

Centrifuges for Robot Technology



Centrifuge

4-16R



Refrigerated Centrifuge

4-16KR
6-16KR

SIGMA 4-16R

No. 90662 (220 – 240 V, 50/60 Hz) other power supply on request

- Universal table top centrifuge; speed range up to 13.500 rpm
- Control unit Spincontrol Universal with RS 232
- Various angle and swing-out rotors available
- Maximum capacity of 4 x 650 ml down to microtubes with different adapters in the same bucket
- Maintenance-free induction drive motor
- A Microcontroller controls speed, gravitational field, time
- 2 Motorized lid locks
- Magnetic rotor identification prevents the rotor from overspeeding
- Stainless steel bowl
- Imbalance switch
- Produced according to national and international safety regulations (e.g. IEC 61010)
- Window in the centrifuge lid for external speed control
- Backlighted keys for start, stop, lid open
- No need to open the casing for emergency lid lock release
- hinged lid
- rotors lockable in 4 or 6 position
- each rotor position identifiable

SIGMA 4-16KR

No. 10469 (220 – 240 V, 50 Hz) other power supply on request

- refrigerated version of 4-16R
- Universal refrigerated table top centrifuge; speed range up to 15.000 rpm
- Possibility of precooling the rotors during standstill
- Refrigerant CFC-free (R404a)
- sliding lid (seedrawing)

SIGMA 6-16KR

No. 10862 (220 – 240 V, 50 Hz) other power supply on request

- additional rotor option
- bigger version of 4-16KR
- max. capacity 4 x 800 ml

Created during production. Centrifuge with one rotor		
	Sigma 4-16R	Sigma 4-16KR, 6-16KR
<i>Calibration certificate for speed and time</i>	No. 17714	No. 17714
<i>Calibration certificate for temperature speed and time</i>	–	No. 17715
<i>IQOQ</i>	No. 17710	No. 17711
<i>For a further rotor</i>	No. 17712	No. 17712

4-16R

4-16KR

Rotor No.	max. [min^{-1}]	max. RCF	max. [min^{-1}]	max. RCF
A10-1-1 + 1 x A10-2-2	4.200	3.096	4.700	3.877
A10-1-1 + 2 x A10-2-1	4.200	3.708	4.700	4.643

A10-1-1 Swing-out rotor for 4 buckets no. A10-2-1, A10-2-2

A10-2-2 Bucket for microtiter- and deepwellplates, max. height = 60 mm, 1 set = 4 pcs.

A10-2-1 Round bucket for adapter, (A10-2-5 to -30), 1 set = 2 pcs.

Adapter for bucket A10-2-1, 1 set = 2 pcs.

A10-2-5 26 x 1.5/2.0 ml, max. \varnothing 11 mm, e.g. no. 15008, 15040

A10-2-6 20 x 4 - 7 ml, max. \varnothing 15.5/18 x 50 - 75 mm, e.g. Monovette, Primavette,

A10-2-7 36 x 5 ml, max. \varnothing 12.5 x 60 - 80 mm, e.g. no. RIA tube 15060, hemolyse tubes

A10-2-8 22 x 5 - 6 ml, max. \varnothing 13.5/17.5 x 70 - 90 mm, e.g. no. RIA tube 15060 Vacutainer -, hemolyse tubes

A10-2-9 32 x 7 ml, max. \varnothing 12.5 x 85 - 115 mm, e.g. no. 15007, 15027

A10-2-10 19 x 9 - 15 ml, max. \varnothing 17.2/19.5 x 85 - 115 mm, e.g. no. 15015, 15022, 15023, 15024 and Monovettes 9 - 10 ml

A10-2-11 20 x 10 - 12 ml, max. \varnothing 16.2/18 x 65 - 90 mm, e.g. no. 15000, 15039

A10-2-12 12 x 15 ml culture no. 15115, cap \varnothing max. 23 mm

A10-2-13 15 x 15 ml culture no. 15115 cap \varnothing max. 22 mm*

A10-2-14 8 x 25 - 30 ml, max. \varnothing 25.4/30 x 90 - 115 mm, e.g. no. 15025, 15026, 15029, 15032, 15033

A10-2-15 7 x 30 ml, max. \varnothing 25/31 x 65 - 95 mm, e.g. Barloworld Scientific Ltd.

