

IndraDrive for Linear Motion Systems

R310EN 2730 (2007.07)

The Drive & Control Company

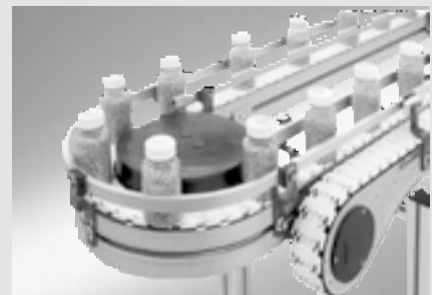
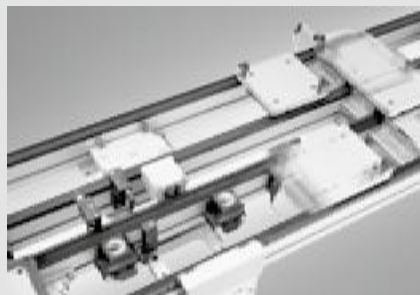
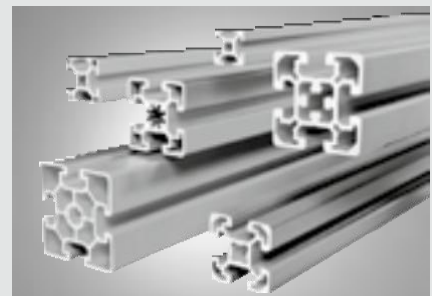
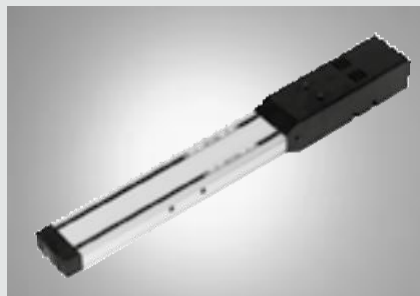
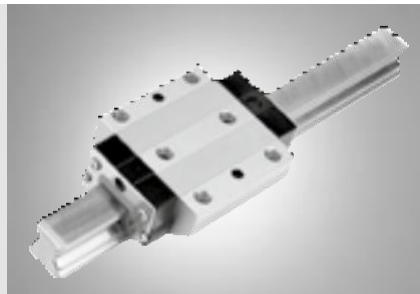
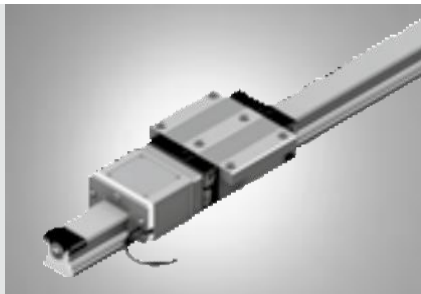


Linear Motion and Assembly Technologies

Ball Rail Systems
Roller Rail Systems
Linear Bushings and Shafts

Precision Ball Screw Assemblies
Linear Motion Systems

Basic Mechanical Elements
Manual Production Systems
Transfer Systems



IndraDrive for Linear Motion Systems

| | |
|--|-----------|
| Product Overview | 4 |
| Motor-Controller Selection Data | 6 |
| Motor Cable Sets | 7 |
| IndraDrive Components and Ordering Data | 8 |
| Dimensions | 10 |
| Order Example | 11 |

Product Overview

Servocontroller IndraDrive C

The intelligent IndraDrive C controller is a compact, versatile servo drive system that can be used to control motion sequences in nearly all areas of automation.

IndraDrive C controllers comprise all the necessary supply and control electronics and are available in several different power ratings.

The HCS power unit and the CSB/CSH control unit are supplied as separate components. A control unit can be integrated into a power unit with any desired power rating, which greatly simplifies warehousing and inventory management.

Tailor-made functionality:

- All standard functions are provided in the basic package.
- Add-on functions can be incorporated as required.
- Industry-specific functionalities available to match different technologies.

