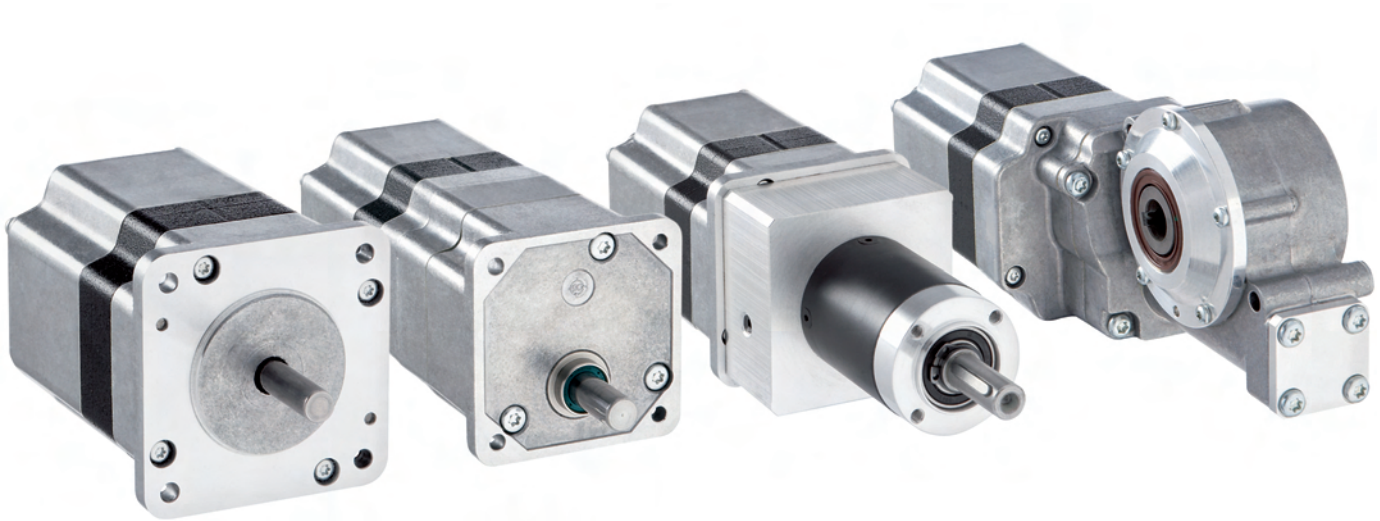
Intelligent Compact Drives IclA N065

Catalogue

January 2009



BERGER LAHR

Schneider Electric

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Product description

The IclA N065 intelligent compact drives are servo drives based on an electronically commutated three-phase synchronous motor, referred to as an EC motor, and a block-commutated positioning controller. Power and control electronics with fieldbus terminal, motor, position sensor and gearing are integrated in the compact unit.

Areas of application

The compact drives are designed primarily for automatic positioning of format axes during setup of production machines or for point-to-point positioning of handling systems.

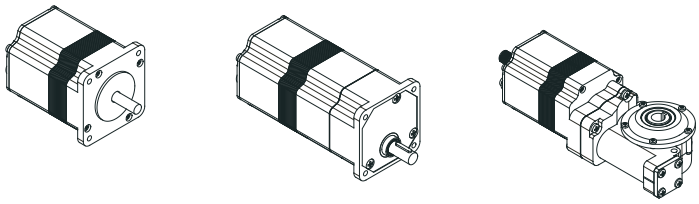
Special features

- Compact construction
- Low wiring requirements
- Integrated positioning and speed control functions as specified by CiA profiles DS301 and DS402
- Fieldbus interface
- High power density
- High availability
- 4 gearing models
- Gearing options: spur wheel gearing, angular worm gearing, planetary gearboxes (accessory)

The magnetisation of the motors guarantees high detent torque, making it unnecessary to use a holding brake in many applications. The motors have an internal resolution of 12 increments per revolution. Spur wheel gearing and angular worm gearing are available. The intelligent compact drives can also be equipped with planetary gears (see accessories).

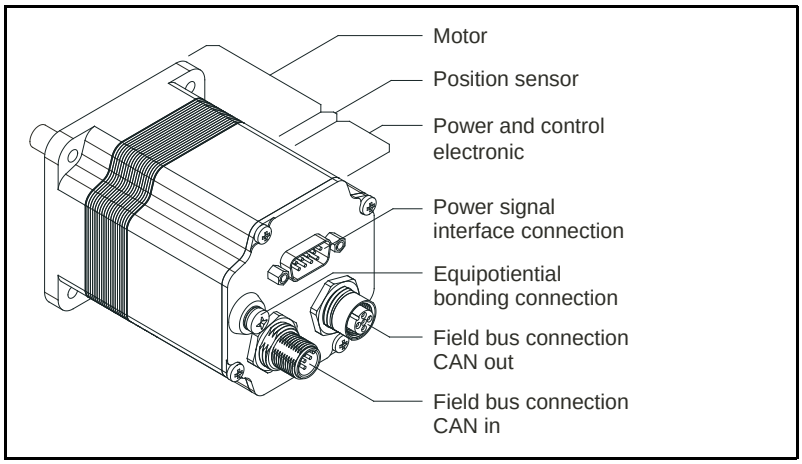
Product offer

without gearing	with spur wheel gearing	with angular worm gearing



IclA N065 without gearing

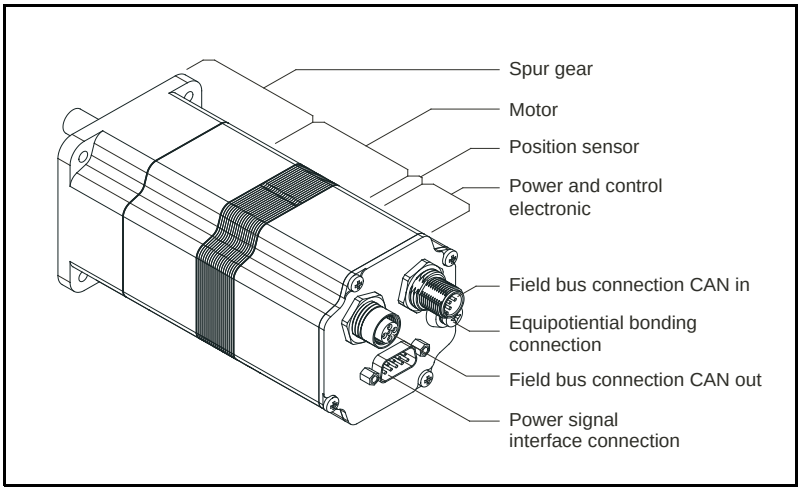
The electronically commutated three-phase synchronous motor in combination with the rare-earth magnets offers outstanding power density and very high efficiency. The motors have a high detent torque, making it unnecessary to use a holding brake in most cases. The motors have an internal resolution of 12 increments per revolution.



IclA N065 0-000 intelligent compact drive as direct drive

IclA N065 with spur wheel gearing

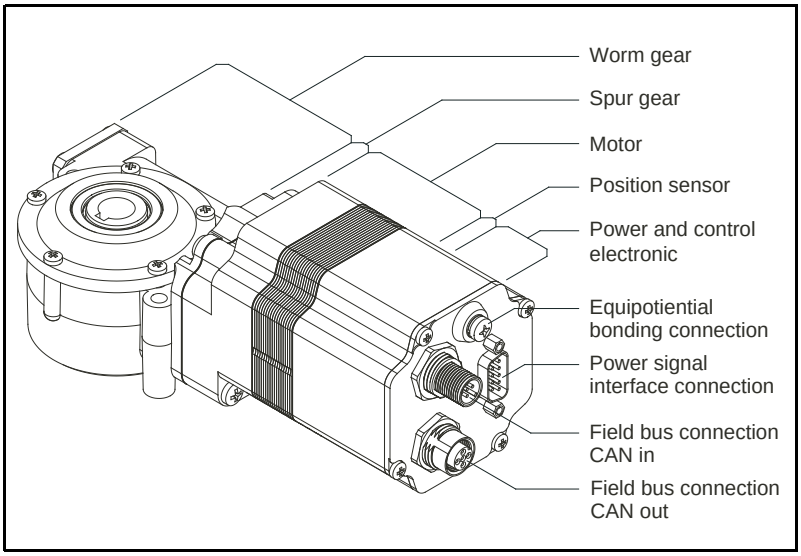
The IclA N065 V-••• compact drive is fitted with a 2, 3 or 4-ratio spur wheel gearing. The gear teeth are metal and fitted with needle bearings. An important feature is the high power density, the low torsional backlash and the compact length of the drive system with spur wheel gearing.