A10-2-16 7 x 40 - 50 ml max. \varnothing 29/32 x 90 - 115 mm, e.g. 13055, 15051, 15052

A10-2-17 4 x 50 ml, max. \varnothing 35/38 x 90 - 115 mm, e.g. 15056, 15050

A10-2-18 5 x 50 ml culture, e.g. no. 15151, Nunc, Corning, Falcon and Greiner

A10-2-19 5 x 50 ml culture, max. \varnothing 29,4/36 x 90 - 115 mm

A10-2-20 7 x 50 ml culture, max. \varnothing 29/36 x 90 - 115 mm*

A10-2-21 3 x 78 - 85 ml, max. \varnothing 38/40 x 90 - 110 mm, e.g. no. 13085, 15076, 15080

A10-2-22 2 x 100 ml, max. \varnothing 45/47 x 85 - 110 mm, e.g. no. 15100, 15102, 15103, 15106

A10-2-23 1 x 125 ml, max. \varnothing 51 x 90 - 115 mm, e.g. no. 15125

A10-2-24 1x 150 - 200 ml culture angle 88°, max. \varnothing 60 x 120 - 140 mm

A10-2-25 1 x 200 ml approx., max. \varnothing 57 x 90 - 115 mm, e.g. no. 15202,

A10-2-26 1 x 200ml - 250 ml culture, angle 60°, max. \varnothing 61.5 x 140 mm e.g. no. 15175, 15174

A10-2-27 1 x 250 ml, max. \varnothing 61.5 x 90 - 125 mm, e.g. no. 13255, 15247, 15249

A10-2-28 1 x 500 ml, \varnothing 85 x 130 - 173 mm, e.g. no. 15501

A10-2-29 1 x 500 ml culture, no. Corning 431123, angle 75°, \varnothing 96 x 150 mm

A10-2-30 1 x 650 ml, \varnothing 100 x 111 mm, cap 17123

* with rim



A10-1-1



A10-2-18



A10-2-12



A10-2-1



A10-2-7



A10-2-5



A10-2-2



A10-2-29



A10-2-13



A10-2-10



A10-2-14



A10-2-20

6-16KR

Rotor No.	max. [min^{-1}]	max. RCF
A10-1-1 + 2 x A10-2-56	4.700	4.816
A10-1-1 + 1 x A10-2-61	4.700	4.495

A10-2-56 Bucket for adapter A10-2-57 to -60, 1 set = 2 pcs.

A10-2-61 Bucket for microtiter-, filter and deepwellplates, max. height of plates 86 mm, 1 set = 4 pcs.

Adapter for bucket A10-2-56, 1 set = 2 pcs.

A10-2-57 24 x 15 ml culture e.g. no. 15115

A10-2-58 10 x 30 ml, max. \varnothing 25/31 x 65 - 95 mm, e.g. Barloworld Scientific Ltd.

A10-2-59 10 x 50 ml culture e.g. no. 15151

A10-2-60 8 x 50 ml culture, max. \varnothing 29.4/35 x 90 - 115 mm



A10-2-56



A10-2-59



A10-2-57



A10-2-61

Rotor No.	4-16R		4-16KR	
	max. [min ⁻¹]	max. RCF	max. [min ⁻¹]	max. RCF
09250 + 2 x 13215	4.500	4.120	5.100	5.292
09250 + 2 x A10-2-4	4.500	3.622	5.100	4.653
09250 + 2 x 13233	4.500	3.668	5.100	4.711
09250 + 2 x 13234	4.300	3.680	4.300	3.680
09250 + 2 x 13235	4.500	4.302	5.100	5.525
09250 + 2 x 13236	4.500	4.256	5.100	5.467
09250 + 2 x A10-2-3	4.500	4.302	5.100	5.525

09250 Swing-out rotor for 4 buckets no. 13215, A10-2-4, 13233, 13234, 13235, 13236, A10-2-3

1 set = 2 pcs.