Optional safety technology S1

Control units with S1 safety technology offer all the available safety functions, including safe motion and safe absolute position. This safety is assured by two redundant diversity processor systems which perform all relevant calculations separately and monitor each other. The two-channel selection of the required safety function can be executed in different ways.

Servo motor MSK

The servo motors we use for our linear motion systems have an absolute measuring system (Hiperface).

This eliminates the need to perform a homing cycle. The motors are available with or without a brake. The motor shaft is smooth, which is standard practice in servo technology.

Pre-assembled motor and feedback cables

The motor and feedback cables are pre-assembled to facilitate installation.

Start-up software IndraWorks Simple and user-friendly, Rexroth IndraWorks is the ideal engineering environment for all Rexroth electrical control and drive systems.

Documentation

The complete documentation is supplied on DVD, which saves both costs and space.

IndraDrive servo controller
consisting of:

- Power unit HCS and
- Control unit CSB/CSH



Servo motorMSK



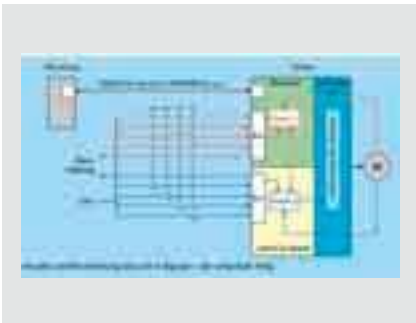
Start-up software IndraWorks Drive



CSB/CSH control unit for integration in the HCS powerunit



Pre-assembled motor and feedback cables

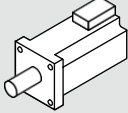



Optional safety technology

Motor-Controller Selection Data

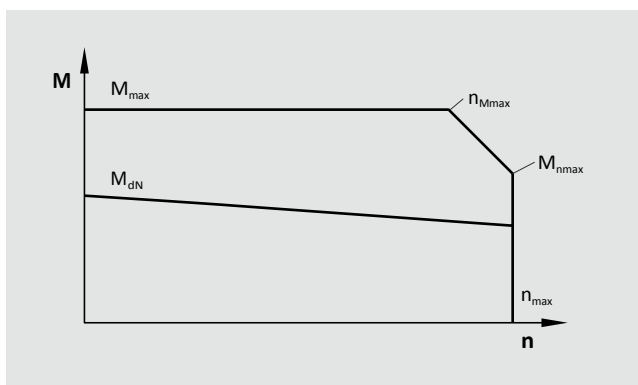
Servo drives with rotary motors

- 400 ms acceleration time
- 60 Kelvin overtemperature
- PWM 4 kHz
- 3x400V -5%, data for natural convection cooling

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|------------------|------------------------|---|---|----------------------|----------------------|----------|-----------|------------|---------------------|---------------------|----------|-------|----------|
| Comparable MKD.. | Motor mount compatible | Motor MSK Digital servo motor | Power section: Converter for 1 axis with direct mains connection via mains filter | n_{max} | n_{Mmax} | M_{dN} | M_{max} | M_{nmax} | J_M | J_{Br} | M_{Br} | m_M | m_{Br} |
| | |  |  | (min ⁻¹) | (min ⁻¹) | (Nm) | (Nm) | (Nm) | (kgm ²) | (kgm ²) | (Nm) | (kg) | (kg) |
| 25 | Yes | MSK030C-0900 | HCS02.1E-W0012 | 9000 | 9000 | 0.8 | 4 | 4 | 0.00003 | 0.000007 | 1 | 2.10 | 0.25 |
| 41 | Yes | MSK040C-0600 | HCS02.1E-W0012 | 5600 | 4043 | 2.4*) | 7.7 | 3.9 | 0.00014 | 0.000023 | 4 | 3.60 | 0.32 |
| - | No | MSK050C-0600 | HCS02.1E-W0028 | 5700 | 4332 | 5 | 15 | 8.2 | 0.00033 | 0.000107 | 5 | 5.40 | 0.70 |
| 71 | No | MSK060C-0600 | HCS02.1E-W0054 | 5200 | 3187 | 8 | 24 | 11.2 | 0.00080 | 0.000055 | 10 | 8.40 | 0.45 |
| 71 | Yes | MSK061C-0600 | HCS02.1E-W0028 | 4800 | 4150 | 7.6*) | 26.7 | 15.2 | 0.00075 | 0.000059 | 10 | 8.40 | 0.40 |
| - | No | MSK070E-0450 | HCS02.1E-W0070 | 3900 | 3482 | 23*) | 57.5 | 40.1 | 0.00458 | 0.000300 | 23 | 16.20 | 1.60 |
| 90 | Yes | MSK076C-0450 | HCS02.1E-W0054 | 4500 | 3510 | 11.8*) | 42.9 | 20.2 | 0.00430 | 0.00036 | 11 | 14.00 | 1.10 |

