Pb 2
2	1	Roue motrice Ref : VPY 80/	IMSAP
1	1	Moteur d'entraînement 2140.931.58.236.050+codeur 34.19.O100	MAXON DC Motor
Rep	Nb	Désignation	Matière
Lycée Kléber		MENTOR CHARIOT FILOGUIDÉ	20/9/1994

Precision Rotative Transducers, Conductive Plastic, Economic Series (ECO)

FEATURES

- Size 05 - 09 - 13 are available
- Long life up to 30 million cycles
- Accuracy ± 1 % down to ± 0.25 %
- Bush or servo mounting types
- Rear mounted terminals
- Following MIL-R-39023 and NFC 93-255 requirements
- Material categorization: fo r definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

QUICK REFERENCE DATA	
Sensor type	ROTATIONAL, conductive plastic
Output type	Output by turrets
Market appliance	Industrial
Dimensions	Various sizes

The “ECO” models are a comprehensive range of rational motion transducers for in dustrial applications.

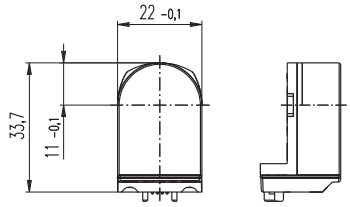
All mechanical and electrical parameters can be adapted to meet your specifications.

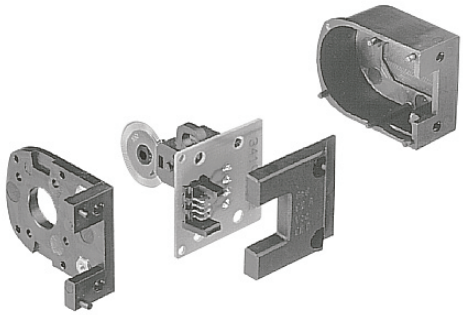
SIZE	05		09			13		
MODEL	50 ES	50 CB	78 ES	78 CS	78 CB	156 ES	156 CS	156 CB

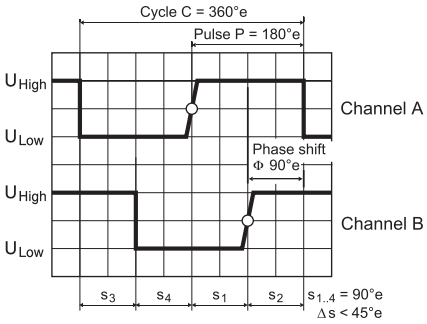
ELECTRICAL SPECIFICATIONS						
Theoretical electrical angle (TEA)	Actual electrical angle (AEA) - 2°					
Independent linearity (over TEA)	A d ± 1 % (standard)		B d ± 0.5 % (special)		C d ± 0.25 % (special)	
Actual electrical angle (AEA)	330° ± 5°		340° ± 5°		350° ± 5°	
Ohmic values (R_T)	1 k: - 5 k: - 10 k: - on request other values					
Ohmic value tolerances at 20 °C	± 10 %	± 20 %	± 10 %	± 20 %	± 10 %	± 20 %
Output smoothness	d 0.05 %					
Maximum power rating at 70 °C	0.2 W		0.3 W		0.5 W	
Wiper current	Recommended: a few µA - 1 mA max. (continuous)					
Tap (current or voltage)	NA		1 (on request)			
Resistance load on wiper	Minimum 10^3 x R_T					
End voltage	d 0.2 %	d 0.5 %	d 0.2 %	d 0.5 %	d 0.2 %	d 0.5 %
Insulation resistance	t 1000 M: , 500 V_{DC}					
Dielectric strength	t 500 V_{RMS}, 50 Hz					

MECHANICAL SPECIFICATIONS						
Mechanical angle (MA)	360° continuous					
On request: stops	NA		340° ± 3°		350° ± 3°	
Mounting type	Servo	Bushing	Servo	Bushing	Servo	Bushing
Shaft guiding	Ball bearings	Sleeve bearings	Ball bearings	Sleeve bearings	Ball bearings	Sleeve bearings
Shaft	Stainless steel					
Housing	Plastic moulding					
Termination	Turrets					
Wiper	Precious metal multi-finger contact					
Starting torque (N.cm)	d 0.2	d 0.5	d 0.2	d 0.5	d 0.2	d 0.5
Torque on stops (N.cm)	50					
Weight (g)	5 ± 2	8 ± 2	13 ± 2	17 ± 2	29 ± 2	34 ± 2
Moment of inertia (g cm^2)	d 0.5		d 1		d 2	