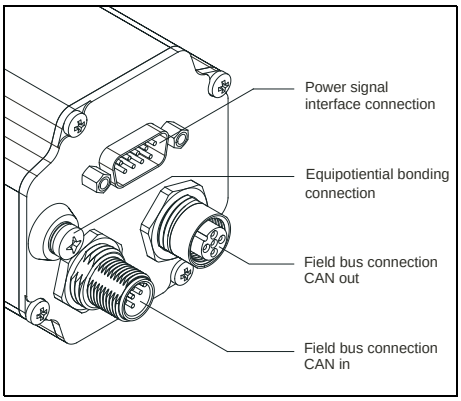
IclA N065 V-••• intelligent compact drive with spur wheel gearing

IclA N065 with angular worm gearing

IclA N065 U-••• compact drive is fitted with a 1 or 2-ration spur wheel gearing and angular worm gearing. The drive systems with angular worm gearing have minimum torsional backlash and very high output torque. The spur wheel and worm reduction combination can be set according to the application for high efficiency values up to self-locking. This type of gearing often proves suitable for implementation of compact and complex installation situations.



IclA N065 U-••• intelligent compact drive with angular worm gearing



Connections

Overview

Connections of the IclA N065 intelligent compact drives:

- Signal interface
- Connection for equipotential bonding conductor
- CAN fieldbus interface

Signal interface

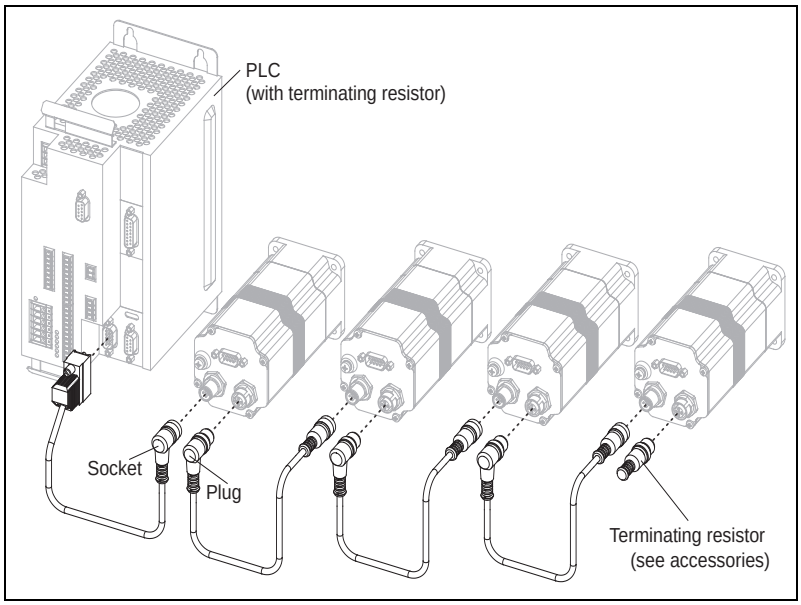
The signal interface is a 9-pin SubD connector and has the following functions:

- supply voltage connection
- power for manual mode control signals
- connection for enable signal
- power connection for signal interface

CAN fieldbus interface

CAN in input
The "CAN in" input for the CAN fieldbus is a 5-pin M12 flange connector.

CAN out output
The compact drive also has a 5-pin M12 flange socket for networking the CAN fieldbus. Additional network devices can be connected here.



Networking of four IclA N065 with a PLC

Functions

Operating modes

Overview

The following operating modes can be set with signals:

- Jog

The following operating modes can be set via fieldbus:

- Jog
- Homing
- Profile position
- Speed control mode

Jog

Jogging via signals
In manual operation using signals the compact drive moves at an adjustable speed within the referenced work stroke. The direction of movement and the jog or continuous operation operating modes are preset over two signal inputs.

Jog via fieldbus
In manual operation via fieldbus the compact drive can also be moved clockwise or counterclockwise within the homing range. The direction of motion and the speed are specified over the fieldbus.

Homing

The compact drive must be homed for "Manual Operation" and "Profile Position" operating modes. The homing specifies three limit switch points for every direction of motion. The compact drive monitors them continuously for overshoot. A homing is also retained after switching the compact drive off and on if the drive was not rotated when the power was off.

Profile position

In "profile position" operating mode the homed compact drive can be moved from point A to point B. A trapeze profile is specified; application-specific trapeze profiles with values for final speed with acceleration and deceleration ramps can be saved in nine additional parameter sets.

Speed control mode

In "speed control" operating mode travel commands are processed via the fieldbus. In this operating mode the drive requires homing if the software limit switches are used. The function of the software limit switches can be disabled by setting parameters of all software limit switches to the minimum or maximum range limits. The compact drive can then also be moved in speed control mode without homing. The reference value of a travel command is the set speed of the drive movement. The acceleration and braking ramp is parameterised and can be adjusted for the specific application.

Operating functions

Communication configuration

Communication parameters of the compact drive can be set for data exchange over fieldbus.
In the CANopen network the baud rate and node number parameters can be modified with LSS (Layer Setting Services).

Configuration mode

Parameter values for the compact drive can only be set via the fieldbus. The configuration mode offers the option of adjusting the compact drive for the operating conditions.

ENABLE

The "ENABLE" function is triggered by a fieldbus command (1st channel) or by interruption of the control signal ENABLE (2nd channel).
The current travel command is cancelled in different ways.
In the case of the fieldbus command an error flag is set and the motor is brought to a standstill with the Quick Stop ramp.
The interruption of the emergency stop control signal ENABLE triggers a time-delayed deactivation of the power electronics. The compact drive is braked at maximum power. After elapse of the delay time the power electronics are disabled. The error flag is set.

Additional operating functions

Various operating functions provide protection against damage and malfunctions:

- Start diagnosis at Power On (self-test of the integrated electronics)
- Current limiting
- Overload monitoring
- Voltage monitoring
- Temperature monitoring
- Start-up error detection
- Rotational speed monitoring
- Block movement detection
- Commutation error and Hall sensor error detection
- Protection against externally applied acceleration
- Electronic log-book
- Watchdog (program sequence monitoring)

IclA N065 without gearing

Technical data

Pole pair count p		2
Nominal voltage U_{DC}	V	24
Nominal speed n_N	1/min	4350
Nominal current $I_{N\ DC}$	A	3.79
Nominal output P_N	W	71
Nominal motor torque M_N	Nm	0.155
Ready-for-operation current I_0	A	0.09
Max. phase current î	A	6.0
Torque constant k_M	Nm/A	0.036
Starting torque M_{max}	Nm	0.22
Detent torque M_S	Nm	0.08
Moment of inertia	kgcm²	0.151
Max. speed of rotation	1/min	5000
Positioning resolution	Inc/rev.	12
Positioning resolution	°	30
Positioning accuracy	Inc.	±1
Mass m	kg	0.8
Shaft load		
• Max. radial force F_R [1]	N	80
• Max. axial force pull F_A	N	30
• Nominal bearing lifetime L_{10h} [2]	h	20000

