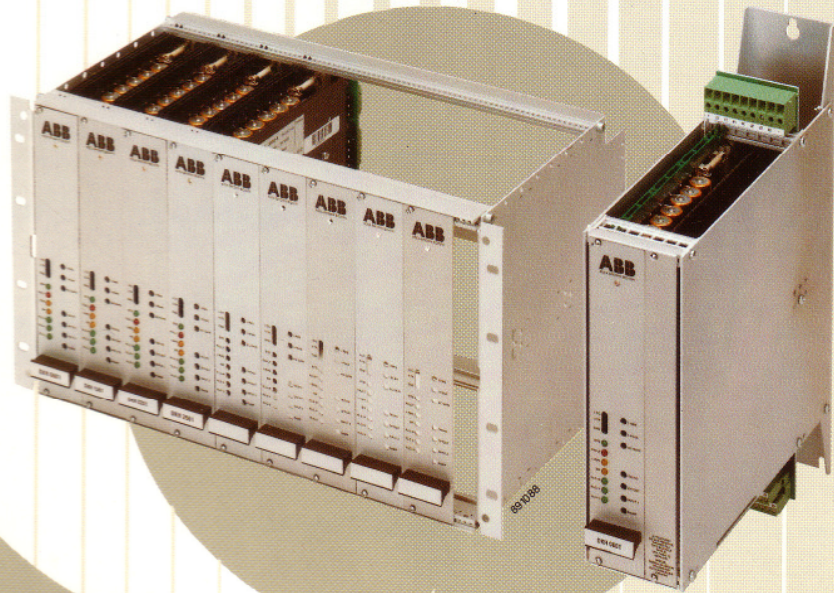


Planning Catalogue/  
Operating Instructions

AXODYN®  
Speed Regulators for  
Brushless DC Servo Drives  
with Permanent-Magnet Motors  
4-Quadrant Operation