Encoder Enc 22 100 CPT, 2 Channels







Direction of rotation cw (denition cw p. 106)

Stock program
Standard program
Special program (on request)

Part Numbers	103935	110520	110521
Type			
Counts per turn	100	100	100
Number of channels	2	2	2
Max. operating frequency (kHz)	20	20	20
Max. speed (rpm)	12000	12000	12000
Shaft diameter (mm)	3	2	3

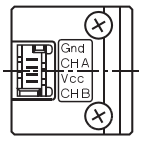
maxon Modular System

+ Motor	Page	+ Gearhead	Page	Overall length [mm] / ● see Gearhead		
RE 25	135/137			68.6		
RE 25	135/137	GP 26, 0.75 - 2.0 Nm	301	●		
RE 25	135/137	GP 32, 0.75 - 4.5 Nm	303	●		
RE 25	135/137	GP 32, 0.75 - 4.5 Nm	304	●		
RE 25	135/137	GP 32, 1.0 - 6.0 Nm	307	●		
RE 25	135/137	GP 32 S	334-336	●		
A-max 19, 1.5 W	154				43.3	
A-max 19, 1.5 W	154	GP 19, 0.1 - 0.3 Nm	288		●	
A-max 19, 1.5 W	154	GS 20, 0.06 - 0.25 Nm	290		●	
A-max 19, 1.5 W	154	GP 22, 0.1 - 2.0 Nm	293/295		●	
A-max 19, 1.5 W	154	GS 24, 0.1 Nm	300		●	
A-max 19, 1.5 W	154	GP 22 S	332/333		●	
A-max 19, 2.5 W	156				45.9	
A-max 19, 2.5 W	156	GP 19, 0.1 - 0.3 Nm	288		●	
A-max 19, 2.5 W	156	GP 22, 0.1 - 2.0 Nm	293/295		●	
A-max 19, 2.5 W	156	GS 24, 0.1 Nm	300		●	
A-max 19, 2.5 W	156	GP 22 S	332/333		●	
A-max 22	158/160				46.3	
A-max 22	158/160	GP 22, 0.1 - 0.3 Nm	291		●	
A-max 22	158/160	GP 22, 0.2 - 0.6 Nm	292		●	
A-max 22	158/160	GP 22, 0.1 - 2.0 Nm	291-295		●	
A-max 22	158/160	GS 24, 0.1 Nm	300		●	
A-max 22	158/160	GP 22 S	332/333		●	
A-max 26	162-168					59.1
A-max 26	162-168	GP 26, 0.75 - 4.5 Nm	301			●
A-max 26	162-168	GS 30, 0.07 - 0.2 Nm	302			●
A-max 26	162-168	GP 32, 0.75 - 4.5 Nm	303			●
A-max 26	162-168	GP 32, 0.75 - 4.5 Nm	304			●
A-max 26	162-168	GP 32, 1.0 - 6.0 Nm	308			●
A-max 26	162-168	GS 38, 0.1 - 0.6 Nm	313			●
A-max 26	162-168	GP 32 S	334-336			●

Technical Data

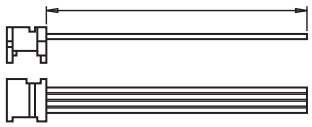
Supply voltage V_{CC}	5 V ± 10%
Output signal	TTL compatible
Phase shift Φ	90°e ± 45°e
Signal rise time (typically, at C_L = 25 pF, R_L = 11 kΩ, 25 °C)	200 ns
Signal fall time (typically, at C_L = 25 pF, R_L = 11 kΩ, 25 °C)	50 ns
Operating temperature range	-20…+85 °C
Moment of inertia of code wheel	≤ 0.05 gcm²
Output current per channel	min. -1 mA, max. 5 mA