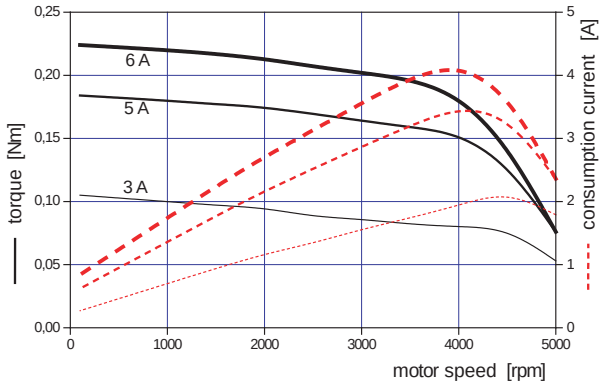
[1] Action point of the radial shaft load: 12.5 mm distance from flange
[2] Operating hours at a probability of failure of 10%

Ambient conditions

Operating temperature as per DIN EN 60721-3-3, Class 3K3	°C	+5 ... +40 (without power reduction)
Storage temperature as per DIN EN 60721-3-1, Class 1K4	°C	-25 ... +55
Transport temperature as per DIN EN 60721-3-2, Class 2K3	°C	-25 ... +70
Installation height without power reduction	m	<1000 above MSL
Vibration strain		sinusoidal, as per DIN EN 60068-2-6
• Acceleration amplitude:	m/s^2	50
• Frequency range	Hz	10 ... 300
• Amplitude	mm	0.35
Continuous shock		semisinusoidal, as per DIN EN 60068-2-27
• Peak acceleration	m/s^2	300
• Duration	m/s	18
Relative humidity		
• Operation	%	5 ... 85
	g/m^3	1 ... 25
• Long-term storage	%	5 ... 95
	g/m^3	1 ... 29
Degree of protection as per DIN EN 60034-5		IP 65 total device except for shaft bushing; IP 41 shaft bushing

Characteristic curves

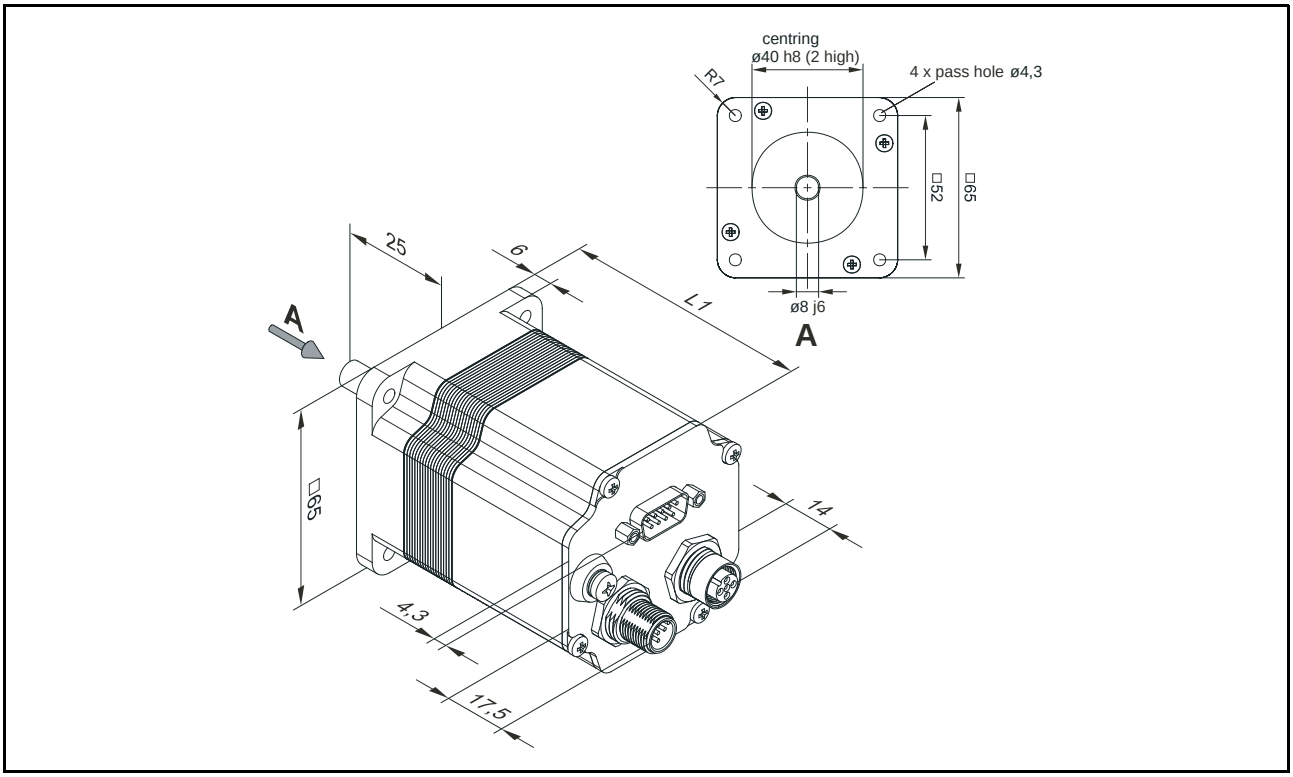
IclA N065 DC024 without gearing



Electrical interfaces

Power supply		reverse-polarity-protected
Nominal power supply range	V_{DC}	19.2 ... 28.8
Ripple at nominal voltage	V	≤3.6
Inrush current	A	Load current for DC bus capacity (500 µF)
24V signal interface		4 signal inputs, 0VDC internally connected with 0VDC supply voltage, reverse-polarity-protected
Permissible low level	V / mA	≤4.5 / ≤0.7
Permissible high level	V / mA	≥15 / ≥2
Admissible voltage range	V	0 ... 30
Signal input debounce time	ms	50 (in manual mode) without debounce (homing movement switch and end position sensors)
CANopen fieldbus interface		CANIn/CANOut - topology
Signal inputs/outputs		according to ISO 11898, no galvanic isolation
Transmission rate	kBaud	10 / 20 / 50 / 100 / 125 / 250 / 500 / 800 / 1000
Transmission protocol		
• Communications profile		DS301 V4.02
• Device profile		DSP 402 V2.0

Dimensional drawings



Dimensional drawing of IclA N065 0-000 without gearing

IclA N065 with spur wheel gearing

Technical data

with spur wheel gearing ...		V-007	V-018	V-038	V-054	V-115
Nominal voltage	V	24	24	24	24	24
Nominal speed	1/min	4000	4000	4000	4000	4000
Nominal output torque	Nm	1.1	2.7	5.8	7.9	12.3
Nominal output speed	1/min	586	225	107	73	35
Nominal output	W	68	64	64	61	45
Nominal current	A	4.43	4.43	4.43	4.43	3.16
Ready-for-operation current	A	0.09	0.09	0.09	0.09	0.09
Max. phase current	A	6.0	6.0	6.0	6.0	4.5
Maximum speed	1/min	733	281	133	92	44
Gear speeds		2	3	3	4	4
Gear efficiency		0.90	0.86	0.86	0.81	0.81
Ratio		430: 63	160: 9	75: 2	490: 9	3675: 32
Torque constant	Nm/A	0.036	0.036	0.036	0.036	0.036
Starting torque	Nm	1.3	3.3	6.9	9.6	15.2
Moment of inertia [1]	g cm²	151	151	151	151	151
Moment of inertia [2]	kg m²	0.0007	0.0048	0.0212	0.0448	0.1992
Detent torque	Nm	0.5	1.3	2.8	4.1	8.6
Positioning resolution	Inc./rev	12	12	12	12	12
Positioning resolution	°	4.40	1.69	0.80	0.55	0.26
Positioning accuracy	Inc.	±1	±1	±1	±1	±1
Mass	kg	1.1	1.2	1.2	1.2	1.2
Number of pole pairs		2	2	2	2	2
Torsional backlash	°	≤1.5	≤1.0	≤1.0	≤1.0	≤1.0
Shaft load						
• Short-term operation						
- Max. radial force [3]	N	200	200	200	200	200
- Max. axial force	N	80	80	80	80	80
- Nominal service life L_{10h} [4]	h	2500	2500	2500	2500	2500
• Continuous operation						
- Max. radial force [3]	N	200	200	200	200	200
- Max. axial force	N	10	10	10	10	10
- Nominal service life L_{10h} [4]	h	15000	15000	15000	15000	15000