*) limited by continuous current of controller

- n_{max} = maximum usable motor speed
- n_{Mmax} = usable speed at maximum torque
- M_{dN} = continuous torque at standstill
- M_{max} = maximum torque usable up to n_{Mmax} and up to 400 ms
- M_{nmax} = maximum torque at maximum usable speed
- J_M = rotor moment of inertia of motor
- J_{Br} = rotor moment of inertia of brake
- M_{Br} = holding torque of holding brake when switched off
- m_M = mass of motor
- m_{Br} = mass of brake



Standard motors for linear motion technology, with multiturn Hiperface, with and without brake (absolute measuring system)

| Without holding brake | |
|-----------------------|-----------------------------|
| Part number | Motor |
| R347108403 | MSK030C-0900-NN-M1-UG0-NNNN |
| R347108603 | MSK040C-0600-NN-M1-UG0-NNNN |
| R347108803 | MSK050C-0600-NN-M1-UG0-NNNN |
| R347109003 | MSK060C-0600-NN-M1-UG0-NNNN |
| R347109403 | MSK061C-0600-NN-M1-UG0-NNNN |
| R347109203 | MSK076C-0450-NN-M1-UG0-NNNN |

| With holding brake | |
|--------------------|-----------------------------|
| Part number | Motor |
| R347108503 | MSK030C-0900-NN-M1-UG1-NNNN |
| R347108703 | MSK040C-0600-NN-M1-UG1-NNNN |
| R347108903 | MSK050C-0600-NN-M1-UG1-NNNN |
| R347109103 | MSK060C-0600-NN-M1-UG1-NNNN |
| R347109503 | MSK061C-0600-NN-M1-UG1-NNNN |
| R347109303 | MSK076C-0450-NN-M1-UG1-NNNN |

Motor Cable Sets

Technical data

| | Power cable | | Feedback cable |
|----------------------------|--------------|--------------|----------------|
| | R1130-001-17 | R1130-001-15 | |
| Diameter (mm) | 12.0 ±0.5 | 12.2 ±0.5 | 8.8 ±0.3 |
| Minimum bending radius | | | |
| – for fixed installation | 60.0 | 61.0 | 44.0 |
| – for flexing installation | 90.0 | 91.5 | 66.0 |
| Spec. cable weight (kg/m) | 0.225 | 0.245 | 0.11 |

Chemical properties:


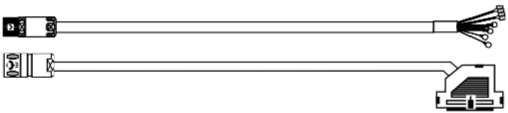
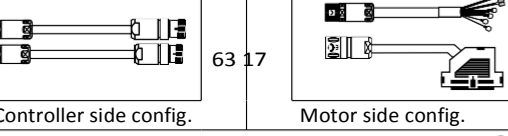
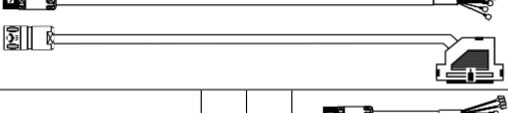
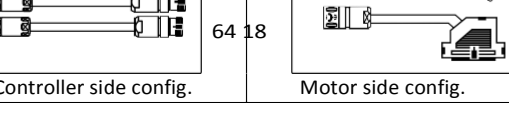
Resistant to most mineral oils and greases, resistant to hydrolysis, silicon-free, halogen-free.