Pin Allocation

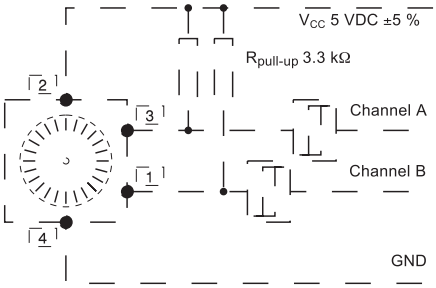


Micromodule contact strip
Type Lumberg MICS 4
Pin 4 GND
Pin 3 Channel A
Pin 2 V_{CC}, Pin 1 Channel B
recommended connectors:
Micromodule connector
Type Lumberg MICA 4

Order number for connector with cable: 3419.506



Connection example

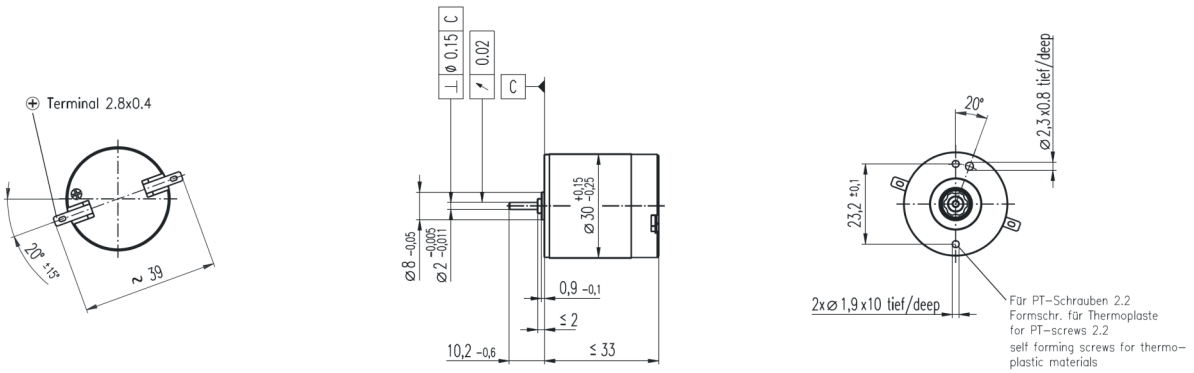


Ambient temperature range ϑ_U = 22 - 25 °C

maxon special program

F 2130 ∅30 mm, Graphite Brushes, 3 Watt

NRND See page 13
Not recommended for New Design



M 1:2

Stock program
Standard program
Special program (on request)

Part Numbers

2130. ... -22.116-050 (Insert winding number)

Winding number		900	903	904	905	906	907	908	910
Motor Data									
Values at nominal voltage									
1 Nominal voltage	V	3	6	6	9	12	12	15	24
2 No load speed	rpm	4220	5260	4190	5470	6050	4920	4990	5140
3 No load current	mA	56.5	31.2	23.5	20.9	17.5	13.5	10.9	6.96
4 Nominal speed	rpm	987	2020	929	2200	2780	1600	1650	1760
5 Nominal torque (max. continuous torque)	mNm	2.41	2.84	2.98	2.97	3.00	3.07	3.08	3.11
6 Nominal current (max. continuous current)	A	0.544	0.332	0.276	0.230	0.189	0.157	0.127	0.0809
7 Stall torque	mNm	3.52	5.01	4.10	5.31	5.87	4.81	4.85	4.96
8 Starting current	A	0.725	0.540	0.353	0.380	0.341	0.228	0.185	0.120
9 Max. efficiency	%	37	51	49	54	57	55	56	57
Characteristics									
10 Terminal resistance	Ω	4.14	11.1	17.0	23.7	35.2	52.5	80.9	200
11 Terminal inductance	mH	0.136	0.496	0.780	1.13	1.71	2.56	3.96	9.87
12 Torque constant	mNm/A	4.85	9.27	11.6	14.0	17.2	21.0	26.2	41.3
13 Speed constant	rpm/V	1970	1030	822	683	555	454	365	231
14 Speed/torque gradient	rpm/mNm	1680	1230	1200	1160	1130	1130	1130	1120
15 Mechanical time constant	ms	72.6	50.6	49.2	46.1	44.5	44.1	43.3	42.1
16 Rotor inertia	gcm²	4.13	3.91	3.91	3.80	3.75	3.71	3.67	3.60