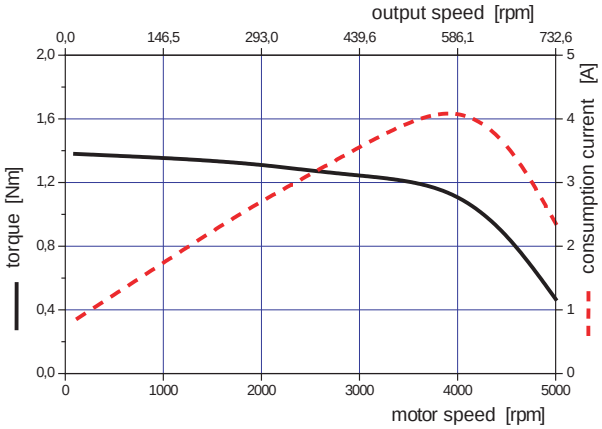
1) With reference to motor shaft
2) with reference to gearing output shaft
3) action point of the radial shaft load: 12.5 mm distance from flange
4) operating hours at a probability of failure of 10%

Ambient conditions

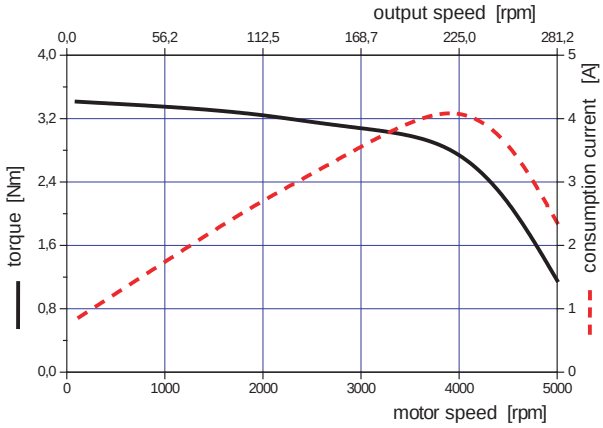
Operating temperature as per DIN EN 60721-3-3, Class 3K3	°C	+5 ... +40 (without power reduction)
Storage temperature as per DIN EN 60721-3-1, Class 1K4	°C	-25 ... +55
Transport temperature as per DIN EN 60721-3-2, Class 2K3	°C	-25 ... +70
Installation height without power reduction	m	<1000 above MSL
Vibration strain		sinusoidal, as per DIN EN 60068-2-6
• Acceleration amplitude:	m/s^2	50
• Frequency range	Hz	10 ... 300
• Amplitude	mm	0.35
Continuous shock		semisinusoidal, as per DIN EN 60068-2-27
• Peak acceleration	m/s^2	300
• Duration	m/s	18
Relative humidity		
• Operation	%	5 ... 85
	g/m^3	1 ... 25
• Long-term storage	%	5 ... 95
	g/m^3	1 ... 29
Degree of protection as per DIN EN 60034-5		IP 65 total device except for shaft bushing; IP 54 shaft bushing

Characteristic curves

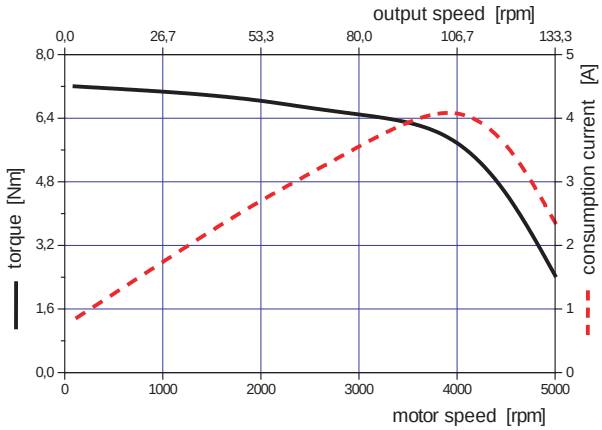
IclA N065 DC024 with spur wheel gearing V-007



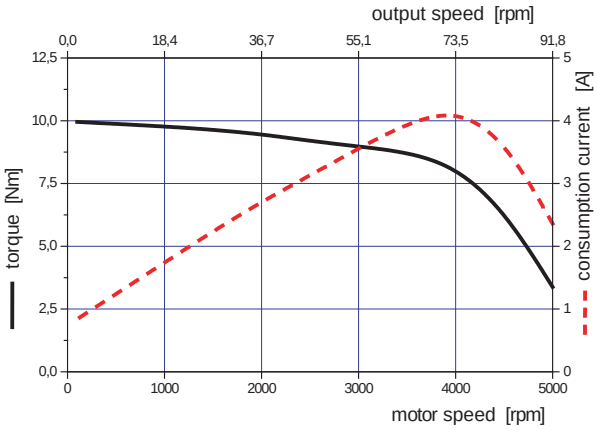
IclA N065 DC024 with spur wheel gearing V-018



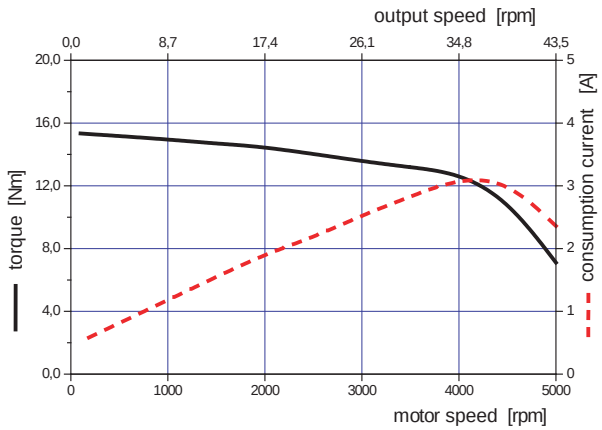
IclA N065 DC024 with spur wheel gearing V-038



IclA N065 DC024 with spur wheel gearing V-054



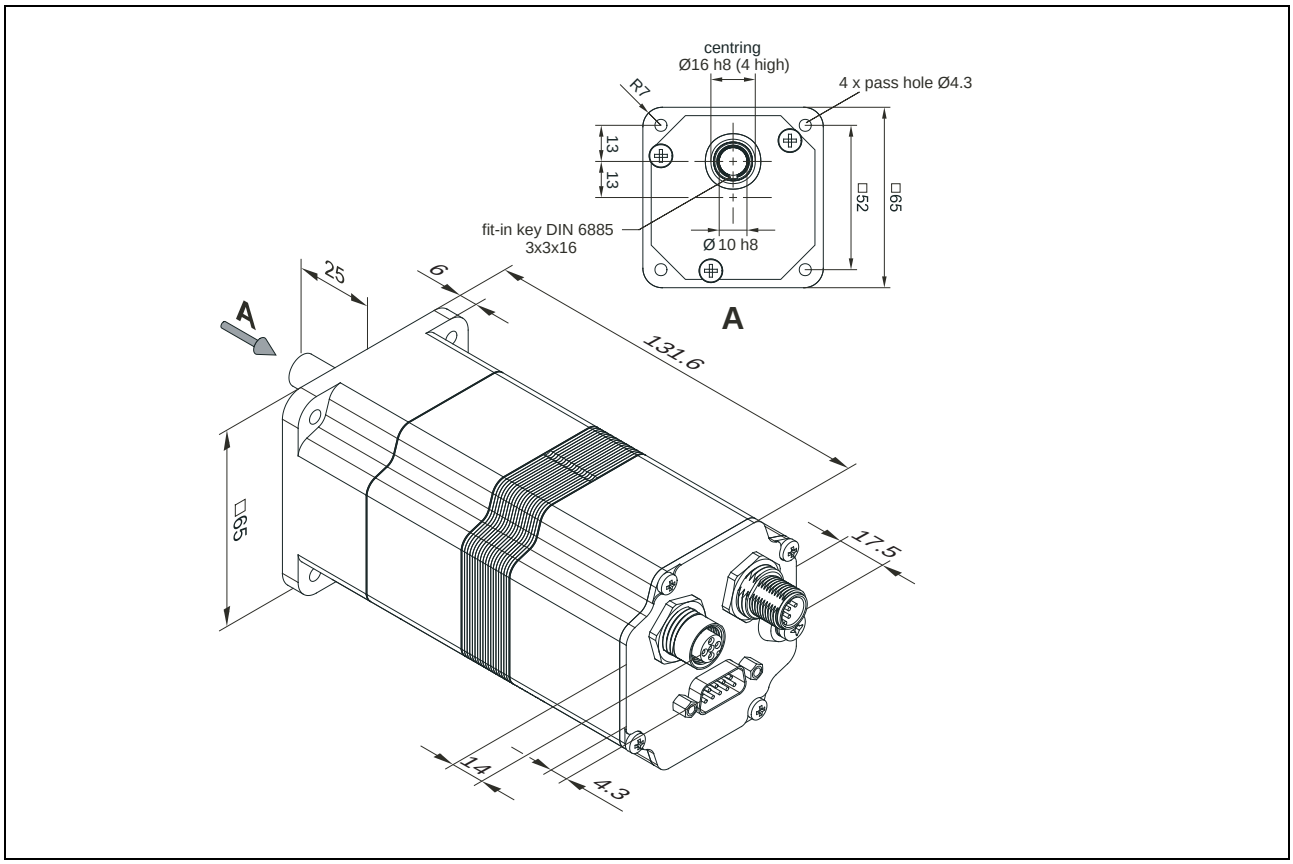
IclA N065 DC024 with spur wheel gearing V-115