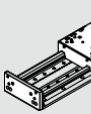
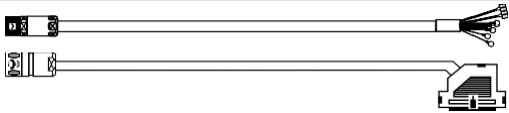
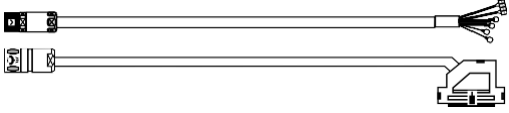
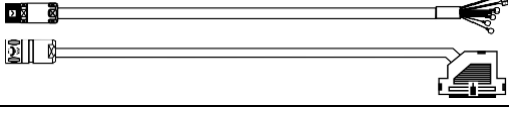
Cable surface:

Low-adhesion, prevents sticking in cable drag chains.

Protection class, when properly installed: IP 65


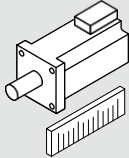

- Permissible ambient temperature in operation: –20 °C to +40 °C
- Maximum cable length: 75 m
- Power and feedback cables fully shielded

| Ordering code for MSK cable sets | | | | |
|---|--------------------------|---|--|-----------------|
|  | Part number Cable set | Cable set options Cable pre-assembly | | For converter |
| | | Motor side | Controller side | |
| MSK030 MSK040 MSK050 MSK060 MSK061 MSK076 | R113000117 | 17 |  | 19 HCS02 12/28A |
| | | 63 17 |  | 18 HCS02 54/70A |
| MSK070 | R113000115 | 18 |  | 26 HCS02 54/70A |
| | | 64 18 |  | |

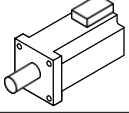
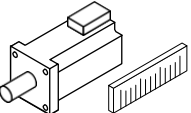
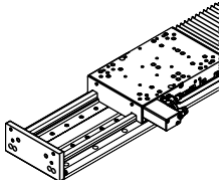

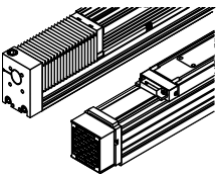
| Ordering code for TKL cable sets | | | | |
|---|--------------------------|---|--|-----------------|
|  | Part number Cable set | Cable set options Cable pre-assembly | | For converter |
| | | Motor side | Controller side | |
| MLP040 | R113000118 | 01 |  | 10 HCS02 12/28A |
| MLP070 | R113000126 | 02 |  | 11 HCS02 54/70A |
| | | | | 12 HCS03 150A |
| MLP100 | R113000141 | 03 |  | 12 HCS03 150A |

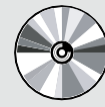
Note: MKL, LKL, and CKL linear modules come complete with cable sets.
There is no need to order motor cable sets separately.