13215 Rectangular bucket for adapter no. 18000 - 18200, max. tube length 115 mm

13221 Bucket for microtiter plates, incl. plate holder no. 17979, max. height of plates 56 mm

13233 Multiple carrier for 50 x tubes approx. 5 ml, max. Ø 12.5 x 70 - 90 mm, e.g. RIA tube no. 15060

13234 Multiple carrier for 4 x 100 ml, Ø 45 x 92 - 100 mm e.g. no. 15100, 15102, 15103, 15106, incl. rubber cushion no. 16051

13235 Multiple carrier for 7 culture tubes 50 ml no. 15151

13236 Multiple carrier for 12 culture tubes 15 ml no. 15115

A10-2-3 Round bucket, for round carriers Ø 85 mm (A10-2-31 - A10-2-55)



09250



A10-2-3



A10-2-4



13235



13233



13215



13234



13236

6-16KR

Rotor No.	max. [min ⁻¹]	max. RCF
09250 + 1 x A10-2-61	5.100	5.554

Double rectangular bucket for rectangular carriers A10-2-61 18002 - 18200, max tube 110 mm, 1 set = 4 piece

without cap



A10-2-61

Adapter for bucket A10-2-3, 1 set = 2 pcs.

- A10-2-31** 24 x **0.5/0.75 ml**, max. Ø 8/10 x 28/31 mm, e.g. no. 15005
A10-2-32 20 x **1.5/2.2 ml**, max. Ø 11 mm, e.g. no. 15008, 15040
A10-2-33 12 x **4 - 7 ml**, max. Ø 15.5/18 x 50 - 75 mm, e.g. Monovettes 4 ml
A10-2-34 25 x **5 ml**, max. Ø 12.5/13.5 x 65 - 80 mm, e.g. no. RIA tube 15060, hemolyse tubes
A10-2-35 16 x **5 - 6 ml**, max. Ø 13.5/17.5 x 70 - 90 mm, e.g. no. RIA tubes, 15060, Vacutainer, hemolyse
A10-2-36 16 x **7 ml**, max. Ø 12.5 x 85 - 115 mm, e.g. no. 15007, 15027
A10-2-37 12 x **10 - 12 ml**, max. Ø 16.2/19 x 65 - 90 mm, e.g. no. 15000, 15039
A10-2-38 12 x **10 - 15 ml**, max. Ø 17.2/19.5 x 90 - 115 mm, e.g. no. 15015, 15022, 15023, 15024 and Monovettes 9 - 10 ml
A10-2-39 9 x **15 ml** culture, max. cap Ø 23 mm, e.g. no. 15115, Falcon, Corning and Greiner tubes
A10-2-40 10 x **15 ml** culture, max. cap Ø 22 mm, Falcon, Greiner, tubes
A10-2-41 5 x **25 - 30 ml**, max. Ø 25.4/29 x 85 - 115 mm, e.g. no. 15025, 15026, 15029, 15032, 15033
A10-2-42 5 x **30 ml**, max. Ø 25/31 x 65 - 95 mm, e.g. Sterilin tube, Barloworld Scientific Ltd.
A10-2-43 4 x **40 - 50 ml**, max. Ø 29/34 x 85 - 110 mm, e.g. no. 15051, 15052, 13055
A10-2-44 3 x **50 ml**, max. Ø 35/38 x 90 - 110 mm, e.g. no. 15049, 15050, 15056
A10-2-45 4 x **50 ml** culture, e.g. no. 15151, Nunc, Corning, Falcon and Greiner
A10-2-46 4 x **50 ml** **, max. Ø 29.4/36 x 90 - 120 mm
A10-2-47 1 x **78 - 85 ml**, max. Ø 38/40 x 85 - 115 mm, e.g. no. 13085, 15076, 15080
A10-2-48 1 x **100 ml**, max. Ø 45/50 x 85 - 110 mm, e.g. no. 15100, 15102, 15103, 15106
A10-2-49 1 x **125 ml**, max. Ø 51 x 90 - 115 mm, e.g. no. 15125
A10-2-50 1 x **175 - 250 ml**, max. Ø 57.5 x 90 - 150 mm, e.g. no. 15201, 15206, 15250, 15251, 15254
A10-2-51 1 x **175 - 250 ml** with pointed bottom angle 60°, max. Ø 61.5 x 120 - 165 mm, e.g. no. 15174, 15175, Corning tubes
A10-2-52 1 x **150 or 200 ml** with pointed bottom angle 88°, max. Ø 60 x 120 - 140 mm, e.g. Nalgene 150 and 200 ml
A10-2-53 1 x **200 ml**, max. Ø 57 x 90 - 115 mm, e.g. no. 15202
A10-2-54 1 x **250 ml**, max. Ø 61.5 x 90 - 125 mm, e.g. no. 15247, 15249
A10-2-55 1 x **500 ml**, PP Ø 85 x 135 mm, incl. screw cap*