Electrical interfaces

Power supply		reverse-polarity-protected
Nominal power supply range	V_{DC}	19.2 ... 28.8
Ripple at nominal voltage	V	≤3.6
Inrush current	A	Load current for DC bus capacity (500 µF)
24V signal interface		4 signal inputs, 0VDC internally connected with 0VDC supply voltage, reverse-polarity-protected
Permissible low level	V / mA	≤4.5 / ≤0.7
Permissible high level	V / mA	≥15 / ≥2
Admissible voltage range	V	0 ... 30
Signal input debounce time	ms	50 (in manual mode) without debounce (homing movement switch and end position sensors)
CANopen fieldbus interface		CANIn/CANOut - topology
Signal inputs/outputs		according to ISO 11898, no galvanic isolation
Transmission rate	kBaud	10 / 20 / 50 / 100 / 125 / 250 / 500 / 800 / 1000
Transmission protocol		
• Communications profile		DS301 V4.02
• Device profile		DSP 402 V2.0

Dimensional drawings



Dimensional drawing of IclA N065 DC024 V-••• with spur wheel gearing

IclA N065 with angular worm gearing

Technical data

with angular worm gearing ...		U-024	U-054	U-092	U-115
Nominal voltage	V	24	24	24	24
Nominal speed	1/min	4000	4000	4000	4000
Nominal output torque	Nm	2.6	6.0	9.2	10.6
Nominal output speed	1/min	168	75	44	35
Nominal output	W	46	47	42	39
Nominal current	A	4.43	4.43	4.43	4.43
Ready-for-operation current	A	0.09	0.09	0.09	0.09
Max. phase current	A	6.0	6.0	6.0	6.0
Maximum speed	1/min	189	93	54	44
Gear speeds		2	3	3	3
Gear efficiency		0.61	0.62	0.56	0.51
Ratio		525: 22	1715: 32	735: 8	3675: 32
Torque constant	Nm/A	0.036	0.036	0.036	0.036
Starting torque	Nm	2.2	5.0	7.8	8.9
Moment of inertia [1]	g cm²	165	150	150	150
Moment of inertia [2]	kg m²	0.009	0.043	0.127	0.198
Detent torque	Nm	2.9	6.5	12.3	16.7
Positioning resolution	Inc./rev	12	12	12	12
Positioning resolution	°	1.26	0.56	0.33	0.26
Positioning accuracy	Inc.	±1	±1	±1	±1
Mass	kg	1.7	1.7	1.7	1.7
Number of pole pairs		2	2	2	2
Torsional backlash	°	≤1.5	≤1.0	≤1.0	≤1.0
Shaft load					
• Max. radial force	N	200	200	200	200
• Max. axial force	N	80	80	80	80
• Nominal service life L_{10h} [3]	h	9000	9000	6000	3000

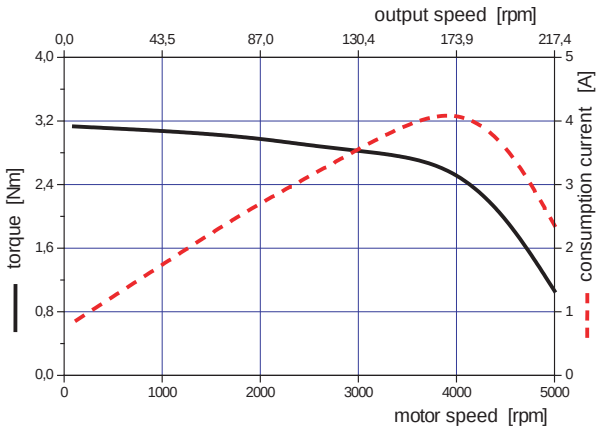
[1] With reference to motor shaft
[2] With reference to gearing output shaft
[3] Operating hours at a probability of failure of 10%

Ambient conditions

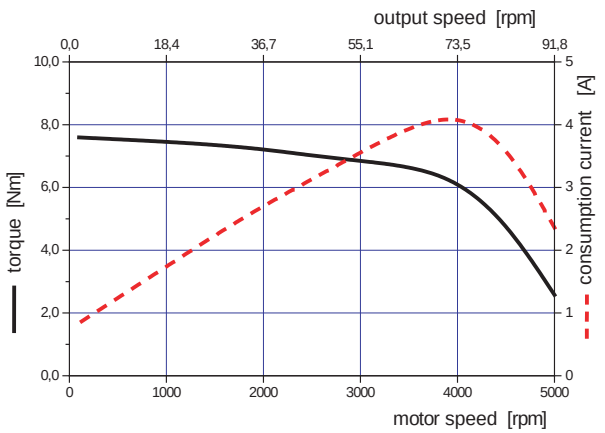
Operating temperature as per DIN EN 60721-3-3, Class 3K3	°C	+5 ... +40 (without power reduction)
Storage temperature as per DIN EN 60721-3-1, Class 1K4	°C	-25 ... +55
Transport temperature as per DIN EN 60721-3-2, Class 2K3	°C	-25 ... +70
Installation height without power reduction	m	<1000 above MSL
Vibration strain		sinusoidal, as per DIN EN 60068-2-6
• Acceleration amplitude:	m/s^2	50
• Frequency range	Hz	10 ... 300
• Amplitude	mm	0.35
Continuous shock		semisinusoidal, as per DIN EN 60068-2-27
• Peak acceleration	m/s^2	300
• Duration	m/s	18
Relative humidity		
• Operation	%	5 ... 85
	g/m^3	1 ... 25
• Long-term storage	%	5 ... 95
	g/m^3	1 ... 29
Degree of protection as per DIN EN 60034-5		IP 65 total device

Characteristic curves

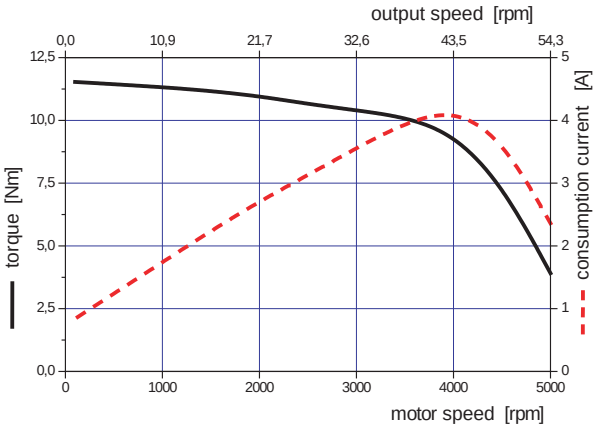
IclA N065 DC024 with angular worm gearing U-024