IndraDrive Components and Ordering Data

| Power supply (mains filter, brake resistor) | | Power unit | | |
|---|--|--|--------------------------|--|
|  | |   | | |
| Connection voltage, rated current | Mainsfilter/choke/brake resistor Part number | For motor | Power unit type | Power unit with connection accessories Part number |
| 1x230V 10A | Mains filter R347700106 | MSK030C MSK040C | HCS02.1E-W0012-A-03-NNNN | R113001561 |
| 3x400V 7A | Mains filter R113089615 | | | |
| 3x400V 16A | Mains filter R113089616 | MSK050C MLP040A MLP040B LDxxxx LMxxx-x | HCS02.1E-W0028-A-03-NNNN | R113001562 |
| 3x400V 30A | Mains filter R113089617 | MSK060C MSK076C | HCS02.1E-W0054-A-03-NNNN | R113001563 |
| | | MSK070E | HCS02.1E-W0070-A-03-NNNN | R113001564 |
| 3x400V 30 ampere or application- dependent! | e.g. mains filter R113089617 + brake resistor R113089680 or application-dependent! | MLP070A MLP070B MLP100A | HCS03.1E-W0070-A-05-NNBV | R113001565 |
| 3x400V 106 ampere or application- dependent! | e.g. mains filter with inte- grated mains choke HNK R113089688 + brake resistor R113089680 or application-dependent! | MLP100B MLP100C | HCS03.1E-W0150-A-05-NNBV | R113001566 |

Other control units available on request

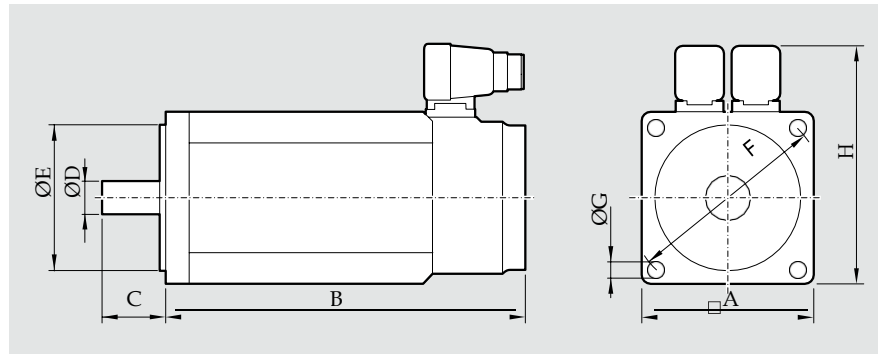
| Control unit | | Part number | | | | | | | Standard R1130015.. | | | Optional safety technology S1 | | |
|---|--|-------------|-----------------------------------|--|-----------------------------------|--------------------------|----------|----------|---------------------|----------|-----------------------------------|--------------------------------------|----------------------|--------|
| For motor | Encoder interface | Type | | Analog | Profibus | SercosII | Parallel | Profibus | Sercos | Parallel | Start-up software IndraWorks D | Interface cable for PC controller | Documentation DVD | |
| | | ENS for MSK | ENS + EN2 for MSK + encoder ~1Vpp | EN2 for TKL with ENDat 2.1 TKL with ~1Vpp | CKL (parameter input by customer) | EN2 + EN1 for LKL MKL | R...39 | R...40 | R...42 | R...48 | | | | R...41 |
|  | ENS for MSK | | | | | | | | | | R113540030 | R113069541 | R113089543 | |
|  | ENS + EN2 for MSK + encoder ~1Vpp | | | | | | | | | | | | | |
|  | EN2 for TKL with ENDat 2.1 TKL with ~1Vpp | | | | | | | | | | | | | |
|  | CKL (parameter input by customer) | | | | | | | | | | | | | |
|  | EN2 + EN1 for LKL MKL | | | | | | | | | | | | | |