Specifications

Thermal data

17	Thermal resistance housing-ambient	23.1 K/W
18	Thermal resistance winding-housing	13.3 K/W
19	Thermal time constant winding	22.1 s
20	Thermal time constant motor	728 s
21	Ambient temperature	-20…+65°C
22	Max. permissible winding temperature	+85°C

Mechanical data (sleeve bearings)

23	Max. permissible speed	13600 rpm
24	Axial play	0.15 - 0.25 mm
25	Radial play	0.014 mm
26	Max. axial load (dynamic)	0.4 N
27	Max. force for press fits (static)	50 N
28	Max. radial loading, 5 mm from flange	2.0 N

Mechanical data (ball bearings)

23	Max. permissible speed	13600 rpm
24	Axial play	0.15 - 0.25 mm
25	Radial play	0.025 mm
26	Max. axial load (dynamic)	1.0 N
27	Max. force for press fits (static)	24 N
28	Max. radial loading, 5 mm from flange	5 N

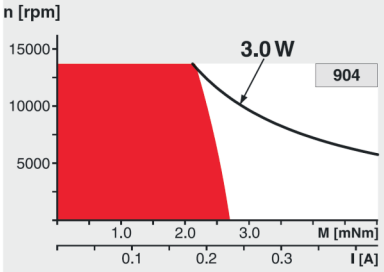
Other specifications

29	Number of pole pairs	1
30	Number of commutator segments	7
31	Weight of motor	63 g

Values listed in the table are nominal.
Explanation of the figures on page 71.

Option
Ball bearings in place of sleeve bearings

Operating Range



Comments

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

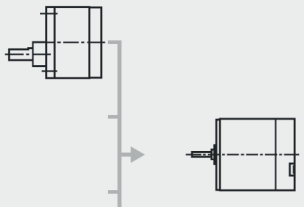
Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

maxon Modular System

Overview on page 20 - 25

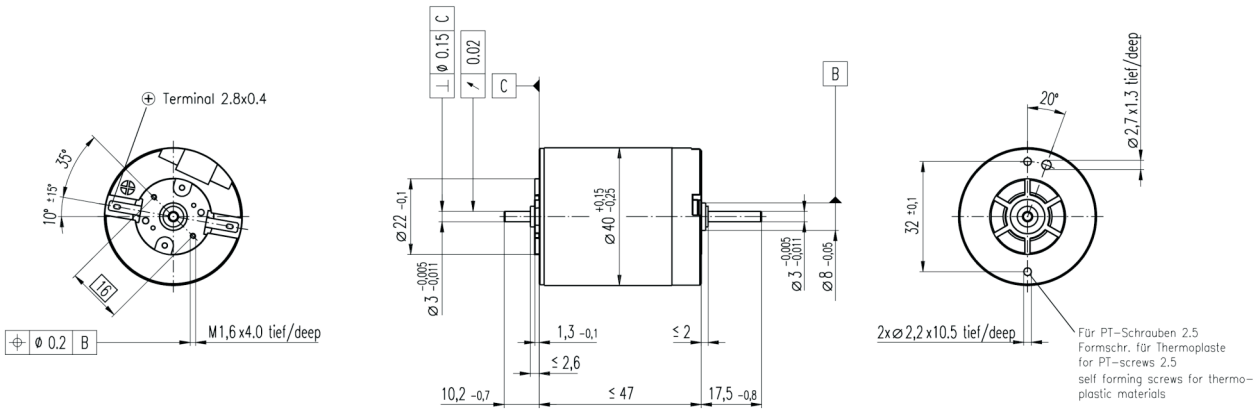
Spur Gearhead
∅30 mm
0.07 - 0.2 Nm
Page 258



Recommended Electronics:

ESCON 36/2 DC	Page 320
ESCON 50/5	321
Notes	**22**

F 2140 ∅40 mm, Graphite Brushes, 6 Watt, CE approved



M 1:2

Stock program
Standard program
Special program (on request!)