*Single bottle **with rim



A10-2-35



A10-2-38



A10-2-46



A10-2-35



A10-2-54



A10-2-45



A10-2-55



A10-1-4

32 x 1.5 – 2.0 ml swing out rotor; on request 6 x 1.5 – 2.0 ml

4-16R

4-16KR

<i>Rotor No.</i>	<i>max. [min⁻¹]</i>	<i>max. RCF</i>	<i>max. [min⁻¹]</i>	<i>max. RCF</i>
A10-1-4	12.000	13.523	13.200	16.363

4-16R

4-16KR

Rotor No.	max. [min ⁻¹]	max. RCF	max. [min ⁻¹]	max. RCF
A10-1-2 + 3 x 13127	4.500	4.324	5.100	5.554

A10-1-2 Sixplace rotor for buckets 13127

13127 Rectangular bucket, for rectangular carriers (no. 18002 - 18200), max. tube length 115 mm, 1 set = 2 pcs.

Adapter for bucket 13127, 1 set = 2 pcs.

18002	20 x 1.5/2.0 ml , max. Ø 11 mm, e.g. no. 15008, 15040
18005	20 x 5 ml , flat and round bottom, max. Ø 12.2 x 60 - 75 mm, e.g. no. RIA 15060
18009	20 x 5 - 6 ml , max. Ø 12.8 x 70 - 90 mm, e.g. no. Hemolyse, RIA 15060
18012	12 x 6 - 7 ml , max. Ø 13.5/18 x 65 - 90 mm, e.g. Vacutainer
18010	12 x 10 - 12 ml , max. Ø 16.8/17.5 x 60 - 85 mm, e.g. no. 15000, 15039
18015	12 x 10 - 15 ml , max. Ø 17 x 90 - 105 mm, e.g. no. 15015, 15022, 15023, 15024
18016	4 x 15 ml culture no. 15115
18018	6 x 15 ml culture e.g. no. 15115
18017	10 x 15 ml , max. Ø 17.5/19.5 x 80 - 112 mm, e.g. 15015, 15022, 15023, 15024, Monovettes 9 - 10 ml
18025	5 x 25 ml , max. Ø 24 x 85 - 105 mm, e.g. no. 15025, 15026
18030	5 x 27 - 30 ml , max. Ø 25.4/27.5 x 80 - 110 mm, e.g. no. 15029, 15032
18022	2 x 30 ml , max. Ø 25/31 x 65 - 95 mm, Barloworld Scientific Ltd.
18051	2 x 40 - 50 ml , max. Ø 29/35 x 80 - 110 mm, e.g. no. 13055, 15051, 15052
18050	2 x 50 ml , max. Ø 35/38 x 85 - 110 mm, e.g. no. 15049, 15050, 15056
18052	2 x 50 ml culture no. 15151
18053	2 x 50 ml culture* max. Ø 29.5/36 x 85 - 118 mm
18085	1 x 78 - 85 ml , max. Ø 38/40 x 85 - 112 mm, e.g. no. 13085, 15076, 15080
18100	1 x 100 ml , max. Ø 45.5/48 x 85 - 110 mm, e.g. no. 15100, 15102, 15103, 15106
18125	1 x 125 ml , max. Ø 51 x 90 - 120 mm, e.g. no. 15125
18250	1 x 175 - 200 ml , max. Ø 57 x 90 - 137 mm, e.g. no. 15201, 15206
18200	1 x 200 ml , max. Ø 57 x 90 - 115 mm, e.g. no. 15202