Dimensions

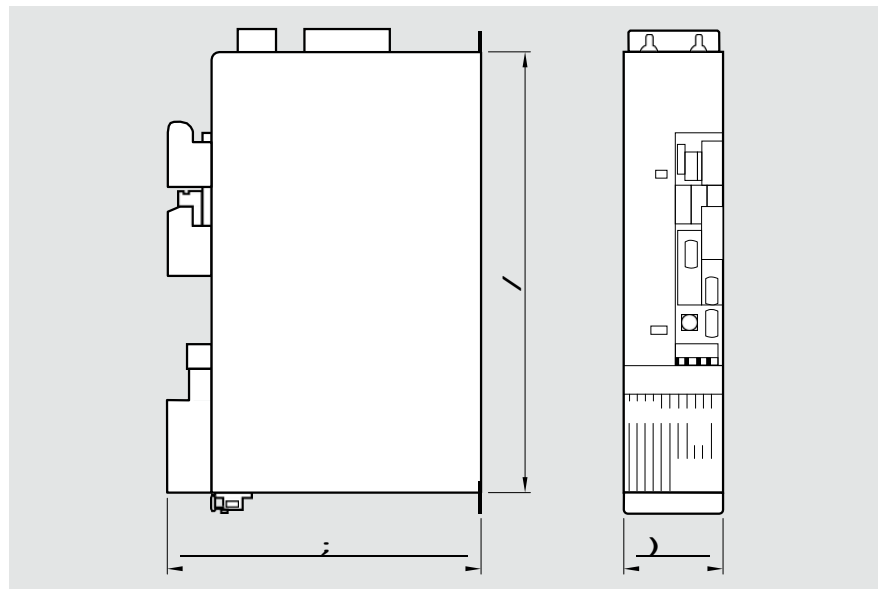
Motor dimensions

| Motor | Dimensions (mm) | | | | | | | | |
|---------------------|-----------------|-----------------|---------------|------|------|-------|-------|------|-------|
| | A | B with brake | Bw/o brake | C | Ø D | Ø E | Ø F | Ø G | H |
| MSK030C-0900 | 54.0 | 213.0 | 188.0 | 20.0 | 9.0 | 40.0 | 63.0 | 4.5 | 98.5 |
| MSK040C-0600 | 82.0 | 215.5 | 185.5 | 30.0 | 14.0 | 50.0 | 95.0 | 6.6 | 124.5 |
| MSK050C-0600 | 98.0 | 233.0 | 203.0 | 40.0 | 19.0 | 95.0 | 115.0 | 9.0 | 134.5 |
| MSK060C-0600 | 116.0 | 259.0 | 226.0 | 50.0 | 24.0 | 95.0 | 130.0 | 9.0 | 156.0 |
| MSK061C-0600 | 116.0 | 264.0 | | 40.0 | 19.0 | 95.0 | 130.0 | 9.0 | 156.0 |
| MSK070E-0450 | 140.0 | 298.0 | | 58.0 | 32.0 | 130.0 | 165.0 | 11.0 | 202.0 |
| MSK076C-0450 | 140.0 | 292.5 | | 50.0 | 24.0 | 110.0 | 165.0 | 11.0 | 180.0 |



Controller dimensions

| Controller dimensions | Converter | | | | | |
|-----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | HCS02.1E- W0012 | HCS02.1E- W0028 | HCS02.1E- W0054 | HCS02.1E- W0070 | HCS03.1E- W0070 | HCS03.1E- W0150 |
| Width W (mm) | 65.0 | 65.0 | 105.0 | 105.0 | 125.0 | 225.0 |
| Height H (mm) | 290.0 | 352.0 | | | 440 | |
| Depth D (mm) | 265.0 | | | | 315 | |
| Weight (kg) | 2.9 | 3.8 | 6.7 | 6.8 | 13 | 20 |



Order Example

Motor with motor cable set and servo controller system for two axes

| Qty | Description | Part number |
|-----|---|--|
| 2 | MSK050C | R3471 089 03 (can also be selected as an axis option) |
| 2 | Cable set, length 5 m (pre-assembled for MSK and HCS02-0012/0028) | R1130 001 17 /17/19 Length 5 m |
| 1 | Mains filter 7A, 3x400V AC | R1130 896 15 |
| 2 | Servo controller HCS02.1E-W0028 | R1130 015 62 |
| 2 | Control unit BASIC Profibus DP | R1130 015 40 |
| 1 | Software IndraWorks Drive | R1135 400 30 |
| 1 | Documentation on DVD | R1130 895 43 |
| 1 | Interface cable | R1130 695 41 |

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Your sales partner

Subject to technical modifications