Order Number

2140. ... -58.236-050 (Insert winding number)

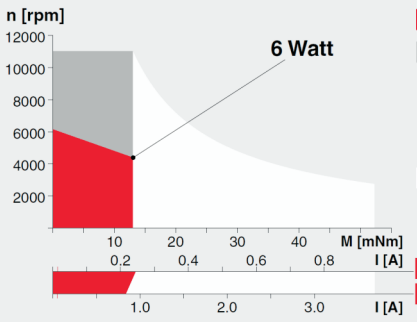
			Winding number	931	932	933	934	935	936	937	939
Motor Data											
1	Assigned power rating	W		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2	Nominal voltage	Volt		6.0	9.0	9.0	12.0	15.0	18.0	24.0	36.0
3	No load speed	rpm		3540	4310	3490	3880	3900	3710	3980	4030
4	Stall torque	mNm		26.3	34.4	27.9	31.2	31.6	29.5	31.9	31.1
5	Speed / torque gradient	rpm / mNm		152	136	136	132	130	132	130	134
6	No load current	mA		56	47	35	30	24	18	15	10
7	Starting current	mA		1830	1870	1230	1130	909	669	578	378
8	Terminal resistance	Ohm		3.28	4.81	7.35	10.7	16.5	26.9	41.5	95.2
9	Max. permissible speed	rpm		11000	11000	11000	11000	11000	11000	11000	11000
10	Max. continuous current	mA		839	691	572	475	384	303	244	162
11	Max. continuous torque	mNm		12.1	12.7	13.0	13.2	13.4	13.4	13.5	13.3
12	Max. power output at nominal voltage	mW		2240	3660	2400	3030	3110	2770	3230	3200
13	Max. efficiency	%		61	66	65	67	68	68	69	70
14	Torque constant	mNm / A		14.4	18.4	22.7	27.8	34.8	44.1	55.2	82.3
15	Speed constant	rpm / V		664	519	420	344	275	216	173	116
16	Mechanical time constant	ms		36	33	33	32	31	31	30	30
17	Rotor inertia	gcm²		22.9	23.5	23.2	23.0	22.7	22.1	22.1	21.1
18	Terminal inductance	mH		0.34	0.56	0.85	1.27	1.99	3.21	5.02	11.20
19	Thermal resistance housing-ambient	K / W		10	10	10	10	10	10	10	10
20	Thermal resistance rotor-housing	K / W		8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
21	Thermal time constant winding	s		43	44	44	43	43	42	42	40

Specifications

- Axial play 0.2 - 0.3 mm
- Max. **ball bearing** loads
  axial (dynamic)
  not preloaded 1.5 N
  preloaded 1.5 N
  radial (5 mm from flange) 7.5 N
  Force for press fits (static) 50 N
  (static, shaft supported) 700 N
- Radial play **ball bearing** 0.025 mm
- Ambient temperature range -20 ... +65°C
- Max. rotor temperature +85°C
- Number of commutator segments 7
- Weight of motor 190 g
- Values listed in the table are nominal.
  For applicable tolerances see page 43.
  For additional details please use the maxon selection program on the enclosed CD-Rom.

Operating Range

Comments Details on page 49



Recommended operating range

Continuous operation
In observation of above listed thermal resistances (lines 19 and 20) the maximum permissible rotor temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit

Short term operation
The motor may be briefly overloaded (recurring).