* with rim



A10-1-2



18007



18005



13127



18100



18050



18025



18015



18200



18052



18016



18012

4-16R

4-16KR

Rotor No.	max. [min ⁻¹]	max. RCF	max. [min ⁻¹]	max. RCF
A10-1-3 + 13218	5.700	5.013	5.700	5.013

A10-1-3 Swing-out rotor for microtiter plates complete, incl. 2 carriers no. 13218 max. height of plates 80 mm

13218 Bucket for microtiter plates, max. height of plates approx. 80 mm, 1 set = 2 pcs.

A10-1-3



13218



A10-1-6



A10-1-8



A10-1-11



A10-1-12



1.5 ml 2 ml 10 ml 15 ml 30 ml 50 ml 50 ml 50 ml 85 ml 85 ml 250 ml

4-16R

<i>Typ</i>	<i>Rotor No.</i>	<i>tubes</i>	<i>max. [min⁻¹]</i>	<i>max. RCF</i>
30 x 1.5-2.0 ml	A10-1-5	15008, 15040	13.500	20.376
100 x 1.5-2.0 ml	A10-1-6	15008, 15040	9.000	14.761
20 x 10 ml	A10-1-7	15000, 15039	12.500	17.119
24 x 15 ml Culture	A10-1-8	15115	10.000	15.531
12 x 30 ml	A10-1-9	15029, 15032	12.500	19.216
8 x 50 ml	A10-1-10	15051, 15052	12.500	16.770
8 x 50 ml Culture	A10-1-11	15151	12.500	18.168
6 x 85 ml	A10-1-12	15076, 15080	12.500	17.119
6 x 250 ml	A10-1-13	13255, 15247, 15249	8.000	10.375

Angle rotors in centrifuges 4-16KR, 6-16KR with sliding lid on request

Spincontrol Universal



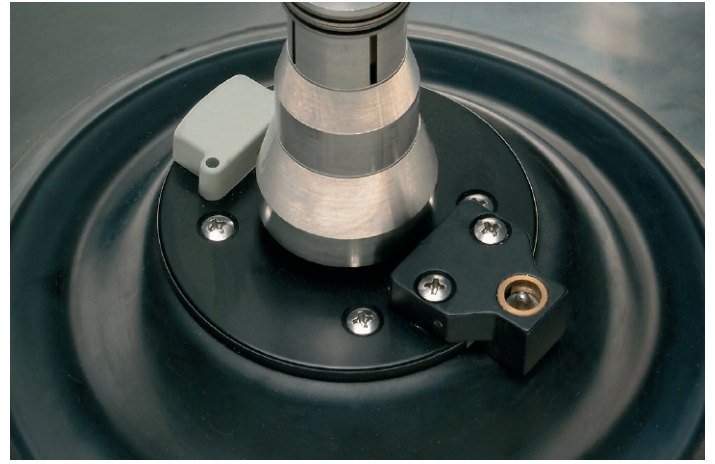
Spincontrol Universal

Display	Grafic LCD
Permanent display preselected, current values	+
Timer	10 sec - 11h 59 min
Time increments [sec]	60 or 1
Short run	+
Continous run	+
Speed increments [rpm]	100 or 1
Display speed and g-force	+
G-force increments [xg]	10 or 1
Temperature increments [°C] ¹	1
Standstill cooling, switchable ¹	+, +
Rapid cooling program: Rapid_cool ¹	+
Programs	50
Linear acceleration curves	2
Linear deceleration curves	2
Brakeless	+
Accoustic signal, switchable	+, +
Optical display stillstand	+
All rotors pre programmed	+
speed, g-force, radius	
Controlunit lockable	+