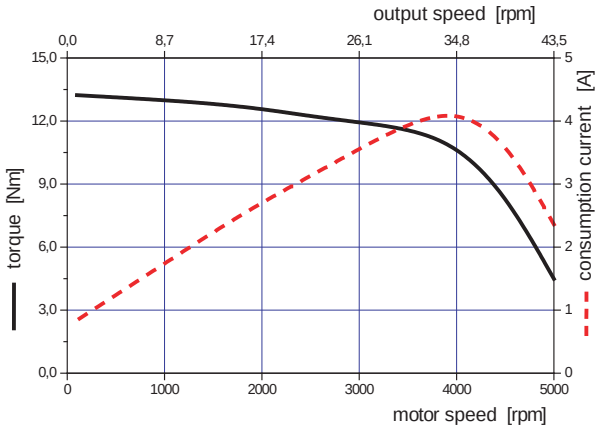
IclA N065 DC024 with angular worm gearing U-054



IclA N065 DC024 with angular worm gearing U-092



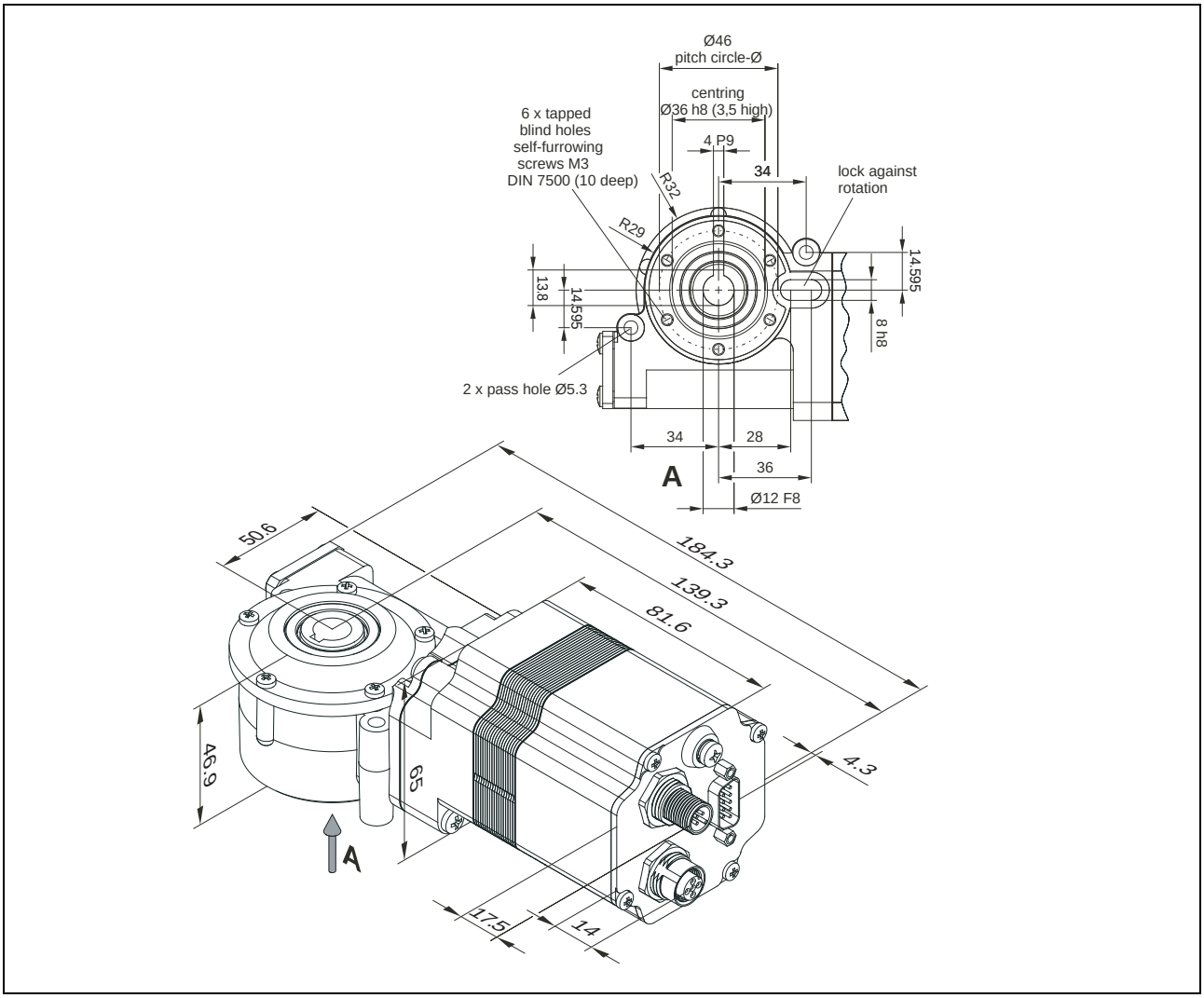
IclA N065 DC024 with angular worm gearing U-115



Electrical interfaces

Power supply		reverse-polarity-protected
Nominal power supply range	V_{DC}	19.2 ... 28.8
Ripple at nominal voltage	V	≤3.6
Inrush current	A	Load current for DC bus capacity (500 µF)
24 V signal interface		4 signal inputs, 0VDC internally connected with 0VDC supply voltage, reverse-polarity-protected
Permissible low level	V / mA	≤4.5 / ≤0.7
Permissible high level	V / mA	≥15 / ≥2
Admissible voltage range	V	0 ... 30
Signal input debounce time	ms	50 (in manual mode) without debounce (homing movement switch and end position sensors)
CANopen fieldbus interface		CANIn/CANOut - topology
Signal inputs/outputs		according to ISO 11898, no galvanic isolation
Transmission rate	kBaud	10 / 20 / 50 / 100 / 125 / 250 / 500 / 800 / 1000
Transmission protocol		
• Communications profile		DS301 V4.02
• Device profile		DSP 402 V2.0

Dimensional drawings



Dimensional drawing of IclA N065 DC024 U-••• with angular worm gearing

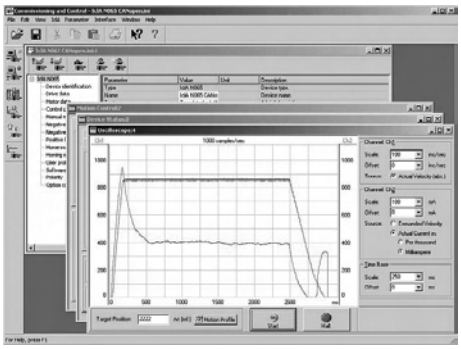
Type code

Example:			**IclA**	**N06**	**5**	**/**	**2**	**DC024**	**V-007**	**K**	**CAN**	**00**
Product family Intelligent Compact Drive IclA			**IclA**	N06	5	/	2	DC024	V-007	K	CAN	00
Size (flange) N06 = 66 mm			IclA	**N06**	5	/	2	DC024	V-007	K	CAN	00
Motor package length 5 = 18 mm			IclA	N06	**5**	/	2	DC024	V-007	K	CAN	00
not used			IclA	N06	5	/	2	DC024	V-007	K	CAN	00
Pole pair count 2			IclA	N06	5	/	**2**	DC024	V-007	K	CAN	00
Supply voltage DC024 = 24VDC			IclA	N06	5	/	2	**DC024**	V-007	K	CAN	00
Supply voltage DC024 = 24VDC			IclA	N06	5	/	2	DC024	**V-007**	K	CAN	00
Gearbox type	Gear ratio		IclA	N06	5	/	2	DC024	**V-007**	K	CAN	00
0- without gearing		0-000										
V - with spur wheel gearing	430:63	V-007										
	160:9	V-018										
	75:2	V-038										
	490:9	V-054										
	3675:32	V-118										
U - with worm gearing	525:22	U-024										
	1715:32	U-054										
	735:8	U-092										
	3675:32	U-115										
Shaft type R = round, smooth shaft K = parallel key (spur wheel gearing only) F = D-shaped shaft (spur wheel gearing only)			IclA	N06	5	/	2	DC024	V-007	**K**	CAN	00
Communication interface CAN = CANopen			IclA	N06	5	/	2	DC024	V-007	K	**CAN**	00
Reserve 00			IclA	N06	5	/	2	DC024	V-007	K	CAN	**00**

Accessories

Software and documentation

IclA CCT commissioning software



The IclA CCT commissioning software supports you when commissioning the IclA N065.
You will require a CAN interface board from IXXAT Automation, a hardware driver for Windows and a licence for the IXXAT CANopen master API, Version 4.0 or compatible, to be able to start the program.