937 Motor with high resistance winding
931 Motor with low resistance winding

maxon Modular System

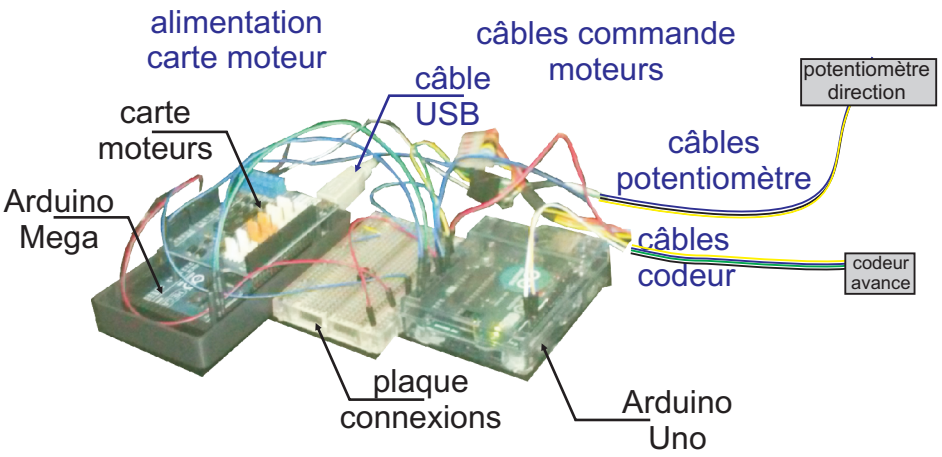
Overview on page 17 - 21

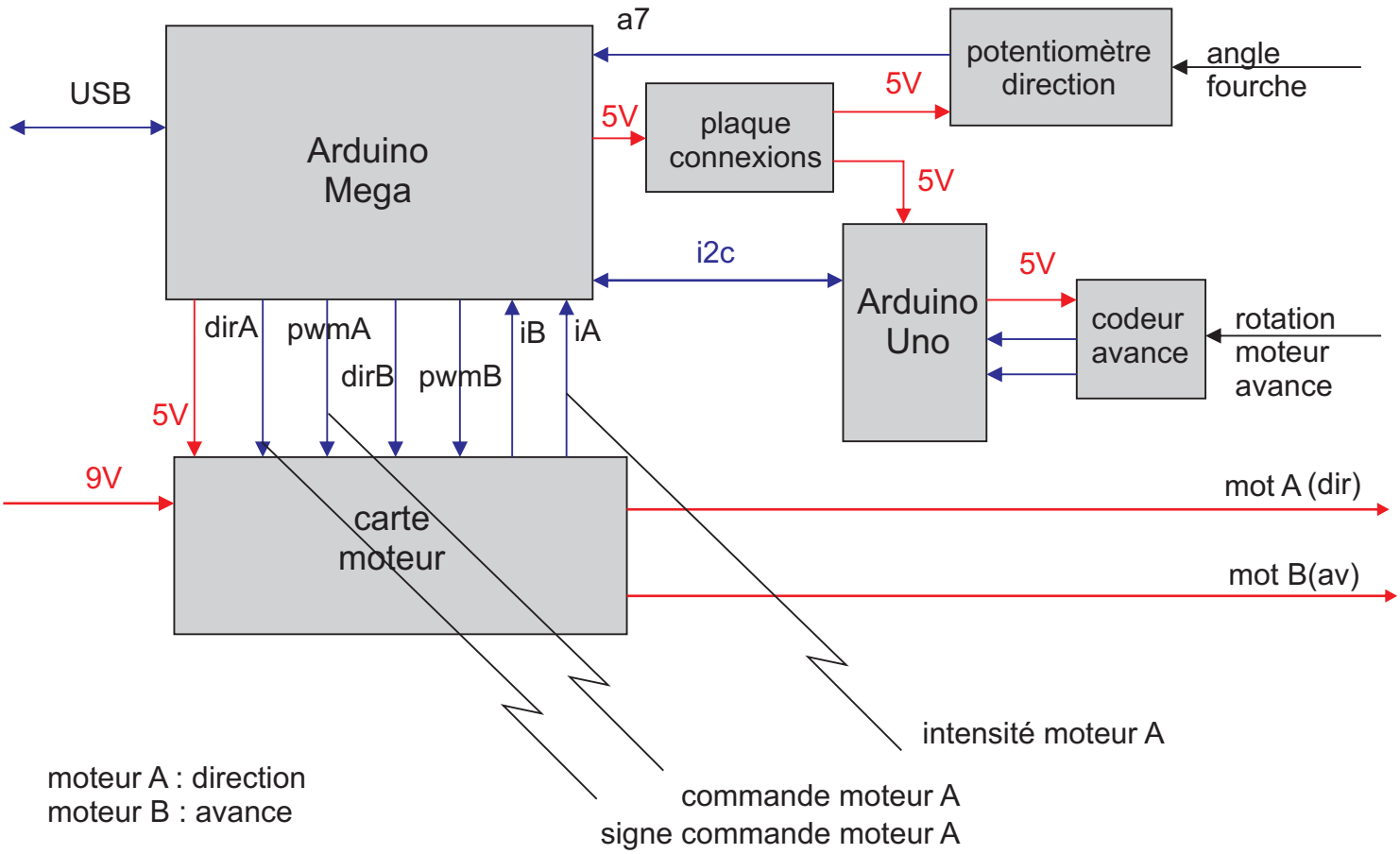
Spur Gearhead
∅38 mm
0.1 - 0.6 Nm
Details page 200