¹ only in 4-16KR, 6-16KR



Rotor positioning device



Time periods

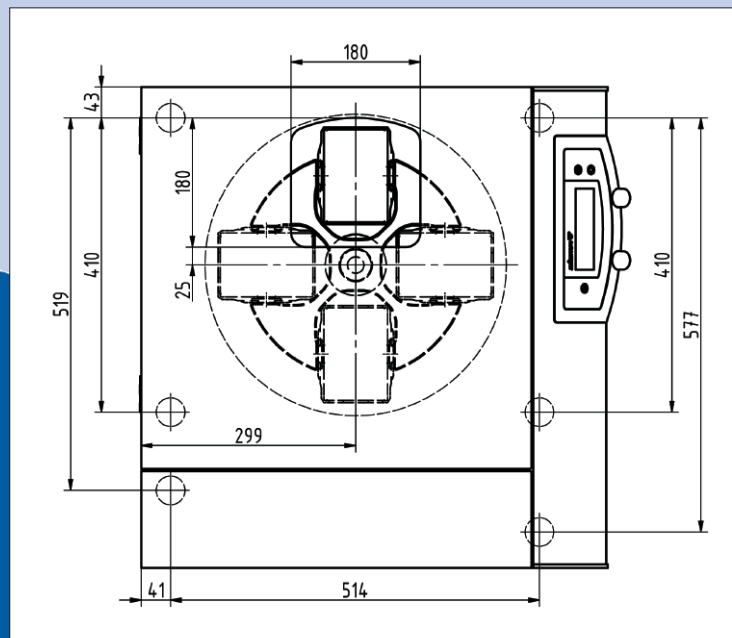
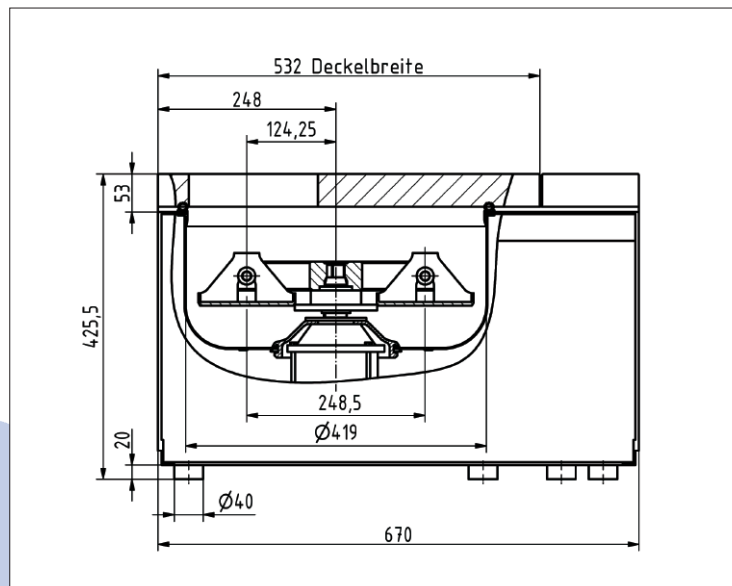
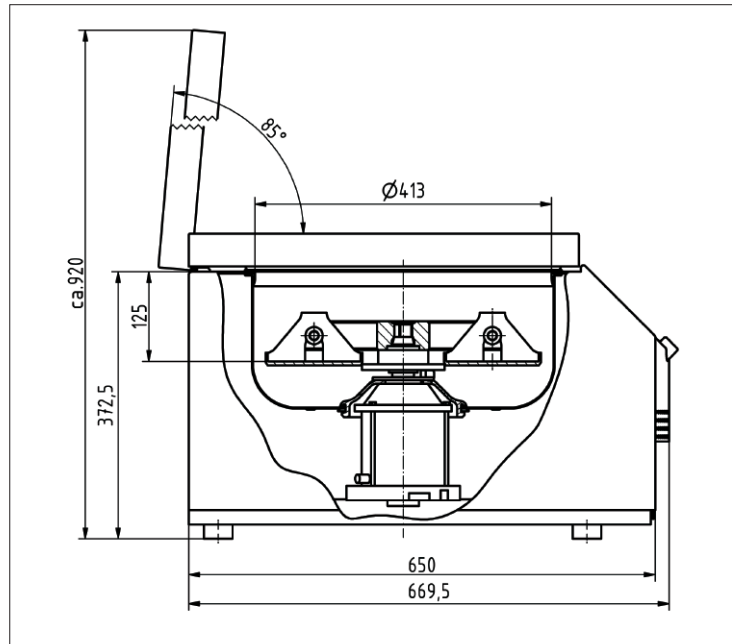
<i>4-16R hinged lid open-close</i>	<i>14 sec</i>
<i>4-16KR; 6-16KR sliding lid open-close</i>	<i>14 sec</i>
<i>Positioning of rotor: depending on rotor an position</i>	<i>6–14 sec</i>