System requirements
Windows NT4 SP3; Windows XP or higher
Pentium 233 MHz or higher
32 MB RAM; 10 MB free hard-disk space

Source
The IclA CCT PC commissioning software and the manuals IclA N065 and Fieldbus IclA CANopen N065 can be found at
www.schneider-electric-motion.com/download

Signal interface

The signal interface is a 9-pin SubD connector supplied by FCT electronic GmbH.

Order data

Designation	Description		Order number
IclA cable for signal interface IP65	with 9-pin sub-D socket for connection to signal interface	5m	**5900000024**
		10m	**5900000034**
		20m	**5900000035**

Accessories for signal interface of IclA N065 are supplied by the following company. When ordering please note the degree of protection of the compact drive (IP 65 recommended):

FCT electronic GmbH
Schatzbogen 13
D-81829 Munich
Telephone: +49 (0) 89 420004-0
Fax: +49 (0) 89 420004-10
Internet: http://www.fct-electronic.de

CAN fieldbus interface

The CAN fieldbus interface consists of a 5-pin M12 flange connector (CAN in) and a 5-pin M12 flange socket (CAN out) supplied by Franz Binder GmbH. If several IclA N065 compact drives are networked with a PLC, a terminating resistor is required. This resistor can be ordered from Hans Turck.

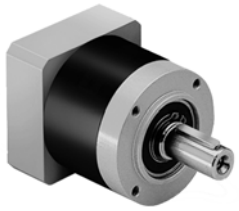
Accessories for the fieldbus interface of the IclA N065 are supplied by the following companies:

Franz Binder GmbH & Co. elektrische Bauelemente KG
Rötelstraße 27
D-74172 Neckarsulm
Telephone: +49 (0) 7132 325 - 0
Fax: +49 (0) 7132 325 - 150
E-mail: info@binder-connector.de
Internet: http://www.binder-connector.de

Hans Turck GmbH & Co. KG
Witzlebenstraße 7
D-45472 Mühlheim an der Ruhr
Telephone: +49 (0) 208 4952-0
Fax: +49 (0) 208 4952-264
E-mail: turckmh@mail.turck-globe.de
Internet: http://www.turck.com

GBX planetary gearboxes

Presentation



In many cases the axis controller requires the use of a planetary gearbox for adjustment of speed of rotation and torque; the accuracy required by the application must be maintained.

Schneider Electric Motion has chosen to use GBX 40 gearbox (made by Neugart) with the IclA N065. These gearbox are lubricated for life and are designed for applications which are not susceptible to mechanical backlash. The fact that their use in combination with IclA N065 has been fully verified and that they are easily assembled, ensures simple, risk-free operation.

The GBX 40 gearboxes are offered in 4 reduction ratios (16:1, 40:1, 60:1, 120:1), see table below.

The values for the continuous torque and the peak torque at standstill which are available at the output shaft, are calculated by multiplying the motor characteristics with the gear ratio and the effi ciency of the gearing (0.94 or 0.90 depending on the reduction ratio).

Technical data GBX 40

Version			Planetary gearbox with straight teeth
Backlash	16:1 ... 40:1	arcmin	< 28
	60:1 ... 120:1		< 30
Torsional rigidity	16:1 ... 40:1	Nm/ arcmin	1.1
	60:1 ... 120:1		1.0
Noise level [1]			58
Casing			Steel, black surface
Shaft material			C 45
Shaft output dust and dump protection			IP 54
Lubrication			Lubricated life
Average service life [2]		h	30000
Mounting position			Any position
Operating temperature		°C	-25 ... +90
Effi ciency	16:1 ... 40:1		0.94
	60:1 ... 120:1		0.90
Maximum permitted radial force [2] [3]	L_{10h} = 10000 h	N	200
	L_{10h} = 30000 h	N	160
Maximum permitted axial force [2]	L_{10h} = 10000 h	N	200
	L_{10h} = 30000 h	N	160
Moment of inertia of gearbox	16:1	kg cm^2	0.022
	40:1	kg cm^2	0.016
	60:1	kg cm^2	0.029
	120:1	kg cm^2	0.029
Continuous output torque [2]	16:1	Nm	20
	40:1	Nm	18
	60:1	Nm	20
	120:1	Nm	18
Maximum output torque [2]	16:1	Nm	32
	40:1	Nm	29
	60:1	Nm	32
	120:1	Nm	29

[1] Value measured at a distance of 1 m, at no-load for a servo motor speed of 3000 rpm and a reduction ratio of 5:1.
[2] Values given for an output shaft speed of 100 rpm in S1 mode (cyclic ratio = 1) on electrical machines for an ambient temperature of 30 °C.
[3] Force applied at mid-distance from the output shaft.

Technical data IclA N065

for operation with planetary gearbox...		1-016	1-040	1-060	1-120
Nominal output	W	71	71	67	63
Nominal current	A	4.43	4.43	4.43	3.85
Ready-for-operation current	A	0.09	0.09	0.09	0.09
Maximum speed [1]	U/min	313	125	83	42
Detent torque	Nm	1.2	3.0	4.5	9.0
Positioning resolution [2]	Inc./U	12	12	12	12
Positioning resolution [1]	°	1.88	0.75	0.50	0.25

1) with reference to gearing output shaft
2) with reference to motor shaft

Order data

Size	Reduction ratio	Reference	Weight kg
GBX 40	16:1, 40:1	GBX 040 ●●● ●●● ●N	0,450
	60:1, 120:1		0,550

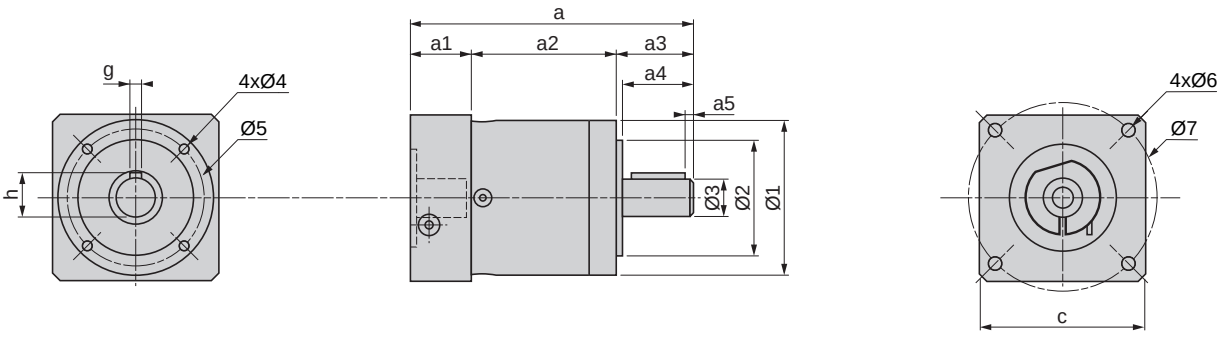
Order code GBX planetary gearboxes

		GBX	●●●	●●●	●●●	●	N
Size	Diameter of the housing	40 mm	040				
Reduction ratio		16:1		016			
		40:1		040			
		60:1		060			
		120:1		120			
Associated intelligent compact drive	Type	IclA N06			N06		
	Motor length [1]	5				5	
Intelligent compact drive adaptation							N

1) See reference of the corresponding intelligent compact drive for possible motor lengths.