Publication No.  
D ANT 4003 90 E

**Series**  
**DKH(-E) 0601....5001**

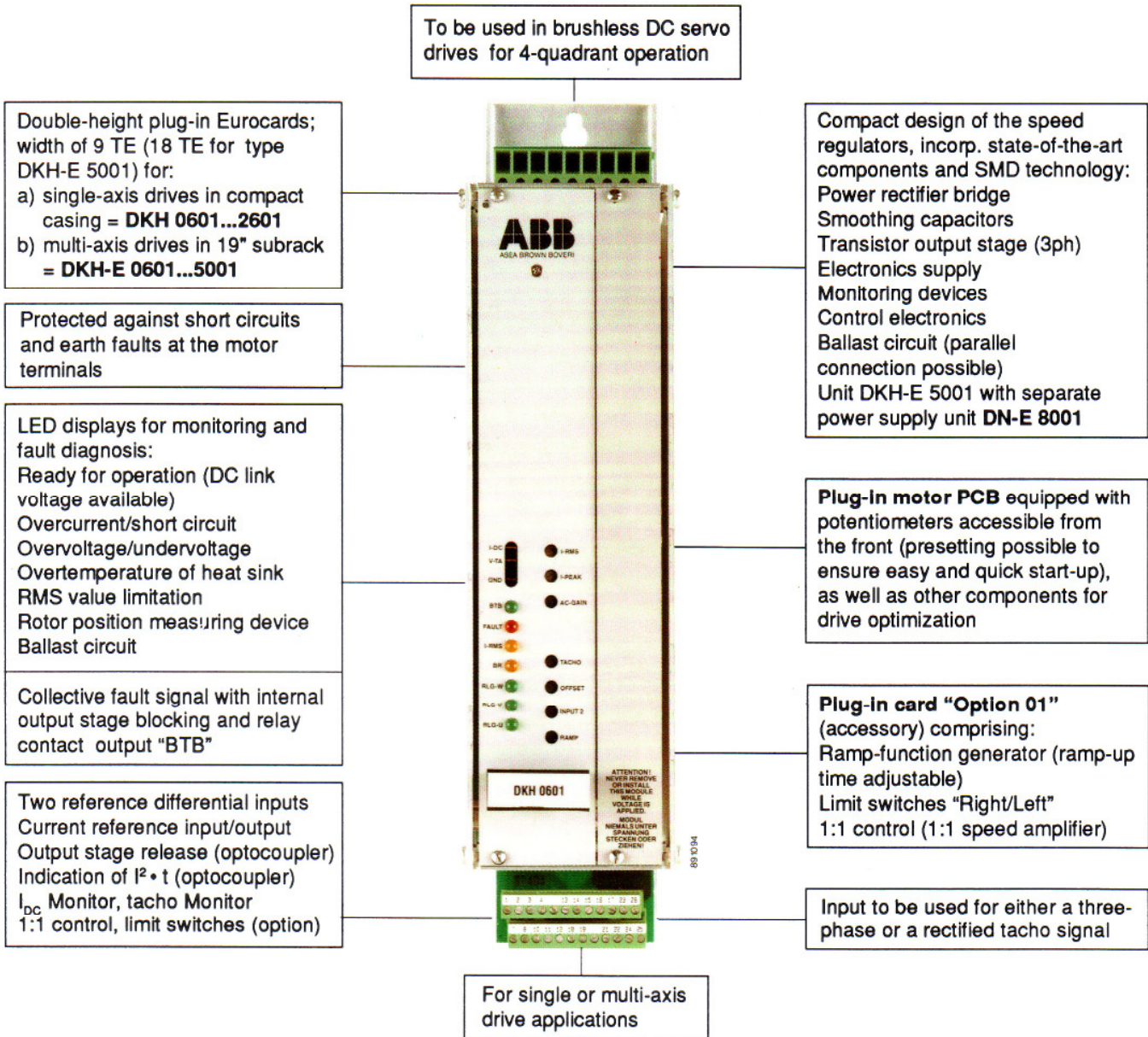


**ABB**  
**Servo drives**  
*dynamic*  
*accurate*  
*reliable*

**ABB Drives**

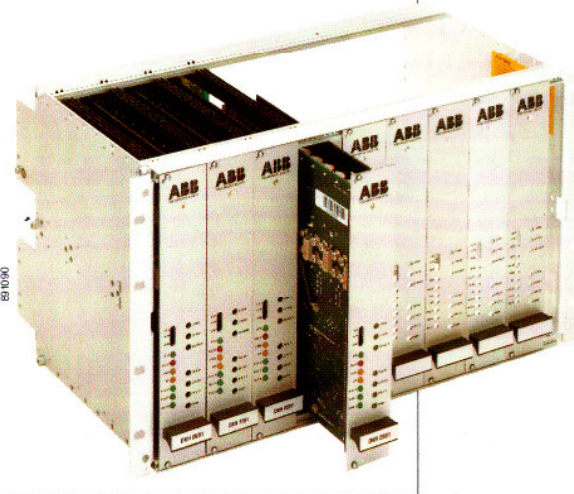
**ABB**  
ASEA BROWN BOVERI

# AXODYN® speed regulators, series DKH(-E) 0601....5001



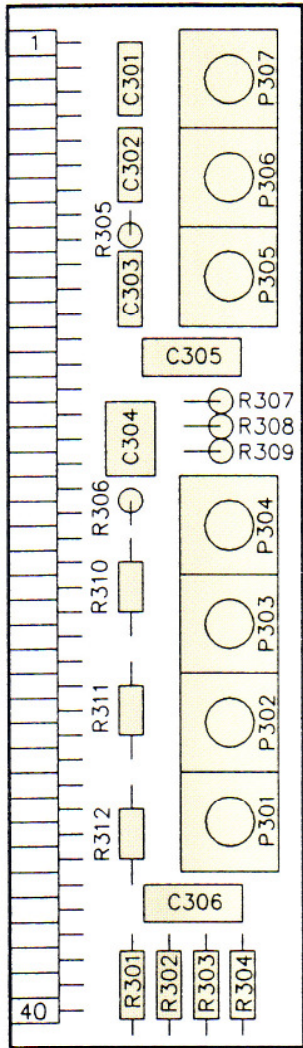
DKH unit in compact casing

DKH-E units in 19" subrack



Speed regulators with  $I_N/I_H$  6/15 ... 50/100 A for brushless DC permanent-magnet motors of extended-rotor or printed-circuit "pancake" design with trapezoidal EMF

## 7.5.1 Motor PCB for series DKH(-E) 0601....2601

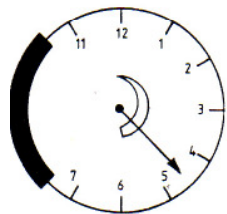


Designation	Function of components	Presetting/standard components
<b>I-RMS-Pot P307:</b>	Setting of $I^2 \cdot t$ (RMS current) limitation (0 ... $I_N$ )	To about rated motor current; see table below
<b>I-PEAK-Pot P306:</b>	Setting of dyn. high current $I_H$ (0 ... $I_H$ )	To plant requirements or motor high current; see table below
<b>AC-GAIN-Pot P305:</b>	Setting of P component of speed controller	To left-hand stop by turning in anti-clockwise direction ( $\rightarrow$ min. P amplification); refer to chapter 8 "Start-up instructions"
<b>C304 (305): R307 (308):</b>	I component of speed controller P component of speed controller	C304 = 0.1 $\mu$ F (as delivered by ABB) R307 = 100 kOhms/47 kOhms for type DKH(-E) 0601 (as delivered by ABB)
<b>R305 / C302</b>	R-C elem. of current controller	As delivered by ABB
<b>TACHO-Pot P304:</b>	Fine adjustment of tacho feedback (setting range $\pm 30\%$ )	To right-hand stop in clockwise direction ( $\rightarrow$ min. speed about $n_{rated} \times 0.7$ )
<b>OFFSET-Pot P303:</b>	Offset voltage balancing (setting range $\pm 10$ mV)	Balancing to zero speed of motor to be performed during start-up
<b>INPUT2-Pot P302:</b>	Adaptation of reference differential input SW2	To right-hand stop in clockwise direction ( $\rightarrow$ max. speed for reference differential input SW2); refer to chapter 7.3 "Analog inputs/outputs"
<b>RAMP-Pot P301:</b>	Ramp-function generator (only active with card "Option 01") P301 = Setting of ramp-up time	
<b>C306:</b>	C306 = Setting of ramp-up time	C306 = 10 nF (as delivered by ABB) $\rightarrow$ ramp-up time 100 ms if P301 is set to left-hand stop (refer to chapter 7.6)
<b>R301...304: (0.5 %)</b>	Tacho standardization (depending on tacho voltage)	R301...304 = about 1 kOhm per 1 V of tacho voltage at max. speed (as delivered by ABB; refer to motor data sheet)

### Setting of I-PEAK and I-RMS

The following table serves for coarse adjustment of I-PEAK and I-RMS during start-up; for accurate setting refer to chapter 8 "Start-up instructions".