4-16KR; 6-16KR: Positioning of rotor possible with open sliding lid.

on request

- *centrifuge for other power supply*
- *water cooling*
- *inert package*
- *customized rotors and adapters for other tubes*

Sigma 4-16KR



Serial control interface specification

Example page 4 - available on request

V 0.2

SERIAL CONTROL INTERFACE SPECIFICATION

SIGMA 

4.1 User commands

The following categories of user commands are available:

- control commands
- commands to change **setpoints** (*OUT_SP_n y*)
- commands to request **setpoints** (*IN_SP_n*)
- commands to request **process values** (*IN_PV_n*)
- commands to change **parameters** (*OUT_PAR_n y*)
- commands to request **parameters** (*OUT_PAR_n*)
- other commands

4.2 Control commands

These commands cause an immediate action.

start	starts the centrifuge with the set values
stop	stops the centrifuge with the preadjusted deceleration
fstop	stops the centrifuge with the maximal deceleration
door	opens the door (only possible when the rotor is stationary)
reset	resets the centrifuge. This command has the same effect as power-on
reseterr	resets an error or warning message

4.3 Commands to change the setpoints

setspeed	or	OUT_SP_1	sets the speed
settemp	or	OUT_SP_2	sets the temperature
settime	or	OUT_SP_3	sets the runtime

4.4 Commands to request process values

speed	or	IN_PV_1	requests the actual rotor speed
temp	or	IN_PV_2	requests the actual temperature
time	or	IN_PV_3	requests the remaining time

4.5 Commands to request setpoints

getsetspeed	or	IN_SP_1	requests the set rotor speed
getsettemp	or	IN_SP_2	requests the set temperature
getsettime	or	IN_SP_3	requests the set time



17927 Trolley for 4-16R
(w x d x h) (490 x 647 x 497 mm)



17926 Trolley for 4-16KR
(w x d x h) (650 x 647 x 497 mm)

Technical data	4-16R	4-16KR	6-16KR
Power consumption [W]	1,680	2,280	2,280
Max. capacity [ml]	4 x 650	4 x 650	4 x 800
Max. speed [rpm]	13,500	15,000	15,000
Min. speed [rpm]	100	100	100
Interference suppression	EN 61326	EN 61326	EN 61326
Height x Width x Depth [mm]	489 x 496 x 650	426 x 670 x 650	448 x 792 x 686
Height with open lid [mm]	940	–	–
Weight without rotor [kg]	87	134	168
Kinetic energy max. [Nm]	50.486	63.897	154.007
Noise level at max. speed (approx.)			
Rotor A10-1-5 at 13.500 rpm [dB (A)]	58	62	62
Rotor 09250 at 4.500 rpm [dB (A)]	66	59 ²	59 ²
Max. acceleration rotor A10-2-3 [sec]	24 ¹	41 ²	41 ²
rotor A10-1-13 [sec]	75 ³	55 ⁴	55 ⁴
Max. acceleration rotor A10-2-3 [sec]	29 ¹	43 ²	43 ²
rotor A10-1-13 [sec]	58 ³	73 ⁴	73 ⁴
Temperature setting range	–	-20°C – +40°C	-20°C – +40°C
Min. rotor temperature *)			
Rotor 09250 5.100 rpm *) [°C]	–	4	4
Rotor A10-1-13 9.000 rpm *) [°C]	–	4	4

¹4.500 min⁻¹ · ²5.100 min⁻¹ · ³8.000 min⁻¹ · ⁴9.000 min⁻¹



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