Dimensional drawings GBX planetary gearboxes

Mounting at motor side



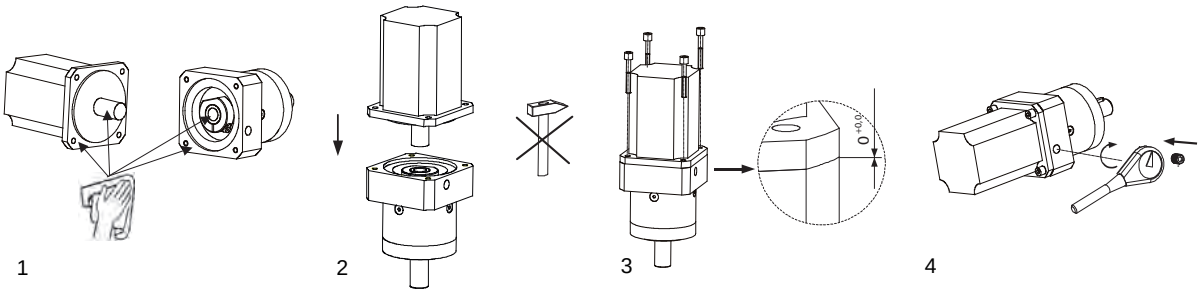
GBX	c	a	a1	a2	a3	a4	a5	h	g	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7
040 016 ... 040	40	106.5	28.5	52	26	23	2.5	11.2	3	40	26 h7	10 h7	M4 x 6	34	M4 x 10	73.5
040 060 ... 120	40	119	28.5	64.5	26	23	2.5	11.2	3	40	26 h7	10 h7	M4 x 6	34	M4 x 10	73.5

Mounting recommendations

Special tools are not required for mounting the GBX planetary gear. Note the following requirements:

1 Clean grease off contact areas and seals.
2 If possible, mount the motor in a vertical position. Fit motor into gearing.
3 Motor fl ange must be in contact with gearing fl ange. Tighten screws crosswise.
4 Tighten clamping ring with torque spanner.

More information can be found in the instructions supplied with the product.



Conversion tables

Rotor inertia

	$lb{\cdot}in^2$	$lb{\cdot}ft^2$	$lb{\cdot}in{\cdot}s^2$	$lb{\cdot}ft{\cdot}s^2$ $slug{\cdot}ft^2$	$kg{\cdot}cm^2$	$kg{\cdot}cm{\cdot}s^2$	$g{\cdot}cm^2$	$g{\cdot}cm{\cdot}s^2$	$oz{\cdot}in^2$	$oz{\cdot}in{\cdot}s^2$
$lb{\cdot}in^2$	–	6.94×10^{-3}	2.59×10^{-3}	2.15×10^{-4}	2.926	2.98×10^{-3}	2.92×10^{3}	2.984	16	4.14×10^{-2}
$lb{\cdot}ft^2$	144	–	0.3729	3.10×10^{-2}	421.40	0.4297	4.21×10^{5}	429.71	2304	5.967
$lb{\cdot}in{\cdot}s^2$	386.08	2.681	–	8.33×10^{-2}	1.129×10^{3}	1.152	1.129×10^{6}	1.152×10^{3}	6.177×10^{3}	16
$lb{\cdot}ft{\cdot}s^2$ $slug{\cdot}ft^2$	4.63×10^{3}	32.17	12	–	1.35×10^{4}	13.825	1.355×10^{7}	1.38×10^{4}	7.41×10^{4}	192
$kg{\cdot}cm^2$	0.3417	2.37×10^{-3}	8.85×10^{-4}	7.37×10^{-6}	–	1.019×10^{-3}	1000	1.019	5.46	1.41×10^{-2}
$kg{\cdot}cm{\cdot}s^2$	335.1	2.327	0.8679	7.23×10^{-2}	980.66	–	9.8×10^{5}	1000	5.36×10^{3}	13.887
$g{\cdot}cm^2$	3.417×10^{-4}	2.37×10^{-6}	8.85×10^{-7}	7.37×10^{-8}	1×10^{-3}	1.01×10^{-6}	–	1.01×10^{-3}	5.46×10^{-3}	1.41×10^{-6}
$g{\cdot}cm{\cdot}s^2$	0.335	2.32×10^{-3}	8.67×10^{-4}	7.23×10^{-5}	0.9806	1×10^{-3}	980.6	–	5.36	1.38×10^{-2}
$oz{\cdot}in^2$	0.0625	4.3×10^{-4}	1.61×10^{-6}	1.34×10^{-6}	0.182	1.86×10^{-4}	182.9	0.186	–	2.59×10^{-3}
$oz{\cdot}in{\cdot}s^2$	24.13	0.1675	6.25×10^{-2}	5.20×10^{-3}	70.615	7.20×10^{-2}	7.06×10^{4}	72	386.08	–

Torque

	lb·in	lb·ft	oz·in	Nm	kg·m	kg·cm	g·cm	dyne·cm
lb·in	–	8.333×10^{-2}	16	0.113	1.152×10^{-2}	1.152	1.152×10^{3}	1.129×10^{6}
lb·ft	12	–	192	1.355	0.138	13.825	1.382×10^{4}	1.355×10^{7}
oz·in	6.25×10^{-2}	5.208×10^{-3}	–	7.061×10^{-3}	7.200×10^{-4}	7.200×10^{-2}	72.007	7.061×10^{4}
Nm	8.850	0.737	141.612	–	0.102	10.197	1.019×10^{4}	1×10^{7}
kg·m	86.796	7.233	1.388×10^{3}	9.806	–	100	1×10^{5}	9.806×10^{7}
kg·cm	0.8679	7.233×10^{-2}	13.877	9.806×10^{-2}	10^{-2}	–	1000	9.806×10^{5}
g·cm	8.679×10^{-4}	7.233×10^{-5}	1.388×10^{-2}	9.806×10^{-5}	1×10^{-5}	1×10^{-3}	–	980.665
dyne·cm	8.850×10^{-7}	7.375×10^{-8}	1.416×10^{-5}	10^{-7}	1.019×10^{-8}	1.0197×10^{-6}	1.019×10^{-6}	–

Power

	H.P.	W
H.P.	–	745.7
W	1.31×10^{-3}	–

Length

	in	ft	yd	m	cm	mm
in	–	0.0833	0.028	0.0254	2.54	25.4
ft	12	–	0.333	0.3048	30.48	304.8
yd	36	3	–	0.914	91.44	914.4
m	39.37	3.281	1.09	–	100	1000
cm	0.3937	0.03281	1.09 x 10-2	0.01	–	10
mm	0.03937	0.00328	1.09 x 10-3	0.001	0.1	–

Rotation

	1/min (rpm)	rad/sec	deg./sec
1/min (rpm)	–	0.105	6.0
rad/sec	9.55	–	57.30
deg./sec	0.167	1.745×10^{-2}	–

Weight

	lb	oz	slug	kg	g
lb	–	16	0.0311	0.453592	453.592
oz	6.35×10^{-2}	–	1.93×10^{-3}	0.028349	28.35
slug	32.17	514.8	–	14.5939	1.459×10^{4}
kg	2.20462	35.274	0.0685218	–	1000
g	2.205×10^{-3}	3.527×10^{-3}	6.852×10^{-5}	0.001	–

Temperature

	°F	°C
°F	–	$(\vartheta - 32) \cdot {}^{5}/_{9}$
°C	$\vartheta \cdot {}^{9}/_{5} + 32$	–

Force

	lb	oz	gf	dyne	N
lb	–	16	453.592	4.448×10^{5}	4.4482
oz	0.0625	–	28.35	2.780×10^{4}	0.27801
gf	2.205×10^{-3}	0.03527	–	980,665	N.A.
dyne	2.248×10^{-6}	3.59×10^{-6}	1.02×10^{-3}	–	0.0001
N	0.22481	3.5967	N.A.	100,000	–

Example for conversion:
Conversion of a 10 inch length measurement into metres. Look for the entry “in” (= inch) in the “Length” table in the left column and the entry “m” (= metre) in the header. The table cell at the point of intersection of the column and the row will show the conversion factor: “0.0254”. Multiply 10 inches by 0.0254 and you will get the value in metres: 10 in x 0.0254 = 0.254 m.

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Photos: Schneider Electric Motion