Potentiometers P306 (I-PEAK) + P307 (I-RMS)  
Illustration of pot. with DKH(-E) unit installed, front view (setting in h):



Pot. setting as delivered by ABB: right-hand stop (7.30 h)

Pot setting in h	Setting of dyn. high current in A Potentiometer P306 (I-PEAK)				Setting of RMS current in A Potentiometer P307 (I-RMS)			
	0601	1201	2201	2601	0601	1201	2201	2601
Right-hand stop	15	30	50	50	6	12	22	26
7	14,5	29	49	49	6	11,5	22	25
6	13	26	43	43	5,5	11	21	23
5	11	22,5	37	37	5	10	19	20,5
4	9	19	31	31	4,5	9,5	17	18
3	7,5	15	25	25	4	8,5	15	16
2	5,5	11	19	19	3,5	7,5	13	14
1	3,5	7	13	13	3	6,5	11	12
12	2	3	7	7	2,5	5,5	9	10
11	(0,5)	(1)	(2)	(2)	(2)	(4,5)	(7)	(8)
Left-hand stop	0	0	0	0	0	0	0	0

**General table of AXODYN® speed regulators of series DKH(-E) \*)**

AXODYN® speed regulators	Input values		Output values			Max. power loss (approximate value)		
	Supply voltage 50/60 Hz	Current (at $I_N$ )	Rated DC voltage	Rated current	Dyn. high current	Series DKH(-E) units without ballast circuit	Ballast circuit thermal	Ballast circuit dynamic
Type ⑨	$\frac{U}{\sqrt{3}ph}$ ①	$\frac{I_{RMS}}{A}$	$\frac{U_{AN}}{V DC}$ ②	$\frac{I_N}{A}$ ③	$\frac{I_H}{A}$ ④	$\frac{P_V}{W}$ ⑤	$\frac{P_{V\theta therm}}{W}$ ⑥	$\frac{P_{V\theta dyn}}{kW}$ ⑦
DKH(-E) 0601	172	4	240	6	15	45	135	5.4
DKH(-E) 1201	172	8	240	12	30	85	135	5.4
DKH(-E) 2201 ⑧	172	14	240	22	50	140	135	5.4
DKH(-E) 2601 ⑧	172	16	240	26	50	170	135	5.4
DKH-E 5001 ⑧	(240 V-)	(33 A-)	240	50	100	280	-	-
+DN-E 8001 ⑧	172	65	240	80	160	200	375 ⑩	27.3 ⑩

① Rated unit supply voltage; for permissible line voltage fluctuations, etc. refer to item "General" in chapter 2

② Rated DC voltage of DC link at rated load; in this case, the motor supply voltage between 2 phases about 160 V (RMS value)

③ At unobstructed convection cooling/ventilation and for a vertical mounting position; for form factor, scope of unit data, etc. refer to the item "General" in chapter 2

④ Maximum duty cycle  $t$  for a load cycle  $0 \rightarrow I_H \rightarrow I_N$ :

$$t \leq \frac{20 \text{ s}}{(I_H/I_N)^2}$$

⑤ Power loss at rated current incl. internal electronics supply (refer to ⑥); power loss with the output stage blocked about 12 W (for type DKH-E 5001 units about 20 W)

⑥ Continuous power loss

⑦ Peak value of power loss for max. duty cycle  $t = 1 \text{ s}$  at  $ED_{max} = 1.2 \%$  without fan (9 % with fan);  $ED = \text{c.d.f. (cyclic duration factor)}$

⑧ With separate ventilation

Fan supply:

In the case of series DKH 2201/2601 units, the fan (rating about 11 W) is internally connected with the power section's supply system.

The fan unit of series DKH-E 2201/2601/5001 and DN-E 8001 units has a separate connection of 220 V/1ph, 50/60 Hz (also refer to chapter 6 "Planning advice")

⑨ Units are designed for installation in cubicles, degree of protection IP00

⑩ Separate braking resistor required (3.3 Ohms/375 W); ballast circuit integrated in power supply unit DN-E 8001. For separately ventilated units, continuous rating of the ballast circuit can be increased up to max. 5 kW by using adequately rated resistances; in this case an internal adaptation of resistor R616 will be necessary (upon request).

**\*) Note:**

More detailed information on the individual series of motors is given in the appertaining data sheets (incl. tables of drive packages, functions of terminals, connection examples, etc.)!