Digital Encoder
22 mm
100 CPT, 2 channels
Details page 215

Recommended Electronics:
LSC 30/2 page 231
MIP 10 245
Notes 17

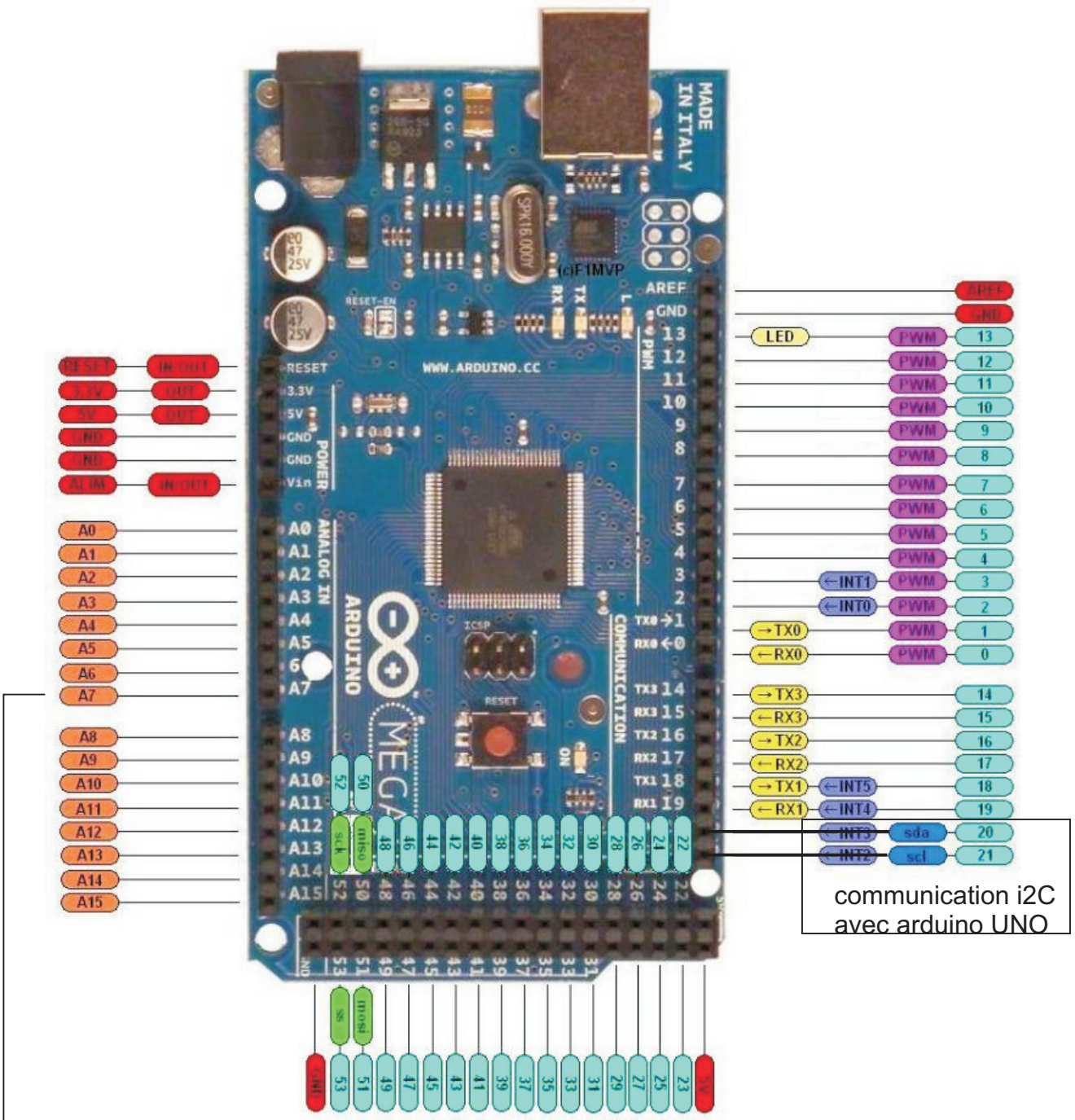
connexions des cartes et capteurs





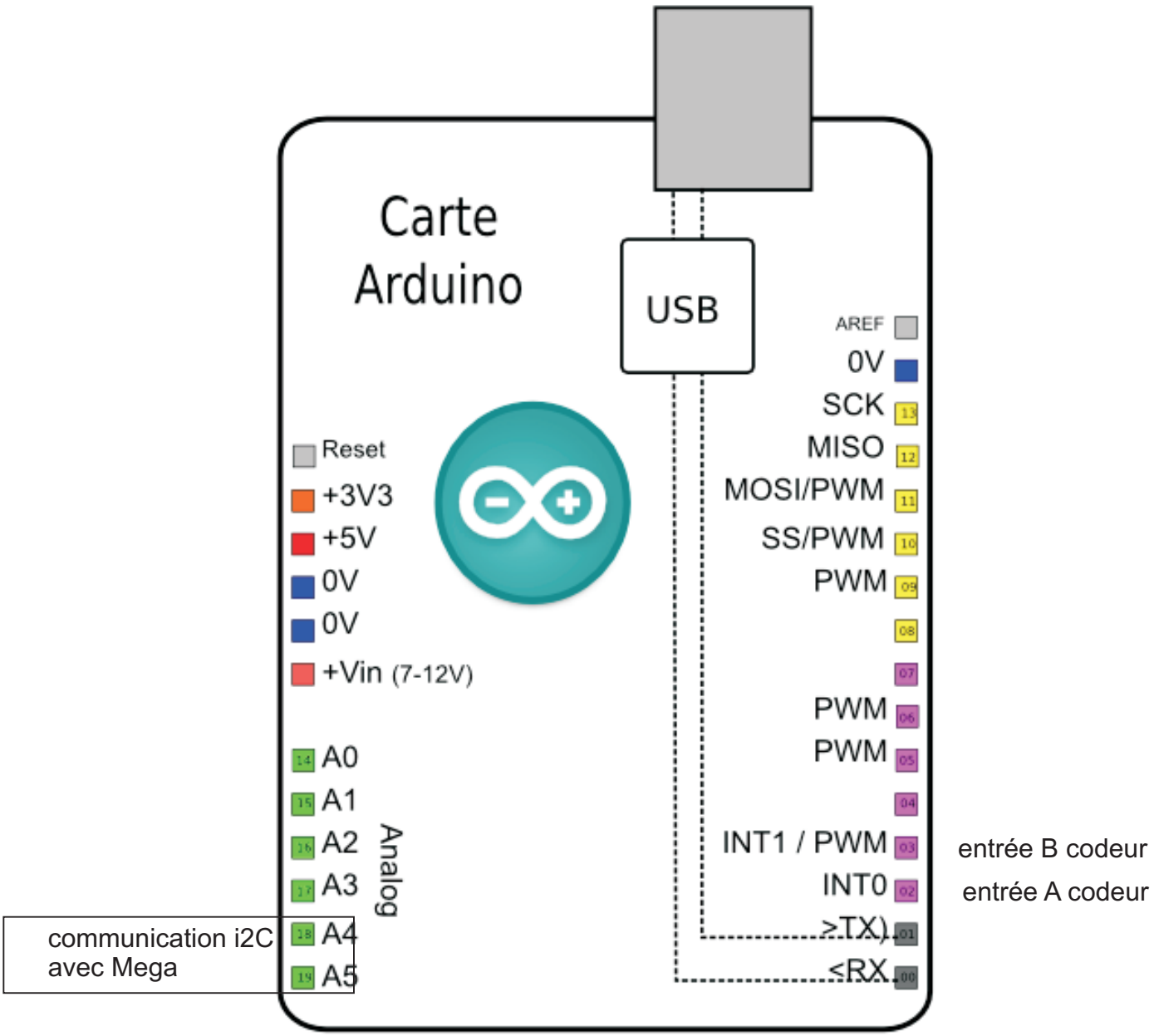
Arduino Mega

usbb pour communication PC



broche reliée au potentiomètre de direction

Arduino UNO


Carte
Arduino
USB
Reset
+3V3
+5V
0V
0V
+Vin (7-12V)
A0
A1
A2
A3
A4
A5
Analog
AREF
0V
SCK
MISO
MOSI/PWM
SS/PWM
PWM
PWM
PWM
INT1 / PWM
INT0
>TX)
<RX
13
12
11
10
09
08
07
06
05
04
03
02
01
00
communication i2C
avec Mega
entrée B codeur
entrée A codeur

Carte moteur :

elle est enfichée sur la carte principale